NATURAL ENVIRONMENT RESEARCH COUNCIL

Future Perspectives on Environment and Human Health Research

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NERC Strategy: Next Generation Science for Planet Earth

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Environment, Pollution and Human Health

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Environmental factors play an important role in the causation and progression of many human diseases, and environmental change is continually providing new challenges to health. NERC science will provide new approaches to predicting the behaviour of pathogens and pollutants and can provide solutions to issues such as the spread of communicable disease, drinking water contamination and air pollution.

Environment, Pollution and Human Health

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VISION

Environmental factors play a very major role in human disease. Research in the EPHH theme is directed at elucidating key environmental processes and providing a predictive capability for both biotic and abiotic environmental influences on human disease and wellbeing, in collaboration with other stakeholders. The ultimate vision is to reduce the burden of human disease linked with environmental causes, and to anticipate new threats to public health before they become serious.

The Challenges (from the Theme Report)

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- ***Challenge 1***: Improve measurement and monitoring of the distribution of pollutants and pathogens at required time and space scales.
- ***Challenge 2***: Improve knowledge of processes and models of the dynamics of transport and transformation of pollutants and pathogens in the environment.
- ***Challenge 3***: Improve assessments of pollutant and pathogen exposure and risk to humans.
- ***Challenge 4***: Understand the impacts of waste management activities on the environment and human health.

General Approach

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- **2008 TIMELY NICHE AREAS SELECTED**
  - Environmental Nanoscience Research
  - Urban Atmospheric Science
  - Environmental Radioactivity (Scoping)

- **2009 MAIN COLLABORATIVE INVESTMENTS**
  - NERC/MRC Infectious Diseases
  - NERC/MRC Non-Infectious Diseases
  - Defra/EA Policy models (Scoping)
  - Macronutrient cycles (led by SUNR)

- **2010 FILL THE GAPS**
  - Policy Models
  - Climate Change and Human Health
  - Waste Management

THEME CHALLENGES

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FIT TO THEME CHALLENGES

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Programme		Theme Challenge			
		1	2	3	4
Environmental Nanoscience	D	✓	✓	✓	✓
Urban Atmospheric Science	D	✓	✓	✓	
Environmental Radioactivity	S		✓	✓	✓
Pollutant Exposures and Human Health	P	✓	✓	✓	?
Environmental and Social Ecology of Infectious Disease	P	✓	✓	✓	
Uncertainty in Policy Models	S		✓	✓	?
Macronutrient Cycles	A	✓	✓	✓	
Climate Change and Human Health	I		✓	✓	
Waste Management Activities	I		✓	✓	✓

1, Measurement & Monitoring; 2, Processes and Models; 3, Exposure and Risk; 4, Waste Management

D, Delivery; S, Scoping; A, Approved; I, Ideas; P, Pre-proposal

Environmental Radioactivity

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CONTEXT

- Anticipated massive expansion of nuclear power
- Threat of terrorist releases of radioactivity
- Planned construction of an underground waste repository
- Changing paradigm of the need to protect non-human biota from radiation damage
- Maps onto Challenges 1, 2, 3 and 4 of Theme Report, LWEC Objective D and Global Security Initiative.

Environmental Radioactivity

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SCIENCE CHALLENGES

- Identify pathways and mechanisms of pollutant transfer within the environment, including uptake by, and distribution within sentinel organisms

- Study natural and less studied anthropogenically released radionuclides

- Enhance predictive capability for security of waste storage facilities and the behaviour of radioactive leakage

ACTION 2009/3 Reducing Uncertainty in Models for Environmental Decision-Making (Scoping Study)

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The Drivers:

- Models are very widely used by government departments and agencies for policy support, decision-making and in regulation
- Model development often occurs despite poor knowledge of some determinants of model performance
- Increased process understanding, improved measurements of environmental properties or better parameterisations of complex processes could improve many models
- Recognition by Defra and EA of the weaknesses in many models which they use
- Major economic consequences of some model-based decisions (e.g. contaminated land)
- Defra are co-funding scoping study
- Contributes to LWEC Objective D

ACTION 2009/3 Reducing Uncertainty in Models for Environmental Decision-Making (Scoping Study)

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The Action:

- Strong potential for Defra/EA co-funding
- Funding £5M (total); £3M from NERC envisaged ultimately
- Funding would be conditional upon
  - (a) processes or properties studied have a demonstrably important influence on the output of a model used for policy development or regulation
  - (b) research can plausibly generate a significant reduction in that uncertainty
  - (c) there is a willing partner in the user community

THE END

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Thank you for your attention

PLEASE MAY I HAVE YOUR VIEWS ON FUTURE ACTIONS