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Secretary
U.S. NUCLEAR REGULATORY COMMISSION
Washington, D.C. 20555

ATTN: Docketing and Service Branch

Gentlemen:

PROPOSED RULE 10 CFR PART 71
TRANSPORTATION REGULATIONS: COMPATIBILITY WITH THE INTERNATIONAL ATOMIC ENERGY AGENCY

Wisconsin Electric Power Company as owner and operator of the Point Beach Nuclear Plant has reviewed the proposed Nuclear Regulatory Commission (NRC) Rule 10 CFR Part 71 - Transportation Regulations: Compatibility with the International Atomic Energy Agency (IAEA) as published on June 8, 1988 (53 FR 21550-21581). This letter is submitted in response to the NRC's request for comments on the proposed rule.

LSA Shipment Limits

Currently, 10 CFR Part 71 allows LSA materials to be shipped without regard to the total activity in a single Type A package provided that certain dose rate limits and concentration limits are met. The proposed rule would restrict the amount of LSA material in a Type A package and would mandate the use of a Type B package for quantities above the limit. Pursuant to the goal of compatibility with IAEA regulations, the NRC proposes to adopt these IAEA restrictions because "... internationally the new limit is considered to be a necessary safety requirement to limit the consequences of a severe transportation accident involving LSA materials". However, the necessity for such a limit in the domestic transport of LSA waste material cannot be demonstrated.

Based upon our analysis of the Supplementary Material for the proposed rule provided in the Federal Register and upon other documents such as Sandia Report SAND87-2808 (The Potential Consequences and Risks of Highway Accidents Involving Gamma-Emitting Low Specific Activity (LSA) Waste by R. M. Ostmeyer et al., 1988, 138 pages) and the NRC generic environmental impact statement (NUREG-0170, Final Environmental Statement on the Transportation of Radioactive Material by Air and Other Modes, 1977) the proposed limitation on LSA shipments is not warranted. Based on the information provided in these documents:

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1. The $2A_1$ quantity limit is more restrictive than the IAEA dose rate limit.

2. The IAEA limit is based on assumptions not supported by the available data.

3. The proposed limitation on solidified LSA materials in Type A packages is not needed because the public health and safety provided by the proposed rule is insignificantly different from that provided by the current Part 71.

4. Adopting these limits for LSA waste material in Type A packages will require a "significant ongoing cost". These increased costs are merely for the sake of IAEA compatibility and not for any significant radiological difference in public health and safety, an increase of two person-rem out of 9790 (NUREG-0170, Volume 1). This proposed change is economically counterproductive and is not consistent with good rule making.

5. The proposed rule does not consider the environmental impact of increasing the volume of waste to be disposed of as the result of the packaging requirements. This increase in the number of packages and in packaging materials is contrary to the volume reduction efforts of the commercial nuclear power industry, policies of the NRC, and one of the intents of Congress in the Low Level Waste Policy Act and Amendments.

6. The proposed rule does not consider the impacts on the ongoing efforts to develop state or regional low-level radioactive waste disposal facilities. Parameters such as transportation, number of shipments, and waste volume are major considerations in the planning, siting, design, and public acceptance of new disposal facilities. The Sandia Study concludes that at the 1 rem/hr at 1m IAEA package limit, hundreds to more than a thousand additional shipments would result. Because the proposed $2A_1$ limit is more restrictive than the 1 rem/hr at 1m limit, even more shipments could be expected. These increased shipments and the corresponding increase in traffic accidents involving radioactive waste would have a significant negative impact upon the public perception of activity at new disposal facilities.

The $2A_1$ limitation for LSA radioactive waste in Type A packages is discussed in more detail below.

The IAEA controls the amount of LSA material in a Type A package by a quantity limit as well as a dose rate limit (Paragraphs 311 and 422, IAEA Safety Series No. 6). The IAEA quantity limit on special form material in a Type A Package, A_1, is the lower of two quantities Q_A and Q_B. These quantities are obtained using the Q system dosimetric methodology which assumes a point source with the complete loss of package shielding. Q_B is the quantity of radioactive material, with a self-shielding factor of 3, which yields a beta dose equivalent rate to the skin at one meter of 1 Sv/h (100 rem/h). Q_A is the quantity, with no self-shielding, yielding a whole-body dose rate from gamma or X-rays at one meter of 0.1 Sv/h (10 rem/h). IAEA regulations also limit the dose rate from the unshielded package contents, for both special and normal form material, to 10 mSv/h (1 rem/h) at 3 meters. Based on the inverse square law, the point source A_1 quantity produces a dose rate only slightly higher than the 1 rem/h at 3 meters limit. But, by contrast, for non-point sources with considerable self-shielding, such as resins solidified in concrete, the A_1 limit would be conservative with respect to the dose rate limit.

The proposed rule incorporates neither of the IAEA limits for LSA material. The NRC staff, recognizing the inherent self-shielding of bulk sources, did not adopt the A_1 limit and, believing that it would be very difficult for the nuclear industry to apply a dose rate limit, did not adopt the 1 rem/h at 3 meters standard. Instead, the proposed rule sets a $2A_1$ quantity limit for LSA material in Type A packages as a close approximation to the quantity that equals the 1 rem/h dose rate at 3 meters.

We do not share the NRC's belief that compliance with the dose rate standard would be difficult. The nuclear industry could comply with a dose rate standard by utilizing the available software for performing dose-shielding calculations on either PCs or on mainframe computers. Therefore, the dose rate standard should remain a viable option if a limit were to be implemented.

Doubling the A_1 quantity does not accurately account for the self-shielding provided by bulk sources over a range of gamma energies. The values in attached Table 1 compare the $2A_1$ quantity to the quantities of a radionuclide which, when uniformly distributed in an unshielded 120 cubic foot resin-concrete monolith encased in a 1/4" steel cask liner, yield 1 rem/h at 3 meters, the IAEA standard, and 10 rem/h at 1 meter, the basis for the A_1 derivation. The calculations were performed using QAD, a generic name for a nationally recognized computer code utilizing the point-kernel technique for performing dose rate and shielding calculations. The 1 rem/h at 3 meter standard yields quantities 2.3 to 400 times larger than the proposed $2A_1$ values. This

demonstrates that the $2A_1$ quantity is not a close approximation to the IAEA standard and actually underestimates the quantity of a radionuclide which yields 1 rem/h at 3 meters.

In addition to the previously discussed point source assumption, the IAEA A_1 derivation also assumes the complete loss of package shielding during an accident. This assumption is not supported by accident data and by analyses reported in a recent Sandia National Laboratories study (Sandia Report SAND87-2808). This study examined the possibilities of various accident scenarios and calculated the radiological consequences assuming the complete loss of the package contents of unconsolidated resins. The report states that in the eight highway accidents involving Type A casks (as of November 1985), five of which resulted in overturning the cask or the cask and trailer together, the casks remained intact with no release of the contents. A stress and failure (where failure means the release of a significant quantity of radioactive contents) analysis of a cask for a 9 meter drop onto an unyielding surface produced two observations. First, that a corner drop is unlikely to produce a catastrophic failure. Second, although a head down impact onto the closure-head end of the cask could lead to failure of the closure bolts, such an impact was unlikely. However, should the closure bolts fail, with waste solidification an accident resulting in the complete loss of contents "... would be virtually impossible". Therefore, we conclude that the assumption of the complete loss of shielding for solidified LSA wastes is unduly conservative.

No Significant Difference in Safety at Significant Ongoing Cost

The NRC makes contradictory claims as to the health and safety benefits of the proposed rule. In the summary statement in the Backfit Analysis section of the supplementary material (53 FR 21556), the claim is made that the proposed rule will provide "... a substantial increase in the overall protection of the public health and safety ...." However, this claim contradicts information presented in the "Backfit Analysis" and "Finding of No Significant Environmental Impact" sections of the supplementary material. First, the NRC staff compared the findings of the latest survey of radioactive material shipments (Sandia Report SAND84-7174, 1985) to those of the generic environment impact statement (NUREG-0170, 1977) and concluded that the differences were so small as to not invalidate the conclusions and results of the 1977 document. Second, the NRC's comparison of the impacts of the proposed rule to those of NUREG-0170 found that the differences between the two to be insignificant with respect to accident and non-accident exposures as well as to nonradiological traffic injuries and deaths. Based on these findings, we conclude

that there is no basis for the statement that the proposed rule with its limit on the quantity of LSA material in a Type A package will produce a significant increase in public health and safety.

Based on its analysis, the NRC concludes that the proposed LSA limit would produce a significant ongoing cost. Similar conclusions were reached in the Sandia Study (SAND87-2808). We find little merit in adopting an international standard which adds significant ongoing costs and potentially significant negative impacts which were not considered without a concomitant increase in safety.

A_1 and A_2 Limits

Throughout the proposed rule, numerical values are given in both conventional units (rems and curies) and SI Units (sieverts and bequerels). The conversion of A_1 and A_2 bequerel values to curies results in several inconsistencies in Table A-1 and elsewhere. The curie A_1 values for Mn-54 and Cm-244 are an order of magnitude too high. The A_1 values for Pm-149 and Pm-151 are reversed in the tables. Also, the conversion to three significant digits in Table A-1 is not consistent. For example, the 2 TBq A_1 value for Au-196 is correctly converted to 54.1 Ci whereas the equivalent A_1 value for Bk-247 is incorrectly converted to 54.0 Ci. Similar mistakes, but with different orders of magnitude, occur for the following radionuclides: Am-241, Ba-131, Be-7, C-14, Cd-113m, Cf-251, Cs-137, Eu-147, Eu-149, and Fe-52.

Definitions

The term "inaccessible surface" in the SCO definitions needs to be defined more precisely. By the strict definition of "inaccessible", it would be impossible to comply with the limits in subparagraph iii of the SCO definitions. As written, the definitions require that the fixed "plus" the non-fixed radioactivity be less than a specified value. This total implies that both the fixed and the non-fixed are to be measured separately and summed. However, this cannot be done for a surface that is truly inaccessible. Therefore, the degree of inaccessibility should be defined.

Summary

Our primary objection to the proposed rule is the inclusion of a very restrictive limit on the quantity of LSA material in a Type A package. In the attempt to achieve regulatory simplicity in its quest for IAEA compatibility, the NRC proposes a limit more U.S restrictive than the IAEA limit. However, no need for such a limit is demonstrated and no technical basis for the proposed

limit is presented. Furthermore, the NRC's analysis reveals that the domestic health and safety impacts of the proposed rule are insigificantly different (a few person-rem) from those for the current Part 71 (9790 person-rem) and appears to ignore significant negative impacts. Additionally, a Sandia study (SAND87-2808) concludes that the current rule, whose limitations on the amount of LSA material in a Type A package is the dose rate external to the package or conveyances, provides adequate protection. Finally, based on cask, stress, and failure analyses, the Sandia report concludes that for special form materials such as solidified resins, the complete loss of package shielding, which the IAEA assumes in deriving its package limit via the Q methodology, is virtually impossible. Hence, we find that the proposed limit is technically overly conservative.

The legislated mandate to protect public health and promote safety should not be interpreted as a license to apply a limit without demonstrating that a limit is needed and without a technical evaluation to justify the proposed value of the limit. The proposed limit should be re-evaluated because of the the lack of evidence that the limit is needed and the lack of a technical justification for the proposed limit. If compatibility with the IAEA standard in this area is desired, the IAEA limit could be applied to LSA waste shipments which enter the international arena.

Very truly yours,

C. W. Fay
Vice President
Nuclear Power

TABLE 1

COMPARISON OF THE $2A_1$ QUANTITY TO THE CURIE CONTENT OF 120 CUBIC FOOT RESIN-CONCRETE MONOLITH REQUIRED TO YIELD THE SPECIFIED DOSE RATES

RADIONUCLIDE	CURIES[4]				
	$2A_1$	1R/H AT 3M[2]	$2A_1$ MULTIPLE	10R/H AT 1M[3]	$2A_1$ MULTIPLE
Ba-140	21.6	969	44.9	1,542	71.4
Ce-141	540	12,453	23.1	19,566	36.2
Ce/Pr-144	10.82	4,331	400	6,980	645
Co-58	54	222	4.1	357	6.6
Co-60	21.6	76	3.5	123	5.7
Cr-51	1,622	5,553	3.4	8,780	5.4
Cs-134	32.4	115	3.5	185	5.7
Cs-137	108.2	317	2.9	507	4.7
Fe-59	43.2	159	3.7	257	5.9
La-140	21.6	85.3	3.9	138	6.4
Mn-54	54	219	4.1	352	6.5
Nb-95	54	309	5.7	496	9.2
Sb-124	32.4	105	3.2	165	5.1
Sb-125	108.2	254	2.3	405	3.7
Zr-95	54	165	3.1	264	4.9

1. Density of concrete + resin = 1.92 g/cc. Monolith enclosed in a 1/4 inch steel cask liner.

2. Dose rate limit for contents of Type A package assuming point source.

3. Photon dose rate basis for calculating A_1 using IAEA Q methodology assuming point source.

4. Curies calculated using dose rate determined by QAD.