

Dr Jon Martin
Head of Research & Environment

Building B587
Curie Avenue
Harwell Oxford
Didcot, Oxon
OX11 0RH

M +44 (0)7799 656418
jonathan.martin@nda.gov.uk
www.gov.uk/rwm

16 May 2018

TO WHOM IT MAY CONCERN

RE: Impacts of the TREE project from the perspective of national regulatory and waste management organisations

The TREE project has benefited from the combined research expertise of leading scientists from the Centre for Ecology & Hydrology and the Universities of Salford, Stirling, Portsmouth, West of England, Lancaster and Plymouth.

As implementer of UK Government policy for the geological disposal of higher active radioactive waste, RWM is leading a multi-generational, multi-billion pound project; one of the largest environmental projects the UK has seen. Disposal of radioactive wastes in England, including geological disposal of higher active radioactive waste is regulated by the Environment Agency. RWM and the Environment Agency are therefore pleased to be able to provide a statement of the relevance and impact of the TREE project on our work.

The previous work of the TREE consortium has made a significant contribution to the understanding of the impacts of low levels of radiation on non-human biota, however it is widely recognised that further work in this area would be beneficial. Some of the new understanding challenging previously accepted dose impacts has highlighted this need.

From RWM's perspective, we recognise that TREE has helped us to ensure that appropriate consideration is given to this theme in our evolving safety case. The impact of long-term, low-dose radiation is an issue which we recognise to be of significant interest to the public, as highlighted by its presence on RWM's 'Issues Register' (<https://rwm.nda.gov.uk/issues/topic/non-human-biota/>).

From the Environment Agency's perspective the outputs from TREE are helping reduce the uncertainties of impacts on non-human biota. This is important in ensuring that our regulatory decisions are robust. Realistic assessments of impacts are important in good decision making for optimisation, including the use of radioactive substances in healthcare.

As a result, TREE has helped to ensure that society can continue to gain maximum benefit from low carbon nuclear power generation and other important uses of radioactivity, such as in nuclear medicine. TREE has also significantly improved public awareness and understanding of radioactivity in the environment. Some of the key impacts that TREE has delivered to date include:

- The demonstration that current and future authorised releases of radioactivity in the UK do not represent a significant risk to wildlife, hence supporting current/future regulation, safety case development and disposability advice for the UK's multi-billion pound nuclear programme over the coming decades.
- Provision of sound scientific evidence on the effects of radiation on wildlife in the Chernobyl Exclusion Zone, demonstrating that many reported studies suggesting effects at very low dose rates are indefensible. Both the EA and RWM are liable to be challenged, especially during public consultations, to demonstrate that radiological risk assessments for the environment are suitable, as exemplified by the above link to RWM's 'Issues Register'. We can now use the findings from TREE's extensive, co-ordinated programme of radiation effects research to help respond to these challenges.
- A significant contribution to changing public understanding of radioactivity and its impacts as a result of extensive public engagement activities and media coverage. TREE has undoubtedly captured the imagination of the public and provides an ongoing source of interest for the media. Through public engagement innovations, such as the unique collaboration with virtual reality developers to develop *Virtual Chernobyl*, TREE has enhanced societal understanding of radiation and the environment.
- The new approaches developed in TREE to assess the transfer of radioactivity to wildlife and food crops are game changing, removing much of the uncertainty associated with the current, simple, ratio approach. The resultant reduction in radiological risk assessment uncertainty helps to ensure societal confidence in nuclear programmes. We welcome the initiative to adapt the ERICA Tool to be able to use the novel transfer approaches developed by TREE.
- Development of soil bioavailability and plant uptake understanding for key radionuclides associated with biosphere assessment models which should be applicable anywhere in the UK. Whilst the UK Government Policy is to build a geological disposal facility (GDF) for nuclear waste, we do not yet know where the site will be. Any potential site will require a safety case, including evaluation of the potential risk to the human food chain and wildlife. The soil bioavailability models developed by TREE will help us to make assessments for the future GDF site as their parameterisation is based upon soil characteristics. Together with the novel TREE models for transfer of radionuclides to food crops and wildlife these soil bioavailability models will also enable us to conduct assessments that account for potential climate change scenarios over the millennial time scales required for GDF safety case development.
- UK leadership in the field of environmental radiation protection and significant contributions to the international framework via engagement with the International Commission (ICRP) on Radiological Protection and the United Nation's International

Atomic Energy Agency (IAEA). The UK adopts advice arising from the ICRP, which will in part be based on TREE results and include the novel approaches developed by TREE to estimate radionuclide transfer to wildlife.

- Robust scientific evidence that challenges some of the existing International Commission on Radiological Protection (ICRP) benchmarks and is causing the ICRP to rethink the benchmark values that it proposes for environmental radiation protection in countries around the world.
- Provision of radiation effects and transfer data for organism types for which data were not previously available, thereby supporting the development of environmental protection methodologies and again making these assessments less uncertain and demonstrating applicability to a wider range of organisms. Through our use of the ERICA Tool and associated databases the new wildlife transfer data will be used in UK assessments of regulated releases of radioactivity into the environment.
- Development of non-lethal approaches for measuring radiation exposure of wildlife, allowing validation of risk assessment predictions and the development of compliance monitoring programmes around nuclear sites. These technological advances, developed within TREE, are especially beneficial given that the object of protection within UK regulations is often protected species.

We were very pleased to see the TREE project being awarded the Times Higher Education 'Research Project of the Year 2016' for the impact of its "ground-breaking" science and the extent to which it had captured the imagination of the public.

The TREE project has achieved highly significant societal impact to date through its role in shaping the international system of radiation protection, educating the public and providing the science necessary to support RWM in its GDF development work and the Environment Agency in its regulatory work; we hope that this impact is appropriately recognised.

Yours faithfully

Jon Martin (Dr)
Head of Research and Environment
RWM



David Bennett
Manager, Radioactive Substances
Regulation
Environment Agency

