



TENORM INFORMATION SHEET

Definitions

NORM stands for **N**aturally **O**ccurring **R**adioactive **M**aterial. NORM is in soil, rocks, water and air. For example, NORM is found in granite countertops, building materials and many foods.

TENORM stands for **T**echnologically **E**nhanced **N**aturally **O**ccurring **R**adioactive **M**aterial. When materials are removed from the earth and concentrated by human activities, such as mining or oil and gas production, NORM becomes TENORM. TENORM is created in the oil and gas industry and found in filter socks, tank bottom sludge, and scale that forms inside well pipes and equipment.

A **picocurie** describes the amount of radioactivity found in a gram of a material. NORM and TENORM are measured in picocuries per gram.

Who regulates radiation levels?

The federal government regulates the use, storage, transportation and disposal of most radioactive materials, such as those from the medical field, industry and nuclear energy activities. The federal government does not regulate NORM or TENORM, which usually has a much lower level of radiation than medical and nuclear waste. Because there are no federal regulations, it is up to each state to determine whether and how to regulate TENORM.

Not all states regulate TENORM, but North Dakota does. Of the states that regulate TENORM, there are wide differences in the regulations, including picocurie per gram disposal levels. Please refer to the North Dakota Department of Health (NDDoH) table "Technologically Enhanced Naturally Occurring Radioactive Material (TENORM) Disposal Limits In States Other Than North Dakota" for more information on the levels other states use to regulate TENORM.

Why is radiation a concern?

People are exposed to natural radiation every day. A person's exposure depends on many factors, including the type and amount of radioactive material, the person's proximity to the material, and how long the person is near the material. Exposure to certain levels and types of radiation can cause health problems. Wastes that contain TENORM must be properly managed in order to reduce human health risks. TENORM is of particular concern if it is ingested through eating, drinking or breathing.

Radiation exposure can be reduced by limiting the time a person is exposed to the material, by keeping a person a safe distance from the material, by shielding a person from the material, or by any combination of those activities. In a landfill, shielding is often accomplished with a covering of soil.

How has TENORM been regulated in North Dakota?

When the state first began to regulate TENORM disposal, the acceptable radiation level was set at 5 picocuries per gram of material because that was similar to background soil radiation. Under the current rules, anything over the 5 picocuries per gram limit must be shipped out of state for disposal.

How could TENORM be regulated in the future in North Dakota?

In reviewing the TENORM disposal problems in the oil patch, the NDDoH determined that acceptable disposal limits of TENORM for in-state landfills had never been studied. The NDDoH commissioned Argonne National Laboratories (ANL) to conduct a study to determine a scientifically-based disposal limit for TENORM that is protective of human health and the environment.

The study found that the highest level of exposure in the various disposal scenarios would be to a worker employed at an active landfill. If the landfill were accepting TENORM at a concentration of 51.6 picocuries per gram, that worker could potentially reach an exposure level of 100 mrems/year, which is the maximum recommended public exposure. This maximum exposure scenario identifies the acceptable upper limit of TENORM, and the NDDoH used this data to propose a new disposal limit of 50 picocuries per gram.

Based on the ANL study and issues with disposal violations, the NDDoH proposes changing TENORM rules to the following:

- All TENORM generators must register with the NDDoH
- All TENORM must be tracked from production to disposal
- TENORM waste up to 50 picocuries per gram may be disposed of at approved Oilfield Special Waste Landfills and Large Volume Industrial Waste Landfills
- Any facility approved by the NDDoH to accept TENORM of up to 50 picocuries per gram will be limited to no more than 25,000 tons/year of TENORM waste
- All TENORM waste must be buried a minimum of 10 feet below the top of the closed landfill

In order for a facility to be approved to dispose of TENORM waste of more than 5 and less than 50 picocuries per gram, the facility would have to apply to the NDDoH for a new permit or a modification of an existing permit. The modified permit may require changes to the waste acceptance plan, plan of operations and the landfill design. No other landfills, including Municipal Solid Waste landfills, will be allowed to accept TENORM waste.

More information about TENORM is available on the NDDoH website at www.ndhealth.gov/EHS/TENORM.