



## Radioactive Waste from Oil and Gas Drilling

The oil and gas industry provides three-fifths of the energy for the United States. Every time we drive in a car, turn on a light bulb, or cook on a stove we are using the fossils of plants and animals as fuel.

Even though we use oil and gas on a daily basis, most people know little about the extraction process, which takes oil and gas from the ground and provides us with material to produce energy, but may also leave behind waste containing concentrations of naturally-occurring radioactive material. Many people do not know about the radioactive waste generated by this process. Not all wells or sites may have associated radioactive wastes, and not all of the radioactivity in the wastes may be considered harmful, but some areas of the country are more likely to have this problem than others (upper Midwest, or Gulf Coast states for instance). Workers are the people most likely to be exposed to this source of radiation, but production sites can also pose a potential hazard to members of the public.

Most states and federal land management agencies have regulations which control the handling and disposal of radionuclides which may be present in produced water, drilling mud, or can concentrate in pipes, storage tanks, or other extraction equipment. The contamination may be present in mineral scale, sludges, slimes, or evaporation ponds or pits. Production sites which were developed prior to the mid-1970s may not have properly disposed of wastes that potentially contain this source of radioactivity. Building on this land, making this land accessible to the public and re-using contaminated equipment in construction are ways the public can be exposed to radiation from the drilling process.

There are two categories of radioactive material that workers and the public need to be concerned about:

- Naturally-occurring radioactive material (NORM) that are released into the atmosphere and deposited on the ground through the drilling process, and
- Technologically-enhanced naturally-occurring radioactive material (TENORM), which is radionuclides that have been concentrated by the extraction and production process, such as mineral scales and sludge waste buildup in oil and gas extraction equipment.

The radiation comes from naturally-occurring radioactive material (NORM) in the underground rock and sediment. When companies drill for gas or oil, the produced fluids, including water, may contain radionuclides, primarily radium-226, radium-228, and radon. The radon gas may be 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 radium brought up during drilling can also decay to radon gas, which a worker can inhale and can raise the risk of lung cancer. Radium-226 emits gamma radiation and the lead emits low-level energy gamma radiation and beta particles. Gamma radiation can also penetrate the skin and raise the risk of cancer. Following worker safety guidance will reduce total on-site radiation exposure.

### 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 (CAA), Clean Water Act (CWA), Safe Drinking Water Act (SDWA), Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

## The States

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

## 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 can you 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.

- Remove potentially contaminated clothes and shoes before returning to the family car and to your home or office.
- Do not bring home discarded equipment or material used at sites such as pipes, devices, bricks rocks, and water or re-use these materials as containers or as building materials.

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

You can explore this radiation source further through the resources at the following URL:

[http://www.epa.gov/radtown/drilling\\_waste.htm#resources](http://www.epa.gov/radtown/drilling_waste.htm#resources)

We provide these resources on-line rather than here so we can keep the links up-to-date.