

**902 KAR 100:180. Technologically Enhanced Naturally Occurring Radioactive Material related to oil and gas development.**

RELATES TO: KRS 189.150, 211.842-211.990, 216B.050(22), Chapters 224 and 353, 40 C.F.R. Parts 144 - 147, 42 U.S.C. 1421 - 1443

STATUTORY AUTHORITY: KRS 194A.050(1), 211.090(3), 211.180(1)(a), 211.842, 211.844(1), 211.863(6), 211.865, 211.893(2)

NECESSITY, FUNCTION AND CONFORMITY: KRS 194A.050(1) requires the secretary of the Cabinet for Health and Family Services to promulgate administrative regulations necessary to protect, develop, and maintain the health, personal dignity, integrity, and sufficiency of Kentucky citizens and to operate programs and fulfill the responsibilities vested in the cabinet. KRS 211.893(2) authorizes the cabinet to exercise its regulatory authority to ensure the proper management of oil- and gas-related wastes containing technologically enhanced naturally occurring radioactive material (TENORM). This administrative regulation establishes radiation protection standards for the possession, use, transport, transfer, and disposal of TENORM related to oil and gas development.

Section 1. Definitions. (1) "Activity concentration" means the rate of disintegration (transformation) or decay of radioactive material per unit of dry mass.

(2) "Oil and gas development":

(a) Means the drilling, operation, and closure of a well permitted and regulated pursuant to KRS Chapter 353, including:

1. A stratigraphic test well;
2. An oil or gas production well;
3. A well drilled or used for enhanced recovery or for disposal of oil or gas-related wastes; or
4. A related production and storage facility; and

(b) Includes gathering lines, but does not include subsequent transmission or processing of produced oil or gas not permitted or regulated pursuant to KRS Chapter 353.

(3) "Technologically Enhanced Naturally Occurring Radioactive Material" or "TENORM" is defined by KRS 211.862(13).

(4) "Well operator" is defined by KRS 353.010(20).

Section 2. Applicability. (1) This administrative regulation shall apply to a person who receives, owns, possesses, uses, processes, transfers, transports, distributes, arranges for the disposal of, or disposes of TENORM with an activity concentration greater than five and zero-tenths (5.0) picocuries per gram of combined radium-226 (Ra-226) and radium-228 (Ra-228).

(2) This administrative regulation shall apply only to TENORM related to oil and gas development.

(3) Each person subject to this administrative regulation shall manage and dispose of waste containing TENORM:

(a) Pursuant to Section 6 of this administrative regulation; or

(b) In accordance with an alternate method authorized by the cabinet upon written request or upon the cabinet's initiative in accordance with this administrative regulation and administrative regulations of the Energy and Environment Cabinet.

(4) Exemptions to this administrative regulation are established in Section 3 and are not considered a hazard to public health based on scientific and health rationale.

Section 3. Exemptions. The following shall be exempt from the requirements of this administrative regulation:

(1) Background activity concentrations upon specific request and the written approval of the cabinet;

(2) Drill cuttings and associated residual pit fluids from wells permitted pursuant to KRS Chapter 353 and managed in accordance with the requirements of that chapter; and

(3) Water produced from or utilized during oil or gas well development or production operations, including produced water and water flowed back following hydraulic fracturing operations that is disposed of in injection wells that are regulated and permitted in accordance with KRS 353.590 through 353.593 and 353.992; 805 KAR 1:110; and, if applicable, the Safe Drinking Water Act, 42 U.S.C. 1421 through 1443 and 40 C.F.R. Parts 144 through 147, and Underground Injection Control Program.

Section 4. Sample Collection and Analysis. (1) All sample collection pursuant to this section shall be conducted so as to be representative of the entire waste load or container.

(2) Sample collection and analysis of the TENORM-containing waste shall take place prior to disposal as established in paragraphs (a) through (e) of this subsection.

(a)1. At least five (5) representative samples taken randomly from within the load or container shall be composited into one (1) sample and analyzed; or

2. For tubing, a representative sample shall be taken every 500 feet.

(b) Analysis of TENORM waste proposed to be transported off-site for management or disposal shall be conducted by a laboratory accredited by the National Environmental Laboratory Accreditation Conference to perform radiological analysis.

(c) Each sample analyzed by an accredited laboratory shall be analyzed for the activity concentration of combined Ra-226 and Ra-228;

(d) For TENORM waste being disposed of downhole pursuant to Section 6(4) of this administrative regulation, sample collection and analysis shall be performed:

1. Pursuant to paragraphs (a) through (c) of this subsection; or

2. At the election of the well operator, by measuring the highest on-contact radiation exposure rate or radiation dose rate reported in microrentgen per hour ( $\mu\text{R/hr}$ ) or microrem per hour ( $\mu\text{rem/hr}$ ) through the use of a portable radiation detector that is:

a. Appropriate for the radiation being measured; and

b. Calibrated at least annually.

(e) The cabinet may require additional testing if another progeny is considered to be of primary concern.

(3) For the purpose of determining disposal method pursuant to Section 6 of this administrative regulation, sample collection and analysis meeting the requirements of subsection (2) of this section may additionally occur after the waste has been prepared or treated for disposal as long as the waste is not treated beyond the minimum required for disposal.

Section 5. Transporting TENORM Waste for Management or Disposal. (1) TENORM waste being transported for management or disposal shall be:

(a) Accompanied by a waste profile or manifest document pursuant to Section 8 of this administrative regulation;

(b) Covered and contained during transportation in accordance with general standards of the U.S. Department of Transportation and KAR Title 601; and

(c) Packaged or stabilized as needed to prevent dispersion during transportation or landfill placement.

(2) Other than TENORM wastes stored on-site prior to disposal in conjunction with an oil or gas operation permitted pursuant to KRS Chapter 353 and those materials awaiting return transportation following rejection at the disposal facility in accordance with Section 6(6)(c) of

this administrative regulation, the storage or treatment of TENORM waste is allowed only if licensed pursuant to 902 KAR 100:040.

Section 6. Disposal of Waste. (1) TENORM waste with an activity concentration greater than five and zero-tenths (5.0) and less than or equal to 100 pCi/g of combined Ra-226 and Ra-228 shall be disposed in a:

(a) Landfill meeting the design and construction standards of a contained landfill as established by the Energy and Environment Cabinet that:

1. Possesses a current permit demonstrating compliance with the requirements of KRS 224 and 401 KAR Chapters 47 and 48; and

2. Ensures the disposal is in accordance with statutory provisions of KRS 224 and regulatory provisions of KAR Title 401 that apply specifically to the disposal of TENORM waste in such a facility;

(b) Well that is regulated and permitted for disposal pursuant to the requirements of subsection (4) of this section; or

(c) Landfill meeting the requirements of subsection (2)(a) or (2)(b) of this section.

(2) TENORM waste with an activity concentration greater than 100 and less than or equal to 200 pCi/g of combined Ra-226 and Ra-228 shall be disposed of in a:

(a) Landfill located in Kentucky specifically permitted by the Energy and Environment Cabinet to accept TENORM wastes for disposal or located in Illinois as specified under the terms and conditions of the Central Midwest Interstate Low-Level Radioactive Waste Compact pursuant to KRS 211.859;

(b) Licensed low-level radioactive waste disposal facility as established in 902 KAR 100:021; or

(c) Well that is regulated and permitted for disposal pursuant to the requirements of subsection (4) of this section.

(3) TENORM waste with an activity concentration greater than 200 pCi/g of combined Ra-226 and Ra-228 shall be disposed of in a:

(a) Licensed low-level radioactive waste disposal facility as established in 902 KAR 100:021; or

(b) Well that is regulated and permitted for disposal pursuant to the requirements of subsection (4) of this section.

(4) The downhole disposal of TENORM waste into a well located on the same lease, pool, or unit from which the TENORM waste was generated shall be allowed if:

(a) The well is permitted by the Energy and Environment Cabinet;

(b) Disposal is done in accordance with 805 KAR 1:060; and

(c) The radioactivity is analyzed pursuant to Section 4(2)(d) of this administrative regulation and reported to and maintained by the Energy and Environment Cabinet.

(5)(a) TENORM waste imported from outside of Kentucky or Illinois shall not be disposed of in Kentucky pursuant to KRS 211.859.

(b) The disposal of TENORM waste with an activity concentration greater than 200 pCi/g of combined Ra-226 and Ra-228 in a landfill in Kentucky shall be prohibited.

(6) Prohibited TENORM waste that is delivered to a landfill for disposal shall be rejected. The owner or operator of the landfill shall:

(a) Record the:

1. Source;

2. Amount;

3. Generator; and

4. Other identifying information about the rejected waste; and

(b) Notify the cabinet by telephone, fax, or electronic mail within one (1) business day of the rejection, impoundment, and quarantine of the material. Contact telephone numbers are established in 902 KAR 100:040, Section 15(3); and

(c) Impound and quarantine the waste load until the cabinet determination on the disposition of the waste if the impounding and quarantining of the waste by the owner or operator of the landfill shall not constitute storage or cause the owner or operator of the landfill to become responsible under law for the further management or disposition of the waste.

(7) Records of disposal, including waste profiles and manifests, shall be maintained by the owner or operator of the landfill for thirty (30) years after closure of the facility.

Section 7. Material or Real Property Containing TENORM. (1) The transfer of TENORM not exempt pursuant to Section 3 shall be authorized if the equipment and facilities contaminated with TENORM shall be used by the recipient for the same purpose.

(2) Transfers made pursuant to subsection (1) of this section do not relieve the person making the transfer from the responsibilities of assessing the extent of TENORM contamination or material present, informing the person receiving the TENORM of these assessments, and maintaining records required by this administrative regulation.

(3) The transfer of TENORM products not exempt in Section 3 shall be authorized provided the requirements of this section are met and the product is accompanied by a waste profile or manifest document pursuant to Section 8.

(4) The remediation of material contaminated with TENORM shall be performed only if licensed to do so pursuant to 902 KAR 100:040.

Section 8. Record Keeping Requirements. (1) A person in possession of TENORM waste with an activity concentration greater than five and zero-tenths (5.0) pCi/g and less than or equal to 100 pCi/g of combined Ra-226 and Ra-228 being transported for management or disposal shall maintain and provide to the off-site treatment or disposal facility receiving waste a waste profile or manifest containing information as required by KRS 224.43-335.

(2) A person in possession of TENORM waste with an activity concentration greater than 100 pCi/g and less than or equal to 200 pCi/g of combined Ra-226 and Ra-228 being transported shall maintain a copy of the TENORM Manifest, form RPS 180. The manifest shall contain the:

(a) Name and signature of any:

1. Generating facility owner or operator;
2. Transporter company; and
3. Receiving facility owner or operator;

(b) Identity and business contact information of the accredited laboratory that analyzed the samples;

(c) Type, amount, activity concentration, and source of TENORM being transported; and

(d) Unique tracking number established by the generator.

(3) A person in possession of TENORM waste with an activity concentration greater than 200 pCi/g of combined Ra-226 and Ra-228 activity concentration being transported shall maintain records in accordance with 902 KAR 100:021.

Section 9. Worker Training and Safety. (1) A landfill approved for the disposal of TENORM waste pursuant to Section 6(2) shall implement a worker training program and safety program to meet the requirements of 902 KAR 100:019.

(2)(a) A landfill permitted to accept TENORM waste pursuant to Section 6(2) shall monitor individuals for exposure to radiation and radioactive material as required by 902 KAR 100:019,

Section 13, for at least two (2) years.

(b) Personnel dosimeters shall meet the requirements of 902 KAR 100:019, Section 12.

(c) If the average result is less than 200 millirems (2.0 mSv) per year, suspension of individual monitoring may be requested and approved in writing by the cabinet.

Section 10. Violations. (1) A violation of this administrative regulation shall be subject to KRS 211.869(1) and (3) and KRS 211.990(2) and (4).

(2) A violation of an Energy and Environment Cabinet regulation referenced in this administrative regulation shall not be subject to the provisions of KRS 211.869 or KRS 211.990.

Section 11. Incorporation by Reference. (1) Form RPS 180, "TENORM Manifest", 10/2017, is incorporated by reference.

(2) This material may be inspected, copied, or obtained, subject to applicable copyright law, at the Department for Public Health, 275 East Main Street, Frankfort, Kentucky 40621, Monday through Friday, 8 a.m. to 4:30 p.m. (44 Ky.R. 477, 1029, 1350; eff. 12-7-2017.)