

TENORM Study

Appalachian Compact Commission Meeting

October 31, 2013

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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



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

- The contractor for the study is Perma-Fix Environmental Services, Inc. (BRP's health physics consulting group)
- The study will also involve BRP, BWM, BPNPSM, BOGM, the BoL and others

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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

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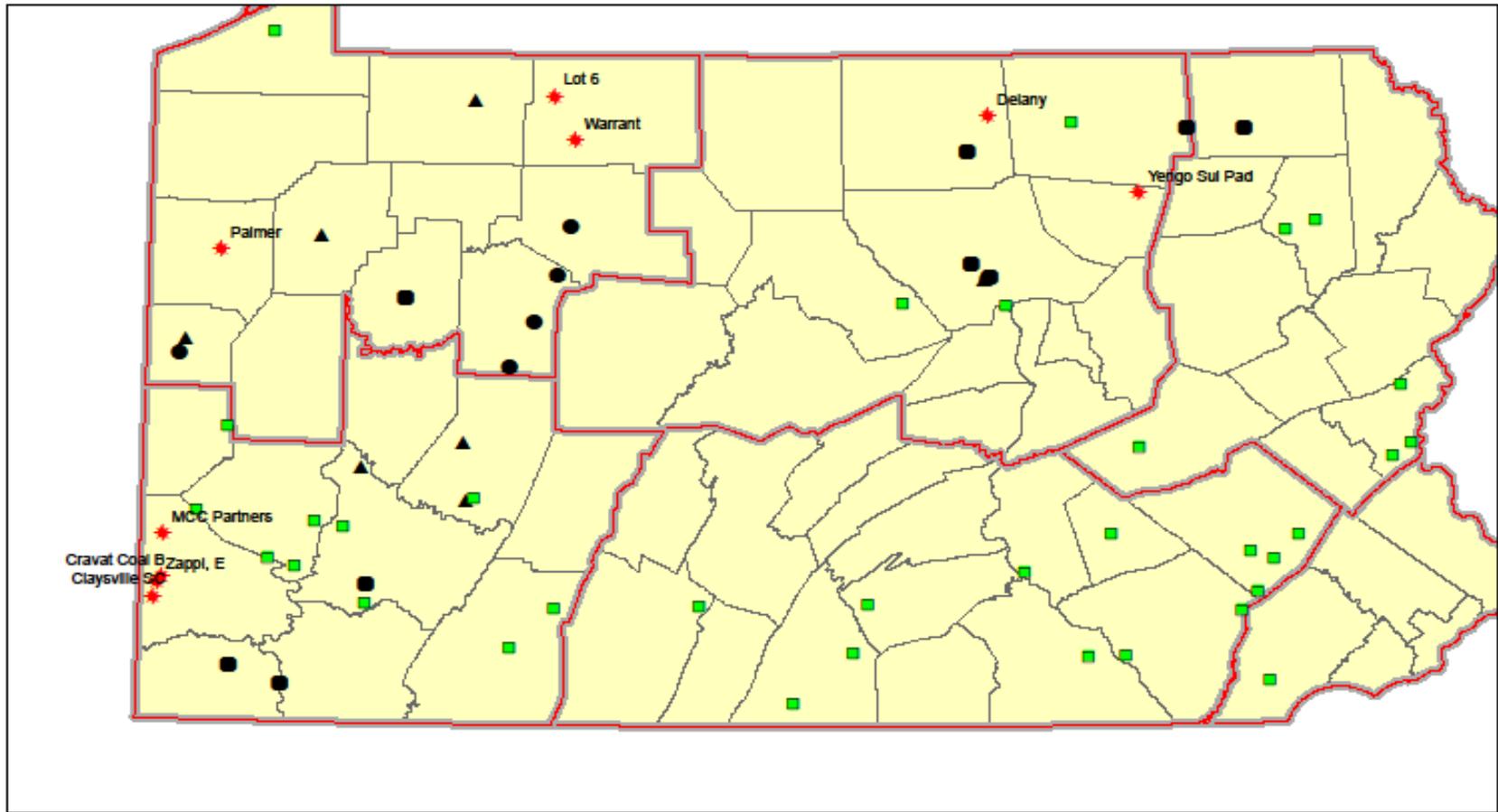
Sampling Dates:

- 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.

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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



Legend



- ★ Well Pads
- Leachate

Water Treatment Facilities

- ▲ CWT
- POTW
- ZLD

- County Boundaries
- PA DEP Regional Boundaries

Note: Completed Landfills Not Shown

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The types of samples collected have included:

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

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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

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Study Modifications:

- Sampling sludge loads and measuring them to determine $\mu\text{R/hr}$ levels at WWTP's then following them to disposal sites and resampling

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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

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Schedule:

- Ever changing well pad development activities
- Well pad development operational factors impact on sampling opportunities

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- **The final study scope and peer reviewed sampling plans are available at:**
http://www.portal.state.pa.us/portal/server.pt/community/oil___gas_related_topics/20349/radiation_protection/986697
- **Periodic updates will be provided to the appropriate DEP Advisory Committees**

Landfill Issues -

- Onsite TENORM Study Survey Work
- TENORM waste tracking
 - $\mu\text{R/h}$ vs pCi/g
- Federal DOT regs in 49CFR
(270 pCi/g / $0.27 \mu\text{Ci/g}$)

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Questions?



pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION



Bureau of Radiation Protection

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