DEQ
Montana Department of Environmental Quality

TECHNOLOGICALLY ENHANCED NATURALLY OCCURRING RADIOACTIVE MATERIALS (TENORM)

The basics: what is TENORM?

NORM stands for "naturally occurring radioactive material"—in other words, a substance that naturally contains one or more radioactive isotopes, also called radionuclides. NORM is present at low levels in soils and rocks. The amount of radioactivity in a material is expressed in units of picocuries per gram (pCi/g).

TENORM is NORM whose radionuclide concentrations are increased by, or as a result of, past or present human practices. TENORM does not include background radiation or the natural radioactivity of rocks and soils. TENORM is not federal Nuclear Regulatory Commission (NRC) licensed material. TENORM is not nuclear waste.

Why is Montana regulating TENORM?

DEQ's mission is to protect public health and the environment. This includes ensuring waste is properly disposed of in the state of Montana. DEQ's responsibility includes proper management of TENORM waste facilities.

There are no federal regulations to guide proper management of TENORM wastes. It is up to individual states to regulate TENORM waste. DEQ has been fine-tuning environmentally protective TENORM rules that are achievable. Our metered approach ensures that careful attention is given to the proper management of this waste stream.

Under some circumstances, TENORM may present external and internal radiation health risks to humans. The potential risk depends on the concentrations of radionuclides in the materials accessible to the environment.

TENORM poses a potential radiation health risk not only from direct radiation exposure, but also from inhalation or ingestion of dust particles associated with the material. Proper landfilling of TENORM waste, such as requiring daily cover, dust monitoring, and dust control, minimizes the potential radiation dose associated with radionuclides. Dose rate monitoring can be used to detect any radiation that exceeds the limits established to protect human health and the environment.

Existing TENORM regulation in Montana

Existing Montana landfill regulations effectively prescribe siting, design and some operational requirements for TENORM wastes. The proposed rules would provide additional regulation specific to the management of TENORM wastes.

In Montana, solid waste classifications depend on the waste's physical and chemical characteristics and their potential to cause environmental degradation or public health hazards. The classification determines the degree of care required in handling and disposal.

TENORM is a "special waste," defined as "a solid waste that has unique handling, transportation, or disposal requirements to ensure protection of the public health, safety, and welfare and the environment." (75-10-802(8), MCA) Special wastes require management at a Class II solid waste management system, which are required to use the most stringent controls of any solid waste management system to ensure the continued protection of human health and the environment.

DEQ has adopted specific rules for managing other special wastes—such as petroleum impacted soils and composting.

Recognizing that TENORM waste may require more attention, DEQ developed specific guidance for TENORM waste management several years ago. The guidance was based on TENORM management practices developed in other states such as North Dakota, Texas, Ohio, Illinois, and Pennsylvania in addition to consultation with health physicists experienced in TENORM management.

The guidance is now being formalized into rule. Specific TENORM rules would provide additional requirements to ensure human health and the environment are protected from the impacts associated with TENORM waste.

The process: Developing and adopting TENORM rules

In developing TENORM rules, DEQ reviewed model TENORM rules published by the Conference of Radiation Control Program Directors (CRCPD), a national non-profit, non governmental organization.

To create a balanced rule package, DEQ staff also participated in the Association of State & Territorial Solid Waste Management Officials (ASTSWMO) Radiation Task Force, collaborated with Region 8 States (ND, SD, CO, WY, UT, MT), and vetted the draft rules through the State Review of Oil and Natural Gas Environmental Regulations (STRONGER) to compare with their guidelines.

Comparison of TENORM waste management in Region 8 States

State	Concentration Limit	Rule or Guidance
North Dakota	50 pCi/g	Rule
Wyoming	50 pCi/g	Guidance (in the process of developing rules)
Colorado	50 pCi/g	Guidance (in the process of developing rules)
Utah	Concentration limit not specified	No rules or guidance
South Dakota	Concentration limit not specified	No rules or guidance
Idaho	Concentration limit not specified	No rules or guidance

DEQ also retained the services of a Health Physicist who has worked professionally for many years in this area of science.

The initial proposed TENORM waste management rules were published by the Montana Secretary of State on Aug. 18, 2017. The purpose of these rules was to provide specific management criteria for TENORM wastes to supplement the existing requirements for special waste management systems.

Specific TENORM rules would provide additional requirements to ensure human health and the environment are protected from the impacts associated with TENORM waste. The proposed rules included safeguards to protect human health and the environment such as: acceptance criteria, prohibitions, design and siting criteria, operation and maintenance plans, ground water monitoring, liquid restrictions, closure and post-closure care requirements, financial assurance, and spill reporting requirements.

DEQ held two public hearings and received valuable comments. The initial 60-day public comment period was extended another 30 days due to public interest. Due to the amount of varied interest and comments, DEQ decided not to finalize the initial proposed rules.

Following the initial effort, DEQ organized a TENORM stakeholder workgroup to further discuss and refine draft rules. The workgroup included participants from non-governmental organizations, industry, local government, science, and citizenry.

TENORM workgroup roster for Oct. 16, 2018 in Billings, MT

Name	Organization
Dick Iverson	Northeast Land and Mineral Owners Association
Stephanie Beckert	Great West Engineering, Inc.
Jason Rittal	Montana Association of Counties
Patty Whitford	Richland County Concerned Citizens Coalition
Seth Newton	Northern Plains Resource Council
Dustin Johnson	Oasis Petroleum
Chad Bauer	Montana Solid Waste Contractors
Jan Johnson	Tetra Tech, Inc.
Mark Franks	Oaks Disposal, LLC
Catherine Card	Independent
Duane Mitchell	Richland County Commissioner
Beki Brandborg	Facilitator
Ed Thamke	DEQ
Rick Thompson	DEQ
Emily Ewart	DEQ
Norm Mullen	DEQ

The workgroup reviewed the draft rules and provided input at a facilitated TENORM workgroup meeting that was held on Oct. 16, 2018 in Billings, MT. Members of the public were welcomed to watch and to provide input. DEQ made revisions based upon feedback provided by the group.

The second proposed TENORM rule package was published by the Secretary of State on Aug. 23, 2019 (MAR Notice No. 17-406) and included similar safeguards as were proposed in the initial rule proposal. The formal public comment period ended Oct. 21, 2019. Two formal public hearings were held during the comment period. One meeting was held in Glendive on Sept. 24, 2019 and the other meeting was held in Helena on Oct. 10, 2019.

In response to comments received on the proposed rules, DEQ decided to propose amendments.

The Secretary of State published a supplemental notice outlining the proposed amendments on Jan. 31, 2020.

Proposed amendments to draft TENORM rules

Specifically, in the supplemental notice, DEQ proposed to:

- Lower the radionuclide concentration limit from 200 to 50 picocuries per gram (pCi/g) for the acceptance of TENORM waste at a TENORM waste management system.
- Lower the gate screening exposure level from 200 to 100 microroentgen per hour (µR/hr), excluding background, for all incoming loads at a TENORM waste management system.
- Remove the requirements for calculating a rolling average of the radionuclide concentration of waste in a TENORM waste unit. The amended lower radionuclide acceptance limit makes it unnecessary to require the average concentration within the landfill to not exceed 50 pCi/g because no loads above that level will be accepted.
- Modify the requirements for filter media:
  - The concentration of incoming loads of filter media will be verified at the gate and screened for exposure level (as proposed in the Aug. 23, 2019 rules);
  - Filter media must comply with more intensive characterization requirements than other types of TENORM waste. See "Requirements for the Characterization of TENORM Wastes," Montana DEQ Solid Waste Program (as proposed in the Aug. 23, 2019 rules); and
  - No longer require random inspections of filter media because random inspection of all incoming waste will be required in Operation and Maintenance plans.
- Change the requirements if the total effective dose equivalent limit of 100 mrem/year is exceeded at the boundary of the TENORM waste management system. Under the proposed amendments, the owner or operator must:
  - Immediately stop accepting TENORM waste;
  - Notify DEQ within 24 hours;
  - Initiate a corrective action plan (this is the same requirement that was in the Aug. 23, 2019 notice); and
  - Follow closure and post-closure care plans, if deemed necessary by DEQ to protect human health and the environment (this is also the same requirement from the Aug. 23, 2019 notice).

For more detail on the reason behind the proposed changes, please see the supplemental notice at: https://deq.mt.gov/DEQAdmin/dir/legal/no_hearing

The public comment period for the supplemental notice closed on March 2, 2020. DEQ received more than 500 comments, most in support of the revised concentration limit and gate screening limit and some opposed to the changes.

Status and next steps

DEQ is currently reviewing and responding to public comments as well as preparing a final adoption notice according to Montana Administrative Procedures Act (MAPA) requirements.

DEQ plans to file an adoption notice with amended proposed rules in late-May 2020.