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ENVIRONMENTAL HEALTH AND SAFETY
UNIVERSITY OF WASHINGTON
Radiation Safety Office

November 18, 1980

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Docketing and Service Branch

Re: Comment on Proposed Rule, F.R. Vol 45, No. 197
p. 67018, Oct. 8, 1980
Docket No. PR 20

Dear Secretary:

I am writing in support of the proposed rules to allow alternate disposal methods for disposal of liquid waste, liquid scintillation waste and animal carcasses contaminated with H-3 and C-14. This will indeed relieve research institutions of a nagging and expensive problem.

As a professional Health Physicist who has been dealing with institutional waste for more than ten years, I am convinced that your action is appropriate. I am concerned, however, with several aspects of the proposal.

1. This proposal does not go far enough. Institutional radioactive waste can be divided into four major components: a) H-3 waste, b) C-14 waste, c) waste with T 1/2 less than 3 months, and d) waste with T 1/2 greater than 3 months and less than 3 years.

   According to the studies done by the University of Maryland, the percentage of volumes of waste in these categories are a) H-3 ∿ 60%, b) C-14 ∿ 4%, c) T 1/2 < 3 months ∿ 34%, d) T 1/2 > 3 months and < 3 years 2%. Four radionuclides dominate the waste in category c: I-125, P-32, Cr-51 and S-35.

   The relief that is offered will affect only part of institutional waste. The remaining amounts should be considered for similar relief. All waste forms containing H-3 and C-14 should be included. In addition, the short lived waste should be considered for some degree of relief.

2. Since the limits suggested will be restrictive at many institutions, the limits should be raised to more closely match or just exceed the needs of larger institutions. As an example, in 1979 the University of Washington

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disposed of 4.8 Ci of H-3 and 0.6 Ci of C-14. Much of this could have been put in the sewer under the proposed rules. But if we had a bit more activity, say 6 Ci of H-3 and 1.5 Ci of C-14, the remaining amounts above the proposed limits would require expensive disposal methods. I suggest that the limit for sink disposal should be increased to 15 Ci for H-3 and 3 Ci for C-14. This amount should not be limiting for any large institution, except perhaps NIH.

The present limit of 1 Ci would in theory allow 1 Ci of I-131. This is equivalent to 45,664 ALI's (Annual Exposure Limits, ICRP 25). The increase I have proposed is equal to 1065 ALI of H-3 and 408 ALI's of C-14 for a total of 1473 ALI's. The release of H-3 and C-14 at levels that better match the actual useage would not substantially increase the level of risk which is currently allowed.

3. The proposal should suggest that safe disposal of solid waste forms can be achieved at municipal land fill sites. All of the arguments for justifying this proposal also apply to solid waste as is mentioned in Item 1 above.

   Institutional waste (either as limited to those forms in the proposal or as I have proposed with broader limits) could be considered safe if it were deposited in municipal refuse sites which generally conform with EPA standards. The large volume of normal waste in proportion to the size of the community served by the institution would serve to dilute the waste. The short lived material would decay before any conceivable return to the biosphere. A specific statement in the regulation that indicates that this mode of disposal is judged to be safe would reduce any regulator opposition from local site managers.

As you see, I am in favor of this proposal as far as it goes. I will now turn to the justification that is presented for this change:

1. If any licensee were to present the argument of this proposal to justify an amendment, you would deny it. If one of my students prepared such a proposal as an exercise they would get a C+. The entire justification of this proposal is one of economic impact on research institutions and the consumption of valuable burial space. Facts about costs and cubic feet and gallons are present. But only declarative sentences are presented for the risk:

   "This change would result in a negligible addition to the level of these radioisotopes already present in the natural environment."

   "Because the amount of Hydrogen-3 and Carbon-14 that could be released to the environment as a result of this rulemaking is very small, and because calculations employing conservative assumptions indicate the dose to any exposed individual is likely to be much less than 1 millirem per year, the Commission believes that the rulemaking would have little adverse impact from a radiological health standpoint."

When will the Commission learn that declarations of safety are no longer acceptable to the public? What does "negligible" mean? Why not provide some numbers and leave the judgment of negligible to the readers? How many people are likely to receive 1 mRem? What is the man-rem estimation? What is the estimated amount of H-3 and C-14 that will be released by this action? The answers to these questions are not found in the Federal Register proposal nor in an August 1 draft of the Value/Impact Statement. I find this level of attention to health physics by the NRC very disappointing.

2. The Value/Impact statement is weak and incomplete. It justifies the need for this proposal - the value; but it does not address the risk - the impact, in a complete manner. The dose to an individual at 40 meters from an incinerator is estimated. But the population exposure that will result from every licensee in the country releasing the proposed amounts is not addressed. In fact, no estimation is even offered for the total release term. It should be obvious to the NRC that the population dose and estimation of risk a la BIER must be considered for long lived radionuclides such as H-3 and C-14.

   The large natural production rate is noted, but no numbers are offered. A comparison of the natural inventory with the expected release term would be most helpful. The dose from natural levels is well documented and could be easily extrapolated for this proposal.

   The dose to an individual from the increased release to the sewer was also indicated. Invalid reasoning is used, however, when conclusions are drawn. The dose is calculated for the annual release if it occurred in a single day. It is then concluded that since the release is not likely to occur in a single day, the dose would be much less than that calculated. Anyone with a basic knowledge of internal dosimetry knows that the total dose is directly proportional to the total activity of the source term and is independent of the rate of release. 1 Curie of C-14 released over a year will result in 1 mRem if it is released in a single day in 365 days. If EPA is worried about more than 4 mRem from drinking water, 1 mRem is a significant impact on the environment.

   As with the incinerator, the individual dose is calculated for sewer release but the population dose is not addressed. A man-rem estimation is not given.

   In summary, I am in favor of this proposal and further extension of this very realistic approach to waste disposal. But I am disappointed by the very casual approach to the risk analysis. The importance of the proposal is fairly well stated. It should not be jeopardized by an incomplete, inaccurate and weak analysis of risk.

Sincerely,

Michael J. O'Brien
Radiation Safety Officer
Certified Health Physicist

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