



HEALTH PHYSICS SOCIETY

“Specialists in Radiation Safety”

28 April 2004

Air and Radiation Docket
Environmental Protection Agency
EPA West Room B108
Mail Code 6102T
1200 Pennsylvania Ave., NW
Washington DC 20460

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Attention Docket ID No. OAR-2003-0095

Dear Sirs:

The Health Physics Society is pleased to comment in response to the Environmental Protection Agency's (EPA) Advanced Notice for Proposed Rulemaking (ANPR) regarding "Approaches to an Integrated Framework for Management and Disposal of Low-Activity Radioactive Waste: Request for Comment; Proposed Rule" published in the [Federal Register on November 18, 2003](#) (Volume 68 Number 222).

The Health Physics Society believes disposal of low-activity mixed waste (LAMW) at sites regulated under Subtitle C of the Resource Conservation and Recovery Act (RCRA), that follow the mandated engineering design and waste treatment and disposal practices, will ensure protection of public health and the environment.

The risks of human exposure to low dose and low dose-rate radiation are generally stochastic and reflect a large degree of uncertainty. Faced with this uncertainty, federal and state limits on human exposure to ionizing radiation are established in accordance with accepted recommendations from the International Commission on Radiation Protection (ICRP) and the National Council on Radiation Protection and Measurements (NCRP).

The risks of exposure to potentially carcinogenic chemicals are even less certain.^{1,2} While the target risks for exposure to radioactive and chemical carcinogens should be similar, given the greater uncertainty associated with chemical carcinogenesis, it may be

¹ See, e.g., NCRP, Report No. 96, "Comparative Carcinogenicity of Ionizing Radiation and Chemicals, March 1, 1989, page 130, "Because the gaps in our present understanding of carcinogenesis and the paucity of human data for most chemicals, risk assessments for chemicals are generally more uncertain than risk assessments for radiation."

² Also see, NRC, SECY-96-110, "Completion of Response to the Staff Requirements Memorandum, for SECY-95-249, on Risk Harmonization White Paper and Recommendations by the Interagency Steering Committee on Radiation Standards," (May 17, 1996), stating at Section 4, "Carcinogenic risk assessments for chemicals generally involve greater uncertainty than do carcinogenic risk assessments for radiation. The uncertainties are greater in estimating both exposure and the dose-response relationship."

appropriate that the protective barriers against incorporation of a chemical carcinogen into human exposure pathways be greater than for radioactive materials.

With this preface, the Health Physics Society supports the proposed rulemaking. We believe that disposal of properly defined LAMW, and low-activity radioactive waste (LARW) in general, in RCRA Subtitle C hazardous waste landfills with prescribed engineering design and associated RCRA requirements (e.g., waste treatment and waste form) will provide protection of public health and the environment.

The proper definition of LAMW and LARW should be consistent, on the basis of risk, with the risk of the hazardous waste with which they are disposed. The fate and transport of hazardous materials is a complex science. Radioactive materials will generally share the fate and transport parameters of the chemical compounds of which they are a part, except to the extent that radioactive decay hastens their degradation. One concept that can inform the definition of LAMW and LARW is half-life of chemicals and radionuclides.

A report by the California Office of Environmental Health Hazard Assessment states, with respect to chemical-specific soil half-lives, “Biodegradation as such is not expected to occur with metals and other elements because of their elemental nature. Therefore, as a default estimate the metal content of soil is assumed to decay with a half-life of 10^8 days [2.74×10^5 years] unless site-specific information is presented showing that soil conditions will result in the loss of soil metal content (such as from leaching or weathering).”³ Effectively, many of the hazardous materials (e.g., arsenic, beryllium, cadmium, chromium (VI), lead and mercury) at Subtitle C RCRA disposal facilities will have “half-lives” on the order of 10^5 years. Given this, it may be appropriate, as a starting point, to consider defining LAMW and LARW as a subcategory (based on half-life) of Class A Low Level Radioactive Waste (LLRW) (as defined in Title 10, Code of Federal Regulations (CFR), Part 61), in addition to setting concentration-based limits that could allow inclusion of the longer-lived constituents of LLRW, LAMW, and Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM).

In general, the Health Physics Society supports the recommendations of the NCRP for radiation protection of the public. The Society has stated in its Position Statement, Ionizing Radiation-Safety Standards for the General Public (Revised: June 2003), “Public radiation-safety standards should be based on specified values of dose rather than hypothetical estimates of risk. These standards should be expressed as an effective dose resulting from all exposure pathways. The Health Physics Society supports the establishment of an acceptable dose of radiation of 1 mSv/y (100 mrem/y) above the annual natural radiation background. At this dose the risk of radiation-induced health effects is either nonexistent or too small to be observed.”

In regards to individual sources of public exposure, such as disposal of LAMW and LARW, the Health Physics Society Position Statement states, “Constraints should be applied to each controllable source of public exposure to ensure that the dose limit for an

³ “Air Toxics Hot Spots Program Risk Assessment Guidelines, Part IV, Technical Support Document for Exposure Assessment and Stochastic Analysis,” Office of Environmental Health and Hazard Assessment, California Environmental Protection Agency, September 2000, Appendix G, pg. G-2.

individual from all controllable sources combined will be met. An effective dose of 0.25 mSv (25 mrem) in any year to individual members of the public is a suitable source constraint in most cases.” This criterion is consistent with the Nuclear Regulatory Commission’s (NRC) radiological criteria for license termination (10 CFR Part 20, Subpart E) that allows unrestricted use of a site following decommissioning of a facility. This dose-based criterion is justifiable and should be coupled to specific analysis to evaluate disposal of LAMW and LARW.

The Health Physics Society recommends that current versions of the RESRAD computer code, developed and widely used to assess impacts for the near surface disposal of wastes containing radioactive materials, be used for the analyses required for assessment of disposal of LAMW and LARW. If site-specific parameters are available, they should be used. If site-specific parameters are not available, reasonable default values should be used.

The Health Physics Society agrees that this ANPR is consistent with recent EPA action in promulgating Subpart N to 40 CFR Part 266 (“Conditional Exemption for Low-Level Mixed Waste Storage, Treatment, Transportation and Disposal”). (See 66 FR 27218, May 16, 2001). That action provided for conditional exemption resulting in a reduced regulatory burden for facilities that store, treat, transport, or dispose of mixed low-level waste (MLLW). Furthermore, that action permits, under certain conditions, certain mixed wastes to be exempted from RCRA regulation, leaving only the requirements of the Atomic Energy Act of 1954 (as amended) to govern their storage, treatment and transportation.

The ANPR asks several global questions and provides detailed discussion of each question by subheadings. The Health Physics Society’s responses to some of these questions are provided below.

II. How Can the Disposal of LAMW be Simplified?

The Health Physics Society believes that in the near term the EPA should promulgate a standard in coordination with the NRC allowing the disposal of LAMW in Subtitle C (hazardous waste) RCRA landfills. The standard should take the form of a primary dose-based and risk-informed standard from which specific analyses may be performed to demonstrate compliance for disposal of specific materials at specific sites. Such a coordinated standard has already been used for the National Emission Standards for Hazardous Air Pollutants (NESHAPS). For the long term, the HPS recommends that the EPA consider the recent report from the National Council on Radiation Protection and Measurements, “Risk-based classification of radioactive and hazardous chemical waste”, NCRP Report No. 139 (2002), as a framework for bringing radioactive and hazardous chemical waste under a consistent regulatory structure.

The current system of regulatory control of radioactive materials is severely fractionated with EPA, NRC and the individual states having authority under various legislation. This fractionated control leads to inconsistency, inefficiency and unnecessarily expensive public health protection policies, as discussed in the HPS Position Statement, “Compatibility in Radiation-Safety Regulations” (adopted January 1992, revised August 2000, reaffirmed March 2001). The promulgation of a clear regulatory standard under

which LARW can be disposed at Subtitle C RCRA disposal facilities will be a step toward a more efficient scheme of regulatory control over radiation exposure in this country. The Health Physics Society further believes that an appropriate rulemaking by EPA and NRC applying the classification framework recommended in NCRP Report No. 139 will achieve equal protection from the hazards of radioactive and chemical waste, while at the same time significantly reducing the effort (and cost) otherwise required to comply with multiple regulatory regimes.

The Health Physics Society supports the use of a risk-informed/performance-based approach in allowing disposal of LAMW and LARW at RCRA Subtitle C sites. The HPS believes that it is difficult to develop a predetermined set of concentration-based values that will apply in all situations. Subtitle C facilities are located in a variety of geohydrological regimes in a variety of locations around the United States. Consequently, one set of concentration values might not be appropriate or risk informed for all of these sites. Therefore, the Health Physics Society recommends a single reference dose-based standard for disposal of radioactive material. If, however, a standard is established based on reference concentrations that are considered protective of public health and safety at all sites, the EPA should allow alternative analyses using site specific conditions to assess performance of individual disposal sites.

The Health Physics Society believes that EPA draft regulations should explicitly address how its regulations will coordinate with Department of Transportation, NRC or Agreement State (AS) regulations regarding the transfer of materials that may be leaving licensed facilities. As such, the EPA is encouraged to include generic types of LAMW and LARW in the rulemaking that are exempt from any further regulatory controls. This recommendation is fully consistent with those specified in NCRP Report 139.

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

The use of a risk-informed approach that serves as the basis for evaluating the potential health risks attributable to land disposal of LAMW and LARW should be applied independent of the origin of the radioactive materials. As such, a risk-informed approach should be applied to natural occurring radioactive material (NORM), TENORM, natural and accelerator produced radioactive material (NARM), and other radioactive materials under consideration in this rulemaking. This is consistent with the findings and general guidance offered to the EPA and other sponsoring agencies from the National Academy of Science in the first of two reports (Report #116, Improving the Regulation and Management of Low-Activity Radioactive Wastes: Current Regulations, Inventories, and Practices *Interim Report*) and NCRP Report No. 139, Risk-Based Classification of Radioactive and Hazardous Chemical Wastes from the National Council on Radiation Protection and Measurements.

Thank you for the opportunity to provide you with these comments and recommendations as part of the rulemaking process.

Sincerely,

A handwritten signature in black ink, appearing to read "Kenneth R. Kase". The signature is fluid and cursive, with the first name being the most prominent.

Kenneth R. Kase, Ph.D., CHP