

 Environment Agency

## Protection of non-human biota from radioactive discharges: The Environment Agency's approach

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**1μGy = 0.1m rad**

13 March 2012, RIC, U.S.NRC

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### Environment Agency

- ⇒ England and Wales
- ⇒ Wide remit (flood protection, fisheries, conventional industry).
- ⇒ Nuclear and 'non nuclear'




- ⇒ Radioactive discharges & disposal to the environment
  - ⇒ Liquid
  - ⇒ Gas
  - ⇒ Solid waste
- ⇒ Joint working with Office for Nuclear Regulation

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### Nuclear in England and Wales:



- Power stations:
  - ⇒ 8 operating
  - ⇒ 7 decommissioning
- ⇒ Enrichment
- ⇒ Reprocessing
- ⇒ No uranium mines
- ⇒ Current challenges
  - ⇒ Decommissioning
  - ⇒ Disposal
  - ⇒ New Nuclear Build

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### Legislative Framework & International Agreements

- Euratom Treaty 1957
  - Euratom BSS 1996 Council Directive 96/29/Euratom (based on ICRP 60 and IAEA BSS)
- England and Wales
  - Environmental Permitting Regulations (England and Wales) 2010
  - Ionising Radiation Regulations 1999
- OSPAR Radioactive Substances Strategy (1998)
  - By 2020 releases 'close to zero'
- **EU Birds and Habitats Directives – protection of non human biota.**



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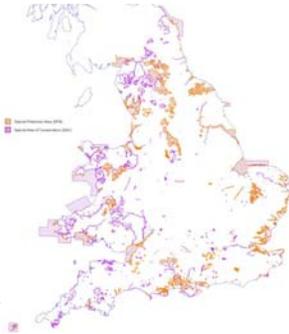
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### EU Birds and Habitats Directives

- Introduced into UK legislation by Conservation (Natural Habitats) Regulations 1994.
- 429 'Natura 2000' sites.
- Consider doses to non-humans from radioactive releases into Natura 2000 sites.
- 'Habitats Assessments'
- **Conservation, not radiological protection.**



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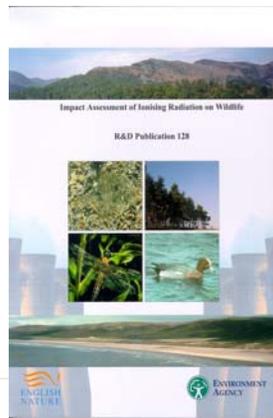
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### R&D 128

- Spreadsheet-based tool
- Uses concept of 'reference' organisms
- Limited number of radionuclides
- Dose rate Per Unit Release (DPUR) values calculated for reference organisms ( $\mu\text{Gy/hr per TBq}$ )



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### Habitats Assessments: Methods

- ⇒ Staged approach
- ⇒ All permits and discharge limits in force in 2007
- ⇒ Total discharges x DPUR = dose rate
- ⇒ Total dose rates calculated for reference organisms in Natura 2000 sites
- ⇒ Dose rate to worst affected reference organism compared to dose criteria
- ⇒ Conservative approach used:
  - ⇒ Assumed discharges were at permitted limits
  - ⇒ Compared to one dose criteria



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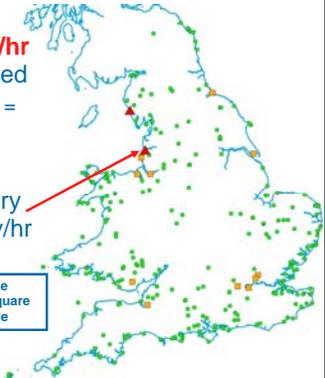
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### Habitats Assessments: Results

- ⇒ If dose rate < **40 µGy/hr** no further work required
  - ⇒ 100 µGy/hr – 60 µGy/hr = 40 µGy/hr
  - ⇒ 40 µGy/hr = 4 mrad/hr
- ⇒ Ribble and Alt Estuary dose rate = 520 µGy/hr



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### Ribble and Alt Estuary

- ⇒ Discharges from a nuclear fuels site.
- ⇒ Assessment used discharge limits permitted until end Dec 2007.
  - ⇒ **Substantial discharge of short-lived beta and gamma emitting radionuclides**
- ⇒ New Permit in Jan 2008 with lower discharge limits to reflect lower planned discharges from site.
  - ⇒ **Reduced discharge of short-lived beta and gamma emitting radionuclides**
- ⇒ Assessment undertaken using:
  - ⇒ New discharge limits
  - ⇒ ERICA tool
- ⇒ Dose rate < 40 µGy/hr



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### New discharges to Natura 2000 sites

- ⇒ Standard ongoing assessments
- ⇒ Prospective assessments made using Initial Radiological Assessment Tool (IRAT)
  - ⇒ Dose rate <1 µGy/hr no further assessment needed
  - ⇒ Dose rate >1 µGy/hr use multiple release tool
- ⇒ If total dose rate for reference organism at Natura 2000 site > 40µGy/hr, need realistic site specific assessment
  - ⇒ Use ERICA tool



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### Nuclear New Build



- ⇒ Generic Design Assessment
- ⇒ 'The requesting party should provide an assessment of the likely impact of the radioactive discharges on non-human species'.
- ⇒ Assessments made using ERICA tool.
- ⇒ Uses reference organism approach.
- ⇒ 10 µGy/hr (1 mrad/hr) screening value used.



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### Summary

- ⇒ Habitats assessments driven by conservation legislation
- ⇒ Staged approach
- ⇒ Move to using ERICA assessment tool
- ⇒ Support further development of ERICA tool
- ⇒ Update of Initial Radiological Assessment Tool (IRAT) with ERICA outputs



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**Publications on website**

- [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)
- Environment Agency (2009) 'Habitats assessment for radioactive substances' Science report SC060083/SR1.
- Environment Agency (2009) 'Impact of radioactive substances on Ribble and Alt estuarine habitats' Science report SC060083/SR2.
- Environment Agency (2003) 'Habitats regulations for stage 3 assessments: radioactive substances authorisations' R&D Technical report P3-101/SP1a.



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