



# Fact Sheet

## RADIOACTIVE SHALE GAS WASTES & “TENORM”

### Recent Updates to Ohio Law

#### The Issue

Horizontal hydraulic fracturing, also known as “fracking,” is the use of high pressure to inject water mixed with sand and chemicals into deep shale rock formations, fracturing the rock and releasing the oil and gas inside. Fracking can pose risks to the environment from groundwater contamination to large fresh water withdrawals, as well as release of radioactive materials into the air and water.

Shale gas waste streams include brine, black shales, flowback fluid, and drilling muds. Black shales contain heavy and radioactive metals including 228Ra, 238U, and 226Ra. These metals are water soluble and can present a health risk.

The U.S. EPA defines TENORM (Technologically Enhanced Naturally Occurring Radioactive Materials) as “radionuclides that occur naturally in ores, soils, water, or other natural materials that are concentrated or exposed to the environment by human activities, such as uranium mining or sewage treatment.”

There are materials that contain trace amounts of TENORM that are naturally occurring and are present in the rocks and minerals of the earth’s crust. Some TENORM has very high concentrations of radionuclides that can result in elevated human exposure to radiation.<sup>1</sup>

#### Recent Updates to Ohio Law

The Ohio Legislature recently amended Ohio law to define TENORM to mean “naturally occurring radioactive material with radionuclide concentrations that are increased by or as a result of past or present human activities.” The new law excludes natural background radiation as well as the majority of shale gas waste streams including drill cuttings and brine from the definition of TENORM.<sup>2</sup>

The new law requires the ODNR Chief of the Division of Oil & Gas Resources Management, rather than the Director of Health, to approve collection and analysis requirements. It also requires the oil and gas well owner to determine concentrations of radium in representative samples of the material.

It also specifies that determining the concentration of radium in TENORM is not required if the TENORM is reused in a horizontal well. Furthermore, the law states that “natural background” is two picocuries per gram or the actual number of picocuries per gram as measured at an individual solid waste facility, subject to verification by the Ohio Director of Health. Radiation levels of solid waste landfills (as measured in picocuries per gram) may vary from site to site and may already be elevated.

The new law requires the Ohio Director of Health to adopt rules establishing requirements governing TENORM, and states that the rules must not apply to naturally occurring radioactive material (NORM).

<sup>1</sup> United States Environmental Protection Agency, Section on TENORM. Available at <http://www.epa.gov/rpdweb00/tenorm>.

<sup>2</sup> 130<sup>th</sup> General Assembly, State of Ohio, House Bill 59. Available at [http://www.legislature.state.oh.us/BillText130/130\\_HB\\_59\\_EN\\_N.html](http://www.legislature.state.oh.us/BillText130/130_HB_59_EN_N.html).

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## Problems Associated with These Recent Ohio Law Changes

The new provisions in Ohio law differentiate between NORM and TENORM such that the majority of wastes associated with shale gas production, especially drill cuttings, will be defined as NORM. This will exempt much of the potentially radioactive materials from sampling and testing for the established regulatory threshold of radioactivity.

But, the difference between NORM and TENORM is irrelevant when radioactivity levels exceed background radioactivity levels. The U.S. EPA, National Academy of Sciences, and American National Standards Institute all recognize drill cuttings as TENORM. Ohio, though, will not.

A related concern is our understanding that the Ohio Department of Natural

Resources plans to allow the “downblending” of wastes with soil or other materials in an attempt to dilute radioactivity. Rather than “diluting” the radioactive material as is intended, the process actually creates more radioactive waste material by turning the once benign base material into radioactive material.

This law also opens the door for Ohio to encourage the disposal of radioactive materials in solid waste landfills that are not engineered to safely contain large volumes of radioactive waste.

Workers at oil and gas wells and at solid waste landfills will be at greater risk for exposure to radioactive materials from the moment that drill cuttings and other wastes come to the Earth’s surface until the waste material is disposed of.

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## OEC Proposal

Radioactive shale gas waste materials that exceed the U.S. EPA safe threshold level of 5 picocuries per gram are not intended for disposal in solid waste landfills or even hazardous waste landfills, and therefore cannot be safely disposed of in Ohio’s solid waste landfills—active, abandoned, orphaned, or otherwise—as they currently exist.

Radioactive materials of this level instead should be properly disposed of by shipping the waste to licensed low-level radioactive waste landfills.

For radioactive materials under the threshold, Ohio should manage its landfills as Michigan and Pennsylvania are doing, where radioactive materials must be disposed of in new areas specifically engineered for low-level radioactive material. Although this method increases disposal costs, it is much safer.

Some states, such as Michigan, West Virginia, and Pennsylvania, are managing radioactive materials through disposal in specially-engineered and designated areas of solid waste landfills called “monocells or monofills.”

These states have also implemented increased levels of monitoring of these areas and the leachate (the fluid substance that accumulates from landfills) from these areas. These states are also very concerned about the future radon gas emissions from these landfills, and the inability to build on these sites once remediated.

Although the Ohio Legislature has adopted the less restrictive definition of TENORM, the OEC will continue to follow the rule making process and make recommendations for strengthening regulations around testing, collection, and analysis.

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