

Session 20: Consideration of Off-Site Emergency Planning and Response using Probabilistic Accident Consequence Assessment Models

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Abstract:

It is recognized that good preparedness in advance of an emergency can substantially improve the emergency response to a nuclear or radiological accident. In particular, it is very important to provide technical guidance for the development of protective actions, such as evacuation, sheltering and iodine prophylaxis, based upon a comprehensive threat assessment that takes into account the full range of postulated events.

Evacuation is most effective if taken as precautionary measure prior to a release of radioactivity to avoid severe deterministic health effects. Sheltering may be a very effective to reduce doses early in an emergency, depending on the type of building available and its location with respect to the site of the accident. Iodine prophylaxis may be effective to reduce doses to thyroid if taken tablets before exposure to radioiodine, or as soon as possible afterwards. Therefore, careful consideration to the most effective way of distribution of stable iodine should be given in off-site emergency planning.

It is likely that the most effective strategy will involve a combination of these protective actions. To develop a generic response strategy, probabilistic accident consequence assessment models can be very useful for providing a quantitative basis for discussing the effective emergency plans including intervention levels and emergency planning zones for the appropriate protective actions. The purpose of this study is to perform a risk informed evaluation of protective actions with a probabilistic accident consequence model, in order to formulate the technical basis for the effective protective action strategy.

This study shows the methodology and results of the technical considerations for off-site emergency planning using a probabilistic accident consequence assessment model. Calculations of the off-site consequence have been made of postulated accidents with source terms derived from a generic level 2 PSA of the reference plant in Japan. The preliminary results provided the insights of technical guidance for the development of protective actions such as evacuation, sheltering and iodine prophylaxis.

Biographical Sketch of Masanori Kimura:

Masanori Kimura is a research engineer in Japan Atomic Energy Agency (JAEA). Mr. Kimura is working at risk analysis and applications research group, Nuclear Safety Research Center of JAEA. He studies technical issues on nuclear emergency planning and response using level 3 Probabilistic Safety Analysis (PSA) methods. He also surveys and analyzes research, development and discussion in international organizations and foreign countries outside of Japan, regarding the technical issues on nuclear emergency preparedness and response in order to assist with the further development of emergency preparedness guideline in Japan.