

EPA & Green Remediation

ASTSWMO Semi-Annual Meeting

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What is “Green Remediation”?

Green Remediation - The practice of considering all environmental effects of a remediation strategy implementation strategy early in the process, and incorporating options to maximize the net environmental benefit of the cleanup action.

Opportunities to Increase Sustainability

- Apply to all cleanup programs
- Exist throughout site investigation, design, construction, operation, and monitoring
- Address core elements



Core Elements: Energy Requirements

- Optimized passive-energy technologies, with little or no demand for external utility power
- Energy-efficient equipment operating at peak performance
- Periodic evaluation and optimization of equipment with high energy demand
- Renewable energy systems to replace or offset grid electricity

Core Elements: Air Emissions

- Optimal use and proper maintenance of heavy equipment
- Use of cleaner fuel and retrofit diesel engines for heavy equipment
- Modify operations to reduce operating & idle time
- Minimized dust export of contaminants

Core Elements: Water Requirements and Resources

- Minimum fresh water use and maximum reuse during treatment and site operations
- Reclaimed treated water for beneficial use or aquifer storage
- Native vegetation requiring little or no irrigation
- Prevention of water quality impacts such as nutrient-loading

Core Elements: Land and Ecosystems

- Minimally invasive in situ technologies
- Passive energy technologies as primary remedies or “finishing steps”
- Minimal soil and habitat disturbance
- Adopt ecorestoration and reuse practices
- Reduced noise and lighting disturbance

Core Elements: Material Consumption and Waste Generation

- Technologies designed to minimize waste generation
- Reuse and recycling of materials, including C&D debris
- Minimized extraction and disposal of natural resources
- Passive sampling devices producing minimal waste

Green Remediation Profile: Ferdula Landfill, Frankfort NY

- Soil vapor extraction relying on wind power to draw vacuum from landfill vents
- Exclusively off-grid operations providing a pulsed effect for carbon removal of VOCs
- VOC concentrations in soil gas reduced over 90% in five years of operation



Advancing Green Remediation Practices: EPA Efforts

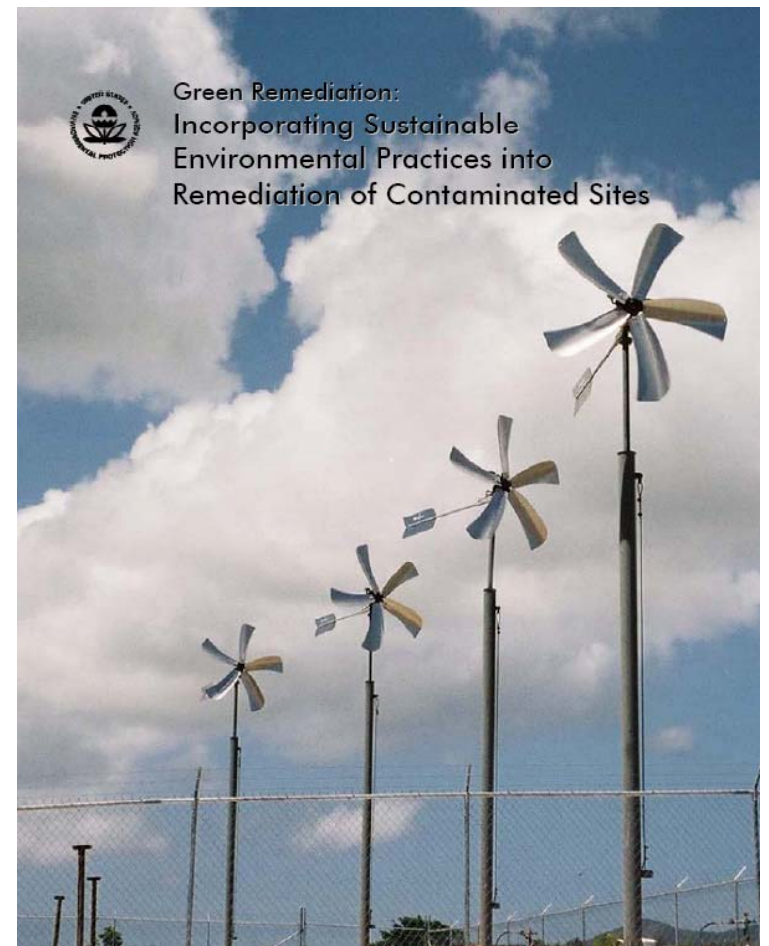
- Documenting state-of-the-art BMPs
- Identifying emergent opportunities
- Establishing a community of practitioners
- Developing mechanisms and tools
 - Pilot projects for renewable energy
 - Standard contract language for cleanups
 - Self-auditing BMP checklists
 - Automated energy calculators

Advancing Green Remediation Practices: Opportunities for Collaboration

- Shared efforts in tech transfer
- Partnering with state and local agencies moving forward with green practices
- Finding new opportunities “outside the box”
- Exploring options for a green remediation evaluation/verification system

Green Remediation Primer

- Released April 22, 2008
- Provides an introduction to GR best practices with examples of how and where they are used
- Focuses on remedy implementation across regulatory frameworks
- Available free online (see next slide)



Information Resources

- “GR Web” cleanup profiles, technical reports, and links: www.clu-in.org/greenremediation
- Technical primer, “*Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites*”
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