



pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION



Bureau of Radiation Protection

PA DEP TENORM Study - Update

2nd Quarter 2014 Update

July 2014

Background

- **Technologically Enhanced Naturally Occurring Radioactive Material**
 - Consists of naturally occurring radioactive material whose radionuclide concentrations have been increased above levels encountered in the natural state by human activities.

Background

Generation of 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



Site Categories

- Waste Water Treatment Plants (WWTPs)
- Landfills
- Sludge Loads to Landfills
- Well Pads
- Underground Natural Gas Storage Sites

Site Categories

- Gas-Fired Electricity Generating Facilities
- Compressor Stations
- Beneficial Use Sites
- Decommissioned Well Casings

2013 Completed Field Work

- 184 Site Visits
- 114 Locations
- 1,000 Samples Analyzed

2013 Completed Field Work

- 25 WWTP's / 73 Visits (3 Rounds)
- 48 Landfills (9 Extensively Sampled)
- 1 Set of facilities to evaluate the effect of transport on sludge radioactivity
- 20 Well Pads / 41 Visits

2013 Completed Field Work

- 13 Beneficial use sites
- 1 Decommissioned well casings disposal site
- 7 Facilities that compress, store and utilize natural gas

Sample Types

- Natural Gas Samples
- Liquid Samples (i.e., frac water, flowback water)
- Solid Samples (i.e., drill cuttings, sludge)
- Radiation Surveys
- 'Swipe' Samples

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-222.

Field Work in 2014

- Well pad sampling (18 visits to 11 pads)
- Continued landfill leachate collection (5 facilities)
- Landfill 'Bulking' operations (2 facilities)
- Beneficial use sites (4 sites)

Field Work in 2014

- Gas-fired power plants (1 facility)
- Gas storage facilities (4 facilities)
- Compressor stations (1 facility)
- Gas processing facilities (1 facility)

Field Work in 2014

- Wastewater impoundments (2 facilities)
- Evaluating the effect of transport on sludge radioactivity (5 events)

Field Work in 2014

- Well pad sampling (5 visits to 2 pads)
- Wastewater Impoundment (1 facilities)
- Beneficial use sites (4 sites)
- Decommissioned Well Pad Casing (if available)

Field Work in 2014

- Landfills – recover radon detectors (8 facilities)
- Landfills – Bulking (2 facilities)

▶ Remaining Field Work – Summer 2014

- Well Pad – if completed, 1 production phase gas collection for radon
- Landfills – collection of ambient radon samplers in SW area of the state
- Well Pads – ambient gamma surveys of areas with buried rock cuttings

Lessons Learned

- Well pad field work schedule changes
- Technical challenges
- Science-based study plan, had to make some adjustments and additions

Schedule

- Most field work to be completed by the end of July
- Sample analysis, data analysis, and report preparation (including peer review) from March through August
- Internal DEP final review
- Final study report planned for completion in 2014...

TENORM Study Information

- Study related documents are available at www.dep.state.pa.us Keyword “TENORM”
- Updates are being provided to the appropriate DEP Advisory Committees and other stakeholders



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Questions?