

Diluting and dispersing very low level radioactive waste

Nuclear decommissioning and the waste hierarchy: where we are, challenges and issues, 11 May 2011

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So far SD:SPUR recommends:

1. Nuclear industry as the principle customer for 'recycled' VLLRW
2. Upstream engagement to reach broad-based consensus about what to do with RSA 93 exempt rad-wastes

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1. VLLRW

- Steel ISO containers, cans, over-packs for higher level rad waste.
- Reinforced concrete structures for waste storage facilities

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Rad 'recycling' facilities

- Problems with siting nuclear linked facilities
- **Emissions** from smelting process - e.g. furnace burn of volatile Caesium, Tritium, Cobalt
- Internal radiation problem

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Practical concerns

- High source terms: **hot-spots** averaged within large volumes
- Difficult to ascertain and measure within large scrap volumes
- Segregation and Characterisation problems
- Poor early waste management practices

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Segregation, Synergy and Characterisation

- Difficult to reliably segregate RSA and exempt categories
- Fundamental uncertainty: **synergistic effects** between rad & non rad (e.g. asbestos, PCBs, hydrocarbons)
- Difficult to reliably measure activity throughout

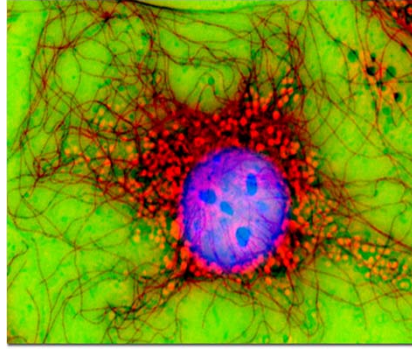
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Substances of Low Activity (SOLA)

- Although not subject to controls under RSA 93
- Wastes below SOLA remain defined as LLRW
- HMG 'Exemption Order' Review to accurately reflect specific hazards of particular radionuclides
- CERRIE

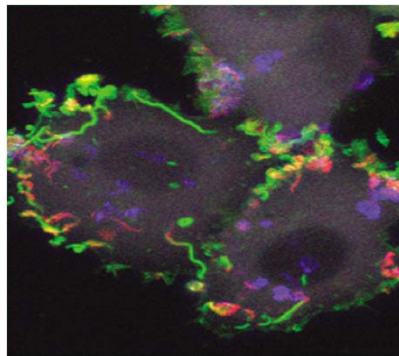
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Radiation biology



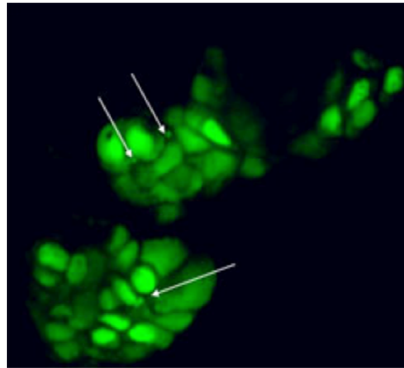
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Genomic instability



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Bystander effect



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Waste hierarchy problems

- Nuclear materials – carcinogenic, teratogenic
- ICRP - no safe threshold
- Radionuclide mobility
- ‘Concentrate and contain’ may be justified by the toxic, persistent and bio accumulative characteristics of radionuclides

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National Policy Statement: Waste management hierarchy

- ‘Objective for LLW management plans should be do deal with potential arisings at the highest practical level’
- ‘Limitations to the application of the waste hierarchy in the management of legacy wastes’

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National Policy Statement: Waste avoidance

- Emphasis on avoiding contaminant migration and generation of secondary wastes from treatment and processing

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Economics

- Little economic value
- Huge non rad stocks
- Potential increased risks driven by disposal costs?

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Post Fukushima:

Public response to rad-risk is fractured



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Public attitudes depend on real life situations

- Science defines risk in large populations
 - people think of their own families



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Responses to risks bound up with wider values



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Public aversion to products associated with radiation risk



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Minister prepares to meet stakeholders



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