

Off-site post-accident recovery after the Fukushima Daiichi accident: challenges and solutions

Monday, 27 October 2014 16:50 (20 minutes)

The response to an accidental release is generally divided into two phases. In the emergency phase immediately after the accident has occurred, key off-site sources of radiation dose to humans include inhalation and radionuclides deposited onto both man-made and natural surfaces. Actions to reduce radiation doses in the emergency phase are termed countermeasures. Thereafter, in the post-accident recovery phase, external doses from surfaces and internal doses from foodchain pathways are both potentially important and actions to reduce these doses are collectively termed remediation. Decisions made on the target dose rates for remediation are critical for planning the remediation strategy, as are the methods used to estimate the external and internal doses to people.

For many countries, the main focus of most emergency preparedness is focused on the emergency phase and little consideration is given to the post-accident recovery phase, especially off site. Accident exercises seldom consider more than the first few days and the development of appropriate policy and plans for the existing situation is rare.

Whilst radioiodine is a potentially important exposure route in emergency situations, radiocaesium and radiostrontium are often the most important dose-forming radionuclides in the long term due to the relatively long physical half lives of some of their radioisotopes and their environmental mobility. Many of the challenges in both the emergency and the post-accident recovery phase are determined by the source term. However, for the post-accident recovery phase there are many other factors which need to be considered, such as the agricultural, economic, social and cultural situation in the affected countries.

Many national and international guidance documents on countermeasures and remediation after nuclear accidents are based on previous experience of serious accidents impacting outside the site boundary, and also of dealing with legacy sites. Such International guidance documents on remediation include the International Atomic Energy Agency's recent Technical Report Series document TRS 475 and the Euranos Handbooks on Emergency Preparedness. For the off-site recovery phase, in particular, much of the guidance is currently based on the experience gained during the response to accidents in the former Soviet Union in the East Urals (Kyshtym accident) and at Chernobyl.

The importance of the external dose pathways is much greater than the internal dose pathway in Japan than it was after the Chernobyl accident, partially due to the enforcement of restrictions and comprehensive monitoring of all food entering the foodchain. The selection of remedial measures, the extent to which they are being applied and the timescale over which they are being implemented also differs. Furthermore, the practicability, feasibility and acceptability of some remedial measures differs considerably in Japan compared with the situation after the Chernobyl accident. Careful analysis of the reasons for differences in the decisions made in Japan and the implementation of remedial measures compared with other accidents will be valuable in extracting lessons for the wider international community.

It is clear that we need to revisit the international guidance documents to take into account of the experience of dealing with the post accident recovery phase in Japan. IAEA activities such as recent report on the Follow-up International Mission on remediation of large contaminated areas off-site the Fukushima Daiichi Nuclear power plant and the Fukushima Report currently being prepared by the IAEA involving more than 100 international experts will provide an important input into this process.

Country or International Organisation

United Kingdom

Primary author: Dr HOWARD, Brenda (Centre for Ecology & Hydrology (CEH), Natural Environment Research Council (NERC))

Presenter: Dr HOWARD, Brenda (Centre for Ecology & Hydrology (CEH), Natural Environment Research Council (NERC))

Session Classification: Session 1 (cont'd): Oral Session

Track Classification: The role of TSOs in Relation to the Fukushima Daiichi Accident