ATD Modeling in NRC's Emergency Response

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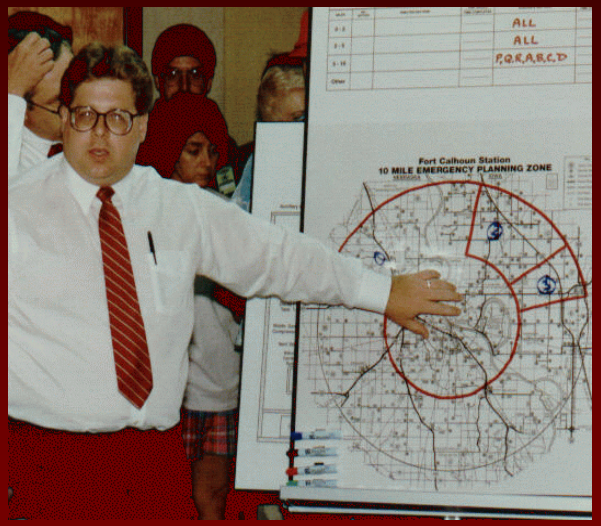
What is NRC?

The Nuclear Regulatory Commission regulates the safety of commercial nuclear power plants and radioactive materials used in industry, research, and medical applications.

Event Responsibilities

State and local governments are responsible for making protective action decisions and implementing those decisions. They are required to have an atmospheric dispersion/dose modeling capability.



Event Responsibilities

The licensee is also required to have an atmospheric dispersion / dose modeling capability and to recommend protective actions to the State and local decisions makers.

NRC ATD Models

The NRC has developed the RASCAL model to meet its needs. This tool couples source term and dose models with ATD models. This provides a capability to accept inputs from reactor or other source term analysts and to create results useful to health physicists.

Models Support Prot. Action Decisions

The intent is to take early protective actions; e.g. evacuation or sheltering. Ideally, the protective actions will begin well before the release starts. Often, protective action decisions are based on plant conditions and not model runs.

Role of ATD Models

ATD models play a supporting role in the early phase protective action decision making. NRC uses RASCAL to estimate the consequences of the event in terms of increased risk to public health. These model results are compared with results from the licensee and State model runs.

Bound the Consequences

Before a release has taken place, the models are used to bound the likely consequences. The most uncertain part of the process is determining the size, composition, and timing of the radionuclide release. When models are used, a number of runs may be required and the results must be available quickly. Thus, speed in doing dose projections is necessary.

Model Requirements

- Must generate a source term based on plant conditions
- Source term must handle 53 nuclides with decay and ingrowth
- Must calculate doses from inhalation, cloud shine, and ground shine
- Must run fast – a minute or two

Lead Federal Agency

The Lead Federal Agency speaks for the entire Federal government. If any Federal plume modeling results are to be released, they should be released *only* by the Lead Federal Agency.

Liaison

The NRC keeps other Federal agencies, the White House, U.S. Congress, news media, international contacts, etc., advised on the status of the event. It also coordinates all non-radiological Federal assistance to State and local response agencies.

Pre- vs. post-plume assessment

The first day, NRC uses RASCAL. On the second day, the Federal Radiological Monitoring and Assessment Center (FRMAC) assumes the lead for plume modeling and dose assessment.

FRMAC

The FRMAC is operated by DOE but is supported by all Federal agencies. It supplies radiological measurements and assessments to the LFA and the State and local decision makers. The NRC is pledged (in the FRERP) to support the FRMAC even when the NRC is not the LFA.

NARAC

The National Atmospheric Release Advisory Center (NARAC) is an important component of the FRMAC. The NRC will be in contact with NARAC as soon as NRC activates its Operations Center.

Conclusions

- We don't need one ATD mode
- We don't need a better ATD model
- We do need a unified assessment of model results with only the selected results shown to decision makers
- Actually, the decision makers usually shouldn't even see the results
- What the decision makers really need is interpretations and recommendations