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United States Nuclear Regulatory Commission
Protecting People and the Environment

U.S. Nuclear Regulatory Commission Perspectives: Remediation Challenges Over the Next Decade

Session 2: Advancing New Remediation Technologies

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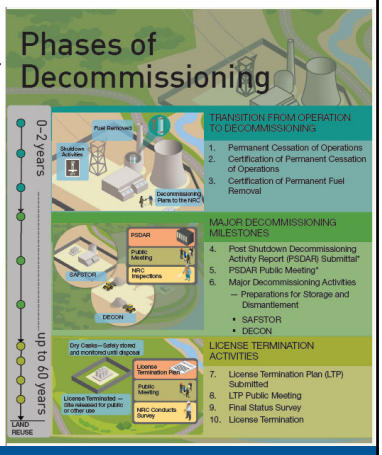
NRC's Advanced Remediation Technologies: Scope, Application & Needs

- Dismantling & Decontamination of facility components and structures at nuclear power plants and spent fuel facilities to protect the public and environment.
- Remediation/Cleanup of soils, subsurface media & groundwater for decommissioning of complex and uranium recovery sites.
- Enhanced and efficient characterization methods and surveys before, during, and after remediation for demonstration of compliance with regulatory safety and environmental criteria.



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NRC's Advanced Remediation Technologies: Scope, Application & Needs (continued)

- Advanced technologies for characterization and survey of radiological contamination, particularly in the subsurface.
- Use of risk-informed approaches and guidance to demonstrate compliance with NRC safety and environmental criteria.
- Obtain real-world knowledge of accomplished site remediation to support risk-informed decision-making and training.

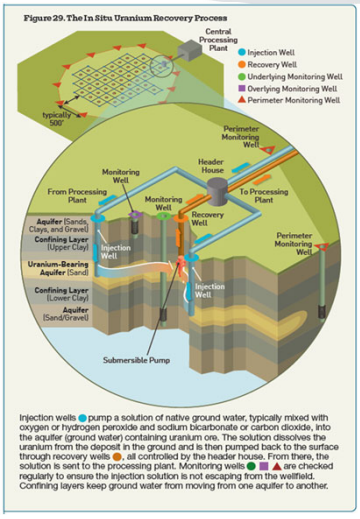

Figure 29. The In Situ Uranium Recovery Process

Injection wells pump a solution of native ground water, typically mixed with oxygen or hydrogen peroxide and sodium bicarbonate or carbon dioxide, into the aquifer (ground water) containing uranium ore. The solution dissolves the uranium from the deposit in the ground and is then pumped back to the surface through recovery wells, all controlled by the header house. From there, the solution is sent to the processing plant. Monitoring wells are checked regularly to ensure the injection solution is not escaping from the wellfield. Confining layers keep ground water from moving from one aquifer to another.

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Challenges

- Knowledge transfer of innovative technologies via FRTR & CLU-IN websites to the remediation community and regulators.
- Accessibility to new technologies and their cost efficiencies.
- Coordination of regulatory updates, guidance, and good practices for robotic surveillance and application of new technologies.
- Awareness of Federally-funded academic and research institutions of new and innovative remediation technologies and their application.
- Transitioning of advanced technologies from laboratory/pilot scale to field implementation.

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Suggestions

- Enhanced communication and technical exchanges at FRTR meetings.
- Program to test and evaluate innovative technologies for transitioning from experimental/pilot scale to field-scale applications.
- Initiate discussions on regulatory updates, guidance, and good practices to incorporate new and innovative technologies.
- Virtual workshops to explain and demonstrate advanced technologies and their transitioning to field implementation.
- Coordination with academic and research institutions to showcase new and innovative remediation technologies funded by Federal agencies.

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Concluding Remarks

- Appreciate the good collaborative work of the FRTR to date.
- Endorse focusing on innovative technologies for remediation of radiological contamination.
- Anticipate further collaboration on innovation, technology transfer and risks assessment for decommissioning and environmental assessments.

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NT1 Nicholson, Thomas, 4/26/2021