

BEFORE THE DEPARTMENT OF ENVIRONMENTAL QUALITY
OF THE STATE OF MONTANA

In the matter of the adoption of a new)	SUPPLEMENTAL NOTICE OF
subchapter codifying New Rules I)	PROPOSED ADOPTION
through X for technologically)	
enhanced naturally occurring)	(SOLID WASTE MANAGEMENT)
radioactive material (TENORM))	
waste)	

TO: All Concerned Persons

1. On August 23, 2019, the Department of Environmental Quality published MAR Notice No. 17-406 pertaining to the public hearings on the proposed adoption of the above-stated rules at page 1239 of the 2019 Montana Administrative Register, Issue Number 16.

2. The department will make reasonable accommodations for persons with disabilities who wish to participate in this rulemaking process or need an alternative accessible format of this notice. If you require an accommodation, contact Sandy Scherer, Legal Secretary, no later than 5:00 p.m., February 24, 2020, to advise us of the nature of the accommodation that you need. Please contact Sandy Scherer at the Department of Environmental Quality, P.O. Box 200901, Helena, Montana 59620-0901; phone (406) 444-2630; fax (406) 444-4386; or e-mail sscherer@mt.gov.

3. In response to comments received on the Notice of Public Hearing on Proposed Adoption, MAR Notice No. 17-406 (original notice), the department is proposing changes to its originally proposed TENORM rules. Specifically, the department is proposing to lower the radionuclide concentration (picocuries per gram – pCi/g) limit for the acceptance of TENORM waste at a TENORM waste management system; lower the maximum gate screening exposure level (microrentegen per hour - μ R/hr); remove the requirements for calculating a rolling average of the radionuclide concentration of waste in a TENORM waste unit; modify the requirements for filter media; and modify the requirements if the total effective dose equivalent (milliroentgen equivalent man – mrem) limit is exceeded at the boundary of the TENORM waste management system.

The department believes these are significant changes to the original notice and is reopening the public comment period with respect to the changes set forth in this supplemental notice only. Please provide comments only to this supplemental notice and not to the original notice. The department is continuing to review the comments and information submitted in response to its original notice, and the department anticipates other changes to the proposed rules at the time of adoption in response to the comments it has received to date. Timely comments previously submitted on the original notice, as well as comments received in response to this supplemental notice, will be addressed in the adoption notice for the proposed rules.

4. The department proposes to amend the following proposed rules with the following changes from the original notice, new matter underlined, deleted matter interlined:

NEW RULE III TENORM WASTE MANAGEMENT SYSTEM LIMITS AND RESTRICTIONS (1) Except as provided in (2), the owner or operator of a

TENORM waste management system shall ensure that:

(a) TENORM waste entering the system does not exceed a gate screening level of ~~200~~ 100 microrentgen per hour ($\mu\text{R/hr}$), excluding background, in accordance with ~~[NEW RULE VI](1)(b)~~;

(b) TENORM waste entering the system does not exceed a concentration of ~~200~~ 50 picocuries per gram (pCi/g) of combined radium Ra-226 and Ra-228 determined by the waste characterization requirements in ~~[NEW RULE VI](1)(d)~~; and

~~(c) the average concentration in a TENORM waste unit does not exceed 50 pCi/g of combined radium Ra-226 and Ra-228 in accordance with [NEW RULE VI](1)(l); and~~

~~(d)~~(c) the total effective dose equivalent (TEDE) contributed by the TENORM waste management system does not exceed 100 millirem per year (mrem/y), excluding background radiation, for a hypothetical member of the public who is at the boundary continuously with no shielding for a year, as monitored in accordance with ~~[NEW RULE VI](1)(m)(l)~~.

(2) TENORM surface-contaminated objects are not subject to the waste characterization requirement in (1)(b), but must not exceed ~~a gate screening level of 100 microrentgen per hour ($\mu\text{R/hr}$), excluding background radiation, in accordance with [NEW RULE VI](1)(b)~~ the gate screening level in (1)(a).

(3) and (4) remain as proposed.

~~(5) The owner or operator of a TENORM waste management system shall conduct random inspections to ensure that incoming loads of filter media do not exceed 200 pCi/g, excluding background radiation.~~

~~(6) If a random inspection detects an exceedance of the limit in (5), the owner or operator shall reject the load.~~

(7) remains as proposed but is renumbered (5).

~~(8)~~(6) If the owner or operator of a TENORM waste management system or the department determines that ~~the combined average concentration of 50 pCi/g in a TENORM waste unit has been exceeded, or that the TEDE limit of 100 mrem/y, excluding background radiation, assessed at the licensed boundary has been exceeded,~~ the limit in (1)(c) has been exceeded, the owner or operator shall:

(a) immediately stop accepting TENORM waste;

~~(a)~~(b) within ~~5 days~~ 24 hours after the determination, or notification by the department, place a notice in the operating record indicating the exceedance and notify the department electronically or by telephone that this notice was placed in the operating record; and

~~(b)~~(c) within 15 days after the determination, or notification by the department, submit for department approval a corrective action plan and follow the closure and post-closure care requirements of [NEW RULE VIII] if determined necessary by the department to protect human health and the environment.

~~(9)~~(7) The corrective action plan required in ~~(8)(b)~~ (6)(c) must:

(a) include corrective measures that will enable the TENORM waste management system to meet the requirements in (1)(c) ~~and (d)~~; and

(b) prohibit the acceptance of TENORM waste until the corrective measures have remedied the exceedance; and

~~(b)(c)~~ establish a department-approved timeframe on a case-by-case basis for implementing the proposed corrective action plan.

(10) and (11) remain as proposed but are renumbered (8) and (9).

AUTH: 75-10-204, MCA

IMP: 75-10-204, MCA

REASON:

Proposed Lowered Acceptance Concentration Level of 50 pCi/g and Elimination of Separate Rolling Average in TENORM Waste Unit: In the original notice, the department proposed a maximum combined concentration limit within a TENORM waste unit of 50 pCi/g, but proposed to allow TENORM waste management systems to accept individual loads of TENORM waste with concentrations up to 200 pCi/g. In proposing this approach, the department noted that allowing disposal of an occasional load of TENORM waste higher than 50 pCi/g would discourage illegal dumping while maintaining protection of human health and the environment, as six years of data collected by the department indicates that most incoming loads of TENORM waste are lower than 50 pCi/g.

After issuing its original notice, however, the department has been able to determine more precisely the complexities and variabilities involved with implementing a rolling average of 50 pCi/g with an upper acceptance limit of 200 pCi/g. Given these complexities and uncertainties, the department is amending (1)(b) to establish a maximum acceptance concentration of 50 pCi/g for all TENORM waste and is eliminating the separate rolling concentration average within the TENORM waste unit as was set forth in (1)(c).

By proposing a fixed upper acceptance limit, the department is addressing concerns raised regarding implementation and enforcement of the limits proposed in the original notice. The department originally proposed allowing each facility to establish its own procedures for ensuring the 50 pCi/g average in-place concentration would not be exceeded because there is no standardized method for calculating the in-place average concentration of TENORM waste within a TENORM waste unit. After further consideration, the department has determined that not having a standardized method would not provide the consistency needed for the department to ensure compliance. Therefore, the department is proposing to eliminate the need for the landfill operator to calculate a running average of the radium concentration in a TENORM waste unit because all accepted waste must have a combined radium concentration at or below 50 pCi/g. Any load above 50 pCi/g would be rejected for disposal at a TENORM waste management system.

A fixed limit of 50 pCi/g provides greater certainty and a less confusing regulatory structure for owners and operators of TENORM waste management systems. Incoming loads of TENORM waste would either pass or fail the 50 pCi/g acceptance limit, and owners and operators of TENORM waste management

systems would no longer be required to create procedures for ensuring an average combined concentration of 50 pCi/g within the TENORM waste unit. Removing this additional calculation would streamline recordkeeping and the determination as to whether an individual load of TENORM waste may be accepted. Additionally, generators and transporters of TENORM waste would have the added certainty that all waste meeting the acceptance levels under (1)(a) and (1)(b) may be accepted at a facility.

The amended proposed rules also assist with regulatory oversight over TENORM waste management systems. The department would not have to account for various methods that may be used to ensure the rolling average concentration within each TENORM waste unit is maintained. The amended proposed rules also make it easier for the department to verify and enforce the limit proposed in (1)(b) by reducing the number of variables associated with maintaining an average concentration with the TENORM waste unit.

Setting a static upper acceptance limit of 50 pCi/g also would decrease the annual dosage in mrems to landfill workers because workers would not handle TENORM waste over 50 pCi/g. The landfill worker is assumed to be the most exposed individual. An average concentration of 50 pCi/g combined radium was shown to be protective of the worker using a RESRAD dose assessment code and applying reasonable exposure factors for the worker. A fixed upper limit provides greater assurance that the 100 mrem per year dose to a member of the public would not be exceeded.

Establishing a fixed upper limit would also provide consistency with how neighboring states are regulating or plan to regulate TENORM waste. The department received approximately 730 comments requesting that the department keep the upper concentration limit at 50 pCi/g for incoming loads of TENORM waste at a TENORM waste management system, with most of these comments noting the differences between the department's original notice and rules promulgated by North Dakota. Since publication of the original notice, the department has become aware of neighboring states initiating rulemaking limiting the upper concentration to 50 pCi/g. Having an acceptance limit consistent with neighboring states would discourage Montana from being targeted for disposal of higher concentration waste from those states. Having an upper limit of 50 pCi/g provides consistency in Montana for the acceptance of TENORM waste in the absence of federal requirements regarding the disposal of TENORM.

Because the department is removing the flexibility of the original notice for TENORM waste management systems to be able to accept an occasional higher load up to 200 pCi/g, the department remains concerned with the potential for illegal dumping of TENORM waste that exceeds the acceptance limits of these amended proposed rules. To address this, the department will work with stakeholders and neighboring states to address the issue of illegal dumping and how to ensure that higher concentration loads will be disposed of at proper facilities that are licensed to accept loads higher than 50 pCi/g. The department invites comments on how to address this potential issue.

Proposed Lowered Uniform Gate Screening Exposure Level of 100 μ R/hr: In conjunction with the changes to the waste acceptance limit in (1)(b), the department

is also amending proposed (1)(a) and (2) to establish a uniform gate screening level of 100 $\mu\text{R/hr}$, excluding background, for all incoming loads of TENORM waste, including TENORM surface-contaminated objects. The department had originally proposed a gate screening level of 200 $\mu\text{R/hr}$ for TENORM waste, with a separate 100 $\mu\text{R/hr}$ gate screening level for TENORM surface-contaminated objects. After receiving comments on the original notice and consulting with the department's retained health physicist, the department now believes a single, uniform gate screening level of 100 $\mu\text{R/hr}$, excluding background, is reasonably necessary given the proposed changes in (1)(b).

Under the proposed rules, the owner or operator of a TENORM waste management system may accept an incoming load of TENORM waste only if the load meets both the waste characterization requirements of (1)(b) and the gate screening requirements of (1)(a). The determination as to whether the load meets the 50 pCi/g combined radium limit in (1)(b) is made based upon the waste characterization documentation from a laboratory that the incoming load does not exceed 50 pCi/g. Having a separate gate screening limit would provide an additional level of confidence that the radium concentrations of incoming loads of TENORM waste do not exceed 50 pCi/g. It also provides a method to test TENORM surface-contaminated objects, which cannot be reliably characterized given the nature of that material. Establishing a single gate screening level rather than a level dependent on the type of load would eliminate landfill operator uncertainty, as loads would no longer be subject to separate gate screening levels depending on the type of waste in the load.

As noted in the Tetra Tech Report prepared by the department's retained health physicist ("Development of TENORM Rules for the State of Montana," Tetra Tech, 2016, available at <http://deq.mt.gov/Land/solidwaste> or by contacting the department's Solid Waste Program at (406) 444-5300), the estimated exposure rate from an infinite plane source with Ra-226 and Ra-228 in full equilibrium with their decay products and at relative concentrations of 75 percent and 25 percent would be approximately 2.1 $\mu\text{R/hr}$ per pCi/g. An infinite plane source is a hypothetical scenario used by health physicists to calculate maximum exposure rates. While calculating exposure rates using an infinite plane source sets an outer limit for what the maximum exposure could theoretically be, a TENORM waste management system would not be receiving a flat load of waste that stretched infinitely. With that in mind, at 50 pCi/g, the maximum exposure rate for an infinite plane source with Ra-226 and Ra-228 in full equilibrium would be approximately 110 $\mu\text{R/hr}$. The fraction of equilibrium is a complex function of the time since separation of the radium isotopes. The radium in most loads would not be at equilibrium or from an infinite plane source so the exposure rate would be significantly lower than the maximum exposure rate for an infinite plane source with Ra-226 and Ra-228 in full equilibrium.

The department notes that while the gate screening limit in (1)(a) is useful as an added layer of protection to the public, it should not be used to assess the total annual dose to a landfill worker. The dose depends on the concentration of combined radium accepted by the landfill. The RESRAD dose analysis conducted by the department's consultant and other experts in the field of health physics demonstrated that the combined radium concentration of 50 pCi/g is protective of

members of the public, including the landfill worker, who is at more risk due to spending more time with the waste material and being in closer proximity to the waste.

The proposed gate screening level of 100 μ R/hr is comparable to North Dakota's gate screening requirement under North Dakota Admin. Code \S 33-20-11-01(2), which sets a maximum exposure level of 100 μ R/hr for equipment contaminated with TENORM. In this supplemental notice, the department is proposing not only that TENORM surface contaminated objects be subject to the gate screening level of 100 μ R/hr, excluding background, but also that all TENORM waste be subject to this upper exposure limit.

Proposed Modifications of Requirements for Filter Media: In conjunction with the other changes to the proposed rules in this supplemental notice, the department is modifying the requirements for filter media, including removing the random sampling of filter media proposed in NEW RULE III(5) and (6) of the original notice. The department notes that, under the proposed rules, random inspections of incoming loads would still be required under NEW RULE VI(1)(n) to protect human health and the environment.

Under the proposed rules, TENORM waste may not be accepted at a TENORM waste management system without concentration results from a laboratory. The concentration results would be verified at the gate prior to disposal, and any results over 50 pCi/g would be refused for disposal. In addition, TENORM waste that exceeds the gate screening limit of 100 μ R/hr, excluding background, would also be rejected. Given these dual requirements that are more stringent than the original notice, in conjunction with NEW RULE VI(1)(n), additional random sampling of filter media is not reasonably necessary to protect human health and the environment.

Moreover, 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 (revised August 2019). Pursuant to those procedures, filter media must be characterized by collecting and analyzing at least one random composite sample that consists of five representative sub-samples per 20 tons or less for filter media generated from the same source, whereas other TENORM waste must be characterized by collecting and analyzing at least one composite sample that consists of five representative sub-samples per 200 tons or less of TENORM waste material generated from the same source.

Proposed Requirements if the TEDE Boundary Limit Is Exceeded: In response to comments received on the original notice, the department is amending proposed (6) to require that a TENORM waste management system stop accepting TENORM waste in the event the TEDE limit in (1)(c) is exceeded at the boundary. The department is also amending proposed (7)(b) to require that the TENORM waste management system not accept TENORM waste until the exceedance has been remedied. The department is proposing these to be able to ensure that corrective actions can remedy the exceedance and require the TENORM waste management system to follow closure and post-closure plans if necessary to protect human health

and the environment. The department is also proposing specific requirements for how an owner or operator must notify the department of an exceedance of the TEDE limit to provide clarity and avoid confusion.

The department also agrees with public comments that 24 hours is a reasonable timeframe to notify the department by telephone or electronically. The department's previous experience working with waste management systems has demonstrated that 24 hours is enough time for a facility to notify the department. Requiring notice within 24 hours would allow the department to act more quickly on working with the owner or operator of the TENORM waste management system to implement a corrective action plan and follow a closure and post-closure care plan, if necessary to protect human health and the environment.

NEW RULE VI OPERATION AND MAINTENANCE (1) through (1)(k) remain as proposed.

~~(l) procedures developed by a health physicist for monitoring of TENORM concentrations in a TENORM waste unit. The operation and maintenance plan must provide that the concentrations be reported to the department quarterly;~~

(m) through (o) remain as proposed but are renumbered (l) through (n).

(2) The owner or operator of a TENORM waste management system shall:

(a) file an annual report, as required by ARM 17.50.410(1)(b), ~~that includes a statement about whether the concentration limit in [NEW RULE III](1)(c) has been maintained;~~ and

(b) submit to the department within 45 days after the end of each calendar quarter a report on TENORM waste delivered during that quarter. The report must contain the following:

(i) through (iii) remain as proposed.

(iv) readings taken at the licensed boundary in accordance with (1)~~(m)~~(l);

(c) through (5) remain as proposed.

AUTH: 75-10-204, MCA

IMP: 75-10-204, MCA

REASON: In conjunction with the removal of the 50 pCi/g average concentration limit within a TENORM waste unit, the department is removing the requirement that the operation and maintenance plan include procedures developed by a health physicist for monitoring the average concentration within the unit, as well as the requirement that this information be included in the annual report filed with the department. The procedures contemplated under (1)(l) are not necessary, as waste characterization results would provide documentation that only waste not exceeding 50 pCi/g is placed within a TENORM waste unit. Furthermore, the statement required in (2)(a) as to whether the TENORM waste unit concentration limit has been maintained is no longer necessary because the requirement to maintain an average concentration limit within the TENORM waste unit has been removed. Please see reason statement for amended NEW RULE III.

5. The department is reopening the comment period on the proposed rules only with respect to the specific provisions identified in this Supplemental Notice of

Proposed Adoption. Timely comments previously submitted on the original notice as well as comments received in response to this supplemental notice will be addressed in the adoption notice for the proposed rules. Concerned persons may submit their data, views, or arguments to Sandy Scherer, Legal Secretary, Department of Environmental Quality, 1520 E. Sixth Avenue, P.O. Box 200901, Helena, Montana 59620-0901; faxed to (406) 444-4386; or e-mailed to sscherer@mt.gov, no later than 5:00 p.m., March 2, 2020. To be guaranteed consideration, mailed comments must be postmarked on or before that date.

Reviewed by:

DEPARTMENT OF ENVIRONMENTAL
QUALITY

/s/ Edward Hayes

EDWARD HAYES
Rule Reviewer

BY: /s/ Shaun McGrath

SHAUN MCGRATH
Director

Certified to the Secretary of State January 21, 2020.