

QUICK REFERENCE GUIDE: Greener Remediation Optimization Techniques

This quick reference guide is intended to supplement Wisconsin DNR’s Green & Sustainable Remediation Manual (PUB-RR-911). For more information about optimization techniques and strategies, see U.S. EPA’s Green Remediation (GR) Best Management Practices (BMPs) fact sheets, available at clu.in.org/greeneremediation.

Optimization Techniques for all remediation technologies

- Perform adequate site investigation to develop good conceptual site model
- Perform semi-annual evaluation of system effectiveness. Make changes or shut system down as appropriate
- Evaluate the concurrent use of phytoremediation
- Evaluate natural attenuation
- Use renewable energy (e.g. solar, wind) to power equipment
- Minimize land disturbance
- Implement idling policies to reduce fuel consumption

REMEDIA- TION TECHNOLOGY	OPTIMIZATION TECHNIQUES	REMEDIA- TION TECHNOLOGY	OPTIMIZATION TECHNIQUES
Pump & Treat	<ul style="list-style-type: none"> • Design system for easy modification as site conditions change • Intermittent pumping • Use real-time monitoring to identify influent changes and modify treatment accordingly • Discharge to surface water or groundwater • Evaluate concurrent use of in situ chemical oxidation, thermal remediation, or bioremediation in source area • Evaluate chemicals and process materials for carbon footprint • Minimize process-derived solid waste • Evaluate beneficial onsite reuse of treated water • Use appropriately sized (i.e. not oversized) pumps, fans, and motors • Use green building methods for construction of Pump & Treat building • Use existing building to house Pump & Treat equipment • Perform routine system maintenance to optimize equipment efficiency • Use real-time measurement technologies and alarms for off-site system monitoring 	In Situ Thermal Technologies	<ul style="list-style-type: none"> • Minimize piping runs from extraction well field to treatment system • Consider phased approach to reduce equipment needs • Use direct-push technology for well installation to minimize waste • Winterize aboveground piping • Reclaim treated groundwater for use onsite • Choose materials with recycled content
	Bioremediation		<ul style="list-style-type: none"> • Conduct bench-scale soil treatability tests • Conduct on-site pilot tests to evaluate methods of delivering substrate or amendment • Use non-traditional reagents and additives, such as manure compost, municipal biosolids, wood ash, and paper sludge • Use direct-push technology for construction of wells • Maximize reuse of existing or new wells and boreholes for injections
		Excavation & Surface Restoration	<ul style="list-style-type: none"> • Evaluate on-site vs. off-site treatment of excavated material • Obtain backfill material from nearby source immediately after soil disposal on same trip • Evaluate in situ treatment or landfarming of some areas • Select the closest disposal location • Stockpile uncontaminated soil for use as fill or other purpose • Salvage uncontaminated material for recycling, resale, or reuse onsite (steel, concrete, granite, wood, etc)



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