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Title

Handling Uncertainty in the Threat and Early Phases

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Text

That estimating the consequences of radiation accidents in the emergency phase is beset with uncertainties, particularly in the threat phase and the very early hours of a release, is uncontroversial and has long been recognised. But despite huge developments in decision support systems and processes for nuclear emergency management over the past 25 years, it continues to be the case that little attention is paid to developing a full – or even, sometimes, any - understanding of uncertainty in the formal analyses. Uncertainty analyses, where performed, are limited to consideration of weather permutations. But often, emergency managers are presented with deterministic analyses based on specific assumptions and left to factor in allowances for the uncertainty through informal discussion and unsupported judgement. Moreover, the assumptions on which the analyses are built are often pessimistic, reflecting some type of worst case situation from the viewpoint of doses (but not for other outcomes, such as agricultural effects or economic impact), with no attempt to consider the uncertainty range in the evolution of the accident and the amount and type of radioactivity released. Note that uncertainty on weather and uncertainty on release content and duration also need to be treated in combination in consideration of the range of possible outcomes as they are not independent.

It is over 30 years since Chernobyl and 5 years since Fukushima, and we should now attempt a more comprehensive treatment of the key uncertainties in our analyses. The paper will discuss the sources of uncertainty and how we might reflect these in preparing advice to emergency managers.