

# Environment Agency Permitting Decisions

## Bespoke permit for accumulation and disposal of radioactive waste

### Executive Summary

1. As the leading organisation working to protect the environment, it is the Environment Agency's role to regulate discharges and waste disposals from non-nuclear premises in England and to ensure their impact on air, water and land is minimised.
2. Based on our recent experience, authorising the production of oil and gas is the area of regulation that has the highest profile and the greatest perceived uncertainties.
3. This decision document summarises our detailed assessment of an application to manage the radioactive waste arising as a result of prospecting for oil and gas in a particular area. We have decided to grant a permit for radioactive waste management to IGas Energy Development Limited at the Larkwhistle Farm Site, Crawley Down, Hampshire, SO21 2RG

### About this decision document

4. This document, which accompanies the permit, is our record of our decision-making process, to show how we have taken into account all relevant factors in reaching our decision.

### Preliminary information

5. The number we have given the permit is EPR/NB3692DA refer to the permit as “the **Permit**” in this document.
6. We gave the application the reference number EPR/NB3692DA /A001. We refer to the application as “the **Application**” in this document.
7. The Applicant is IGas Energy Development Limited. We refer to IGas Energy Development Limited as “the Applicant” in this document. Where we are talking about what would happen after the Permit is granted, we call IGas Energy Development Limited “the Operator”.
8. The site for the proposed radioactive substances activity (the accumulation and disposal of radioactive waste) is at Larkwhistle Farm Site, Crawley Down, Hampshire, SO21 2RG (‘the premises’). We are satisfied following additional information supplied by the operator on 7/11/17 and 17/11/17 that the three wells shown on the premises have a technical link and are considered to be part of the same premises shown in schedule 5 of the permit. (the three wells are drilled into the same strata and produced water reinjection at the Larkwhistle Farm well will aid oil production at the other two wells by flushing oil towards these wells for extraction.)

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9. The Application was duly made on 18/09/2017. This means we considered it was in the correct form and contained sufficient information for us to begin our determination.

## Use of terms

### *Drilling muds*

10. Are used to lubricate the wellbore while drilling.

### *Drill cuttings*

11. Are broken bits of solid material naturally occurring underground and removed from a borehole as part of the drilling process into underground formations.

### *EPR*

12. The Environmental Permitting (England & Wales) Regulations 2010 and the amendments made to radioactive substances regulation in the Environmental Permitting (England & Wales) (Amendment) Regulations 2011 are referred to together as "the EPRs". References to schedules or paragraphs in EPR are to the schedule or paragraph currently in force. Radioactive substances activities have to meet the requirements set out in Schedule 23 of the EPRs. The current version of Schedule 23 is contained in the 2011 Regulations. EPR permits for radioactive substance activities are referred to as RSR permits.

### *Flowback fluids*

13. Fluid contaminated with minerals and NORM returned to the surface during and following well stimulation

### *NORM*

14. Is "naturally occurring radioactive material" derived from the radioactive decay of uranium and thorium naturally present in rocks since their formation. NORM will contain many different radioactive materials in differing amounts from the radioactive decay of uranium and thorium, with radium 226 and radium 228 typically the radioactive materials of most significance in produced waters.

The production of oil and gas is a NORM industrial activity which requires a radioactive substances activity permit for the accumulation and disposal of radioactive waste.

### *Produced water*

15. The water naturally present in some hydrocarbon-bearing strata that is brought up during the extraction of oil and gas.

### *Radiation dose*

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16. The total amount of radiation absorbed by material or human tissues, expressed in sieverts (Sv). The average annual dose from all sources of radiation in the UK (including from radon and medical procedures) is 2.6 millisieverts per year.

## *Regulated facility*

17. This is the term used in the Environmental Permitting (England and Wales) Regulations. Those regulations provide that any regulated facility must be operated only under and in accordance with an environmental permit.

## *Well stimulation fluids*

18. Fluids, often water, mixed with additives used to encourage more oil and gas to flow from a particular rock formation

## Brief outline of the process

19. The application was made for a permit for the management of radioactive waste resulting from the NORM industrial activity of production of oil and gas. The produced water which arises with the oil extracted will contain NORM in sufficient quantities to be classed as radioactive waste. Solid wastes such as pipeline scale and sediment may also contain NORM in sufficient quantities to be classed as radioactive waste. The permit also recognises that a residual layer of fluids from the process, which may contain NORM, may remain in the area adjacent to the wellbore. This would constitute a disposal of radioactive waste, occurring in the area of or immediately adjacent to the well. This disposal has been taken into account in our decision.
20. The produced water (whilst accumulated on the premises), drill cuttings, spent drilling muds and other fluids and waste gases arising from the production of oil and gas are considered to be extractive waste and as such fall under the Mining Waste Directive. The activity of managing these extractive wastes is classified as a mining waste operation with no mining waste facility and will also be regulated by the Environment Agency by means of a separate permit subject to the EPRs; reference EAWML 104409.

## Record of decision

21. We have decided to grant the permit specified below.  
The permit number is EPR/NB3692DA

The applicant is IGas Energy Development Limited

The facility is located at Stockbridge Oilfield, Larkwhistle Farm Site, Crawley Down, Hampshire, SO21 2RG

The decision is effective from 11/07/2019

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22. We consider in reaching that decision we have taken into account all relevant considerations and legal requirements and that the permit will ensure the appropriate level of protection of people and the environment. These considerations and legal requirements are set out in the published government and Environment Agency guidance supporting the EPRs.

## Reasons for our decision

23. Unless specified otherwise below, we have accepted the applicant's proposals.

## Justification

24. Justification is the process by which Government decides whether types of practices involving radiation are acceptable, as set out in The Justification of Practices Involving Ionising Radiation Regulations 2004 (the Regulations'). Further information is in Government guidance available at:  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/48980/Justification\\_of\\_Practices\\_on\\_Ionising\\_Regulationsguidance.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48980/Justification_of_Practices_on_Ionising_Regulationsguidance.pdf).
25. We conclude that justification is not required in this case because the radioactive substances activity being carried out is not a "practice" as defined in the Regulations, where the radioactive material is being exploited for its fissile or fertile properties. The radioactive waste arises from natural radioactivity present in the rocks being unavoidably displaced by the permitted operations.

## Operator and operator competence

26. We are satisfied that the applicant is the person who will have control over the operation of the facility after we grant the permit in line with our [Regulatory Guidance Note RGN 1: Understanding the meaning of Operator \(version 4.0\)](#).  
The initial application was made in the name of Island Gas limited during the determination the applicant re-applied in the name of IGas Energy Development Limited the proposed operating techniques and management systems remained unchanged as a result of this application.
27. We have assessed the operator's management arrangements against our guidance (see <https://brand.environment-agency.gov.uk/mb/DzM3jp>). Having considered the information submitted in the application, we are satisfied that appropriate management systems and management structures will be in place. Also they ensure that accidents are prevented but that, if they should occur, their consequences are minimised.  
We have not identified any reasons indicating that the operator will be unable to operate in accordance with the permit.

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## Disposal of radioactive waste – optimisation

28. The principle of optimisation is that all reasonable efforts be made to reduce radiation doses (social and economic factors being taken into account) to as low as reasonably achievable (ALARA). Optimisation is one of the three principles of radiation protection, the others being justification (see above) and limitation. In the case of the potential for public exposure to radiation from activities involving radioactive substances optimisation in waste management including disposals to the environment is required.
29. We have assessed the operator's proposals against our guidance on 'best available techniques' BAT (see <https://brand.environment-agency.gov.uk/mb/DECqof>) to minimise radioactive waste creation and disposals, minimise the time over which radioactive waste is accumulated, and select appropriate disposal routes.
30. We are satisfied that the operator has demonstrated that the best available techniques will be used to minimise the creation of radioactive waste and the activity in and volume of radioactive waste to be disposed of.
31. The operator considered various different disposal routes for the aqueous waste. We are satisfied that the selected route, reinjection to strata adjacent to the well borehole at the installation represents BAT. Transfers of solid radioactive waste to suitably permitted sites also represents BAT.

32.

### Disposal routes and permit limits

The operator has contracts in place for any proposed disposal from the premises, copies of contracts supplied as additional information to the permit application on 17/11/17 and saved onto EDRM

33. Permit conditions specify certain key measures for this type of process to protect members of the public and the environment. We have used the relevant generic conditions from our bespoke permit template along with other process-specific conditions to ensure that the permit provides the appropriate standards of environmental protection.
34. Our generic conditions allow us to deal with common regulatory issues in a consistent way and help us to be consistent across the different types of radioactive substance activities.
35. The permit limits the length of time that the solid and aqueous waste can be stored to three months and the maximum activity in the accumulated waste to 30 MBq Ra-226. (The limits set are the same as those set in the standard rules permit, the max calculated value based on a maximum storage capacity for aqueous waste on site of 27 cubic meters and the historic measured levels of NORM in produced water being 0.26 MBq. The operator originally requested limits for two entries for Ra226 this was later adjusted to the limits set in the permit when clarified under additional information supplied on 7/11/17).

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36. The operator was asked to demonstrate that they had contracts in place or could readily put contracts in place for the disposal by transfer of aqueous and solid waste. The operator provided evidence that contracts could be readily put in place.

## Assessment of the radioactivity in discharges and disposals

37. We are satisfied that the operator has identified appropriate measures to assess the radioactivity in discharges and disposals on and from the premises.
38. We are requiring the operator to sample and analyse any accumulated produced water and any solid waste that is generated.

## Radiological assessment

39. The operator has not had to assess the radiological impacts of any transfers of radioactive waste to another operator, for example the transfer of aqueous waste to a waste disposal operator for treatment and disposal. This is because we have assessed the impacts of disposals from the waste disposal operators when we issued their permits.
40. The operator has not had to assess the radiological impacts of any fluids that are left underground because there is no pathway that could lead to the radiological exposure of members of the public or the environment from such disposals.
41. The waste gas that is vented from tank relief valves may contain small quantities of entrained NORM, and so the permit allows for the disposal of gaseous waste to air. We have assessed the environmental and health impacts of NORM in flared and vented gas and found it to be negligible.
42. We are satisfied that the authorised accumulation and disposals of radioactive waste will not give rise to any dose exceeding the public dose limit of 1000 microsievarts per year, and the source dose constraint of 300 microsievarts per year.
43. We are satisfied that reference flora and fauna would be exposed to a maximum dose-rate within our guideline value of 40 micrograys per hour. The discharges will thus have no significant adverse impact on a European site, SSSI or AONB.

## Consultation and Web Publicising

44. Consultation commenced on: 03/10/2017

Consultation ended on: 23/10/2017

A second consultation in the name of IGas Energy Development Limited commenced on 04/01/18 and ends on 05/02/18

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45. We advertised the Application by a notice placed on our website, which contained all the information required by the regulations, including telling people where and when they could see a copy of the Application.
46. We placed a paper copy of the Application and all other documents relevant to our determination on our Public Register at The Environment Agency, Goldcrest House, Alice Holt Lodge, Farnham, Surrey, GU10 4LH (no paper public register – EDRM used). Anyone wishing to see these documents could do so and arrange for copies to be made.
47. Further details along with a summary of consultation comments and our response to the representations we received can be found in Annex 1. We have taken all relevant representations into consideration in reaching our determination.

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## Annex 1: Consultation and web publicising

48. Summary of responses to consultation and web publication and the way in which we have taken these into account in the determination process.

No responses were received during the consultation periods.



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