2005 Environmental Sampling Data – Water in Vicinity of the IEL Landfill

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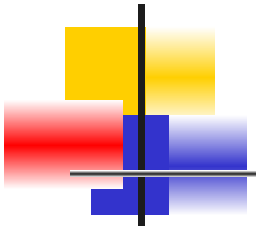
Purposes

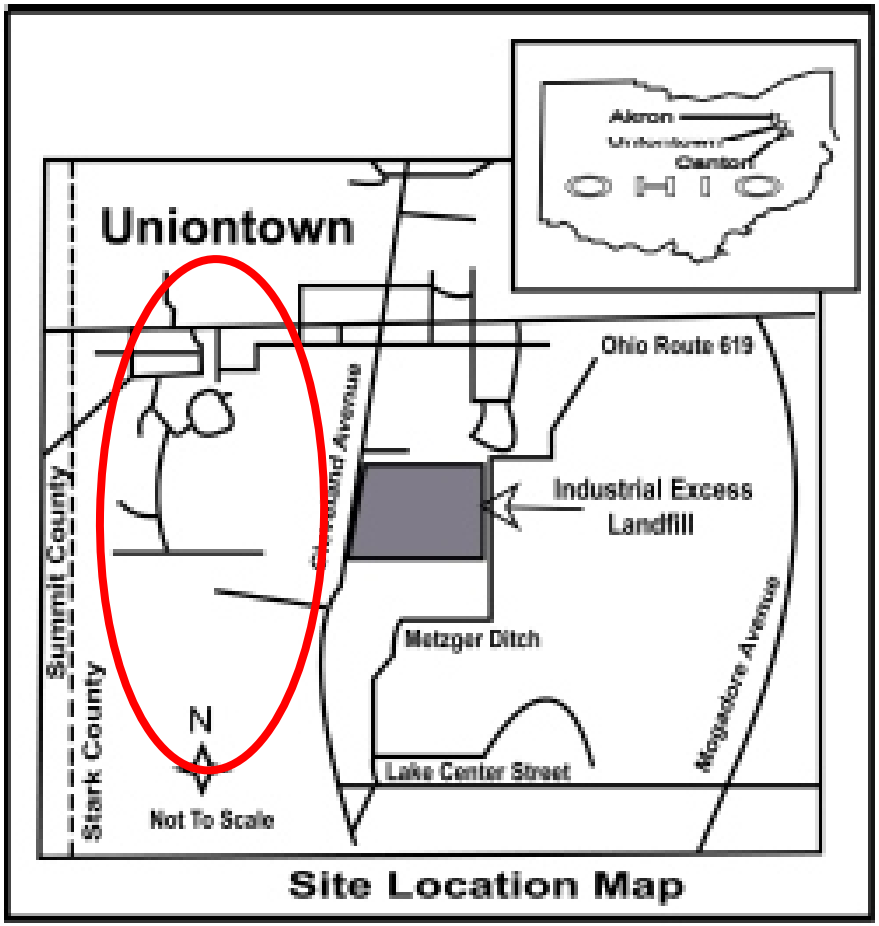
- Investigate the possible presence of anthropogenic radioactivity in water samples from the vicinity of the IEL Landfill
- "Fingerprinting" of anthropogenic radioactivity



Sampling Episodes

- July 15, 2005
- October 21, 2005

Locations


Akron
Canton
Uniontown
Ohio Route 619
Cleveland Avenue
Industrial Excess
Landfill
Summit County
Stark County
Metzger Ditch
Mogadore Avenue
N
Lake Center Street
Not To Scale
Site Location Map

Targeted Analytes

- Plutonium: activities of 238Pu and 239+240Pu; isotope fingerprinting
- Uranium: concentrations, 238U/235U atom ratios, 236U
- Technetium-99 (99Tc)
- Radium (activities of 226Ra and short-lived isotopes)
- Gamma activity in residue

Sampling Procedures

- Groundwater was sampled from two installed monitoring wells and several existing wells
- Used a submersible pump head with Teflon tubing – purge ~ 15 minutes before sample collection
- Collected a suitable set of sample containers for analysis of targeted constituents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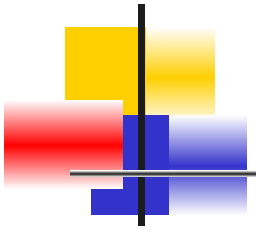
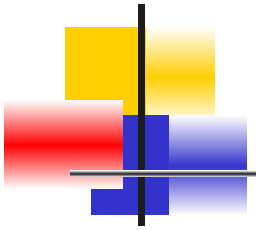
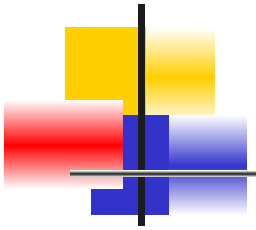


Analysis



Analysis

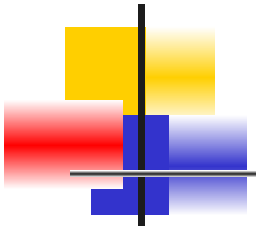


Analysis

Uranium concentrations,

Analysis

Radium by gamma spectrometry – measures emitted gamma particles (photons or light)



Analysis

Findings

No 238Pu or 239+240Pu detected

No 236U detected

Uranium concentrations are relatively low (< 1 microgram/liter)

No evidence for abnormal 238U/235U

Findings

- 99Tc was detected in groundwater samples from private wells west of the IEL.
- This is a non-naturally occurring radionuclide that is soluble and mobile in groundwater environments.

Sources of ^{99}Tc

- 99Tc is a “fission product” made by splitting uranium or plutonium atoms
- Associated with nuclear testing debris, wastes from nuclear reactors, and “recycled uranium”
- Likely source: “recycled uranium” wastes present in the IEL

Future needs

- Additional studies of
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