

Similarities and Differences between Optimization/Green Remediation (GR)/ Green and Sustainable Remediation (GSR) Programs of the Federal Agencies

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Presentation Outline

- ▶ Definitions and Short History
- ▶ Summary of Federal Agency Optimization and GSR/GR Policies and Approaches
- ▶ Common elements across the GR/GSR/Optimization spectrum
- ▶ Conclusions and Challenges



Contributors

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What is “Optimization”

- Optimization started with the remedial system evaluation (RSE) process developed by the USACE in the late 1990s, followed by a similar remedial performance optimization (RPO) process
- Third party optimizations were performed to assess the protectiveness and cost-effectiveness of an operational remedial system



What is “Optimization”, cont

- *EPA definition from 2012 National Optimization Strategy*
“Efforts at any phase of the removal or remedial response to identify and implement specific actions that improve the effectiveness and cost-efficiency of that phase. Such actions may also improve the remedy’s protectiveness and long-term implementation which may facilitate progress towards site completion. To identify these opportunities, regions may use a systematic site review by a team of independent technical experts, apply techniques or principles from Green Remediation or Triad, or apply other approaches to identify opportunities for greater efficiency and effectiveness (EPA 2013 Optimization Strategy)



Federal Agency Optimization Policy

Agency	Optimization Policy (Y/N),	Remedial Phases	Comments
DOD	Y	Post and including Remedy Selection	General requirement to optimize – no specific requirements
Army	Y	Same as DOD	
USACE	Y	Same as DOD, also RA-O	Required optimizations on existing FUDS remedial systems with annual O&M costs > \$100,000
Navy	Y	All	Optimization across all remedial phases
Air Force	Y	All	Performance-based contracting (PBC) requires optimization approaches with major focus of achieving accelerated site completion
DOE	N		
EPA	Y	All	Formal program that primarily utilizes third party reviews. Optimization program encompasses CSM development, Triad, and GR
NRC	Y	All	Reasonably achievable residual doses with economic, societal, and environmental factors taken into account

Summary – Federal Agency Optimization

- Optimization has expanded over the remedial cycle from its original focus on RA-O
- Optimization has expanded from its original focus on protectiveness and cost effectiveness to include remedial strategy elements (TRIAD, data management, etc.)



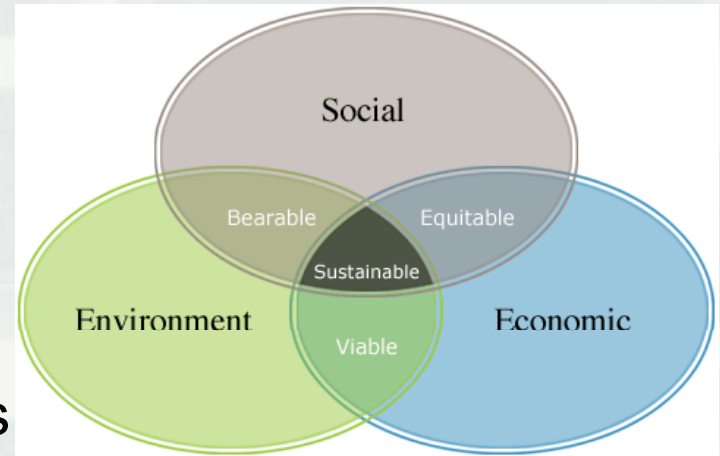
What is “Green Remediation”

- 2008 EPA Green Remediation Primer: The practice of considering all environmental effects of remedy implementation and incorporating options to minimize the environmental footprints of cleanup actions
- 2013 ASTM Greener Cleanups Guide definition: 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
- 2013 ASTM Greener Cleanups Guide Process covers the entire remedial cycle



What is “Green and Sustainable Remediation”

- The Green and Sustainable Remediation (GSR) movement followed GR, e.g. SURF White Paper (June 2009) and the ITRC GSR Practical Framework (Sept 2011)
- ITRC GSR Definition - Site-specific employment of products, processes, technologies, and procedures that mitigate contaminant risk to receptors while making decisions that are cognizant of balancing community goals, economic impacts, and environmental effects



What is “Green and Sustainable Remediation”?

- DoD GSR started with a 2009 memo replaced by GSR policy in the 2012 DERP manual
- DoD 2012 DERP Manual GSR description - “GSR employs strategies for cleanups that...
 - Use natural resources and energy efficiently
 - Reduce negative impacts on the environment
 - Minimize or eliminate pollution at its source
 - Reduce waste to the greatest extent possible”
- Green and sustainable opportunities exist throughout all phases of remediation
- DOD Component should consider and implement GSR opportunities when feasible and shall, where practicable based on economic and social benefits and costs, ensure green and sustainable remediation practices.



Federal Agency GR/GSR Policy

Agency	GSR/GR policy (Y/N)	Remedial Phases covered by Policy	Approach includes social and economic elements	Comments
DOD	Y	All	Y	GSR when feasible and where practicable
Army	Draft policy under review	All	Y	Currently identical to DOD policy, reference to ACSIM Study Approach if GSR included
USACE	Will follow Army policy	All	Y	Currently holding until Army GSR policy final
Navy	Y	All	Y	GSR evaluation performed as part of optimizations
Air Force	Y	All	No specific GSR approach identified	Template PBC contract language requires implementation of Environmental Management System (EMS) principles including GSR techniques
DOE	Y	All	Y	Inclusion of GSR in all remediation contracts, goal added to 2015 DOE Site Sustainability Plan to verify GSR contracting language has been implemented
EPA	Y	Varies	N (indirectly through CERCLA criteria)	All EPA Regions have Clean and Green Policy (CGP), required for fund-lead sites – generally applied after alternative selection; ASTM GR Guide approach is encouraged, which is applied over all phases, technology specific BMP sheets can also be used
NRC	Y	All	Y	Part 6 Decommissioning and Termination of Activities



Conclusions – Agency GR-GSR

- Most GR-GSR policies cover the remedial cycle but some selectively focus post remedy selection, i.e. greening of the remedy
- GR focuses primarily on the environmental element
- GSR focuses on a balance of social and economic elements with the environmental element

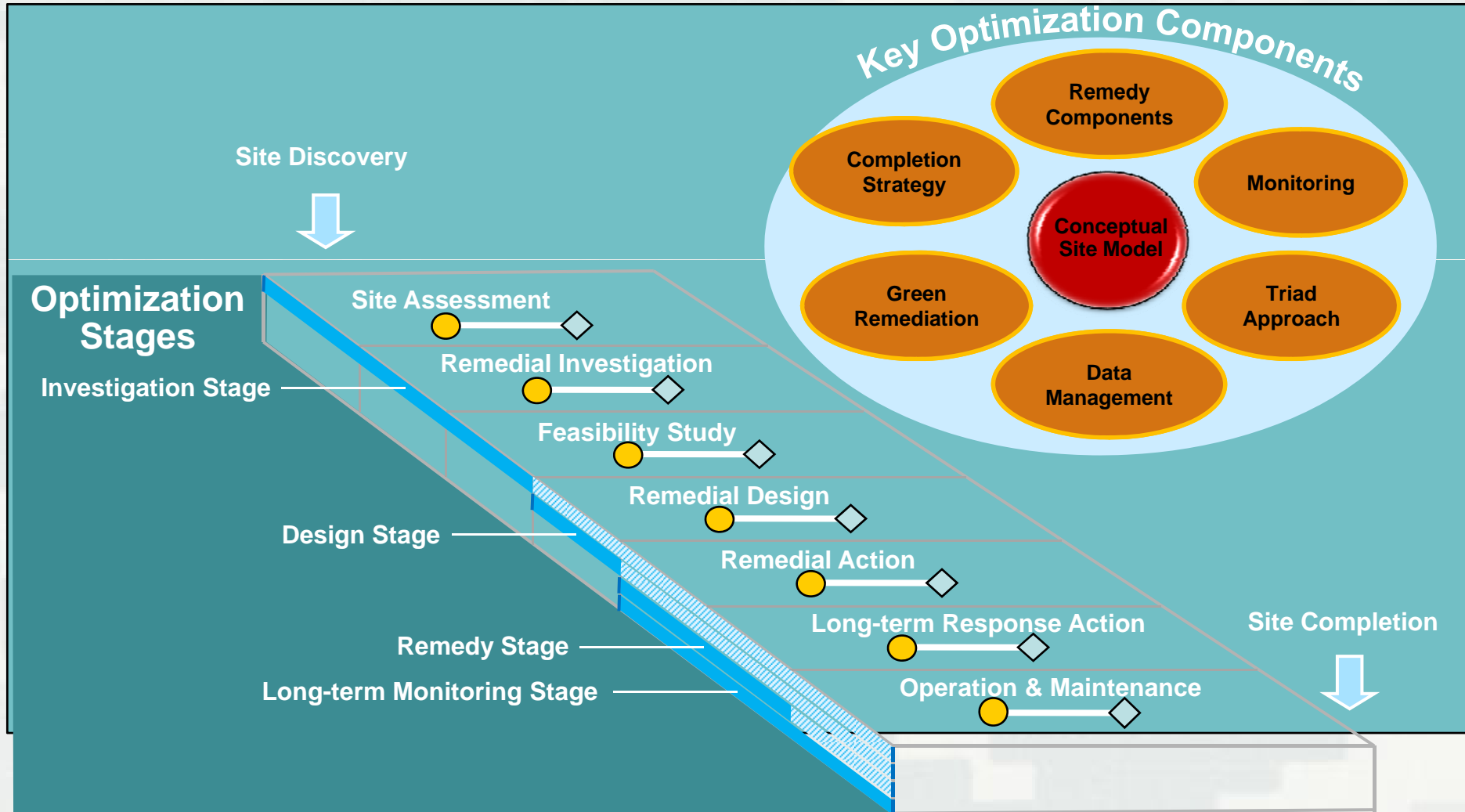


Comparison Across Optimization and GSR/GR

- Core process in GSR/GR assessment is identification of applicable GR/GSR best management practices (BMPs) and related footprint reduction options
- The different GSR/GR Best Management Practice (BMP) lists have different foci
 - ▶ ASTM Guide for Greener Cleanups – environmental only
 - ▶ ASTM Guide for Integrating Sustainable Objectives into Cleanup – environmental, community, and economic
 - ▶ Army ACSIM Study – remedial strategy, environmental, social, and economic – structured by remedial activity area
 - ▶ Navy GSR Guidance – remedial strategy, environmental, social, and economic, BMPs per remedial phase



EPA Optimization As Expanded over Phase and Component



Comparison Between EPA Optimization Strategy and GSR BMPs

EPA Optimization Process	Examples of Related Federal Agency GSR BMPs
Optimization Efforts Across the Remedial Cycle	BMP-B2 Perform regular optimization evaluations to improve efficiency of current or planned actions and/or develop alternative remedial approaches that might shorten remedy duration or otherwise improve the net environmental benefit of the remedy (Army ACSIM Study)
Individual EPA Optimization Process Components	Examples of Related Federal Agency GSR BMPs
Completion Strategy	Implement exit strategies (Navy GSR guidance); BMP A-11 : Use language in work plans, proposed plans, and decision documents that maximizes flexibility to allow GSR recommendations to be implemented (Army ACSIM Study)
TRIAD Approach	BMP B-6 : Consider real-time measurements and dynamic work plans to reduce mobilizations and improve effectiveness of investigation efforts (Army ACSIM Study); Use on-site mobile lab or other field analysis (for example, portable gas chromatography/mass spectrometry for fuel-related compounds and VOCs) (ASTM Integrating Sustainable Objectives into Cleanup Guide)
Data Management	Systematic planning - identify the PQOs and data required to meet the project objectives (Navy GSR guidance)
Site Conceptual Model	BMP B-1 : Develop and routinely update a conceptual site model (CSM) to use as a basis for making remedial process decisions (Army ACSIM Study)
Monitoring	BMP B-4 : Establish decision points to trigger a change from one technology to another or from one remedy alternative to another (Army ACSIM Study)

Conclusions Across Agency Programs

- GSR BMPs include remedial strategy components that optimize the overall remedial process and decision-making
- Same components are mirrored in the EPA National Optimization Strategy
- These components are similar to Performance-Based Environmental Management principles (ITRC 2007)
 - ▶ life-cycle cost analysis
 - ▶ exit strategies
 - ▶ data management, analysis, and visualization techniques
 - ▶ performance-based management



Overall Conclusions

- Federal agency optimization and GSR effectively optimize with respect to traditional (cost, risk) and nontraditional (resources, social and economic) considerations across the remedial cycle
- Some Agency GSR BMPs include considerations not typically in the traditional remedial process
 - Remedial strategy optimization
 - Social and economic considerations beyond those in the CERCLA/RCRA statutory criteria
- GR is more focused on environmental footprint reduction whereas GSR focuses more on the balance of social, economic and environmental considerations



Challenges

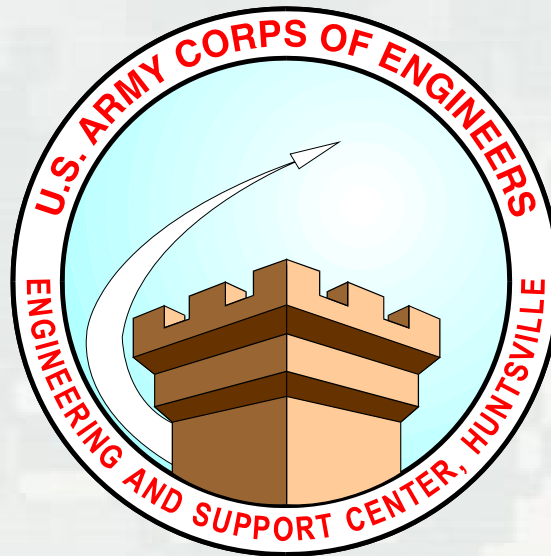
- GSR has expanded the way we look at remediation, looking at the environmental lifecycle as well as elements that weren't traditionally considered or required by regulation. However, the traditional regulatory framework has not significantly changed.
 - ▶ What are the boundaries of GSR/GR?
 - ▶ How does the expanded GSR process fit in the traditional regulatory framework?
 - ▶ How can the information from GSR evaluations effectively be used in the traditional remediation process?
 - ▶ How can remedial strategy optimization outside third party evaluations be effectively implemented?



Questions?

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Resources

- *Air Force Instruction (AFI) 32-7020, Final Draft, 28 August 2013, http://static.e-publishing.af.mil/production/1/af_a4_7/publication/afi32-10142/afi32-10142.pdf, Air Force Instruction (AFI) 32-7001, <http://www.denix.osd.mil/swr/upload/afi32-7001.pdf>, and Draft Optimized Exit Strategy (OES) Compendium for Performance-Based Remediation, 15 January 2013. These combined documents contain the current Air Force approach “to focus on the most efficient and effective means of achieving accelerated site completion at the broadest range of sites across installations rather than to optimize remedy efficiency at individual sites”, with the primary mechanism used in meeting this objective Performance-Based Restoration (PBR) contracts.*
- Army ACSIM GSR Study Report http://www.fedcenter.gov/Documents/index.cfm?id=22322&pge_prq_id=27392
- ASTM International “Standard Guide for Greener Cleanups E2893-13”, Nov. 25, 2013
- ASTM International “Standard Guide for Integrating Sustainable Objectives into Cleanup E2876-13”, June 2013.
- Defense Environmental Restoration Program (DERP) Manual, revised 9 March 2012, No. 4715.20

- Department of Energy Memo “Green and Sustainable Remediation Contract Language” from J. E. SURASH, DEPUTY ASSISTANT SECRETARY FOR ACQUISITION AND PROJECT MANAGEMENT to MARK A. GILBERTSON, DEPUTY ASSISTANT SECRETARY FOR SITE RESTORATION, with attached contract language, November 2013.



Resources, cont.

- DON Policy for Optimizing Remedial and Removal Actions at all DON Environmental Restoration Program Navy Sites (2 Apr 2012), http://www.navfac.navy.mil/navfac_worldwide/specialty_centers/exwc/products_and_services/ev/erb/gsr.html#polguid.
- DON Guidance on Green Sustainable Remediation, UG-2093-ENV, Rev1 (5 April 2012), http://www.navfac.navy.mil/navfac_worldwide/specialty_centers/exwc/products_and_services/ev/erb/gsr.html#polguidin.org/greenremediation/.
- EPA memorandum “Encouraging Greener Cleanup Practices through Use of ASTM International’s Standard Guide for Greener Cleanups”, December 2013, http://www.epa.gov/oswer/greenercleanups/pdfs/oswer-aa-gc-memo_december-2013.pdf
- EPA National Optimization Strategy, September, 2012, <http://www.clu-in.org/Optimization/strategy.cfm>.
- EPA Green Remediation Primer USEPA 2008, EPA 542-R-08-002, *Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites*, www.cluin.org/download/remed/Green-Remediation-Primer.pdf
- EPA GR Best Management Practices (by remedial technology) <http://www.clu-in.org/greenremediation/>.



Resources, cont.

- ITRC Green and Sustainable Remediation: A Practical Framework, November 2011, <http://www.itrcweb.org/GuidanceDocuments/GSR-2.pdf>.
- ITRC Improving Environmental Site Remediation Through Performance-Based Environmental Management, November 2007, <http://www.itrcweb.org/GuidanceDocuments/RPO-7.pdf>.
- ITRC Remediation Process Optimization: Identifying Opportunities for Enhanced and More Efficient Site Remediation, September 2004, <http://www.itrcweb.org/GuidanceDocuments/RPO-1.pdf>
- Sustainable Remediation Forum (SURF) White Paper, 2009, <http://www.sustainableremediation.org/library/issue-papers/>

Publicly Available Federal Agency GR/GSR Tools

- SiteWise™ GSR Tool
<http://www.sustainableremediation.org/tools/>
- Sustainable Remediation Tool (SRT) <http://www.sustainableremediation.org/tools/> (to be loaded)
- Spreadsheet for Environmental Footprint Analysis (SEFA) (developed by EPA)
<http://www.sustainableremediation.org/tools/>

