



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D.C. 20555-0001

September 16, 1999

Dr. William D. Travers
Executive Director for Operations
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Dr. Travers:

**SUBJECT: PROPOSED REVISION 1 TO REGULATORY GUIDE 1.78 (DG-1087),
EVALUATING THE HABITABILITY OF A NUCLEAR POWER PLANT
CONTROL ROOM DURING A POSTULATED HAZARDOUS CHEMICAL
RELEASE**

During the 465th meeting of the Advisory Committee on Reactor Safeguards, September 1-3, 1999, we reviewed the draft Regulatory Guide DG-1087, which revises Regulatory Guide (RG) 1.78, "Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release." Our Subcommittee on Severe Accident Management reviewed this matter during its August 9-10, 1999 meeting. During these meetings, we had the benefit of discussions with representatives of the NRC staff and of the documents referenced.

Recommendations

- The proposed Regulatory Guide should be redrafted to facilitate risk-informed license amendment requests to eliminate technical specification requirements for toxic gas monitoring systems.
- The staff should consider providing performance-based guidance to licensees rather than prescriptive guidance in the proposed Regulatory Guide.
- The staff should document evidence of the validity and the capability of computer codes endorsed in regulatory guides such as the HABIT code endorsed in this proposed Regulatory Guide.

Background

The staff proposes to revise RG 1.78 and to include into the revised Regulatory Guide information contained in RG 1.95, "Protection of Nuclear Power Plant Control Room Operators Against an Accidental Chlorine Release." The staff has undertaken this revision to:

- provide improved, consistent limits on toxic chemical concentrations that require actions to protect control room operators,

- provide clarification of screening criteria to be used by licensees to assess the threat of operator incapacitation posed by toxic chemical releases, and
- recommend an improved dispersion model for evaluating the atmospheric dispersal of toxic materials.

The staff anticipates that the revised Regulatory Guide will:

- reduce plant shutdowns caused by spurious alarms of the toxic gas monitoring system,
- reduce administrative burden on licensees arising from compliance with two similar regulatory guides, and
- reduce in some cases the estimated threat of core damage posed by toxic gas release and operator incapacitation.

Discussion

The contribution to a typical plant core damage frequency that is attributable to toxic gas release and operator incapacitation is quite small (about $4 \times 10^{-7}/\text{yr}$). It is evident that this threat should not be a focus of safety efforts by the staff or by licensees that do not have peculiar vulnerabilities to toxic gas releases. Licensees may therefore be expected to use the risk-informed mechanisms described in RG 1.174 to seek license amendments to remove Technical Specification requirements for toxic gas monitoring systems. Indeed, the spirit of risk-informed regulation should motivate the staff to encourage such license amendments by revising the proposed Regulatory Guide in a manner that would facilitate review in the terms provided in RG 1.174.

The proposed Regulatory Guide specifies toxic chemical concentrations that prompt protective actions for the control room operators. The concentration limits are the concentrations "immediately hazardous to life and health" defined by the National Institute for Occupational Safety and Health. Such concentrations ". . . will cause death or immediate or permanent adverse health effects if no protection is afforded within 30 minutes." The staff has assumed operators will be able to don protective apparel within two minutes after concentrations this high are reached in the control room ventilation inlets. We support the limiting concentrations selected by the staff. They provide a consistent basis for evaluating threats posed by the diverse chemical releases that could occur.

The proposed Regulatory Guide recommends the use of the HABIT code by licensees to predict atmospheric dispersal of toxic materials. The HABIT model does have more sophisticated modeling than was available for previous versions of the Regulatory Guide. Superior physics alone does not guarantee validity of a computer code. The staff does not appear to have documented evidence of formal peer review, verification, and validation of the HABIT code. Such evidence and a defensible basis for staff confidence should be in hand before the staff endorses a computer code for regulated activities. We encourage the staff to consider review of the HABIT code following processes developed by the Office of Nuclear Regulatory Research for review of codes such as SCDAP-RELAP.

The proposed Regulatory Guide includes guidance that may be interpreted as being requirements:

"Breathing apparatus should be provided and be readily accessible throughout the plant..."

"A control room exit leading directly to the outside of the building should have two low-leakage doors in series."

These examples and others may pressure licensees to undertake activities with costs out of proportion to the risks associated with toxic gas releases. Protection against toxic gas releases appears to be an ideal opportunity for the staff to provide performance-based guidance rather than prescriptive guidance to licensees. The staff should consider revising the proposed Regulatory Guide in a performance-based format.

Sincerely,



Dana A. Powers
Chairman

References:

1. Memorandum dated July 28, 1999, from Charles E. Rossi, Office of Nuclear Regulatory Research, NRC, to John T. Larkins, ACRS, Joseph A. Murphy, Committee to Review Generic Requirements, Stuart A. Treby, Office of the General Counsel, transmitting Draft Regulatory Guide DG-1087 (Proposed Revision 1 to Regulatory Guide 1.78), "Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release."
2. U. S. Nuclear Regulatory Commission, Regulatory Guide 1.95, Revision 1, "Protection of Nuclear Power Plant Control Room Operators Against an Accidental Chlorine Release," January 1977.
3. U. S. Nuclear Regulatory Commission, Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," July 1998.
4. ACRS letter dated July 20, 1995, from T. S. Kress, ACRS Chairman, to James M. Taylor, Executive Director for Operations, NRC, Subject: Resolution of Generic Safety Issue 83, "Control Room Habitability."