

Characterization and Remediation of Residual Radioactivity during Nuclear Plant Decommissioning



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**2015 Regulatory Information Conference
Technical Session T7
10 March 2015**

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Presentation Content

- Characterization and Remediation of Land Areas
 - Sr-90 Groundwater Contamination Case Study
- Characterization and Remediation of Underwater Sediments
 - Discharge Canal Case Study
- Summary of Typical Issues with Residual Radioactivity during Decommissioning
- Development of Guidance for Long Term Groundwater Monitoring Program Optimization and Decommissioning Planning

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Overview

- Most sites undergoing decommissioning have not experienced substantial issues with residual radioactivity in the environment
 - Some common areas of isolated contamination
- Monitoring and record keeping during operations are key to identification of potential areas of concern
 - NEI 07-07 groundwater protection initiative
 - 50.75(g) documentation process
- With the exception of well-known but isolated cases, groundwater monitoring in the current fleet has not identified substantive issues
 - Remediation has been implemented, as warranted
 - For example, pump-and-release and monitored natural attenuation

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Scoping and Characterization Surveys of Land Areas



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Scoping and Characterization Surveys *Land Areas*

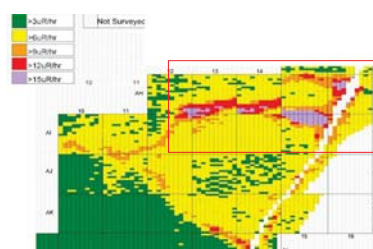
- Determine the extent of radiological contamination in site areas
 - Surveys biased based on Historical Site Assessment
 - Information collected during other work included (i.e. soil samples collected during Groundwater Monitoring well installation)
 - Systematic sampling done when no events have occurred in an area
 - Additional sampling to bound contamination horizontally and vertically, if detected
 - Determines limits of the required remediation
 - Need to evaluate for Hard To Detect Nuclides (HTDN, i.e., Alpha, Pure Beta nuclides) early in the process

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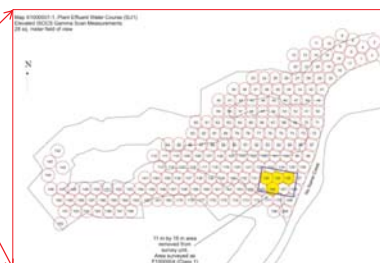
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Surface and Subsurface Characterization (Typical)



Survey Results for Discharge Outfall



ISOCS Results for Outfall

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Case Study: Soil and Groundwater Contamination



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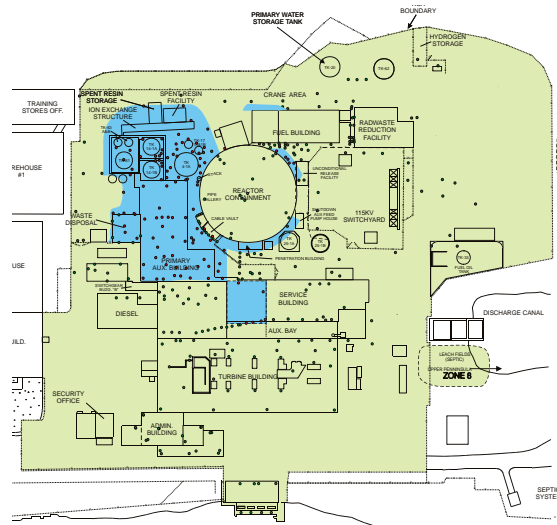
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Subsurface Sample Locations



Direct Push Sampler



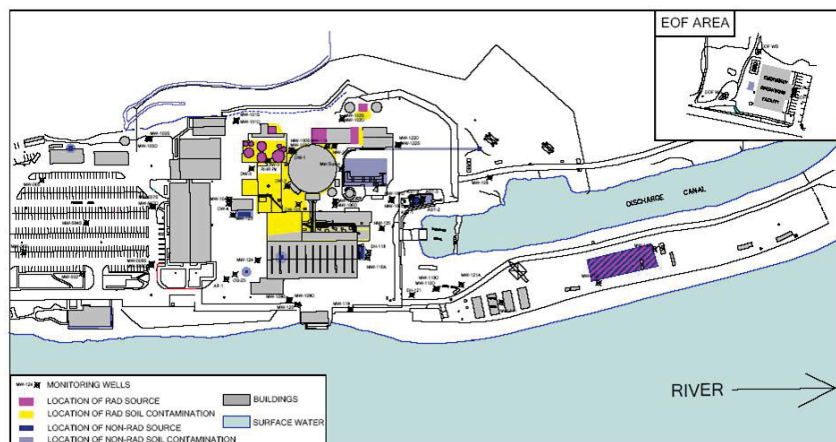
Sampling and Remediation Locations

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Groundwater Contaminant Source Map



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Subsurface Remediation

- Summary of remediation of soil/groundwater contamination
 - Material remediated in Sr-90 groundwater plume area
 - 33,000 m³ of soil
 - 1,000 m³ of bedrock
 - Depth of the excavation was up to 12 m



Sr-90 Plume Remediation Area

Environmental Remediation Efforts had a Major Effect on Program Cost and Schedule

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Characterization and Remediation of Underwater Sediments



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Discharge Canal Characterization and Remediation Case Study

- Porous Sides of Canal Precluded Draining
- Discharge Canal Required Dredging to Allow Reactor Vessel to be Shipped by Barge
 - Sediments Slightly Contaminated: Required Disposal as Radioactive Waste
- Canal Adjacent to Discharge Structure Required Blast Rock and Sediment Removal due to Radioactive Contamination
- Post Removal Final Status Survey Performed



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Underwater Surveys

- Remediation of Upper Portion of Canal Required
 - Silt Curtains installed downstream of Remediation Area
- Post Remediation Final Site Survey Performed
 - Used Specially Outfitted Survey Boat
 - Approximately 1000 Samples Taken
 - Global Positioning of Sample Location
 - Depth of Sample Into the Sediment Layer Measured/Recorded



Aerial View of Discharge Canal



Post-Remediation Surveys

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Summary of Typical Issues with Residual Radioactivity during Decommissioning (Most Common)

- Soil and groundwater contamination by leakage from tanks and piping
 - Well addressed by current groundwater monitoring and protection programs
- On site radioactive material disposal areas
- Radioactive material handling and transport routes
- Storm drain run-off
- Discharge canals
 - Underwater sediment
 - Deposited sediment due to transient overflow
- Other less common: deposition from airborne discharges, temporary material storage areas, sewage plant crossties

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Development of Guidance for Long Term Groundwater Monitoring Program Optimization and Decommissioning Planning



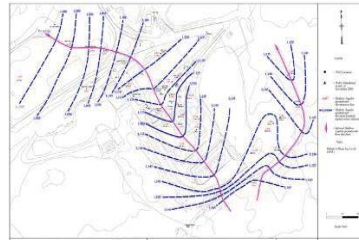
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Current Project: Long Term Groundwater Monitoring Plan Optimization and Decommissioning Planning

- Develop guidance to address:
 - Long term stewardship of the operational groundwater protection program;
 - Timing and options for any required remediation; and
 - Decommissioning planning and transition
- Identify long term optimization and enhancement opportunities and potential maintenance issues for groundwater protection programs.
- Use existing EPRI Groundwater Protection and Decommissioning research and technical guidance
- Project completion in 2016



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