

Dear Mr Wilkinson

Thank you for your queries in the recent emails to my colleague Gavin Thomson concerning the steps we would take to limit the risks to you from radiation from the existing and proposed nuclear power stations at Sizewell.

The Environmental Permitting Regulations 2016 (EPR16) place a legal duty on the Environment Agency to exercise its relevant functions to ensure that radiation exposures of the public resulting from the disposal of radioactive waste are:

- as low as reasonably achievable (ALARA) taking social and economic factors into account; and
- do not exceed 1 milliSievert (mSv) per year.

We are also required, at the planning stage (when permits for radioactive waste disposal are determined), to have regard to a maximum dose constraint of 0.3 mSv per year for a single source and a maximum dose constraint of 0.5 mSv per year for a single site.

You asked about the use of the one in a million per year risk criterion. The limits and constraints associated with our regulation of radioactive waste disposals during the operational phase, as explained above, are not expressed in terms of risk but in terms of radiation dose. Monitoring programmes are in place to check that doses being received by those most exposed are not exceeding these standards and are ALARA.

As addressed in our previous response, one area where we do use a risk criterion, as part of a suite of requirements, is when assessing the future performance of solid waste disposal facilities in the period after those facilities have closed and are no longer subject to the permitting regime. Here we would use a risk guidance level of one in a million per year.

In your letter of 5 June you suggest that a relative risk coefficient of 0.5 per Sievert (International Commission on Radiological Protection (ICRP) Publication 103 Table A.4.6) might be more appropriate to use when calculating risk. We are advised by Public Health England (PHE) that this is not appropriate in the evaluation of population level risks as it represents the risk of an incident cancer for a specific case. Risk coefficients will vary with age at exposure, attained age and sex.

Public Health England has advised on the application of ICRP Publication 103<sup>1</sup> in the UK. Table 3.1 in this publication shows that the most appropriate risk coefficient to estimate lifetime detriment is 0.057 per Sievert, our guidance is in accordance with this advice<sup>2</sup>.

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<sup>1</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/335097/RCE-12\\_for\\_website\\_v2.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/335097/RCE-12_for_website_v2.pdf)

<sup>2</sup> <https://www.gov.uk/government/publications/geological-disposal-facilities-on-land-for-solid-radioactive-wastes>

The radiological risks to the public from aspects of the operation of nuclear installations other than radioactive waste disposal are a matter for the Office for Nuclear Regulation.

The requirements in EPR16 reflect the wider radiation protection framework as recommended internationally by the ICRP. The current framework (based upon ICRP's 1990 recommendations in Publication 60) is enacted in EU legislation in the Basic Safety Standards Directive (BSSD - 96/29/EURATOM), which is implemented, in part, through EPR16. The potential risks from low dose radiation are considered when setting the dose constraints and dose limit in EPR16. The revised BSSD 2013 (2013/59/EURATOM), to be transposed by Member States by 2018, takes account of ICRP's most recent set of recommendations in Publication 103 in 2007.

The permits for radioactive waste disposal that we issue under EPR16 include a number of mechanisms to ensure the above requirements are met. These include:

- setting legal limits on discharges;
- requiring the use of best available techniques (BAT) to avoid or minimise waste arisings, and to dispose of unavoidable waste in ways that minimise radiological impacts;
- carrying out prospective assessment of doses from planned discharges;
- requiring monitoring and accountancy of discharges; and
- requiring monitoring of the environment and the assessment of doses actually received by those most highly exposed. An independent monitoring and assessment programme is also carried out (see below).

One consequence of the legal requirement to use 'best available techniques' to minimise disposals and the impact of disposals is that radiation doses to the most exposed individuals can be expected to be well below the dose limit and dose constraints.

Any operator who wishes to apply for a permit to dispose of radioactive waste must provide a radiological impact assessment in support of permit application. The assessment must take into account the likely routes of potential radiation exposure resulting from the disposals and the radiation doses received by the most exposed individuals. A permit application must also set out how the operator will minimise and monitor disposals and the presence of radionuclides in the environment that may result from the disposals in order to check that radiation exposures remain ALARA and below statutory limits. We will not issue any permit to dispose of radioactive wastes in any form (gaseous, liquid or solid) until we have rigorously assessed the application and supporting assessment, consulted upon it and published our conclusions.

We have yet to receive a permit application for the proposed Sizewell C power station and so cannot yet set out the proposed discharges, exposure pathways and impacts specific to Sizewell C. However, the following are relevant in setting out what we do:

- a) For proposed new nuclear power station designs we undertake a detailed assessment at the generic design stage to look at impacts. The overall process is set out at:

<https://www.gov.uk/government/publications/assessment-of-candidate-nuclear-power-plant-designs>

- b) A key document is one that sets out our approach to setting discharge limits: <https://www.gov.uk/government/publications/discharge-of-radioactive-waste-from-nuclear-sites-setting-limits>)
- c) We have undertaken a 'Generic Design Assessment' (GDA) for the EPR™ design of nuclear power station proposed for construction at Sizewell. The radiological impact assessment for the GDA is available at: <http://www.epr-reactor.co.uk/ssmod/liblocal/docs/PCER/Chapter%2011%20-%20Radiological%20Impact%20Assessment/Chapter%2011%20-%20Radiological%20Impact%20Assessment.pdf>)
- d) Monitoring for radioactivity is undertaken around nuclear sites and in the wider environment. This is reported and provides further reassurance that dose limits are met. See: <https://www.food.gov.uk/science/research/radiologicalresearch/radiosurv/rife/radi-oactivity-in-food-and-the-environment-rife-report-2015> and <https://www.gov.uk/guidance/monitoring-radioactivity>

Finally, in your letter of 5 June you stated that there is a *'legal requirement imposed on the Environment Agency to ensure that it uses sound science in agreeing its operational risk levels'*. There is no stated legal requirement for us to use sound science, however we clearly aim to apply sound science and evidence as a matter of policy within the legal framework of standards and limits. We consider that the standards and limits set in legislation are underpinned by sound science. ICRP's recommendations are based on the best available and rigorously peer reviewed scientific information and represent a strong international consensus.

In undertaking our role we follow international standards, as referred to above, and national advice from Public Health England. We would not grant an environmental permit unless satisfied that a robust assessment had been carried out and that impacts are both limited and minimised, in line with the requirements set out in EPR16 which reflect EU and international standards.

We would be happy to explain our regulatory role and approach in more detail if required at a meeting of the BEIS-NGO forum or in a separate meeting. However, if you wanted an in-depth discussion of radiation health effects and radiation risk factors then I would suggest that PHE and the Committee on the Medical Aspects of Radiation in the Environment would be the most appropriate bodies.

Yours sincerely

A Mayall  
17<sup>th</sup> July 2017