

of conservatism is appropriate? (II.D.3.b.i)

13. Should disposal facility operators have the opportunity to calculate site-specific radionuclide concentration limits? For mobile radionuclides only? Based on specific practices to protect workers? (II.D.3.b.i, H.1)

14. What is the appropriate way to assess long-term protection? Is dose the appropriate measure? Is risk? Based on annual or lifetime exposures? What about radionuclide concentrations in the environment (as a basis for modeling)? (II.D.5)

15. What is the appropriate level of protection to derive waste concentrations (in terms of risk or dose)? Should the same level apply to all exposure scenarios? (II.D.5)

16. Should such a standard have different waste concentration limits for "dry" sites versus "wet" sites? What criteria should we use to differentiate between "wet" and "dry" sites? Is there another generic way to distinguish "better" sites? (II.D.3.b.ii)

17. Should we establish minimum site suitability requirements? What should they be? How would your suggested requirements make LAMW disposal more protective? (II.D.3.b.ii)

18. What is the appropriate timeframe for modeling? (II.D.3.b.iii)

19. How should we evaluate a post-closure disturbance of the disposal site? (II.D.3.f)

20. To what extent should bulk waste be included in this approach? As a generator, is bulk waste a significant proportion of your waste? (II.D.3.d)

21. Should such a rule require a specific waste form, such as solidified/stabilized? Should different standards apply to different waste forms, or should a generator be able to demonstrate the performance of a particular waste form? Should containers be required? Should there be special conditions for bulk waste? (II.D.4.b)

22. What types of solidification/stabilization would be most effective at containing radionuclides? What are the relative costs of these methods? (II.D.4.b)

23. Is the Class A maximum an appropriate additional control on radionuclide concentrations? What other methods might we use? (II.D.4.a)

24. Should a curie or volume limit apply to each disposal facility, in addition to radionuclide concentration limits? To each disposal cell? To individual radionuclides? An overall limit, or an annual limit? (II.D.4.c)

25. Is the "unity rule" an appropriate method to limit exposures? Under what circumstances might it not be

appropriate? How else might we achieve the same goal? (II.D.4.d)

26. How should the chemical toxicity of radionuclides, particularly those elements not addressed by RCRA regulations (e.g., uranium), be considered in developing waste concentrations? (II.D.5)

27. What regulatory approach should NRC take? Are there particular advantages or disadvantages to each? What aspects of LAMW disposal need special consideration? (II.F)

28. How would States and facilities implement the rule? What concerns would States need to have addressed? (II.H)

29. RCRA requires ground-water monitoring for hazardous constituents. How should ground-water protection be addressed for radionuclides?

30. What factors would States, generators, and disposal facilities consider in supporting or opposing (choosing not to use) a standard for LAMW disposal? How would you characterize your interest in this approach? What would increase or decrease your interest?

31. Is it appropriate for the generator to be responsible for documenting compliance with waste form requirements? What is the best way to ensure that radionuclide concentrations in waste comply with a standard? How might disposal facility sampling procedures need to be modified? (II.C.2, H.2.b)

32. What level of public participation is appropriate? (II.H.2.a)

33. Should volume averaging or "blending" be allowed? Under what conditions? (II.H.2.b)

34. How will LAMW disposal facilities be affected by the regional low-level waste compacts? (II.H.3)

35. Do you anticipate cost savings if the approach in this document were to be implemented? Where would you expect to see cost savings?

III. Is It Feasible To Dispose Other Low-Activity Radioactive Wastes (LARW) in Hazardous Waste Landfills?

Aside from low-activity mixed waste, there are a variety of other wastes with "low" concentrations of radionuclides, which are either unregulated or are subject to an inconsistent or uncertain regulatory framework. While some of these other low activity wastes may be mixed waste, we are widening the scope of consideration here to include both mixed and non-mixed waste within each of these categories. Wastes included in this category are residuals from the processing of uranium or thorium ore that NRC has determined are not subject to the Uranium Mill

Tailings Radiation Control Act of 1978 (UMTRCA) (we refer to these residuals in this document as "pre-UMTRCA byproduct material," much of which is subject to remediation under the Formerly Utilized Sites Remedial Action Program (FUSRAP)), certain categories of Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM) wastes, and Atomic Energy Act (AEA) radioactive waste presently exempted from regulation.

A. How Would the Proposed Disposal Concept Apply to Other Low-Activity Radioactive Wastes?

1. From a Technological Perspective

The RCRA-C technology itself offers no barriers to extending the disposal concept to other low-activity radioactive wastes. There is no physical difference between a radionuclide in low-activity mixed waste and the same radionuclide in pre-UMTRCA byproduct material or TENORM waste. It may in fact be easier to assess the protectiveness of the landfill technology for pre-UMTRCA byproduct material or TENORM wastes, as they will contain a much narrower range of radionuclides (primarily uranium, thorium, and radium, with daughter products), and lesser amounts of other components that could have an effect on the physical and chemical behavior of the radionuclides in the disposal system, than will LAMW. Waste form and volume issues may be more important for these other low-activity waste streams in assessing their behavior in the disposal system. From a safety perspective, the RCRA-C disposal system should be no less effective for these other waste streams than for LAMW.

2. Pre-UMTRCA Byproduct Material

The Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA) explicitly extended AEA jurisdiction to waste from the processing of uranium or thorium ore ("byproduct material" newly defined in section 11e.(2) of the AEA) and designated NRC to regulate this material at active processing sites (see section III.D, "Background Information Regarding Other LARW" for more detail). "Pre-UMTRCA" byproduct material is physically and chemically very similar to 11e.(2) byproduct material regulated by NRC pursuant to its responsibilities under UMTRCA. Pre-UMTRCA byproduct materials are residuals from ore processing activities mixed with soil or residual contaminants of building debris. They comprise the majority of the material being remediated from commercial and