

such a case, we would make assumptions about how close the worker is to the waste and for what length of time. We would also consider Department of Transportation requirements for transportation of radioactive material.

f. Post-Closure Site Use. The worker exposure modeling we envision would also help assure limited exposures to the public in the future, when all waste is buried and the site is closed. Because existing regulations allow RCRA sites to remain privately owned, it is possible that a site could be made available for some limited (surface) use after closure. People who casually traverse the site, or even spend hours at a time engaged in an activity, would not be expected to receive doses that exceed those calculated for the worker, and therefore such doses should be acceptable.

When a Subtitle C disposal facility closes, RCRA requires that the owner/operator file a survey plat with the local land-use authorities and the EPA Regional Administrator that shows the location of all hazardous waste units.¹¹ The survey plat must note that the future use of the land is restricted in accordance with applicable regulations. The deed to the property also must state that it has been used to manage hazardous waste and must cite the appropriate restrictions on future use. At a minimum, use of the property that will disturb the integrity of the final cover, the liner, or other parts of the containment system is not permitted unless necessary to protect human health and the environment, or if such use will not increase the potential hazard to human health and the environment.

The facility's owner or operator must construct the final closure cap to minimize infiltration and erosion and accommodate settling or subsidence with little maintenance (40 CFR 264.310, although active maintenance would be possible during the post-closure care period). Even in the event of some noticeable erosion of the cap, which would not occur until well after final closure, doses to an exposed person should remain well within acceptable public dose limits. Because of the multi-layer cap construction, erosion by itself should not be sufficient to expose the waste. We believe that the controls established by RCRA will be adequate to prevent intrusion, more extensive use, or disruption of the site. NRC may apply the 10 CFR part 20, subpart E, unrestricted use standard of 25 mrem to RCRA sites chosen for disposal of low-activity mixed waste. If

subpart E is applied, NRC might not impose additional facility requirements. On the other hand, NRC could decide that additional controls for such sites are necessary. Specifically, NRC could impose extended post closure care, restricted access after closure, limitations on land use and restricted site ownership requirements to such disposal sites. In this ANPR, we are assuming that such additional requirements will not exist.

Although we believe limited use of an undisturbed LAMW disposal site is not likely to present a significant risk to members of the public, we must consider the possibility of more extensive use involving a disturbance of the disposal cell. A common scenario for such an analysis involves a person who builds a house on the disposal site, where the construction involves excavation of some portion of the disposal cell, disturbing the waste layer and scattering of the contaminated material on the surface. The foundation and basement could be constructed at some depth in the disposal cell, and the resident could engage in small-scale crop production or raise some livestock on the contaminated site. Further, in locating water to support the resident, it might be assumed that a well is drilled through the disposal cell, involving some exposure to the driller(s) as contaminated material is brought to the surface.

This last possibility introduces the prospect that some disturbance of the cell would enhance transport of radionuclides to the off-site receptor. In past actions (e.g., geological disposal) we have addressed a person who uses heavy equipment, such as a drill rig, to penetrate the waste layer and cell liner, essentially creating a pathway for radionuclides to move through the unsaturated zone to the aquifer. If one assumes this type of drilling scenario, how would such a disturbance affect the release and transport of radionuclides? The most likely effect would be to create a pathway for the transport of material containing radionuclides through the unsaturated zone into direct contact with the aquifer. We would expect that only a very small volume of waste would be affected by such action. Whether the waste is solidified or not, the bulk of the radioactive material would be likely to stay within the confines of the original disposal cell. It is also clear that there would be no change in the way radionuclides are released from the waste material remaining in the cell. Once a radionuclide is released, however, the penetration may provide a preferred

pathway that decreases the travel time through the unsaturated zone.

If they could occur, the types of site disturbances described above would happen at some time in the future beyond the end of the RCRA post-closure period. We do not consider such disturbances to be very likely, given the site controls prescribed by RCRA regulations,¹² but must examine them as an extreme scenario. In its rulemaking for 10 CFR part 61, NRC concluded that the possibility of extensive inadvertent intrusion activities at near surface disposal facilities was not credible for waste in a structurally stable waste form (that is, as long as the waste remained in a form recognizably man-made, either in a stabilizing medium or container, intruders would determine that it should not be disturbed).¹³ If we assume that the intrusion occurs after any solidified waste has broken down or containers have degraded, this would likely be several hundred years beyond site closure, suggesting that shorter-lived radionuclides will have decayed. We note that hazardous constituents that do not degrade over time, such as heavy metals, will still be present in the disposal cell and may present a risk comparable to or greater than the risk from radionuclides. We also note that the closure requirements described above apply to Subtitle C facilities. As commenters consider the applicability of this approach to Subtitle D facilities (see section II.A.2), it would be appropriate to consider whether the same post-closure exposure scenarios would apply to those facilities.

4. Other Considerations Affecting the Risk Analysis

a. Use of Part 61 Classification System. For LLRW, the NRC system defines three waste classes (A, B, C) by the concentration of each radionuclide. Class A has the lowest concentrations of short- and long-lived radionuclides and is the least restrictive in terms of packaging requirements. Classes B and C have more stringent packaging and stabilization requirements. Class C waste must be located at least 5 meters below ground. NRC does not consider low-level radioactive waste that exceeds Class C concentrations ("Greater-than-Class C" waste) to be generally suitable for disposal in a near-surface facility. Some radionuclides do not move easily with ground water (or are very short-lived) and may also not be significant contributors to worker or post-closure

¹² 40 CFR part 264.

¹³ See Draft Environmental Impact Statement on 10 CFR part 61, NUREG-0782, Vol. 2, page 4-53, Sept. 1981.

¹¹ 40 CFR part 264, subpart G.