



Green Remediation: Reduction of the remediation impact on the environment

USEPA ERAF and TSERAWG Joint Winter Meeting
January 27, 2008, Vicksburg, MS

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What is Green Remediation?

The practice of considering all environmental effects of a cleanup during each phase of the process, and incorporating strategies to maximize net environmental benefit of the cleanup.

Focus is on remedy implementation vs. remedy selection



Is it Our Job?

- ◆ **Executive Order 13423, January 26, 2007-Strengthening Federal Environmental, Energy, and Transportation Management**
 - » Section 1. Policy. It is the policy of the United States that Federal agencies conduct their environmental, transportation, and energy-related activities under the law in support of their respective missions in an environmentally, economically and fiscally sound, integrated, continuously improving, efficient, and sustainable manner.
- ◆ **EPA Strategic Plan Goal 1: Clean Air and Global Climate Change**
 - » Protect and improve the air so it is healthy to breathe and risks to human health and the environment are reduced. Reduce greenhouse gas intensity by enhancing partnerships with businesses and other sectors.
- ◆ **EPA Strategic Plan Goal 5: Compliance and Environmental Stewardship**
 - » Stewards of the environment recycle wastes to the greatest extent possible, minimize or eliminate pollution at its source, conserve natural resources, and use energy efficiently to prevent harm to the environment or human health.



Opportunities to Increase Sustainability in Site Cleanups

- Apply to all cleanup programs
- Exist throughout site investigation, design, construction, operation, and monitoring
- Are aligned with our mandates (EPA Strategy, EO13423, etc).



Green Remediation Profile: St. Croix Alumina, St. Croix VI

- ◆ PV panels generating electricity for fluid-gathering system during oil recovery
- ◆ Wind-driven turbine compressors and electric generators powering pumps to recover free-product oil
- ◆ Reclaimed oil from RCRA site used for refinery feedstock



"OSWER" Green Remediation Strategy

For the purpose of advancing green remediation best practices across cleanup programs OSWER seeks to:

- » Benchmark and document GR best management practices
- » Assemble a toolkit of enablers
- » Build networks of practitioners
- » Develop performance metrics and tracking mechanisms



Green Cleanups Information & Feedback Channels

Technology Innovation Program Green Remediation (GR) Effort
Superfund GR Workgroup
Technical Support Project (TSP) Green Committee
Green Remediation, Revitalization, and Reuse (GRRR) Team
Climate Change and Contaminated Lands (CCCL) Workgroup
Climate Change Coordinating Committee (C4)
ASTSWMO Greener Cleanups Task Force
ITRC Green and Sustainable Remediation (GSR) Project
Federal Remediation Technologies Roundtable (FRTR) GR Focus
EPA Partnerships with Other Federal Agencies Department of Defense (USACE IAG & MOU) Department of Energy (NREL IAG & MOU)
State Initiatives (Cal/EPA GR Team, Illinois Greener Cleanups, Wisconsin Initiative on Sustainable Cleanups (WISC)
Brownfields Sustainability Pilots: Green Redevelopment
Tribal Initiatives
EPA Regional Initiatives: Region 3 Pilot Project on Green Cleanup Standards Region 9 Cleanup-Clean Air Initiative
Sustainable Remediation Forum (SuRF)



Green Remediation Activities

Existing

- ◆ Green remediation primer, website, and profiles of projects
- ◆ Internet seminars, and archived discussions (clu.in.org)
- ◆ Tech support for Federal and State project managers
- ◆ Contracts toolkit for RACs
- ◆ Renewable energy fact sheets and website
- ◆ NARPM 8-hour training

In the Pipeline

- ◆ MOU with NREL
- ◆ MOU with the USACE recognizing and fostering GR BMPs at Superfund cleanups
- ◆ Green Remediation Analyses and Development of Methodology (Region 9)
- ◆ Contracts toolkit for ERRS
- ◆ Remedy specific green remediation “cheat sheets”
- ◆ Site cleanup energy audit tool
- ◆ Who’s who in green remediation (EPA Intranet)
- ◆ ER3 for green remediation
- ◆ OSC 4-hour training
- ◆ Engineering forum “GR review and technical support” capability
- ◆ **Green cleanup voluntary standards project**



Opportunities for a Standard

- ◆ Growing interest in social responsibility
- ◆ Companies have internal goals to become greener
- ◆ New tools are being developed to evaluate impacts from cleanups
- ◆ Builds upon state and local government incentives currently being developed
- ◆ US Green Building Council has indicated interest in EPA developing green cleanup standard
- ◆ Initiates a constructive dialogue



Conceptual Development for Green Cleanups Standard

Standards Development

EPA initiates workgroup to develop Concept Paper for EPA management

EPA Workgroup partners with ASTSWMO to develop straw metrics and incentives

EPA collaborates with Standard Developing Organization

SDO Develops Green Cleanup Standard through Consensus Process

Green Standard

Conformity Assessment

EPA/States Evaluate Standard and Develop Recognition Program(s)

Self Declaration

Submit documentation to cleanup program

EPA/States Partners with Accrediting Organization(s)

Certifying Organization(s)

Recognized Compliance with Green Cleanup Standard

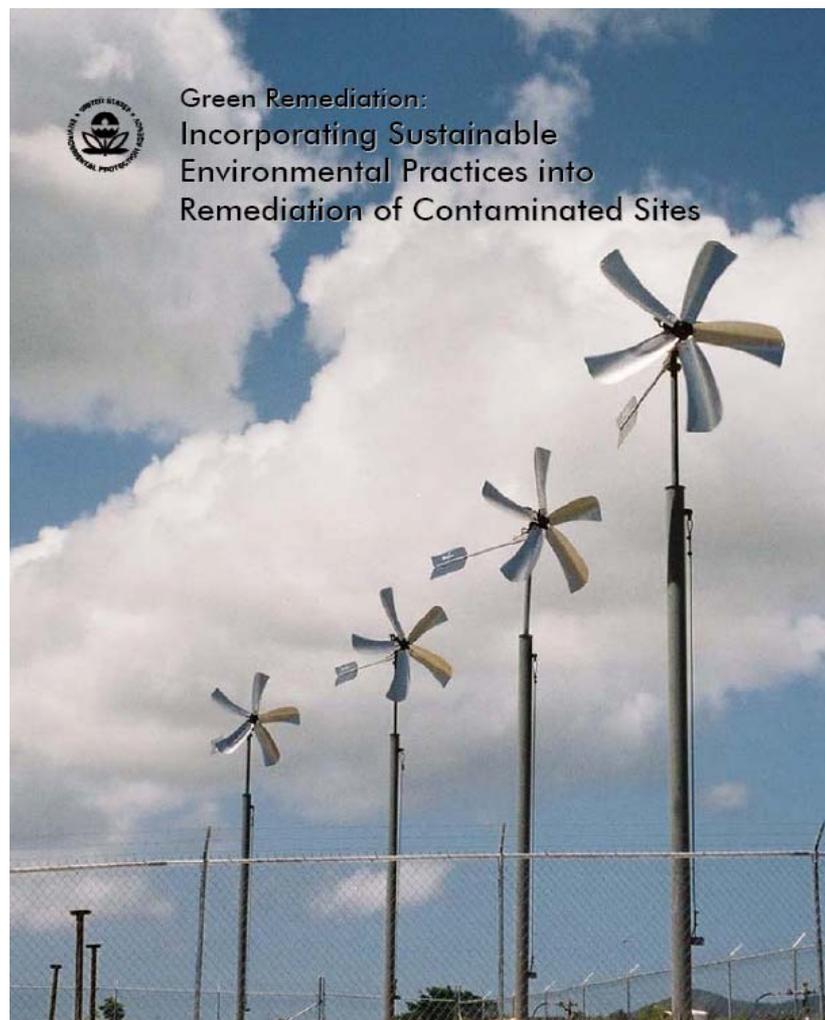
Key Attributes

- ◆ **Voluntary** - Not mandating new cleanup evaluation
- ◆ **Transparent** - Consensus based standards development
- ◆ **Universal** - Easier for stakeholders to implement
- ◆ **Flexible** - Program or State-specific recognition options
- ◆ **Minimal Resources** - Independent 3rd party or self-certification (audits)
- ◆ **Market Driven** - Certifying Projects or Persons (promote technology innovation)



EPA Green Remediation Primer

- ◆ Provides introduction to best practices with examples of how and where they are used
- ◆ Focuses on remedy implementation across regulatory frameworks
- ◆ Released April 2008, available at: <http://clu.in.org/greenremediation>



Green Remediation:
Incorporating Sustainable
Environmental Practices into
Remediation of Contaminated Sites



Green Remediation on the Web

www.clu-in.org/greenremediation



Site Name	State	Core Elements						
		Energy Efficiency	Renewable Energy	Air Emission	Water	Land & Ecosystem	Materials & Waste	Stewardship
Altus Air Force Base	OK							
Apache Powder	AZ							
Barksdale AF Base	LA							
BP Casper	WY							
BP Paulsboro	NJ							
California Gulch	CO							
Crozet Orchard	VA							
De Sale Restoration Area	PA							
Former Carswell Air Force Base	TX							
Former Ferdula Landfill	NY							
Former Nebraska Ordnance Plant	NE							
Former St. Croix Alumina Plant	VI							
Fort Carson	CO							

