(18)

DOCKET NUMBER
PROPOSED RULE PR 71
(65 FR 44360)

September 29, 2000

'00 OCT -2 P5:00

Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555
Attention: Rulemaking and Adjudications Staff

SUBJECT: Comments on the Major Revision to 10 CFR Part 71 as Requested in the Federal Register on July 17, 2000

This letter transmits comments on the proposed revisions to 10 CFR Part 71 as set forth in the Register (Volume 65, Number 37, 44359-44397).

As stated in the Commissionís summary statement, it is understood that the USNRC seeks to a risk-informed alternative to the existing rule. In addition to a general comment regarding the Part 71 rule revision process, the following topics are discussed as requested in the Federal Re Notice:

1. What potential problems may occur as a result of adopting ST-1 requirements?

2. How should risk considerations be factored into the rulemaking issues related to the 10 CFR Part 71 revisions?

Comment #1 ñ The technical bases for major revisions to 10 CFR part 71 should be summarize issued as a report for public comment prior to a rule change.

With regard to major revisions to Title 10 of the Code of Federal Regulations, the USNRC has se exemplary precedent in its revision for the Emergency Core Cooling System (ECCS) Rule found in 10 CFR 50.46 and 10 CFR 50 Appendix K. In that rule revision effort, the USNRC set forth the tec basis for the ECCS rule change in NUREG-1230, ìCompendium of ECCS Research for Realisti Analysis.î NUREG-1230 was the culmination of approximately $750 million of Loss-of-Coolant-Acciden (LOCA) research. The experimental database and the best-estimate thermal hydrauli compute codes developed through that research effort now serve as the foundation for current plant risk assessment studies. A technical basis document, similar to NUREG-1230, has not b in support of the proposed revision to 10 CFR Part 71. The USNRC should not revise 10 CFR solely to be compatible with IAEA ST-1. The technical basis for the revision to 10 CFR Part 71 be fully documented in a summary report, and issued for public comment, as has been done fc major revisions to USNRC rules.

Template = SECY-067

SECY-02

Comment #2 ñ Adoption of ST-1 would eliminate the requirement for 10 CFR Part 71 (c) except for the Type 30B UF_6 Shipping Packages; thus eliminating the requirement for special design features to prevent moderator in-leakage.

This comment section specifically addresses Issue 4 ñ ìUranium Hexafluoride Package Requir

The proposed adoption of the ST-1 exception for UF_6 packages states that a single package is not required to be subcritical in the event of in-leakage of moderation. This is contrary to the existin regulations as stated in 10 CFR 71.55 (b). However, previously published criticality safety analy results for a single canister with containment failure and in-leakage of water demonstrate that s system can be significantly supercritical. [New Valner, R.L. and Pryor, W.A. , ìA Nuclear Criticalit Safety Assessment of the Loss of Moderation Control in 2.5 and 10-Ton Cylinders Containing E UF_6,î 2nd International Conference on Uranium Hexafluoride Handling, Oak Ridge, TN, October 1991]. Results of MCNP4B and KENOVa calculations performed at Oregon State University f number of accident scenarios support this conclusion.

Because calculations for the Type 30B UF_6 Shipping Container indicate that criticality will occur with water in-leakage, such shipping containers can only be approved through an exception as stated CFR 71.55 (c). 10 CFR 71.55 (c) requires that special design features be incorporated into the to ensure that no single packaging error would permit leakage.

Ensuring that criticality cannot occur in these packages is essential to protecting the public healt safety. It is recommended that the ST-1 guidance regarding shipping UF_6 package criticality not be adopted. Instead, it is recommended that the USNRC:

1. Clearly define the types of special design features that would be acceptable to ensure that n packaging error would permit leakage. This could be issued as a Regulatory Guide.
2. Issue the technical basis (published in a NUREG report for public comment) for accepting th special design features, and
3. Revise the existing rule to make the special design features part of the rule as opposed to a exception to the rule. Additional explanatory materials could be included as a 10 CFR Appen

Comment #3 ó Risk-Informed Regulations and Cost-Benefit Analyses for Uranium-Hexafluoride (UF_6) Packages will require a formal assessment of accident risk for UF_6 packages.

This comment section specifically addresses Issue 4 ñ ìUranium Hexafluoride Package Requir The comments are aimed at suggesting a methodology that would support risk-informed regul cost-benefit analysis in this area.

There are many advantages to performing a risk assessment study. The systematic process of a risk assessment would serve to:

- Organize the existing technical data base for UF_6 packaging and transport,
- Identify gaps in the existing experiment database,
- Identify weaknesses in the existing thermal-hydraulic and criticality safety analysis tools,
- Identify potential problems in packaging design.

The successful completion of a risk assessment study of UF_6 packages would help guide and assess any emergency planning developed to mitigate the consequences of accident and must be performed to develop a technically meaningful, risk-informed, cost-benefit analysis.

Figure 1 schematically illustrates a methodology that could be used to as a road map to estima associated with the handling and transport of UF_6 packages. This is a standard methodology which ha been used in Probabilistic Risk Assessment (PRA) training at the Sandia National Laboratory (NUREG/CR-4350) for many years. The most comprehensive and successful use of PRA is the ì Risk Reference Document,î NUREG-1150, issued by the USNRC in 1987. NUREG-1150 is ar excellent example of how a risk analysis supports a cost-benefit analysis. Risk assessment tec including computerized event tree and fault tree analysis tools, are now numerous and commer available.

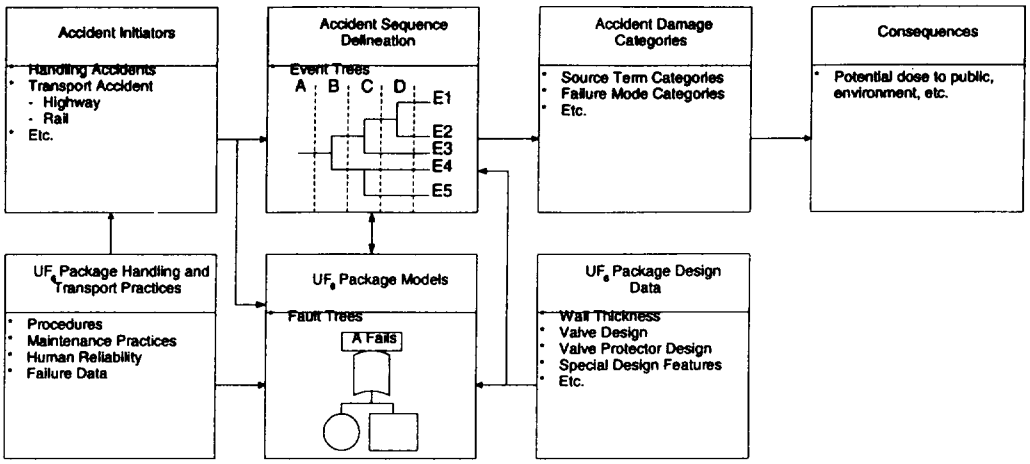

Figure 1. A Standard Risk Assessment Methodology Applied to UF6 Package Handling and Transport

Comment #4 ó Risk-Informed Regulations and Cost-Benefit Analyses for Uranium-Hexafluoride (UF_6) Packages may require additional research.

The UF_6 package risk assessment process will likely identify the need for additional experiment analysis tools. For example, the multiplication factor of a single failed canister depends sensitively on several factors: the geometry of the system (including the shape, size and location of containm breach), the nature of the mixing between the UF_6 and UO_2, and the rates of chemical reactions and the influence of reaction products (HF and F_2). To properly address the reactivity of this system, a tru time-dependent calculation coupling neutronics, chemical rate equations, and hydrodynamics mu completed. Experimental data would be needed to properly benchmark these calculations.

The methodology developed for the Severe Accident Research Program, as summarized in NU 5809, ìAn Integrated Structure and Scaling Methodology for Severe Accident Technical Issue Resolution,î could be adapted to develop a research plan in support of a UF_6 risk assessment study.

We hope that these comments are useful to your rule revision effort.

Sincerely,

Dr. JosÈ N. Reyes, Jr.
Dr. Todd S. Palmer
Oregon State University
Department of Nuclear Engineering
E130 Radiation Center
Corvallis, OR 97331-5902