



Green Cleanup Standards Initiative

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

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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

Deconstruction, Demolition & Removal

- Reuse/recycle deconstruction and demolition materials
- Reuse materials on site whenever possible
- Consider future site use and reuse existing infrastructure
- Use clean fuels for equipment
- Retain native vegetation and soils, wherever possible

Cleanup & Waste Management

- Use clean fuels for equipment
- Use renewable energy sources to power remediation activities
- Improve energy efficiency cleanup technology
- Use cleanup approaches that reduce resource use and impact on air, water, land
- Incorporate remediation activities that sequester carbon

Design & Construction for Reuse

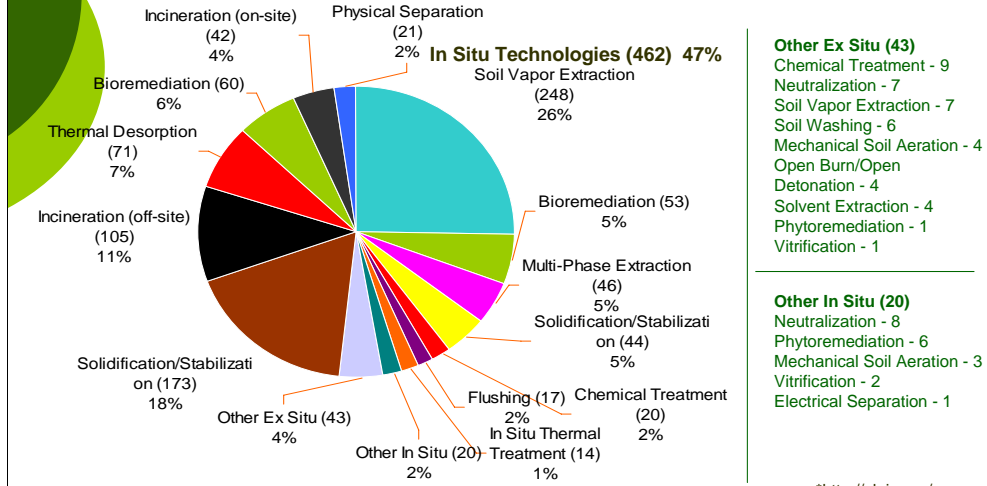
- Use Energy Star, LEED, and GreenScapes principles in new and existing buildings
- Incorporate Smart Growth principles
- Use natural systems to manage stormwater, like green roofs, landscaped swales, and wetlands
- Create ecological enhancements to promote biodiversity and provide habitat
- Use native landscaping

Sustainable Use & Long Term Stewardship

- Reduce use of toxic materials in building and land maintenance
- Minimize waste generation and recycle
- Use energy efficiently
- Monitor engineering and institutional controls
- Manage waste properly to prevent contamination

The Work of Cleaning Up Contaminated Sites

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



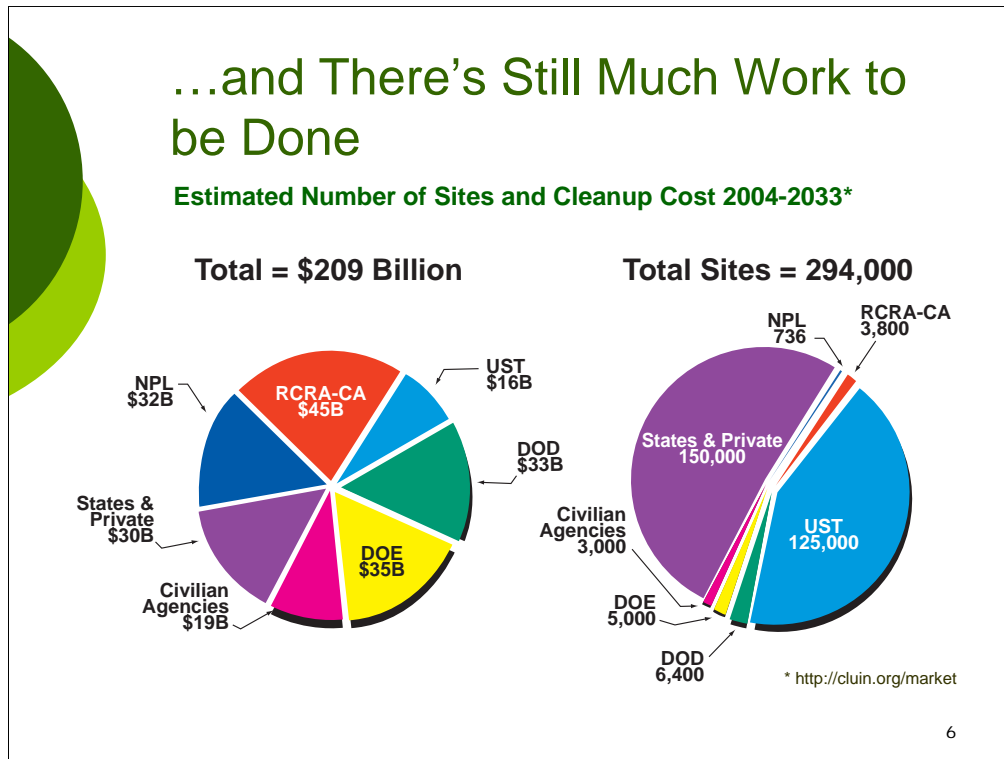
Other Ex Situ (43)
 Chemical Treatment - 9
 Neutralization - 7
 Soil Vapor Extraction - 7
 Soil Washing - 6
 Mechanical Soil Aeration - 4
 Open Burn/Open Detonation - 4
 Solvent Extraction - 4
 Phytoremediation - 1
 Vitrification - 1

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

*<http://cluoin.org/asr>

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

Estimated Number of Sites and Cleanup Cost 2004-2033*



- 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

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

Check out:
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?

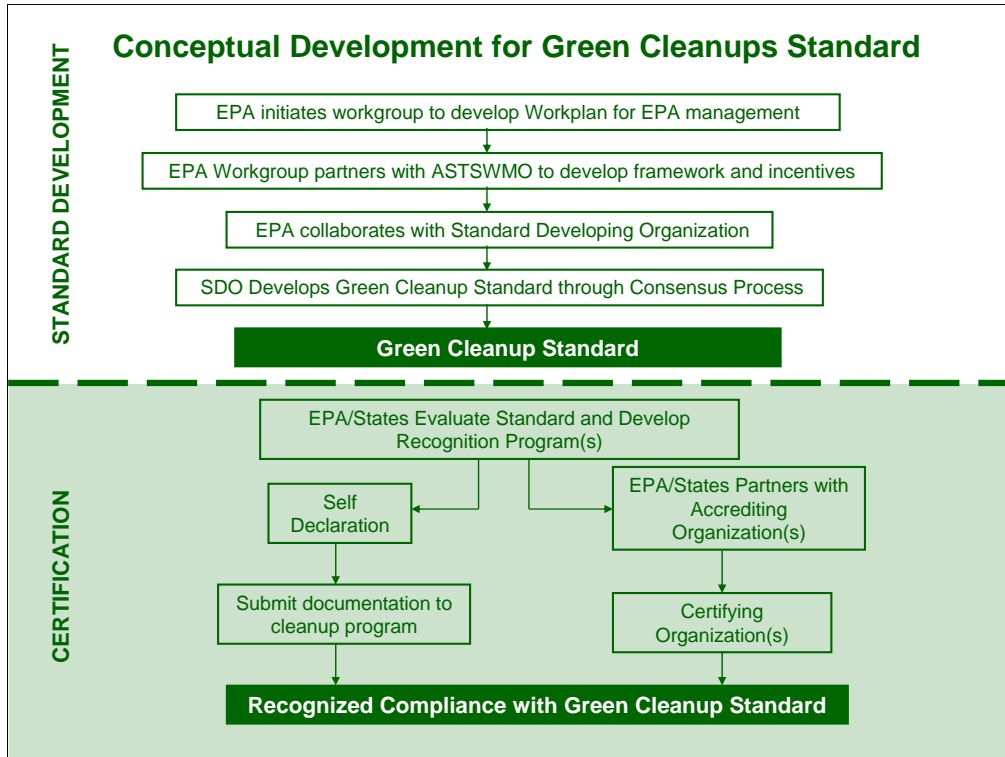
- Growing interest in social responsibility
- Companies have internal goals to become greener
- Could use new tools being developed
- Builds upon state and local government incentives
- US Green Building Council is interested in a green cleanup standard
- Leverages resources in the private sector
- May 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 3rd party or self-certification (audits)

Market Driven - Promote technology innovation

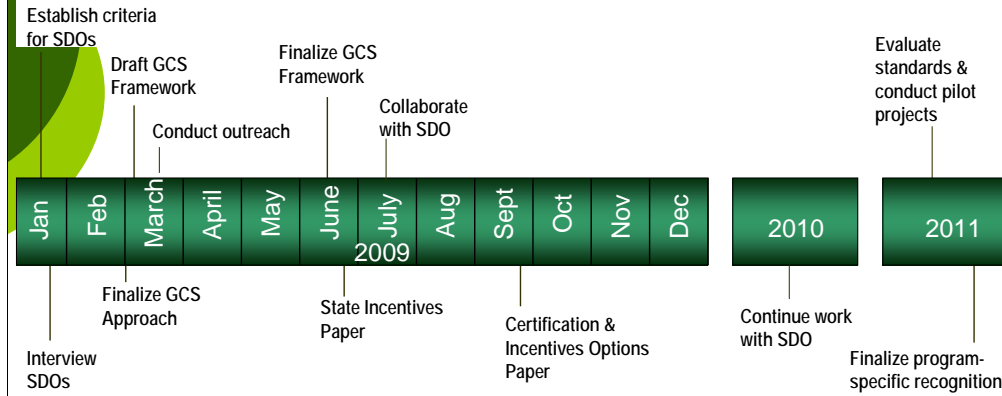
Verifiable - Documentation to support decisions



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



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.

A cartoon illustration of a hand holding two rectangular signs. The top sign is light orange and contains the text 'Links to Additional Resources'. The bottom sign is also light orange and contains the text 'Feedback Form'. The hand is drawn in a simple, friendly style with a thumb pointing up.

Thank You

[Links to Additional Resources](#)

[Feedback Form](#)