Radioactive Wastes from Oil and Gas Drilling

This page describes the radioactive waste created during the oil and gas drilling process.

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Overview

The oil and gas industry provides three-fifths of the energy for the United States. When most of us drive a car, turn on a light bulb, or cook on a stove, a large portion of the energy we use comes from the fossils of plants and animals. While fossil fuels are chemical sources of energy, the processes used to extract them from the earth often generate radioactive waste.

Even though we use them on a daily basis, most people know little about the processes that take oil and gas from the ground to produce energy. These processes may leave behind waste containing concentrations of naturally-occurring radioactive material (NORM) from the surrounding soils and rocks. Once exposed or concentrated by human activity, this naturally-occurring material becomes Technologically-Enhanced NORM or TENORM. Radioactive materials are not necessarily present in the soils at every well or drilling site. However in some areas of the country, such as the upper Midwest or Gulf Coast states, the soils are more like to contain radioactive material.

Radioactive wastes from oil and gas drilling take the form of produced water, drilling mud, sludge, slimes, or evaporation ponds and pits. It can also concentrate in the mineral scales that form in pipes (pipe scale), storage tanks, or other extraction equipment. Radionuclides in these wastes are primarily radium-226, radium-228, and radon gas. The radon is released to the atmosphere, while the produced water and mud containing radium are placed in ponds or pits for evaporation, re-use, or recovery.

The people most likely to be exposed to this source of radiation are workers at the site. They may inhale radon gas which is released during drilling and produced by the decay of radium, raising their risk of lung cancer. In addition, they are exposed to alpha and gamma radiation released during the decay of radium-226 and the low-energy gamma radiation and beta particles released by the decay of radium-228. (Gamma radiation can also penetrate the skin and raise the risk of cancer.) Workers following safety guidance will reduce their total on-site radiation exposure.
Most states and federal land management agencies currently have regulations which control the handling and disposal of radionuclides which may be present in production sites. However, the general public may be exposed to TENORM from oil and gas drilling when sites that were active prior to the mid-1970s, when regulations went into effect, are released for public use. It is likely that a number of these sites contain radioactive wastes. The public may also be exposed when contaminated equipment is reused in construction projects.

Who is protecting you

U.S. Environmental Protection Agency (EPA)

EPA is responsible for setting federal radiation standards for exposure to NORM and TENORM.

EPA develops standards for the oil and gas extraction and production industry under the Clean Air Act, Clean Water Act, Safe Drinking Water Act, Resource Conservation and Recovery Act and the Comprehensive Environmental Response, Compensation, and Liability Act.

The States

Each state has one or more programs that address both NORM and TENORM. Some states have established or set limits to control to TENORM. These limits apply to the oil and gas drilling industry. Most states also control public exposure to radiation through programs implementing the federal Clean Air Act, Clean Water Act and other environmental laws authorized by the EPA.

U.S. Department of Labor (DOL), Occupational Safety and Health Administration (OSHA)

DOL’s Occupational Health and Safety Administration (OSHA) establishes health and safety regulations for the oil and gas extraction, production, and servicing industry. OSHA also issues hazardous information bulletins to inform staff and the public of significant occupational safety and health issues including radiation hazard recognition, evaluation, and control in the workplace.

U.S. Department of Energy (DOE)

DOE provides grants for research on the use and disposal of radioactive materials related to the development of energy sources.

What you can do to protect yourself

Government organizations continue to address potential threats from oil and gas drilling and production for the public health and safety but you can take actions as well for your own health and safety.

Workers in the industry have the potential for overexposure to radioactive material and must stay up-to-date on federal, state, and industry health and safety guidelines. Following these procedures will reduce total on-site exposure. Workers also need to take precautions to avoid
bringing radioactive material residue on their clothes and shoes home to their families and neighborhoods.

Change out of potentially contaminated clothes and shoes before returning to the family car and to your home or office.
Do not re-use or bring home discarded equipment or material such as pipes, devices, bricks, rocks, or water.

Members of the public should contact their local state geological survey or bureau of health to determine if there is a likelihood of NORM and TENORM occurrence associated with oil and gas production in their state, or area where they live. Until then:

Limit exposures and disturbance of the production site and any abandoned equipment.
Do not handle, dispose or re-use abandoned equipment used at drilling sites.

Resources

Technologically-Enhanced, Naturally-Occurring Radioactive Material
June 2009. U.S. Environmental Protection Agency, Radiation Protection
This site provides information on health concerns, lists the products, processes and industries that generate Technologically-Enhanced, Naturally-Occurring Radioactive Material (TENORM) and gives an overview of applicable Environmental Protection Agency laws and guidelines.

Sector Notebook Project – Oil and Gas Extraction [about pdf format]
October 2000. U.S. Environmental Protection Agency
This document provides a description of the oil and gas extraction process, how to comply with the Environmental Protection Agency’s health and the environmental laws and techniques for pollution prevention.

NORM (Naturally Occurring Radioactive Material) [EXIT Disclaimer]
2005. North Dakota Department of Health, Radiation Control
This page provides an overview of NORM and presents North Dakota state requirements.

Oil and Gas Well Drilling and Servicing eTool
December 2008. U.S. Department of Labor, Occupational Safety & Health Administration
This site discusses safety issues related to oil and gas drilling.

Health Hazard Information Bulletin: Potential Health Hazards Associated with Handling Pipe used in Oil and Gas Production
This document discussed potential health hazards associated with materials used in oil and gas production.

Safety Report Series No. 34: Radiation Protection and the Management of Radioactive Waste in the Oil and Gas Industry [EXIT Disclaimer]
This publication describes the precautions that should be taken in the oil and gas industry worldwide to reduce exposure to radioactive materials.