



EPRI's Approaches to Site Characterization and Survey in Support of Nuclear Power Plant Decommissioning

Examples of In-Situ Gamma Spectroscopy and other Techniques for Subsurface Characterization

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2013 Waste Management Symposium

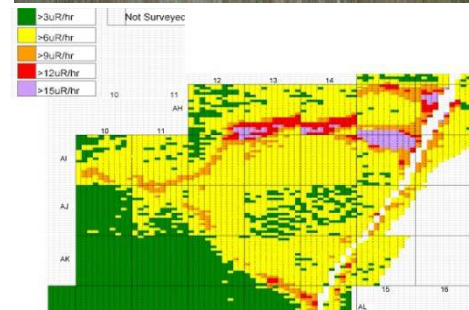
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EPRI Decommissioning and Groundwater Protection Programs

- Objectives:
 - Develop technical guidance
 - Document, demonstrate, develop advanced technologies
 - Database of experiences, lessons learned, best practices

Site Characterization for Decommissioning Optimization Strategies

- Historical Site Assessments
- Preliminary Characterization
- Investigation Wells
- Development of Site Conceptual Models
 - Subsurface modeling
- Long-term monitoring

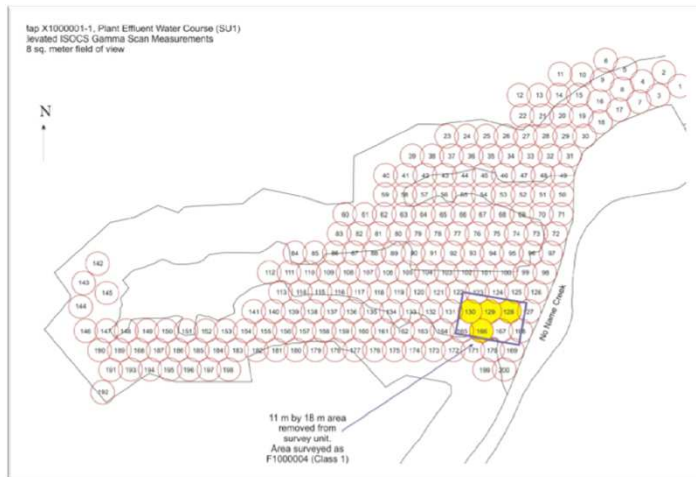


Shonka Research Associates - Subsurface Multi-Spectral Contamination Monitor (SMCM) at Rancho Seco

Source: Characterization and Dose Modeling of Soil, Sediment, and Bedrock During Nuclear Power Plant Decommissioning: Detailed Experiences 1993-2009. EPRI, Palo Alto, CA: 2009. 1019228.

Applied Technology: In-Situ Gamma Scanning Technologies

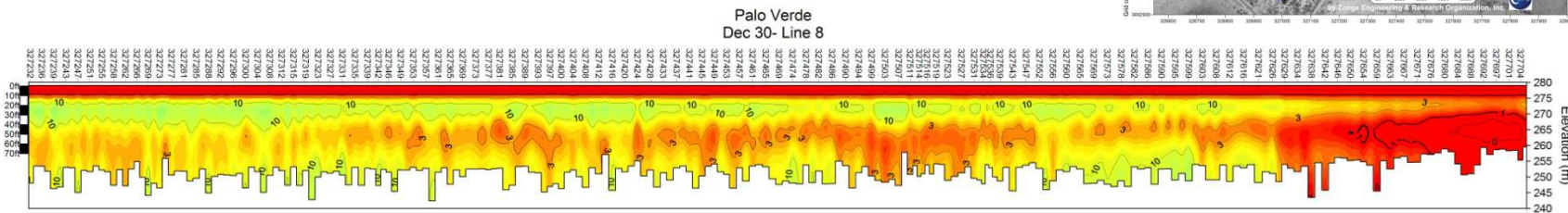
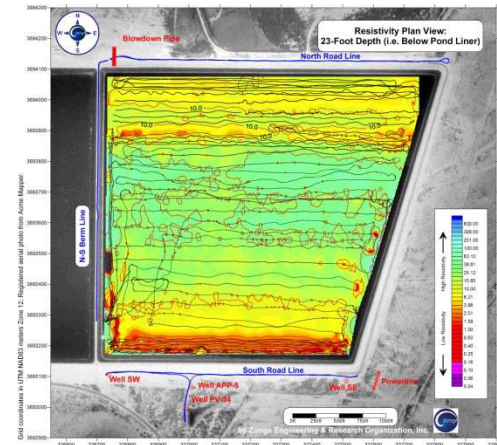
- Applied to decommissioning related characterization:
 - Large scale initial characterization
 - Surveys during remediation
 - Subsurface, borehole investigations
 - Underwater surveys
 - Building and bulk material surveys



Source: Use of In-Situ Gamma Spectroscopy During Nuclear Power Plant Decommissioning. EPRI, Palo Alto, CA: 2010. 1021108.

Innovative/Developing Technology: Geophysical Subsurface Investigations

- Geophysical Subsurface Investigations
 - Use of electric properties* of subsurface geology and water to identify leaks or spills.
 - *Resistivity, potential, induced polarization.
 - Needs to be coupled with sampling to investigate radiological impact.
 - Potentially a screening tool for initial characterization purposes.



Graphics Source: Lesan, H. Palo Verde Nuclear Generating Station Geophysical Tools for Groundwater Characterization. Presented at the 2010 EPRI Groundwater Protection Workshop.*

*Proceedings: 2010 EPRI Groundwater Protection Workshop: In Collaboration with the Nuclear Energy Institute. EPRI, Palo Alto, CA: 2011. 1023188

Innovative/Developing Technologies: EPRI Soil Vapor Extraction and Monitoring System

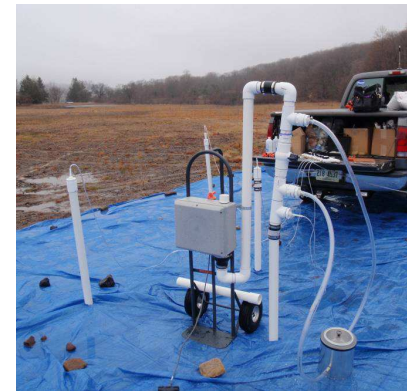
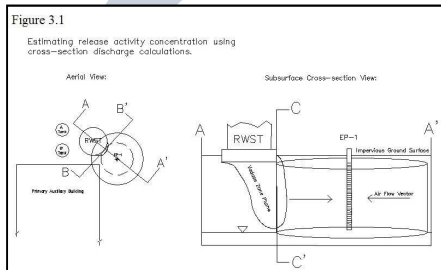
EPRI Technology Innovation

'10 Implementation

'09 Pilot Test

'08 Bench-Top Test

'07 Concept



- Sample and analyze soil vapor for tritium in vadose zone / groundwater.
- Less invasive, easier to install than groundwater wells.
- One sample point covers an area defined by radius of influence.
- Can be effective early detection tool for leaks and spills under buildings or tanks.

Program on Technology Innovation: EPRI Soil Vapor Extraction and Monitoring System Development: Bench Test and Pilot Test Results. EPRI, Palo Alto, CA: 2010. 1021105.

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Key Take-Aways

- Subsurface monitoring programs can be optimized through careful planning and initial investigations
- Innovative technologies are being applied and are in development
 - Currently capabilities for in-situ, subsurface radiological characterization is limited.
 - However, non-radiological investigations can be used to optimize radiological characterization programs.
 - There is always room for development!



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