

ASTM's Standard Guide for Greener Cleanups
 ASTM E2893

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ASTM Framework for Greener Cleanups

- Greener Cleanup is a Process, not a Technology
 - Greener cleanup principles should be integrated into cleanup projects
 - Applied on a phase-by-phase basis
 - Is not just about remedy selection and green technologies
- "Only is green if it works"
 - Focus on how to incorporate BMPs into projects

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ASTM's Standard Guide Development

- EPA requested that ASTM prepare a green remediation standard
- Initiated in October 2009 at an ASTM meeting in Atlanta
- Developed a task group to prepare standard following ASTM consensus-based process
- Final standard published in November 2013
- In the process of updating the standard

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ASTM Definition of Greener Cleanup

Greener cleanup—the incorporation of practices, processes, and technologies into *cleanup* activities with the goal of reducing impacts to the environment through reduced demands on natural resources and decreased *emissions* to the environment. A *greener cleanup* considers the five *core elements*, while protecting human health and the environment. In the environmental remediation industry, this term is used interchangeably with green *cleanup*, green remediation, and greener remediation.

Designation: E2893 - 13

Standard Guide for Greener Cleanups¹

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The Basics

- Provides a step-by-step approach
- Flexible, with qualitative and quantitative options
- Includes reporting expectations
- Documentation must be publicly available (inhibits "green washing")
- Environmental professional must lead the team and sign attestation that the standard was followed
- Designed to be the industry standard; particularly if adopted by regulatory agencies

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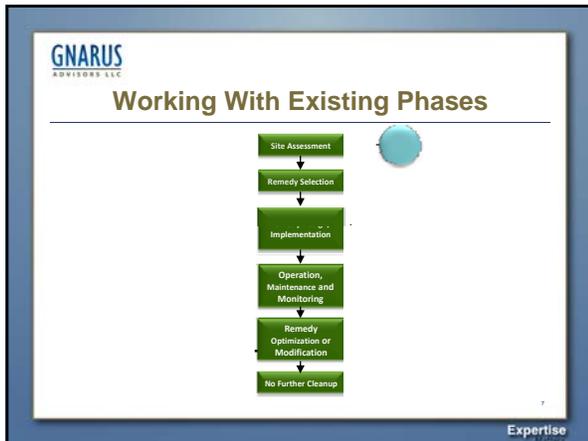
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ASTM Standard Guide Overview

- Fundamental core is selecting BMPs
- Flexible evaluation process
- Qualitative evaluation (BMP selection)
- Quantitative evaluation (numerical)
- Standard is applied on a phase-by-phase basis
 - Site Assessment
 - Remedy Selection
 - Remedy Design and Implementation
 - Operation, Maintenance and Monitoring
 - Remedy Optimization

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ASTM Greener Cleanups Standard

Sections

1. Scope
2. Referenced Documents
3. Terminology
4. Significance and Use
5. Planning and Scoping
6. BMP Process
7. Quantitative Evaluation
8. Documentation and Reporting

- Standard Management Practices are not Best Management Practices**
- ❖ Standard Management Practice (not included because routine)
 - Considered industry standards and are truly basic in nature
 - Recycling office waste
 - Using compact fluorescent light bulbs
 - Minimizing paper use with electronic filing systems
 - ❖ Best Management Practice
 - Activity that reduces the environmental footprint of a remedy
 - ASTM developed a comprehensive list BMPs

- Best Management Practices**
- ❖ BMPs drive environmental footprint reduction
 - ❖ BMPs are organized on a technology or activity basis, but are applied based on the phase of the project
 - ❖ BMPs assigned to EPA's five core elements
 - Energy
 - Air Emissions
 - Water Impacts
 - Material and Waste
 - Land and Ecosystem
 - ❖ Also established 10 Categories

- Green BMP Categories**
- | | |
|---------------------------------------|--------------------------------------|
| 1. Buildings | 6. Sampling & Analysis |
| 2. Materials | 7. Site Preparation/Land Restoration |
| 3. Power & Fuel | 8. Surface/Storm Water Management |
| 4. Project Planning & Team Management | 9. Vehicle & Equipment Management |
| 5. Residual Solid & Liquid Waste | 10. Wastewater Management |
- Insider note: likely reducing to 9 categories by merging Wastewater Management into other categories*

- BMP - Step 1 Opportunity Assessment Greener Cleanup BMP Table**
- ❖ Task Group painstakingly compiled table with over 160 BMPs
 - ❖ ASTM offers the table in Excel format as an "Adjunct"
 - ❖ Arranged by category, core element and technology
 - 10 Categories (e.g., power & fuel, materials, vehicles...)
 - 5 Core elements
 - 11 Technologies (e.g., SVE, P&T, excavation...)
 - ❖ User strongly encouraged to add BMPs to the table
 - ❖ User can sort the Excel table by technology, core element or category

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Green BMP Compilation Process

- ❖ Identified sites where green BMPs were utilized
 - ASTM reports
 - EPA reports
 - SURF reports
 - Private reports
- ❖ Excluded sites with less than 3 BMPs or if greenwashing was suspected
- ❖ Inventoried BMPs from 18 sites
- ❖ Total of 163 BMPs (Average = 9 BMPs/site)

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Green BMP Compilation Process

- ❖ Assigned BMPs to the generic ASTM BMPs (160 different BMPs)
- ❖ Compiled master database of all BMPs
- ❖ Sorted database to develop results
 - BMPs used most frequently
 - EPA core elements
 - ASTM categories
- ❖ Also, evaluated results based on experience to identify observations about implementing BMPs at cleanup sites

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Top 10 BMPs

# Sites Used	Green BMP
6	Use biodiesel as fuel source
6	Use on-site or nearby sources of fill material
5	Use native species for vegetative cover
5	Reclaim uncontaminated material for reuse, salvage value or recycling
5	Use on-site generated renewable energy (e.g., solar, wind, landfill gas)

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Top 10 BMPs

# Sites Used	Green BMP
5	Incorporate wetlands, bioswales and other natural resources into cleanup
4	Use biodegradable hydraulic fluids in equipment
4	Use local staff to minimize resource consumption
4	Use dedicated materials for sampling
4	Re-vegetate excavated or disturbed areas quickly

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Frequency of Various Categories

❖ Materials	32 BMPs
❖ Site Preparation/Land Restoration	32 BMPs
❖ Power & Fuel	26 BMPs
❖ Project Planning	16 BMPs
❖ Lower Use	
➢ Sampling & Analysis	11 BMPs
➢ Vehicles & Equipment	11 BMPs
➢ Wastewater Management	11 BMPs
❖ Very Low Use	
➢ Residual Solid & Liquid Waste	7 BMPs
➢ Building	6 BMPs
➢ Surface Water/Storm Water Management	4 BMPs

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Frequency of EPA Core Elements Addressed by BMPs

❖ Materials and Waste	101 BMPs
❖ Energy	89 BMPs
❖ Air	66 BMPs
❖ Land and Ecosystem	58 BMPs
❖ Water	52 BMPs

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Observations/Conclusions

- ❖ Heavily focused on recycling and reuse
- ❖ Also, vegetative related BMPs frequently used
- ❖ Appeared to be little quantitative evaluation and, if used, focused on a specific issue (e.g., thermal treatment and energy use in pump & treat)
- ❖ Very little greenwashing observed

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Observations

- ❖ Missing some low hanging fruit
 - Looking at LEED from a programmatic perspective
 - Including green requirements into RFPs and contracts
 - Purchasing green products
 - Implementing idle reduction plans
 - Retaining local laboratories
 - Using advanced testing to better delineate sites (e.g., Triad and surgical delineation)

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Recommendations

1. Get the Word Out!
 - > Post green remediation reports to ASTM website
 - > Post GSR case studies to SURF website through SURF's Case Study Initiative
2. Expand database and evaluation
3. Compile environmental footprint findings
4. Provide summary of lessons learned
5. Update BMP table – which is in progress

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Questions?

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