

## **ERMIN European Model for Inhabited Areas: use within a wider decision making framework**

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European Nuclear Accident Decision Support Systems (DSS) RODOS and ARGOS assemble models and tools that address the different components of nuclear accident management. They form a loose chain from source term estimation, through atmospheric dispersion, deposition, emergency decision-making, hydrological transfers and food chain contamination. An important component towards the end of the chain is the management of recovery in inhabited areas for which the emphasis is the long term residual exposure of resident and relocated populations and the effect of clean-up operations on those exposures. The European Model for Inhabited Areas (ERMIN) was developed to address this component.

ERMIN uses empirical models to represent the long term weathering of contamination on urban surfaces (walls, roofs, roads, lawns and trees) and it applies a library of dose rates to estimate doses in various standard inhabited environments that could represent individual houses, villages or cities. ERMIN modifies exposures with various clean-up operations and also estimates additional endpoints such as waste mass and activity, clean-up worker exposures, clean-up cost and resources. However, perhaps more challenging than the technical details of the model is the implementation of it as a functional tool within the DSS that is actually useful within the complex decision making environment of post-accident recovery.

Recovery of inhabited areas can take months or years and during that time the lives of the affected population can be profoundly disrupted. For this reason the emphasis of recent recovery advice and guidance is less about applying fixed criteria to trigger defined sets of actions and more about building consensus between multiple stakeholders about what should be done to keep exposures as low as reasonably achievable. Raw model output is seldom useful for building consensus in any situation, so the development of the ERMIN interface has emphasised allowing the user to frame the problem in a way that is both simple but also flexible enough to match the wider decision-making process in which it is being used. The ERMIN interface allows the consequences of strategy options to be explored, compared, refined and used to inform the discussions. It has been built on the lessons of previous such tools and development continues iteratively based on the feedback from users, although this is somewhat limited as post-accident recovery is seldom exercised.