



July 26, 2002

Secretary, U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: Rulemaking & Adjudications Staff

Dear Secretary:

Attached are the comments of the New Mexico Environmental Evaluation Group (EEG) on "10 CFR part 71 Compatibility with IAEA Transportation Safety Standards (TS-R-1) and Other Transportation Safety Amendments: Proposed Rule (April 30, 2002). Our comments are restricted to Issue 17. Double Containment of Plutonium (PRM-71-12).

EEG is strongly opposed to the deletion of Section 71.63(b) for the reasons detailed in our comments. We believe that both sections 71.63(a) and 71.63(b) would be technically improved by having the 0.74 TBq (20 Ci) value apply to all actinides with A_2 values equal to or less than 1×10^{-3} TBq (2.7×10^{-2} Ci).

Thank you for the opportunity to comment on this proposed rule.

Sincerely,

Matthew K. Silva
Director

MKS:JKC:pf

cc: Inés Triay, DOE/CBFO
Enclosure: (EEG-33)

020741



**EEG Comments on 10 CFR Part 71 Compatibility with IAEA Transportation Safety Standards (TS-R-1) and Other Transportation Safety Amendments:
Proposed Rule (April 30, 2002)**

Summary

These comments by the Environmental Evaluation Group (EEG) are restricted to Issue 17. Double Containment of Plutonium (PRM-71-12).

The proposal to delete existing section 71.63(b) will affect shipments of transuranic wastes to the Waste Isolation Pilot Plant (WIPP) more than any other activity. Therefore, our comments rely heavily on WIPP experience.

We believe that the NRC has erred in rejecting its historical qualitative judgment that double containment was a prudent requirement for the qualitative judgment of a 1997 petition. There is no indication from the proposed rule or background documents (NUREG/C12-6711, 6712, 6713) that any effort was made to verify the claims made in the 1997 petition.

The EEG has used its experience in WIPP transportation evaluations over the years, as well as operating data available from WIPP since first receipt of wastes in March 1999, in formulating our comments. Our major conclusions are:

- (1) The conclusion that single containment will decrease radiation doses is incorrect for WIPP shipments. Radiation doses would increase, to both workers and the general public.
- (2) There have been minor reductions in the volume of waste shipped to date (8-13%) due to weight restrictions caused by double containment. These penalties will be reduced in the future by the use of the NRC certified half PACT. Also, it is uncertain at this time what the allowable payload might be in a single-contained Type B package that can successfully pass full scale hypothetical accident condition tests. The total cost of certifying a new Type B package also needs to be included when considering possible economies from single containment. The possibility of significant net cost savings has not been demonstrated.
- (3) If section 71.63(b) is deleted, there will very likely be some use of single-contained packages for future WIPP shipments.
- (4) There is some inconsistency with the A_1/A_2 concept in the current sections 71.63(a) and 71.63(b). The proposed rule corrects only the inconsistency in 71.63(b). EEG believes the major inconsistency in the current rule for WIPP shipments is that ^{241}Pu is counted as a plutonium curie and that ^{241}Am curies are not counted. We recommend that the 0.74 TBq (20 Ci) value be applied to all actinides with A_2 values equal to or less than 1.0×10^{-3} TBq (2.7×10^{-2} Ci).

- (5) EEG concurs with the qualitative judgment that a double contained package is less likely to have a radionuclide release in the event of a serious accident than is a single contained package. A release accident would have serious economic, shipping disruption, and public confidence implications. We believe this is the primary reason for retaining the double containment requirement.

Because of the above 5 conclusions, the EEG strongly opposes the deletion of Section 71.63(b). We believe that both sections 71.63(a) and 71.63(b) would be technically improved by having the 0.74 TBq(20 Ci) value apply to all actinides with A_2 values equal to or less than 1.0×10^{-3} TBq (2.7×10^{-2} Ci).

Detailed Comments

Reduction of Radiation Dose from Single Containment

The following statement is made in the preamble to the Proposed Rule: "The NRC expects that cost and dose savings would accrue from the removal of §71.63(b)." The petitioner asserted there would be additional radiation exposure from "additional handling required for the separate inner container," but did not provide an analysis.

The EEG completely disagrees with these claims of extra radiation exposure in the case of TRUPACT-II shipments to WIPP. Also, we believe that at the present time, the double containment issue is, for all practical purposes, a WIPP issue. Therefore, WIPP experiences and the effect of the rule change on WIPP needs to be explicitly considered. Our rationale and supporting data are given below.

Enclosed is a copy of EEG-33 ("Adequacy of TRUPACT-I Design for Transporting Contact-Handled Transuranic Waste to WIPP," June 1986). This report was also sent to the NRC with our September 2000 comments. Despite the statement in the proposed rule, ("The NRC is unaware of any risk studies that would provide either a qualitative or quantitative indication of the risk reduction associated with the use of double containment in transportation of plutonium") the EEG believes that EEG-33 does provide a qualitative risk assessment relative to TRUPACT-I. It cannot be considered a quantitative study because the external radiation analysis is specific to the TRUPACT-I design.

The EEG-33 methodology provides a more comprehensive evaluation of radiation doses received from accident-free operation of the TRUPACT because the radiation dose resulting from a sealed TRUPACT-I is also included. A single contained package would have less mass in container walls and thus less attenuation of radiation (for example the 0.25 inch thick inner containment vessel (ICV) of the TRUPACT-II would attenuate 0.1 Mev gamma radiation by about 84%). Removal of the ICV would result in greater radiation doses to workers, truck drivers, security personnel and members of the public along the route.

Table 1 is a summary of radiation doses received by WIPP workers from March 1999 through June 2002 from transporting, receiving, unloading, checking for contamination, transporting underground, and emplacing transuranic wastes received in the double contained TRUPACT-II.

TABLE I

GROUP	AVERAGE MILLIREM (COLLECTIVE)		TOTAL PERSON MILLIREM
	PER TRUPACT	PER SHIPMENT	
Waste Handling	0.40	0.86	827
Rad Con	0.42	0.91	874
Truck Drivers	0.17	0.37	353
Others	0.48	1.04	1008
Total	1.46	3.17	3062

From 965 shipments containing 2093 TRUPACT-IIs (Presentation by Casey Gadbury, DOE/CBFO at 7/23/02 Quarterly Meeting).

There are several relevant observations from these data:

- (1) The doses are low;
- (2) the groups involved in opening the TRUPACT-IIs (Waste Handling and Rad Con) received only 56% of the collective dose;
- (3) most of the Waste Handling and Rad Con group doses would be incurred during all the subsequent steps necessary to emplace waste in underground storage rooms. A time-motion study of CH-TRU waste handling at WIPP (Final Report for the WIPP CH TRU Preoperational Checkout, DOE/WIPP 88-012, July 1988) indicated that only about 11% of the total dose to these two groups would occur from all operations on the TRUDOCK. The remainder occurs handling waste containers away from the TRUPACT-II;
- (4) truck drivers and others (which includes QA, management, training, and security personnel) are only exposed to unopened TRUPACT-IIs and would receive higher doses if the packaging was only single contained.

After evaluating these actual data, the EEG concludes that occupational doses from transporting, receiving, and emplacing transuranic wastes at WIPP would increase if the packaging had only single containment.

Population Exposure. Various studies over the years have estimated population doses along the WIPP route from incident-free shipments. The 1997 Supplemental EIS for WIPP (DOE/EIS-0026-S-2) estimated that the non-occupational collective doses to persons along the route would be five to seven times that of the drivers. This dose then would be 1.9 to 2.6 mrem/shipment. The non-occupational dose would increase with

single containment because of less attenuation of gamma radiation. EEG concludes that non-occupational radiation doses along the WIPP route would increase if shipments were in single contained packages.

Cost of Double Containment

The proposed rule also uses cost as a justification for elimination of the double containment requirement.

Shipping transuranic waste in TRUPACT-IIs is clearly more expensive than in other packages used in the past. However, most of the cost is incurred by complying with the payload requirements in the Certificate of Compliance and not increased waste loading complexities. The renewed interest in shipping transuranic waste in the ATMX railcar in 2000 was not due to its single containment features but to payload restrictions (especially those concerning hydrogen gas generation). EEG strongly supports these payload requirements and the preamble to the proposed rule implies the payload requirements would not be affected by elimination of 71.63(b).

There clearly is some weight and volume penalty from requiring double containment in similar designs. In the case of TRUPACT-II (which was a much different and superior design) versus TRUPACT-I there was little difference. The package weight for 3 TRUPACT-IIs on a trailer was only about 1350 pounds greater than for TRUPACT-I and the number of drums that could be transported (in the absence of weight limitations) was 16.7% (42 drums versus 36) greater in TRUPACT-II. However, we agree that it should be possible to obtain more weight reduction and increase volume in a new state-of-the art single contained packaging.

A lighter weight, single contained, TYPE B package could have more problems in passing the full-scale hypothetical accident condition tests (section 71.73) that the TRUPACT-II (eventually) passed. The inability of a package to pass these tests would be proof that its integrity under severe accident conditions was less than the TRUPACT-II.

EEG believes that the comment in the preamble that assumes the ICV in TRUPACT-II could be removed and its 2,620 pounds could then become payload to be speculative. Until a single contained Type B package has successfully passed hypothetical accident tests there is no way to know what the payload would be in a certified container. Also, EEG is uncomfortable with the fact that the wording in the preamble did not state that a TRUPACT-II without the ICV would not longer be NRC certified.

Neither the petition, the proposed rule, or the Environmental Assessment provided any quantitative data from WIPP shipments or elsewhere on the extent of the weight penalty. The experience on shipments to date to the WIPP is summarized below:

- (1) Weight restrictions for current shipments from the Rocky Flats Environmental Technology Site (RFETS) result in a volume reduction of zero to about 6%.
- (2) Weight restrictions for current shipments from the Idaho National Engineering and Environmental Laboratory (INEEL) result in a volume reduction of 29-35%.
- (3) None of the first 178 shipments (up to February 2001) to WIPP were weight limited. Twenty shipments from other sites since February 2001 have not been weight limited.
- (4) For the approximately 1000 shipments to date to WIPP the overall weighted average volume reduction due to weight limitations has been approximately 8% to 13%.
- (5) The NRC has already certified the half PACT for shipments to WIPP. The half PACT is a more efficient packaging for heavier weight containers. Its use should reduce the current volume reduction penalty.

An 8-13% volume reduction due to weight restrictions caused by double containment is not trivial but the benefits from reducing this weight penalty needs to be balanced against the resulting increase in radiation doses, the increased likelihood of a release in the event of a severe accident and the increased cost of certifying a new package. EEG concludes that the likelihood of significant net cost savings has not been demonstrated in the proposed rule or background documents.

Possibility of New Packages for WIPP

The Draft Regulatory Analysis (NUREG/CR-6713) states that the DOE is unlikely to switch from using the TRUPACT-II because the fleet has been procured and "shipping fixtures are designed around these packages." This is probably true for most contact-handled waste shipments to WIPP. However, the DOE is seriously considering a TRUPACT-III, which would be a large packaging to transport waste containers that are too large to fit into the TRUPACT-II. If the NRC does eliminate 71.63(b), a TRUPACT-III would probably be designed for single containment. Also, the CNS 10-160B package, which is already certified for shipping remote handled transuranic waste (RH-TRU) shipments of less than 20 curies plutonium to WIPP would be available. So, it is prudent to assume that if 71.63(b) is deleted there may be single contained Type B packages transporting waste containing more than 20 curies of plutonium package to WIPP.

A₁/A₂ Values

The petition stated that the present rule violated the basis of the A₁/A₂ system by not requiring non-plutonium radionuclides which had A₂ values less than or equal to plutonium to meet the same requirement.

EEG agrees the current 71.63(b) is inconsistent. However, the main effect is different than suggested. All of the other radionuclides are actinides and, except for ²⁴¹Am, are unlikely to be shipped in large sized Type B packages.

Note that the current section 71.63(a) is also inconsistent with the A₁/A₂ concept since it deals only with plutonium. This section is being retained.

The most important inconsistencies in the current rule are in: (1) counting ²⁴¹Pu radioactivity in the 20 Ci limit; and (2) not counting ²⁴¹Am in the 20 Ci limit. This has significant implications for the WIPP inventory where the emplaced radioactivity (as of 6/4/02) is 60.6% ²⁴¹Pu, 15.3% ²⁴¹Am, and only 24.1% from the sum of ²³⁸Pu + ²³⁹Pu + ²⁴⁰Pu. Since ²⁴¹Pu has an A₂ value that is 59 times greater than the other four radionuclides it should not be included in the 20 Ci limit. Americium-241 has the same A₂ value as ²³⁹Pu and should be included.

EEG recommends that both 71.63(a) and 71.63(b) be retained but that the limit be expressed as 0.74 TBq (20 Ci) for the total of all actinides with A₂ values equal to or less than 1.0×10^{-3} TBq (2.7×10^{-2} Ci). Incidentally, the A₂ value (2.7×10^{-3} Ci) reported for ²³⁹Pu in Table A-1 in the proposed rule is incorrect. It should be 2.7×10^{-2} Ci.

Releases From Severe Accidents.

It is acknowledged at several places in the preamble to the proposed rule that “a separate inner container provides an additional barrier to the release of plutonium in an accident,...”. Later it is concluded that “this type of approach is not risk informed nor performance based.” Also, the statement is made “The NRC is unaware of any risk studies that would provide either a qualitative or quantitative indication of the risk reduction associated with the use of double containment.”

The enclosed report (EEG-33) presents a methodology for estimating the possible reduction in releases from severe transportation accidents. We submit that this is a qualitative study. It cannot be considered quantitative because there are no experimental data on accident releases with and without double containment.

Evaluations by others also estimate the probability of an accidental release during the lifetime of WIPP from TRUPACT –II and RH-72B packages. For example, in DOE/EIS – 0026-S-2, Appendix E, the calculated value is 0.3 releases. If single containment were to result in releases at one lower severity category (from III to II

for thermal release and from V to IV for impact release) the estimate would be 1.5 releases. There is some respirable material in WIPP waste (which was one of the justifications for initially requiring double containment) and this would increase the likelihood of releases and doses in the event of a severe accident.

We do not believe it wise to increase the probability of a release for the sake of relatively minor economic benefits. Even a minor release is likely to result in extensive cleanup costs, delays in project shipping, possible societal costs from transportation or other economic disruptions. Perhaps the greatest impact would be a reduction in public confidence in the shipment of radioactive materials.

EEG believes that the primary justification for double containment is to decrease the probability of a release in the case of a severe accident. We believe this is also the principal concern of elected officials, state governmental organizations, and citizens.