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Chief, Rules Review and Directives Branch
U. S. Nuclear Regulatory Commission
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NRC Staff:

I am responding to your invitation to comment on the Package Performance Test Protocols Draft Report, Draft NUREG-1768. I am a concerned citizen and not responding in any official capacity. My packaging experience encompasses NRC and public interaction. I was the leader of a successful application to NRC for certification of a large Type B package, the double contained TRUPACT II used for transport of plutonium contaminated waste to the Waste Isolation Pilot Project (WIPP). One of my responsibilities was to manage the accident conditions test program which we chose to pursue in order to demonstrate compliance with 10CFR71 for a new technology package. The path of testing versus analysis was chosen because the design innovations of TRUPACT II were not entirely compatible with the structural codes that are suitable for modeling the mechanical response of the thick walled spent fuel casks designs. I served as the primary interface with the public and media and was responsible for explaining how the testing conservatively bounded any probable transportation accidents. The 30 foot drop (30 mph) on to an unyielding surface is a severe test. One of my more challenging tasks was to effectively communicate the conservative nature of the testing so that the public would have the confidence in the package that all of us involved with that package (including NRC) had gained during the test program.

I am having difficulty in understanding how the tests outlined in the Package Performance Test Protocols will contribute to the stated objective of "enhancing public confidence in the inherent safety of spent nuclear fuel cask design". In fact, I am alarmed at the apparent lack of sensitivity to the potential consequences of the proposed study. If this test protocol is not modified drastically there is an unnecessary danger of seriously degrading public confidence. The proposed test velocity of 75 mph, coupled with an unyielding surface, is unreasonably extreme and will result in forces that are far beyond any probable rail accident condition. The proposed back-breaker test of the truck cask represents another severe condition that is essentially unattainable in transportation accidents. Yet this test protocol implies that such accident conditions are probable.

One of the stated objectives is "validating the capability of the cask models and analysis codes to accurately capture cask and fuel response to extreme mechanical ... environments". What is the basis for selecting the extreme mechanical environments? Clearly, one test point from each of two different designs will not provide statistical validation of the models and codes. One possible conclusion is NRC desires to demonstrate that the structural codes are valid up to the point of structural failure.

E-RIDS = ADM-03
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However, the general public doesn't understand the context of "failure" in this case and will assuredly jump to the conclusion that an NRC certified cask failed. Another possible conclusion is that the scientists don't expect a failure and their intent is to show this huge margin of safety. If that is the case, this test plan is woefully inadequate in explaining to the public why you are testing to such extreme conditions and certainly does not explain that these extreme conditions are not representative of expected accident conditions. Nor does it prepare them for the unforeseen missteps inherent in most test programs. One can conclude after reading this test plan that 60 to 90 mph impacts onto an unyielding surface represents a probable real world accident condition for rail casks. I strongly disagree and urge you not to depart from the current 10CFR71 accident condition requirements.

I find that most people have trouble understanding the severity of a drop test onto an unyielding surface. After reading this test protocol, I am wondering if the scientists who prepared this study are also having difficulty with correlation of train accident impact velocities and probable impact surfaces with the severe unyielding surface test condition for they seem to have forgotten their own science. To even suggest to the public that velocities between 60 and 90 mph onto an unyielding surface represents a probable train accident condition borders on abdication of responsibility when it comes to enhancing public confidence. I submit, that your query of the public in soliciting comment on the Package Performance Study Test Protocols has already damaged public confidence in that the public will now suspect that NRC believes the 10CFR71 requirements are not adequate and will expect higher test velocities in the near future requirements. NRC has a lot of back tracking to do to repair that damage.

The general public does not understand and can not readily translate the results of the proposed tests to real world accident conditions. That technical translation is the responsibility of the Federal Government with most of that responsibility falling on the shoulders of NRC. It seems to me that your efforts should be focused on demonstrating that the current drop velocity of 30 mph onto an unyielding surface has proven to be quite conservative and, in fact, bounds probable rail accidents. Improvements in structural codes confirm the conservative margin of the original 10CFR71 requirement. As a reminder, impact onto a hard rock surface is not as severe a condition as impact onto an unyielding surface. Secondly, impact velocities will not be at the velocity of the train engine because of energy dissipated through derailment and deformation of the coupled cars that serve to buffer the cask.

My recommendation is for NRC to revamp this proposed study starting by clearly stating the specific objectives of this series of tests with supporting technical justification of how each test will contribute to accomplishing the objectives. The Package Performance Study Test Protocols, as currently stated, define general objectives with no clear technical justification of what each test is designed to resolve. If you insist on moving forward with no change to the extreme accident conditions, I urge you not to utilize any test package that remotely resembles a full size cask while doing the extreme tests.

Another acceptable alternate to this plan is to perform full scale testing of each cask design in accordance with the 10CFR71 requirements. That will allow correlation of full scale structural model analysis with previous analysis of smaller scale tests. Even though I haven't commented on the fire tests previously, I would like to make a concluding remark. Thermal analysis is less complex and is capable of predicting, with sufficient accuracy, the rise in temperature of the seal area (area of concern). The thermal mass of spent fuel casks is so large that the fire does not represent much of a threat to the package integrity. That knowledge should be communicated to the public. A full scale open pit fire test of 10CFR71 duration is adequate to demonstrate that we can model the outcome and therefore can predict the margin of safety for longer duration fires.

Another point for your consideration, NRC also has a responsibility to the international regulatory community to not needlessly depart from the standards that have served so well in protecting the public during transport of radioactive materials. We should continue the progress that NRC has made toward better aligning the U. S. radioactive transportation certification requirements with those of the International Atomic Energy Agency (IAEA). Quite frankly, the proposed study seems to be a radical departure from the successful policies encouraging international cooperation. I suggest that NRC seek comments from the international technical community on the desirability of such testing before proceeding with these tests. I think that a likely outcome of such a solicitation is that NRC would choose to significantly revamp the proposed test protocols.

Respectfully,

James B. Tollison