



DEVELOPING THE RESRAD FAMILY OF COMPUTER CODES FOR ENVIRONMENTAL RISK ASSESSMENT

EAD designed the RESRAD family of computer codes to evaluate doses and related risks to human health and the environment resulting from exposure to radioactively and chemically contaminated materials. The codes are frequently used to calculate cleanup criteria for contaminated soils and building material.

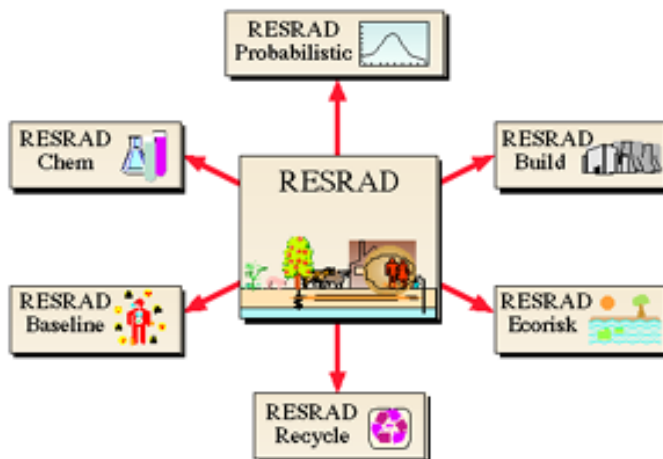
PROBLEM/OPPORTUNITY

Potential risk to human health and the environment is a primary consideration in federal agencies' efforts to formulate a variety of important environmental policies and decisions. Specific questions such as "how clean is clean?" cannot be answered without scientific basis. To study the potential impact on human health and ecological systems resulting from exposure to radioactive and chemical contaminants often requires the modeling of contaminant transport in the environment.

All of the RESRAD codes have user-friendly interfaces and provide on-line help messages. They can be used for different applications and are maintained and updated regularly; several documents have been prepared to support their operation.

APPROACH

Under DOE's sponsorship, EAD has developed a series of computer codes to assess human health and environmental risk at sites contaminated with radioactive materials and hazardous chemicals.



EAD designed the RESRAD family of computer codes to assist in environmental risk assessment.

RESULTS

RESRAD has been applied to more than 50 sites in the United States and other countries. RESRAD is the only code designated in DOE Order 5400.5 for the evaluation of radioactively contaminated sites. NRC has approved the use of RESRAD for dose evaluation by licensees involved in decommissioning and waste disposal. Several universities have used RESRAD and RESRAD-CHEM as teaching tools. More than 40 training workshops have been conducted, and about five hundred people have been trained to use the RESRAD code. A recent survey of RESRAD users revealed that cleanup costs are considerably reduced by the use of RESRAD.

* **RESRAD** is a pathway analysis computer code that calculates radiation doses and cancer risks to a critical population group and derives cleanup criteria for radioactively contaminated soils.

* **RESRAD-CHEM**, designed for chemical risk assessment, uses the same methodology as RESRAD and adds two contamination pathways: inhalation of volatile compounds and dermal absorption.

* **RESRAD-ECORISK** estimates the risk from contaminant exposure to ecological receptors. It uses species-specific life history information to calculate an ecological effects quotient.

* **RESRAD-BUILD** evaluates potential health impacts in buildings contaminated with radioactive materials. A variety of building compartments and contamination forms are modeled along with corresponding human exposure pathways.

* **RESRAD-RECYCLE** estimates radiation doses to various receptors resulting from the recycle and/or reuse of radioactively contaminated materials and equipment.

* **RESRAD-BASELINE** performs baseline risk assessments following EPA's human health risk assessment guidelines.

* **RESRAD-Probabilistic** quantifies uncertainties associated with environmental risks.

FUTURE

EAD will continue to develop new risk assessment models, update the current models, and provide technical assistance. New data will be collected to support the database and parameters used in these models. EAD will continue to conduct training workshops and provide assistance in applying these models to actual sites. Validation of the RESRAD code will be continued by participating in the international BIOMOVs II project.

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