

August 10, 2001

Ms. Patricia Gorman, Deputy Director  
Conference of Radiation Control  
Program Directors, Inc.  
205 Capital Avenue  
Frankfort, KY 40601

Dear Ms. Gorman:

I am responding to the Conference of Radiation Control Program Directors, Inc. (CRCPD), letter of March 13, 2001, requesting that the Nuclear Regulatory Commission (NRC) review and comment on the revisions to the CRCPD Suggested State Regulation (SSR) for Control of Radiation, Part N - Regulation and Licensing of Technologically Enhanced Naturally Occurring Materials (TENORM) and the Rationale document.

As you know, NRC does not have legal authority over TENORM. Our authority over radioactive materials is limited to source, special nuclear, and byproduct materials under the Atomic Energy Act (AEA), or those materials that are generally associated with the nuclear fuel cycle. Nevertheless we have an interest in Part N and the standards that it establishes for TENORM. As a co-chair (with the Environmental Protection Agency) of the Interagency Steering Committee on Radiation Standards (ISCORS), we are responsible for facilitating consensus on allowable levels of radiation risk to the public and workers, and the promotion of consistent and scientifically sound risk management and assessment approaches for radiation protection. As a regulator of AEA materials, we are interested in having an appropriate degree of consistency in the regulation of radioactive materials, including TENORM. We have formed an Interagency Working Group that includes representatives from Federal and State agencies whose purpose is to explore the best approach to delineate their responsibilities with regard to these materials. The approaches developed in Part N should be useful in this effort. We recommend that both the Interagency Working Group and ISCORS be briefed on revised Part N because of the harmonization implications.

In our review of Part N, we have considered the standards and risk management approaches contained in our regulations, in particular 10 CFR Part 20 for radiation protection and 10 CFR Part 40, Appendix A, for the operation of uranium mills and the disposition of mill tailings. Because of the similarity of some TENORM to uranium mill tailings, and the significant quantities of each that must be managed, we believe that some of the requirements in Part 40 for mill tailings such as a greater reliance on institutional controls might be more appropriate (see Comment No. 4 in the enclosure) than our license termination criteria in 10 CFR Part 20, Subpart E. At the same time, we recognize that there are other considerations in regulating TENORM, and that other requirements in 10 CFR Part 40, Appendix A, are not applicable.

We have also considered the recommendations of the National Academy of Sciences' TENORM report<sup>1</sup> in developing our comments. Several appear to be particularly relevant.

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<sup>1</sup> National Academy of Sciences (National Research Council), 1999, "Evaluation of Guidelines for Exposures to Technologically Enhanced Naturally Occurring Radioactive Materials." Washington DC

First, the NAS concluded that, "The ALARA (as low as reasonably achievable) objective is the most important factor in guiding agency actions aimed at radiation protection—much more important than established regulatory limits or goals. . . . Judgments about what is reasonably achievable in controlling exposures to TENORM take into account such factors as the costs of reducing exposures in relation to the benefits in reduced health risks to the public and other societal concerns." In this regard, the report notes that negotiated cleanup levels at sites that take into account these other factors have corresponded to lifetime cancer risks of about  $10^{-4}$  to  $10^{-2}$ , which, at the high end, are above the risks associated with the dose limit contained in Part N. Given the importance of the ALARA concept, we believe some additional detail regarding its use should be provided in Part N (see Comment No. 1 in the enclosure). Second, the NAS committee found that ". . . differences in the guidelines for TENORM developed by EPA and other organizations are based essentially on differences in policy judgments for risk management." Risk management includes the establishment of risk goals or standards, and methods to achieve their implementation, such as reliance on long-term institutional controls, and the consideration of costs, as well as other factors. In developing Part N, CRCPD has made a number of policy judgments concerning risk management that are based on its knowledge of the industries that produce TENORM, and the costs and other factors that affect the development of criteria in a standard. We recognize that these may, in many cases, be different from those associated with the nuclear fuel cycle, and that approaches identical to ours are neither necessary nor appropriate in all cases. Finally, the NAS concluded: "Therefore, guidelines for TENORM must correspond to levels of naturally occurring radionuclides in the environment at which it is practical to distinguish the radionuclides resulting from human activities from those in the undisturbed natural background. Furthermore, determinations of practical levels for identifying and controlling TENORM must take into account the variability of natural levels in different environmental media, as well as the average levels." Part N includes limits on radionuclides that consider background levels of radiation.

We believe that Part N addresses these issues and represents a significant accomplishment by the CRCPD in establishing a model regulation for use by States. As the NAS noted in its study, many potentially important sources of public exposure to TENORM are not regulated by any Federal agency. Given the significant amounts of TENORM, (1 billion tons generated each year, and 60 billion tons of TENORM inventory in the U.S.), to the extent that Part N approaches are adopted by States, it will be useful in minimizing risks to the public from exposure to ionizing radiation from TENORM.

After you have had the opportunity to review our comments, NRC staff is prepared to discuss and review the comments with CRCPD staff. If you have any questions, or would like to arrange for discussion with NRC staff, please contact me or James Kennedy, Office of Nuclear Material Safety and Safeguards at (301) 415-6668 or e-mail: jek1@nrc.gov.

Sincerely,

*/RA/*

Paul H. Lohaus, Director  
Office of State and Tribal Programs

Enclosure:  
As stated

Patricia Gorman

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August 10, 2001

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STP-C-7

**NRC Staff Comments on March 13, 2001 Revisions to  
Suggested State Regulation (SSR)  
Part N - Regulation and Licensing of  
Technologically Enhanced Naturally Occurring Materials (TENORM)**

1. Although Part N was developed with knowledge of what is reasonably achievable in regulating TENORM, it does not explicitly address the use of the ALARA (as low as is reasonably achievable) in its criteria. As noted by the NAS in its TENORM report, the ALARA objective “is the most important factor guiding agency actions aimed at radiation protection—much more important than established regulatory limits or goals.” We recommend that a specification of ALARA principles and requirements appropriate to these materials be provided in Part N and/or its guidance.
2. We recommend that CRCPD consider the use of the term “average member of the critical group” rather than “reasonably maximally exposed individual,” in Section N.3. NRC, in its projections of future human activities, as well as many other organizations, uses the “average member of the critical group” approach recommended by the International Commission on Radiological Protection (ICRP), most recently in ICRP-77, to help ensure reasonableness in decision making. This critical group approach is used in NRC’s July 1997 license termination rule. Further, the use of an average concentration in the release criterion N.7.b is inconsistent with your definition of a “reasonably maximally exposed individual” which considers exposure to the maximum concentration.
3. The justification for exempting zircon, zirconia, and zircon products from Part N4.c needs to be strengthened. The rationale should state whether the exemption is for a specific industrial sector or all uses of these materials and address in more detail (for example with references) the basis for this exemption.
4. In our comments on the previous version of Part N, we stated that the use of institutional controls needed to be addressed in greater detail. Among the issues we raised were the need for some identification of the types of institutional controls that can be used and who will be responsible for implementing them in the future. The revised version of Part N no longer uses the term “institutional controls,” but has instead substituted a new undefined term, “longevity related controls” that can be relied on for confining TENORM or remediating sites. Based on correspondence with members of the Part N working group, “longevity related controls” include institutional controls such as deed restrictions, government ownership, etc. As we recommended in our comments on the previous version of Part N, the use and limitations of these controls needs to be better defined in the standard or its implementing guidance.
5. Part N is unclear on whether the dose standard in Section N.5d applies to the provisions for unrestricted use in N.7, or whether the criteria in N.7 by themselves are sufficient for release of facilities, equipment, and land. The standard should be clarified on this point.
6. The concentration standard in N.7.b. applies only to radium. The rationale should explain what consideration has been given to setting a concentration standard for other radionuclides.

7. Section N.7a states that facilities and equipment will be released for unrestricted use if levels are below the values listed in Appendix A. Appendix A contains surface contamination values that are identical to those provided in Regulatory Guide (RG) 1.86 and its equivalent, Fuel Cycle Policy and Guidance Directive FC 83-23. These values have been commonly used by industry in the past and we note that these values were developed primarily through consideration of detection sensitivity. Since the RG 1.86 values are not dose-based, NRC does not use these values for the release of facilities (i.e., buildings) under 10 CFR 20 Subpart E. Dose modeling is used to determine the surface contamination levels on building surfaces that correspond to NRC's 0.25 millisievert (25 millirem) per year unrestricted use limit. However, the NRC will continue to use the RG 1.86 values for the release of equipment and materials during operation, to the extent allowed under the specific licenses. NRC maintains that the use of RG 1.86 contamination levels for the unrestricted release of facilities and buildings is inconsistent with a dose-based rule. NRC is re-examining its approach to the control of solid materials. At this time, as we note in Comment No. 8, the National Academy of Sciences is studying this issue. NRC continues to evaluate license requests on a case-by-case basis using existing guidance.
  
8. Sec. N.7c., "Transfer or Release for Conditional Use," allows the conditional transfer of contaminated equipment for metal recycling as long as radiation exposure rates do not exceed 50 uR/h, including background. NRC is currently in the preliminary stages of examining its approach on controlling solid material and has deferred a final decision on whether to proceed with rulemaking pending completion of a study by the National Academy of Sciences on possible alternatives for release of slightly contaminated materials. At this time, the Commission has not reached a conclusion regarding a preferred alternative for control of solid material, including criteria for release of scrap metal for recycling. Therefore, we are not in a position to offer comment on this criterion.