

## **NORM and TENORM in Pennsylvania: Past, Present & Future**

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This work provides a review of past naturally occurring radioactive material [NORM] investigations, and recent work related to Oil & Gas (O&G) technologically enhanced NORM (TENORM). With the discovery of high indoor residential radon levels in the mid-1980s throughout the Reading Prong, the Bureau of Radiation Protection (BRP) began regional and state-wide radon studies. Those studies and public outreach continue today, e.g., with the recent discovery of extremely high radon levels in new homes being constructed near Allentown, PA. In conjunction with the O&G program, BRP examined the radium levels in conventional O&G wastewater in the early to mid-1990s. That work was restarted with the significant increase in unconventional O&G well development circa 2010. A major “cradle to grave” O&G TENORM Study was conducted at that time, with results and all related documentation published online in May 2016. Follow-up to this Study’s results and recommendations is ongoing, including routine landfill leachate testing for radium, and the requirement for O&G operations that may generated TENORM have a Radiation Protection Action Plan. A related technical guidance document on developing such Action Plans will be published in early 2022. In addition to this review of past and present work, the future of NORM and TENORM work and waste disposal will be discussed.

See - <https://www.dep.pa.gov/Business/Energy/OilandGasPrograms/OilandGasMgmt/Oil-and-Gas-Related-Topics/Pages/Radiation-Protection.aspx>