

Nationwide Environmental Survey of U.S. Department of Energy Sites, USA, Using MEPAS

In mid-1980's, a major national concern in the USA was the potential for significant environmental impacts associated with operations of U.S. Department of Energy (DOE) facilities. To address these concerns DOE headquarters undertook a ground-breaking nationwide environmental survey to identify and evaluate any such impacts. DOE headquarters actually started with little information on site-specific operations; the DOE facilities had been historically run independently with little direct headquarters supervision. The resulting effort paved the way for similar future integrated modelling efforts.

DOE first conducted onsite environmental audits of all facilities to identify current or potential environmental releases. The audit findings were categorized as either 1) being of immediate concern and requiring immediate action or 2) being of potential concern. Next DOE ranked the audit-identified releases of potential concern from a human health impact standpoint.

This undertaking was a very ambitious effort requiring the development of an integrated environmental modelling software system, MEPAS (Multimedia Environmental Pollutant Assessment System). MEPAS was designed to provide comparable human health impact estimates from widely different types of waterborne and airborne releases. MEPAS evaluates multi-pathway impacts of both radionuclide and chemical releases. MEPAS is based on combining standard regulatory evaluation methodologies (mostly annual average screening-level models) in a single integrated system. A current version of MEPAS is available in the FRAMES software distribution.

The 1988 publication of survey ranking results for the 25 major DOE sites was a culture changing event. Suddenly site operations staff, previously focused on groundwater issues, were confronted by data showing airborne releases from their operations also had important (and more immediate) health impact concerns. Although their initial reaction was that the rankings were wrong – the results stood, and priorities were changed. Headquarters staff, previously focused on air releases, learned there were important health implications of groundwater contamination. The results provided DOE decision makers with information to help them act in ways to minimize the potential health impacts.

Keywords

Integrated Modeling, MEPAS, Health Effects, Carcinogens, Radiation, Release, Transport, Exposure, Uptake, Toxicity, Nuclear

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