




# **Green Cleanup Standards Initiative**

**3/4/09 CLU-IN Internet Seminar**  
**<http://www.cluin.org>**

**Patricia Overmeyer, *Office of Brownfields and Land Revitalization***  
**Carlos Pachon, *Office of Superfund and Technology Innovation***  
**Kristeen Gaffney, *Region 3 Brownfields and Land Revitalization***


**U.S. Environmental Protection Agency**



## Today's Topics

---

- Sustainability and green cleanups
- EPA's vision of a "green cleanup" standard
- Discussion & feedback on key questions
  - Green cleanup framework
  - Structuring standards and certification
  - Implementation considerations such as cost, recognition, etc.

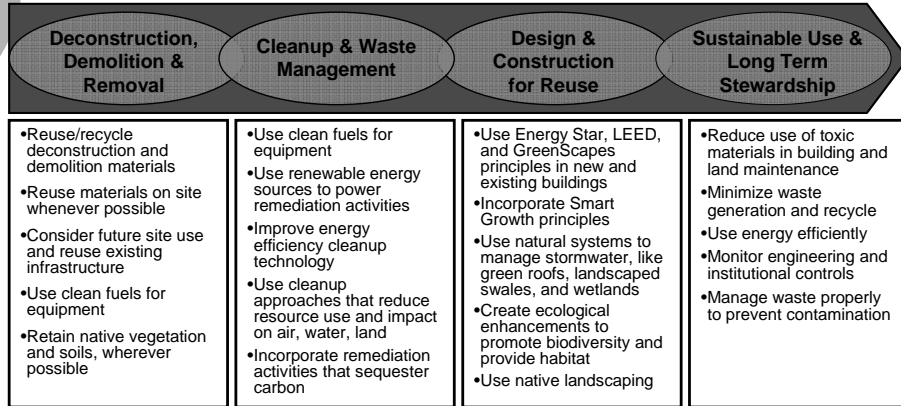


## What's Driving the Move towards “Green”

---

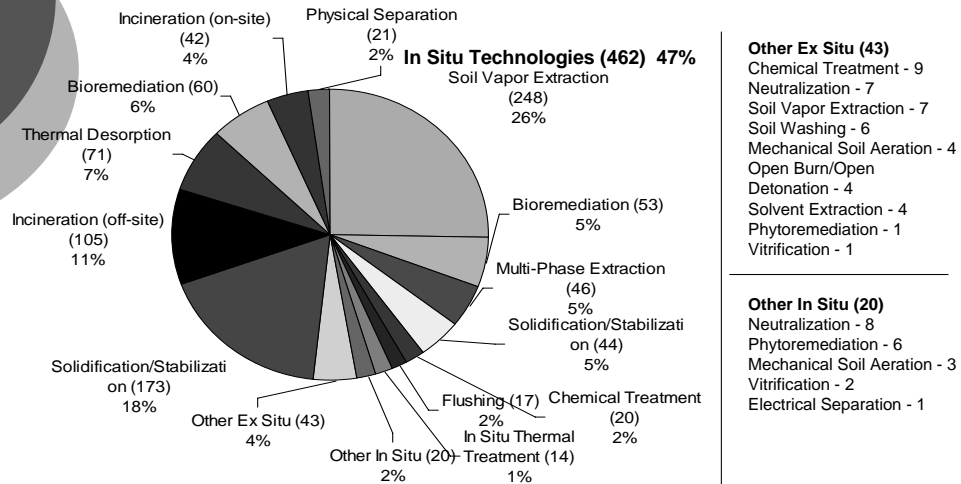
- Public sentiment
- Understanding linkages – and that ecosystems are not single media
- Energy prices
- Climate change
- Advances in engineering
- Practitioners in the field – seeking sustainability

# Sustainable Revitalization



# The Work of Cleaning Up Contaminated Sites

Sample subset of treatment technologies (Superfund, 2005-2008)\*



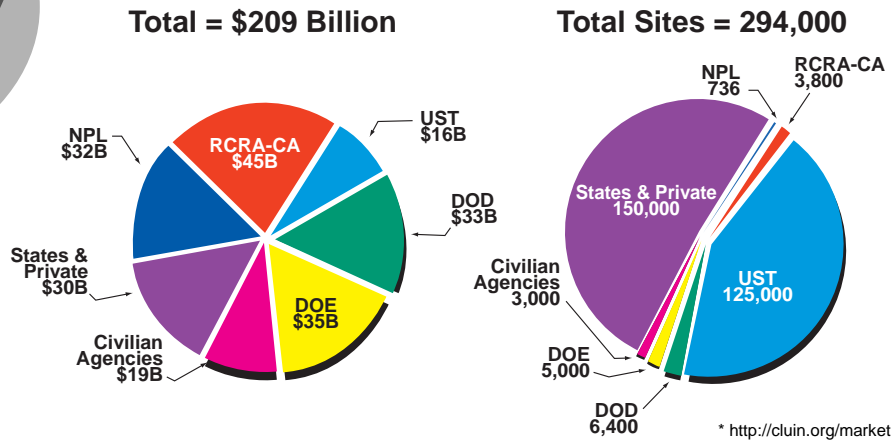
**Other Ex Situ (43)**  
 Chemical Treatment - 9  
 Neutralization - 7  
 Soil Vapor Extraction - 7  
 Soil Washing - 6  
 Mechanical Soil Aeration - 4  
 Open Burn/Open Detonation - 4  
 Solvent Extraction - 4  
 Phytoremediation - 1  
 Vitrification - 1

**Other In Situ (20)**  
 Neutralization - 8  
 Phytoremediation - 6  
 Mechanical Soil Aeration - 3  
 Vitrification - 2  
 Electrical Separation - 1

\*<http://clu.in.org/asr>

## ...and There's Still Much Work to be Done

Estimated Number of Sites and Cleanup Cost 2004-2033\*



6

- Sites that have not yet selected a remediation contractor; Does not include site that are already being cleaned up
- We are combining data on a heterogeneous programs
  - Some tend to be larger more complex sites (NPL, RCRA)
  - Some are mixed (DOD, DOD)
  - Some are small (UST, States)

•NPL: funding future RAs will depend on allocation of Superfund resources e.g., between new and old sites and between RA and other activities. RFF projects an average shortfall of \$100-200 million annually over 10 years.

•RCRA is influenced by state oversight resources, private funding, and development. State hazardous waste budgets have not increase in at least 7 yr.

### •UST PROJECTION IS FOR 10 YEARS (other markets for 30 yrs.)

•UST State trust fund revenues have been steady (\$1.3 billion in 2003). There is \$2.2 B in Federal LUST Trust Fund not being spent.

•If DOD's current restoration budget (\$1.8 B) is maintained, it would be enough to complete the cleanup work as currently specified, in under 18 years.

•If DOE's current restoration budget (\$1.4 B) is maintained, it would be enough to complete the cleanup work, as currently specified, by DOE's target date of 2035.

•Civilian agencies only spend about \$133 million annually.

•State and private sites may also be constrained by oversight staff and budgets. However, development often will subsidize the state programs (fees).

•UST & State/VCP programs are highly fragmented. DoD & DOE are larger, consolidated, but hard to penetrate

•Report discusses strategies for penetrating each of these markets (focusing on technology providers)

## What is a Green Cleanup?

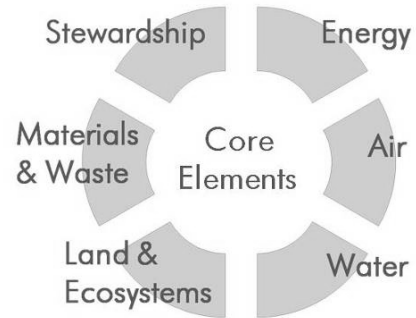
---

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

## Opportunities to Increase Sustainability in Site Cleanups

---

- Apply to all cleanup programs
- Exist throughout site investigation, design, construction, operation, and monitoring
- Involve best management practices for core elements



## Core Elements: Air Emissions

---

- Use cleaner fuel and retrofitted diesel engines
- Modify operations to reduce operating and idle time
- Minimize dust export of contaminants
- Minimize long distance transport



*Former St. Croix Alumina Plant*

## Core Elements: Water Use

---

- Minimize water use and maximize reuse
- Reclaim treated or storm water for beneficial use
- Use native vegetation requiring minimal irrigation
- Use stormwater best management practices



*Poudre River Site*



## EPA Green Cleanup “Strategy”

---

- Benchmark and document green cleanup best management practices
- Assemble a toolkit of enablers
- Build networks of practitioners
- Develop performance metrics and tracking mechanisms
- Collaborate with the private sector to develop a standard

# Green Cleanups Efforts

<b>ASTSWMO Greener Cleanups Task Force</b>
<b>Federal Remediation Technologies Roundtable (FRTR) GR Focus</b>
<b>State and Tribal Initiatives</b> Cal/EPA GR Team, Illinois Greener Cleanups, Wisconsin Initiative on Sustainable Cleanups (WISC)
<b>ITRC Green and Sustainable Remediation (GSR) Project</b>
<b>Sustainable Remediation Forum (SuRF)</b>

*Check out:*  
[www.clu-in.org/greenremediation](http://www.clu-in.org/greenremediation)





# EPA Green Cleanup Activities

---

## Existing

- Green remediation primer, website, and profiles of projects
- Internet seminars, and archived discussions (clu-in.org)
- Training for staff and technical support for projects
- Renewable energy fact sheets and website
- Contracting Toolkits

## In the Pipeline

- Partnerships with National Renewable Energy Laboratory and US Army Corps of Engineers
- Remedy specific green cleanup “cheat sheets”
- Site cleanup energy audit tool

## The Challenge: Integrating Green Cleanup Goals Across Programs

---

### Regulatory Frameworks

- Superfund
- RCRA
- Federal Facilities
- Tanks
- Brownfields

### Green Cleanup Goals

- Minimize ancillary impacts such as CO2 emissions to the air
- Minimize total energy use and promote use of renewable energy
- Preserve natural resources
- Maximize the recycling of material
- Maximize reuse options for land



## Why a Green Cleanup Standard?

---

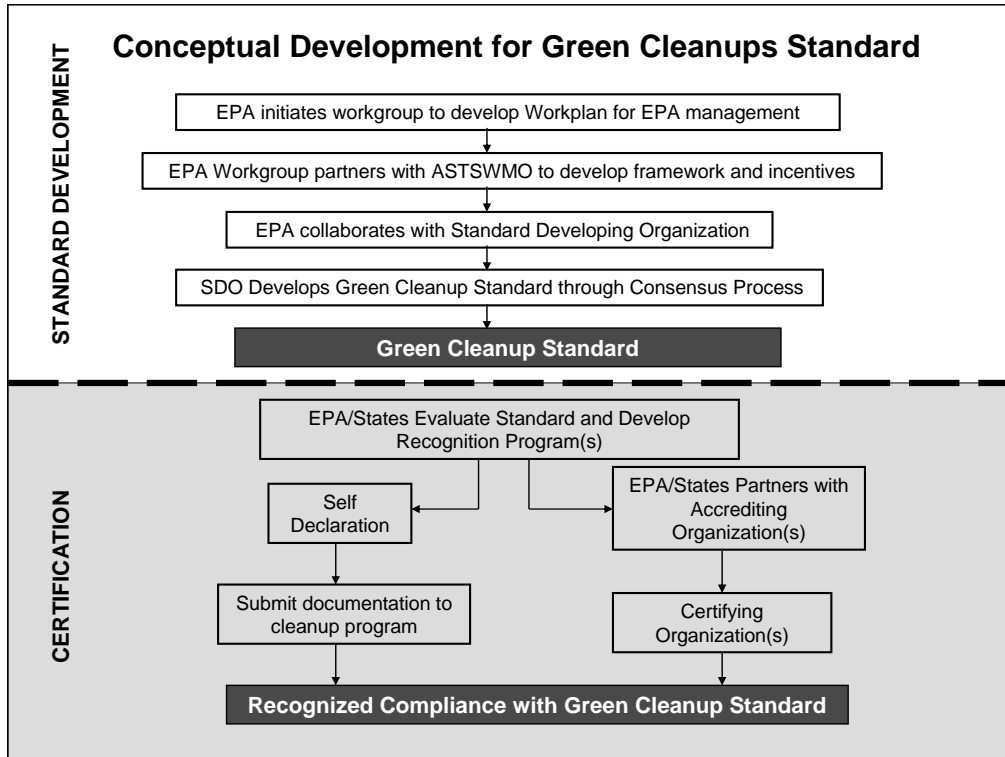
- Growing interest in social responsibility
- Companies have internal goals to become greener
- Could use new tools being developed
- Builds upon state and local government incentives
- US Green Building Council is interested in a green cleanup standard
- Leverages resources in the private sector
- May provide measurable results
- Initiates a constructive dialogue

# Standards Development

National Technology Transfer and Advancement Act (NTTAA)-

- Enacted February 1996
- Requires federal agencies to develop standards through a consensus process







## Potential Incentives

---

- Carbon offsets and credits
- Credit for LEED or other green building programs
- Loans and grants
- Reduced processing time and fees for remedies
- Publicity and recognition
- Contract incentives
- Consultant education and accreditation



## Key Attributes

---

- **Voluntary** - Not mandating new cleanup evaluation
- **Transparent** - Consensus based development
- **Universal** - Easier for stakeholders to implement
- **Flexible** - Program or State-specific recognition options
- **Minimal Resources** - Independent 3<sup>rd</sup> party or self-certification (audits)
- **Market Driven** - Promote technology innovation
- **Verifiable** - Documentation to support decisions

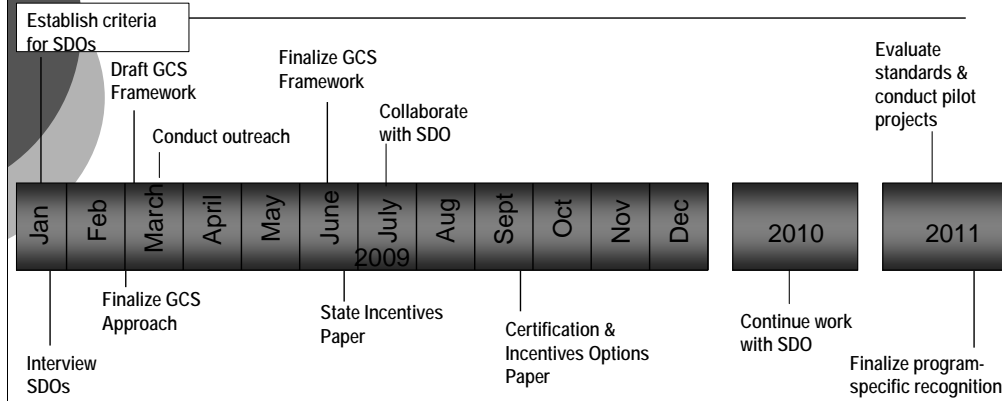


## Key Challenges

---

- Keeping it simple (*given site specific nature of cleanups*)
- Defining scope
- Balancing various stakeholders' needs
- Specifying incentives & certification prior to completion of standard
- Establishing baseline values to measure improvements against
- Minimizing energy use while supporting active cleanup

# Green Cleanup Standard Initiative: 2009-2011 Timeframe



GCS: green cleanup standard  
SDO: standard development organization



## Key Questions for Your Input

- a. Are voluntary standards a viable approach?
- b. Are we targeting the right core elements?
- c. What should the boundaries be?
- d. Should the boundaries/standards apply to projects, practices, people?
- e. Will the market bear the costs?
- f. What incentives are needed?
- g. What certification approach might yield the best results?
- h. Is there an SDO we should reach out to?
- i. How should we measure results?



[www.clu-in.org/greenremediation](http://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 Fardula Landfill	NY	☀️	🌿					
Former Nebraska Ordnance Plant	NE	☀️	🌿					
Former St. Croix Alumina Plant	WI	☀️	🌿				♻️	
Fort Carson	CO	☀️	🌿	🌬️	💧		♻️	🌐

# Thank You

After viewing the links to additional resources,  
please complete our online feedback form.



**Thank You**

[Links to Additional Resources](#)

[Feedback Form](#)