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Interim Policy and Guidance Pending Rulemaking for Control and Disposition of Technologically-Enhanced Naturally Occurring Radioactive Materials in Colorado

Rev. 2.1
Final Draft for Comment

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Colorado Department
of Public Health
and Environment

Hazardous Materials and Waste Management Division
Water Quality Control Division

Executive Summary

The purpose of this *Interim Policy and Guidance Pending Rulemaking for Control and Disposition of Technologically-Enhanced Naturally Occurring Radioactive Materials in Colorado* is to provide disposal policy, general guidance and suggested criteria for the control and release of technologically enhanced naturally occurring radioactive material (TENORM). Radioactivity is naturally present in rocks, soils, surface water and groundwater at trace concentrations. The radioactivity in TENORM is due to a few predominant radionuclides associated with two radioactive decay series, namely uranium-238 and thorium-232 and their respective decay products, and potassium-40. The interim policy describes a tiered, graded approach acceptable to the Colorado Department of Public Health and Environment (the Department) for disposal or reuse of TENORM, primarily from the treatment of drinking water, but may also be applied to other diffuse sources on a case-by-case basis. The guidance provides an overview of the issue and suggested approaches to controlling potential doses from TENORM. In a few isolated instances, a radioactive materials license may be required for control or disposal of TENORM.

Most industrial waste streams that contain small amounts of radioactivity are not classified as radioactive waste. Disposal of most commercial low-level radioactive waste (LLRW) is prohibited in Colorado. One Colorado facility is licensed to accept a subset of low-level radioactive waste (LLRW) that is limited only to TENORM. In Colorado, TENORM may be considered solid waste, depending on the dose and risk of the particular waste. In most instances, bulk TENORM will be able to be managed as a solid waste, whereas more concentrated forms may require licensure and management as radioactive material. Therefore, the final disposition of wastes containing TENORM are made using a risk-informed approach that depends on the amount of radioactivity in the waste, the associated risks to the public, workers, and the environment, along with other stakeholder (social) inputs using reasonable and prudent precautions. Since disposal of solid waste is largely regulated at the local level, suggested criteria for permitting authorities is presented. Detailed discussions of the regulations follow in later sections.

The Department has authority under numerous Colorado statutes and regulations that are relevant to control and disposition of TENORM, on which the interim Policy and Guidance are largely based. The statutes and regulations include: the *Colorado Solid Waste Act* [30 CRS 20, Pt.1], the *Radiation Control Act,* [25 CRS 11], *Hazardous Waste Commission Regulations* [6CCR 1007-3], *Basic Standards for Groundwater* [5CCR1002-41] and the *Basic Standards and Methodologies for Protection of Surface Water* [5CCR 1002-31], and the *Primary Drinking Water Regulations* [5 CCR 1003-1], the *Colorado Rules and Regulations Pertaining to Radiation Control* [6CCR 1007-1], the *Colorado Hazardous Waste Regulations* (for the underground injection control program), and the *Regulations Pertaining to Solid Waste Disposal Sites and Facilities* [6CCR 1007-2]. The Colorado programs for drinking water and solid waste generally mirror those of the EPA. For the Radiation program, Colorado is an Agreement state, and its radiation program is modeled after, but may go beyond the scope of, the U.S. Nuclear Regulatory Commission

program, which does not regulate NORM or TENORM. About a dozen states have specific regulations for TENORM, the others regulate it under their rules and regulations of radioactive materials.

The regulation of radioactive material is the responsibility of the Radiation Control Program (RCP) of the Hazardous Materials and Waste Management Division (HMWMD) of the Department. The authority to regulate TENORM is found in the general provisions *Radiation Control Act* [CRS-25-11-101], and the *Colorado Rules and Regulations Pertaining to Radiation Control* [6 CCR-1007]. Colorado has adopted dose-based limits of exposure to workers and the public derived from federal regulations. Workers at most facilities are considered members of the public, not radiation workers. Federal guidance provides an upper dose limit to members of the public from all industries and facilities, and provides for a site-specific approach to be taken. The As Low As Reasonably Achievable (ALARA) concept is also applied to reduce the potential dose as far below the limit as is feasible, economic, social and logistical concerns taken into account. In addition to risk, other stakeholder concerns were taken into account when deriving the policy and guidance.

The guidance also recommends a preventive approach such as engineered safety systems or operational procedures, to safely manage potential exposures to TENORM. The control of occupational exposures associated with TENORM is addressed by the guidance. Very few workers are likely to be exposed to the extent that they would be required to become trained radiation workers. Common industrial hygiene practices employed at the subject facilities, perhaps with some additional training, usually provide adequate protection from radioactivity.

It is anticipated that rulemaking will be pursued in the near future to codify the policy and accepted practices in the guidance. Since the issue of TENORM spans multiple industries and jurisdictions, it is not possible for a one-size-fits-all approach. Therefore, in addition to the suggested approach taken in this document, other approaches may be submitted to the Department for review.

The Department primarily developed this policy and guidance to help utilities and disposal contractors develop best practices for protection to workers, the general public and the environment from radioactivity concentrated as a result of radionuclide removal from drinking water, and is based on existing practices of the Department. It is designed to be a companion document to the Environmental Protection Agency (EPA) "*A Regulators' Guide to the Management of Radioactive Residuals from Drinking Water Technologies*" (EPA 2005). It may be expanded to other industrial sectors (i.e., oil and gas, uranium overburden) as needs arise and resources become available.

The policy and guidance do not apply to common activities, such as tilling or plowing for agricultural purposes and preparation and grading of sites for construction. It is concerned with practices and operations that might concentrate and relocate radioactivity or make radioactivity more accessible such that members of the public potentially may receive doses that would warrant the application of appropriate protective measures and corrective actions.

The last documented review of CPDHE policy regarding the handling and disposition of TENORM, and specifically water treatment residues, was conducted in 1988. Since that time, numerous changes in national and state regulations and policies have occurred on how residuals are handled and disposed. A number of federal and state statutes, regulations and guidance documents are the basis for the criteria in the disposal policy and recommended practices in this guidance. Work on the revised policy began in 2003. A stakeholder process was used in 2005 to develop input for the first draft, which was issued in January, 2006. Comments were received on the first draft through June 2006, leading to a major rewrite, which yielded this document, which is also consistent with existing policy and approach. Concurrent with the comment and rewriting period, the Rocky Mountain Low-Level Radioactive Waste Board took up the issue of diffuse TENORM and made modifications to its rules, which are reflected in this draft. Also, the Nuclear Regulatory Commission has issued guidance to provide enforcement discretion for utilities that possess uranium in source material concentrations (USNRC 2006). Under current regulations, utilities that possess uranium in source material concentrations are required to obtain a specific radioactive materials license.

The primary method of distribution of the document will be through electronic files. Therefore, acronyms and references for both the Policy and the Guidance are consolidated into the same listings, and hyperlinked.