

Radiation Protection Program

DEP's [Bureau of Radiation Protection](#) is responsible for statewide radiation control and monitoring activities. The program is responsible for reducing unnecessary radiation exposure and includes the oversight of radioactive materials, radiation generating equipment, radon testing and mitigation, and environmental surveillance. The program provides emergency response capability for nine nuclear power plants in Pennsylvania.

In 2016, Radiation Protection staff published a report on an [extensive study](#) which analyzed the naturally occurring levels of radioactivity associated with oil and natural gas development in Pennsylvania. The study examined the extent that technologically enhanced naturally occurring radioactive materials (TENORM) were concentrated by oil and gas extraction and wastewater treatment, and the potential impact of TENORM contaminated waste disposal. Wastewater treatment plants (WWTPs) were studied as a part of this investigation. A total of 29 WWTPs were surveyed and/or sampled, and influent and effluent were sampled as part of the study. The samples were analyzed for uranium, thorium, radium, and gross alpha/beta levels. The study concluded there is low potential for radiological exposure to workers and the public from treatment plants processing oil and gas waste. However, there is a potential for radiological environmental impacts from spills of flowback hydraulic fracturing fluid from natural gas well sites, and from spills that could occur from the transportation and delivery of this fluid and produced water with TENORM. There is also potential for radiological environmental impacts from spills and the long-term disposal of filter cake from these WWTPs at Pennsylvania landfills. The program is currently scoping follow-up work recommended in the study.

The [Environmental Surveillance Section](#) in Radiation Protection is responsible for routine radiological monitoring around nuclear power facilities, as well as special projects. This section performs sampling of air, milk, surface water, drinking water, vegetation, and fish for levels of man-made radioactivity. The U.S. Nuclear Regulatory Commission (NRC) requires all nuclear power plants to meet very low offsite public radiation dose limits, and to have surveillance programs with annual data reports.

The [Decommissioning Section](#) performs technical reviews of decontamination and decommissioning (D&D) activities for radioactive materials licensees and non-licensed radiologically contaminated sites. The section also performs on-site reviews and inspections that include confirmatory surveys and sampling to ensure the cleanup levels established for the site have been met. Currently one of the highest profile sites undergoing a cleanup is the old U.S. Radium (aka, Safety Light Corp.) site in Bloomsburg, which is a joint EPA and DEP endeavor. This site is located on the Susquehanna River, with a significant fraction in the flood plain.

The Radiation Protection Program ensures radioactive materials licensees comply with federal regulatory limits for radionuclides by incorporating NRC regulation by reference in 25 Pa. Code Article V. The NRC has direct liquid discharge and sanitary sewer

effluent limits in Title 10, Code of Federal Regulations, Part 20, Appendix B ([10CFR20](#)). In addition, the US EPA has drinking water standards for radionuclides (Table 1).

Table 1. Radionuclide drinking water standards

Combined Radium-226 & Radium-228	5 pCi/L
Uranium	30 ug/L
Gross Alpha Emitters	15 pCi/L
Beta Particle & Photon Radioactivity	4 mrem/yr.

*Adapted from EPA: [Radionuclides Rule - A Quick Reference Guide](#)

The program produces annual reports describing the previous year’s important work and environmental surveillance data. DEP’s full 2017 Environmental Radiation in Pennsylvania Annual Report is available [here](#). During 2017, several key items were completed related to water quality:

- Over 700 Nuclear Power Plant site visits and safety reviews, and hundreds environmental sampling tasks,
- Follow-up surveys related to the TENORM Study, and
- DEP’s continued Water Quality Network (WQN) sampling at 10 stations for radionuclides; all were indicative of natural background radiation levels.

The vast majority of funding for program activities comes from fees, although some comes from small US EPA radon grants, and fines and penalties. Funding for water protection is not individually provided for in the program’s budget. Nonetheless, an overview of the expected revenue in the current spending plan is provided in Table 2.

Table 2. Overview of FY 2018-2019 spending plan

Radon Certification*	\$685,000
X-Ray Machines	\$4.0 million
Radioactive Material*	\$4.6 million
Nuclear Power Plants	\$3.25 million
Fines & Penalties	\$50,000