



pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION



Office of Waste, Air, Radiation & Remediation

TENORM Study Update

Solid Waste Advisory Committee Meeting
September 26, 2013

▶ Background

Generation of technologically enhanced naturally occurring radioactive material (TENORM) has increased significantly. This is mainly due to the recent expansion in natural gas exploration and production in Pennsylvania.

There are many issues with TENORM that must be managed effectively.

These issues include:

- Potential worker radiation exposure
- Public radiation exposure
- Environmental (water, etc.) contamination
- Waste disposal



Who is involved?

We are going to collect the necessary data by performing a comprehensive study

- The contractor for the study is Perma-Fix Environmental Services, Inc.
- The study will also involve BRP, BWM, BPNPSM, BOGM, the BoL and others.

➤ Sampling

The following types of facilities have been sampled thus far:

- Publicly Owned Treatment Works
- Centralized Waste Treatment Facilities
- Zero Liquid Discharge Facilities
- Landfills
- Well Pads
- Underground Natural Gas Storage Sites

▶ Sampling Dates

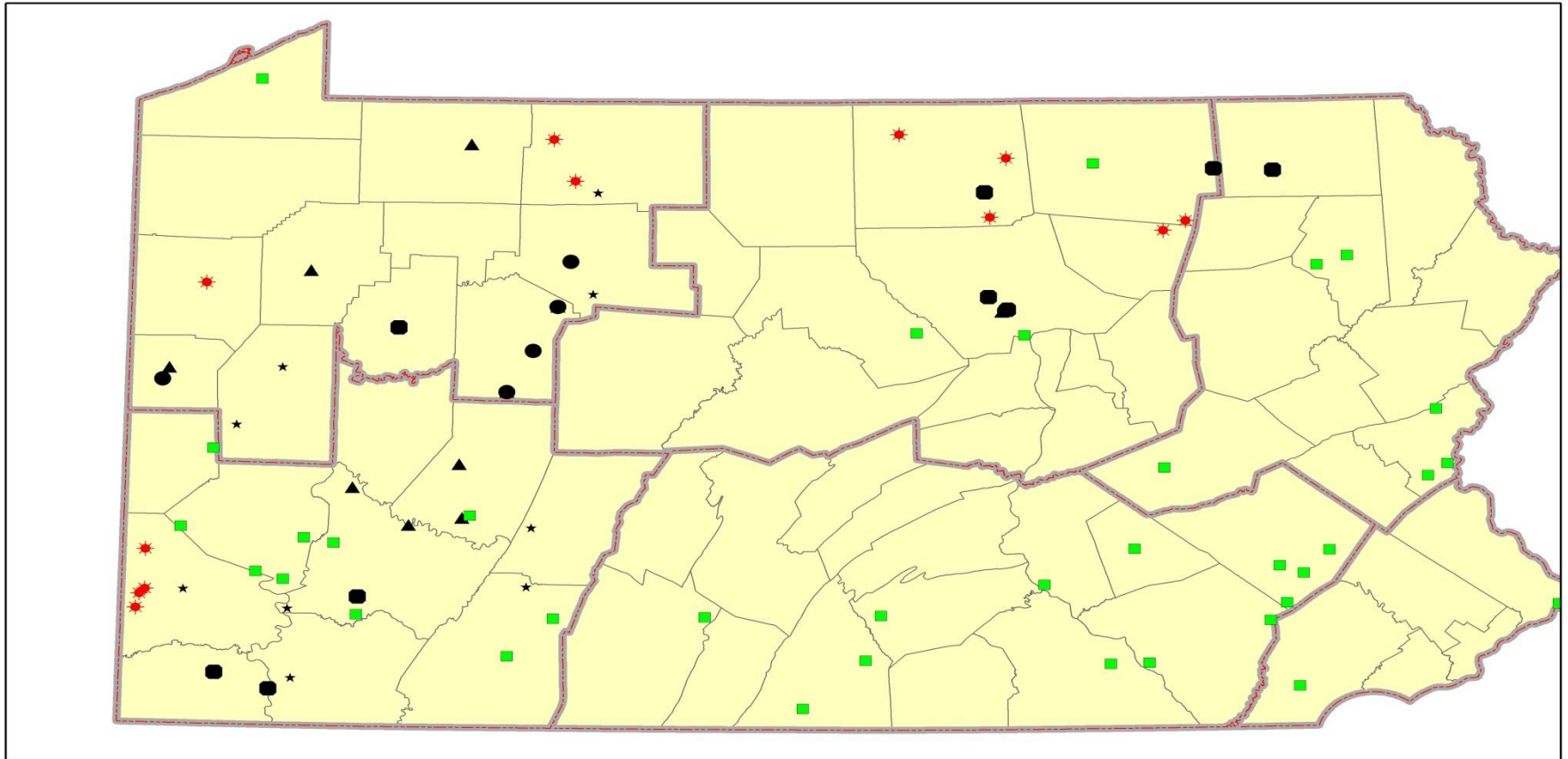
- The first Round of sampling including Waste Water Treatment Plants (WWTP's) and Landfills commenced on April 15th. The second round began on June 7th.
- Underground Gas Storage Site Sampling started on May 14th.
- Well Pad sampling began on June 17th.

▶ Sampling Conducted To Date

Sampling has been conducted at the following number of facilities:

- 50 WWTP's (2 Rounds 25 facilities)
- 9 Landfills
- 12 Well Pads (Drilling and Fracking)
- 4 Underground Natural Gas Storage Sites

▶ Sampling Map



Legend

-  Well Pads
-  Leachate
-  Centralized Waste Treatment Facility
-  Publicly Owned Treatment Works
-  Zero Liquid Discharge
-  Landfills

-  County Boundaries
-  PA DEP Regional Boundaries

Sample Types

Types of samples collected include:

- Natural Gas Samples
- Liquid Samples (i.e. frack water, waste water)
- Solid Samples (i.e. drill cuttings, sludges)
- ‘Swipe’ samples of loose material throughout the facilities

▶ Sample Analysis

- The samples are being analyzed for the presence of Alpha, Beta, and Gamma Radiation.
- The Gas is being sampled for the presence of Radon.

Study Modifications

- Sampling sludges generated at WWTP's and taking micro-roentgens per hour ($\mu\text{R/hr}$) readings on each load of waste sludge, then following the loads to disposal facilities and resampling

▶ Future Work

- Continued Well Pad Sampling
- Third Round of WWTP Sampling
- Continued Landfill Leachate Collection
- Beneficial Use Sites
- Pipe Disposal/Refurbishing Facilities
- Gas Fired Power Plants, Compressor Stations, and Processing Facilities

➤ Schedule

- Changing due to market-driven well pad development activities
- Operational factors of well pad development have an impact on sampling opportunities

Projected Schedule

- Sampling End Date: February 2014
- Sampling Analysis Completion Date: May or June 2014
- Report Finalization Date: August 2014

** These dates are projections based on many variables outside the realm of DEP control that impact timely results. They are subject to change based on market-driven well pad development activities; operational factors of well pad development have an impact on sampling opportunities.*

TENORM Study

- Final peer reviewed plans are available at:
http://www.portal.state.pa.us/portal/server.pt/community/oil___gas_related_topics/20349/radiation_protection/986697
- Updates will be provided to the appropriate DEP Advisory Committees



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Questions?

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