

Public Workshop on Groundwater Contamination at Nuclear Power Plants

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The Framework for Groundwater Protection at Nuclear Power Plants is Established by the Voluntary “Industry Groundwater Protection Initiative” (NEI 07-07)



U.S. NRC Oversight

The NRC assesses each licensee's voluntary implementation of NEI 07-07 at each operating nuclear power plant in accordance with NRC Inspection Manual, Temporary Instruction 2515/173



NEI 07-07 Action 1

Establish a Groundwater Protection Program

- NEI 07-07 refers to EPRI's "Groundwater Protection Guidelines for Nuclear Power Plants" to assist utilities in implementing a groundwater protection program.

NEI 07-07 Action 2: Voluntary Communication

- Communication to external stakeholders of inadvertent leaks or spills is required regardless of risk
- Investigations are “slow”. Cannot yield answers quickly, regardless of public pressure to provide prompt solutions.
- A groundwater protection plan, including proactive characterization of site hydrogeology and routine monitoring of groundwater quality, is a source of rational data that can relatively quickly provide a technical basis for response to leaks and spills if it is implemented before they occur.



Industry Practice

- In accordance with NEI 07-07, each plant has established an on-site groundwater monitoring program to detect groundwater contamination, if it occurs.
- Radionuclides typically analyzed for:
 - Tritium
 - Plant-related gamma-emitters (Cs-137, Co-60, Mn-54)
 - “Hard-to-Detect” species (Sr-90, Ni-63, Fe-55)



Industry Experience

- At sites with identified groundwater contamination
 - Incidents have been aggressively investigated and effectively resolved, using various techniques:
 - Drilling monitoring wells
 - Deploying data-logging pressure transducers and temperature probes to map hydraulic head and temperature gradients
 - Using robotics to inspect drains, pipelines, tanks and other SSCs that are potential contaminant sources
 - Completing down-hole and/or surface geophysical surveys
 - Soil Vapor Extraction Sampling
 - Analyzing soil and groundwater samples for various radionuclides
 - Conducting groundwater pumping tests and tracer tests
 - Simulating aquifer response by constructing a numerical groundwater flow model



Industry Experience (continued)

- Effective Remediation Methods Include:
 - Source removal
 - Construction of impermeable liners
 - Hydraulic control by pump and discharge
 - Monitored natural attenuation

