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U.S. Nuclear Regulatory Commission  
Mail Stop T-6-D-59  
Washington, DC 20555-0001

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109

Reference: NUREG-1768, United States Nuclear Regulatory Commission Package Performance Study Test Protocols, Draft Report for Comment, February, 2003

Subject: NAC International and NAC Nuclear Technology Users Group (NUTUG) Comments on Draft NUREG-1768

Dear Madam or Sir:

NAC International, together with the NAC NUTUG organization, is pleased to submit the attached comments on the Referenced draft NUREG. The NRC is to be commended for the public information objectives of this proposed test program and for the participation solicited by the NRC from the public in shaping the requisite protocols of the program. While NAC feels there are improvements to be made in the formulation of the testing proposed, the process has allowed a thorough discussion of issues and a dialogue appropriate for the significance of the program. NAC wishes to thank the NRC for this opportunity.

NAC's corporate experience in spent fuel transportation represents a large fraction of all the spent fuel moved within the U.S., and NAC's transport cask fleet is responsible for most of the commercial and research reactor spent fuel moved globally by U.S.-owned casks. In addition, our NUTUG organization represents some of the largest nuclear plant facilities in the U.S. and each member is proceeding with dry multipurpose spent fuel storage with systems of NAC's design, in the full expectation that these systems will be used to move spent fuel to an approved repository at Yucca Mountain at the earliest possible date. Therefore, the comments contained herein come from experienced parties, organizations that want spent fuel storage and transportation to succeed. We are committed to the success of all such efforts that advance the cause of closing the nuclear fuel cycle safely, efficiently, and with the public's best interest at heart. Public information with the demonstration of the inherent safety of the technology is the highest objective of the program, and this belief may be said to characterize, if not the letter, then the spirit of all of our comments.

In light of this background and experience, we encourage serious consideration of our comments, with a particular focus on the spirit contained therein. We would be pleased to discuss these comments and any questions associated therewith at your convenience. Please feel free to contact me with questions or if I can be of any further service.

Sincerely,

Charles W. Pennington  
Senior Vice President  
NAC International

Attachment

Template = ADM-013

F-RFDS = ADM-03  
Call = A. Snyder (AMS3)  
A.J. Murphy (A.J. Murphy) (ASMI)  
MD20030001

**NAC INTERNATIONAL AND NUTUG COMMENTS  
ON DRAFT NUREG-1768**

The following are NAC International's comments on the draft report for comment of NUREG-1768, "United States Nuclear Regulatory Commission Package Performance Study Test Protocols".

1. **General Comment -** While the NRC is to be commended for its concern with expanding public understanding of the inherent safety of spent fuel transportation packagings, a primary PPS objective cited in section 1.2, it does not appear that the protocols presented will accomplish that objective. Rather, the protocols seem too focused upon confirming finite element analyses, obtaining benchmark data, and getting regulatory modeling up to the same level of development as that of private industry. NAC views the improved public understanding objective as significantly more important than any of the others and recommends that the protocols be modified to focus on that objective.

Simply stated, the drop scenarios proposed are supra-regulatory hypothetical accident tests that will not resonate with the true public. The tests are not obviously bounding or extraordinary to the public eye, despite the incredible nature of the test conditions when viewed by the informed expert. The public will not be generally moved by what the protocols are proposing.

Lessons from others who have been through the same efforts to achieve public understanding are instructive in this regard. The British embarked upon a highly successful testing program for their casks that involved major collisions with high-speed locomotives and other realistic testing that the public could see as clearly representative of worst case scenarios from their own experience.

At the Interim Storage of Spent Fuel (ISSF) Conference in Tokyo on May 14, 2003, Mr. Reinhard Koenig, Managing Director of BLG Gorleben and BZA Ahaus, made a presentation on how his companies had explained safety effectively to the residents of Gorleben and Ahaus in Germany. The experts' challenge was to make non-experts understand the inherent safety of the casks, and Mr. Koenig related how the films of the German tests of real casks undergoing real fires, real explosions, and real impacts were very effective in meeting this challenge.

As a result of this experience, NAC recommends that the focus of the protocols be modified so that the transport casks selected be exposed to tests with which the public can identify. The testing should be at bounding conditions of real velocities, temperatures, and durations, but should be done with conveyances attached and, for impacts, with real surfaces having bounding hardness (ie, around 6,000 psi compressive strength). This means the tests should be more like the Sandia rail impact tests of the past, rather than the proposed drops from around 200 feet onto an unyielding surface with no conveyance or personnel barrier.

2. **General Comment -** The protocols, as proposed, are also deficient in providing key considerations that determine their suitability. Of primary interest is the consideration of the acceptance criteria, both for packaging performance and for modeling/prediction performance. This must be rigorously defined in concert with the establishment of the testing program, but should also be clearly proposed as part of the protocols.

3. General Comment - The protocols must also come to grips with the definition of packaging "failure" (eg, the definition of a "release" that constitutes a material failure of the packaging would be one approach to this definition). Exceeding ASME Code stress allowables is not failure. Lid unseating or reduction in lid closure force to less than 0 psi does not constitute release. If there is no sustained opening of substantial area and no motive force for release, there is no hazard to the public and no failure. In a similar vein, modest releases resulting in small population exposures should not be defined as a "failure".

In this regard, a comparative hazard assessment of potential packaging failures with common societal exposures to radionuclides and other hazardous materials should be part of the final report of the testing performed. Comparison is the only real way that inherent safety can be "demonstrated". The public is routinely deprived of information in the nuclear arena that answers the question "Relative to what?". The testing program and its report should not fail in this area.

4. Section 2.3, page 8 - Current regulatory requirements for hypothetical accident conditions, and whether compliance is demonstrated either by testing or by analysis, are already at the limits of credible events. If testing is to proceed well beyond that into supra-regulatory space, then the additional conservatism proposed does not appear to be warranted. Specifically, realistic but bounding surfaces should be used and conveyances with personnel barriers should be included. As stated in section 2.7 on page 49 of the protocols, "In risk analyses the protection provided by all barriers to release is considered." NRC's own admonition in this regard should be rigorously adhered to in setting up the testing program.
5. Section 2.4.4, page 32 - For these supra-regulatory tests, seal leakage should never be construed as a package failure. Failure should only be defined as a release that results in population exposures exceeding what is commonly accepted every year, without regulation, from other "technologies". To do otherwise is to feed the public's misperception of the hazard of spent fuel transportation, rather than to correct it. The educational purpose of this program must remain its highest objective.
6. Section 2.4.5, page 36 - The neutron shield assembly should be modeled in the FEA. The shield system and its enclosure shell will act as an impact limiter, providing some measure of energy absorption, and will also function as a "load spreading" surface, thereby improving the calculated safety margins by reducing the likelihood of highly localized stresses that could be interpreted as local containment boundary tearing and failure.
7. Section 3.1, page 53 - It would seem that, while a fire lasting one hour may bound 82% of all train fire accidents, an optically dense one hour fire greatly exceeds 82% of all train fire accidents. This appears to be further conservatism that is not appropriate for this testing.
8. Appendix A, page A-3 - The transportation statistics cited say that a rail accident "comparable" to a 60 mph impact on an unyielding surface has a probability of 1.6E-6. However, an unyielding surface is virtually impossible to find in nature or in man-made structures that surround transport routes. Indeed, the current regulatory requirements bound impacts approaching 80 mph on typical surfaces found in the transportation environment. Therefore, the testing proposed should use both credible speeds and surface characteristics.