



## **Guidance on Incorporation of Sustainability into Army Environmental Remediation Practical Aspects of Incorporation and Application**

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## Overview

- Background and Structure of Army Guidance
- If, When, and How to Incorporate Sustainability
- Path Forward



## **Definition - Sustainability (from Army Strategy for the Environment 1-Oct-04)**

- A strategy that “simultaneously meets current as well as future mission requirements world-wide, safeguards human health, improves quality of life, and enhances the natural environment”



## Guidance Audience

- Army in-house project delivery teams
- Army contractors
- Army headquarters
  
- ❖ Purpose: Provide standard operating and documenting procedures
- ❖ Procedure: Use/modify structures already familiar to the Army where possible



## Guidance Structure and Application

- Decision flow chart(s) and on-line resources.
- Guidance covers all phases of the remediation process
- Methodology differs between remedial phases
  - Does phase have existing evaluation structure? Use existing structure.
    - Remedy Selection
    - Remedy Implementation
    - Remedy Operation and Maintenance
  - No existing evaluation structure? Use modified Environmental Management System (EMS) matrix.
    - Site Investigation
    - Site Closeout
- Two basic structural components
  - Threshold (veto) and balancing (modifying) criteria
  - Screening and detailed analysis



## Basic Questions for each Phase

- Can sustainability be incorporated?
- Should sustainability be incorporated?
- How is sustainability incorporated?



## Can Sustainability Be Incorporated? Contract Considerations

<b>Contract type</b>	<b>Existing</b>	<b>Future</b>
Fixed Price	Yes	Yes
Cost Reimbursement	Yes	Yes
Performance Based	Difficult (contract already negotiated; based on prescribed outcome)	Challenges (weighting factors; measurement objectives; need for intermediate decisions)



## Can Sustainability Be Incorporated? Resource Considerations

- Human resources adequate?
- Project funds adequate?
- Incorporation procedures in place?
- Adequate knowledge of procedures?
- Need to incorporate sustainability into budget, schedule, resource allocation, and training at level of implementation





# How is Sustainability Incorporated? No Existing Structure

- Site Investigation and Site Close-out
- Use Modified Environmental Management System Evaluation



## RAC Scoring (Former FUDS MMRP Scoring Method)

		HAZARD PROBABILITY				
		FREQUENT A	REASONABLY PROBABLE B	OCCASIONAL C	REMOTE D	IMPROBABLE E
SEVERITY	CATASTROPHIC I	HIGH				
	CRITICAL II	HIGH				
	MARGINAL III		MEDIUM			
	NEGLIGIBLE IV				LOW	



## Modification of EMS Rating Factors

- Use of Environmental Management System aspects
  - Environmental impact
  - Mission impact
  - Regulatory impact
  - Community Concern
- Cross plot activity level – Combination of frequency (5<sup>th</sup> EMS aspect) and duration of activity
- Options identified, scored with respect to aspects, and then compared.



## Incorporation of Sustainability Threshold Criteria

- Threshold – similar, not same as NCP; if not met, option dropped. Red – no further consideration. Use categories – project specific.

Threshold Criteria	Rating Scale		Activity Level			
			High	Medium	Low	Rare
			4	3	2	1
Mission Impact	Enhances mission	4	16	12	8	4
	Compatible with mission	3	12	9	6	3
	Neutral	2	8	6	4	2
	Some obstacles	1	4	3	2	1
	Significant negative impact	0	0	0	0	0
Regulatory Impact	No regulatory constraint	4	16	12	8	4
	Preferred regulatory practice	3	12	9	6	3
	Accepted regulatory practice	2	8	6	4	2
	To be regulated	1	4	3	2	1
	Not permitted	0	0	0	0	0

 High  
 Medium

 Low  
 Do not use





## Incorporation of Sustainability Balancing Criteria

- Balancing – Similar to but not same as NCP criteria (not statutory), Consider not using but no automatic elimination, environmental impact = sustainability

Balancing Criteria	Rating Scale		Activity Level			
			High	Medium	Low	Rare
			4	3	2	1
Community Concern	Incentives for inclusion	4	16	12	8	4
	Strongly in favor	3	12	9	6	3
	Mildly in favor	2	8	6	4	2
	No interest	1	4	3	2	1
	Against	0	0	0	0	0
Environmental Impact	High, beneficial	4	16	12	8	4
	Moderate, beneficial	3	12	9	6	3
	Low	2	8	6	4	2
	No impact	1	4	3	2	1
	Significant negative impact	0	0	0	0	0

 High  
 Medium

 Low  
 Consider not using



## What Should Be Included? Screening Level Sustainability Evaluation

- Purpose is to determine which options should be considered further.
- Things to consider - screening:
  - Significant negative impact to mission/ does not meet mission?
  - Not allowed by regulation or time frame unacceptable to regulators?
- Option is screened out
- Significant negative environmental impact or public concern – option could be screened out, decision up to project team



## Comparison of Options Retained from Screening (Detailed Analysis)

### No Existing Comparative Framework

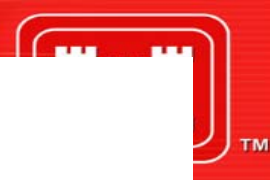
- Direct use of modified rating factor scoring method to score options. Scoring of options. Use Tier II Air Force Tool to obtain relative scores for environmental impact (sustainability)

Threshold Criteria	Rating Scale		Activity Level			
			High	Medium	Low	Rare
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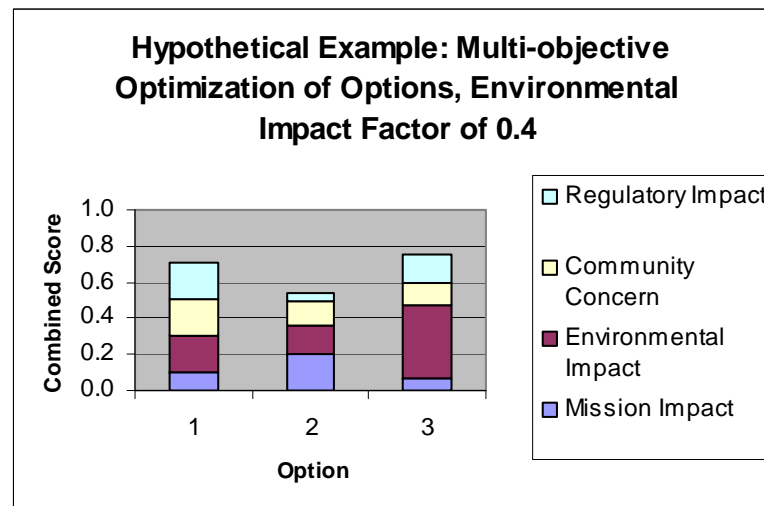
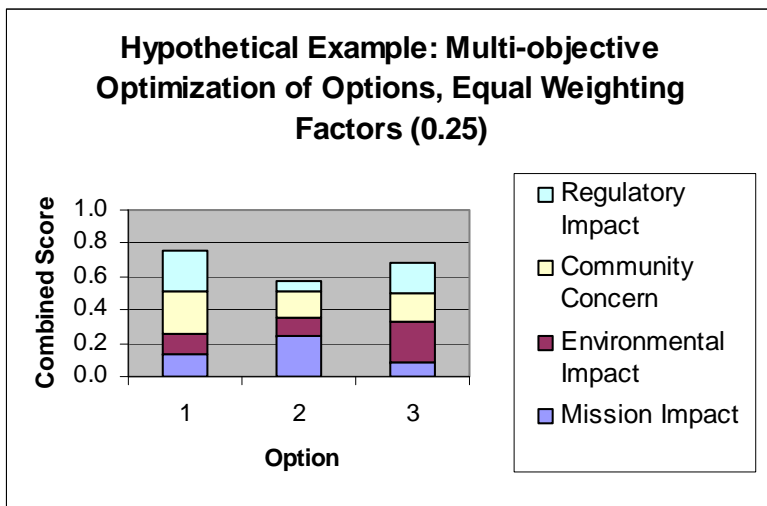
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# Investigative or Closeout Phase Comparison of Alternatives No Existing Comparative Framework, cont.

- Is there a clear winner?
- No? Establish relative importance of rating factors – assign importance (weighting factors), rescore, compare options through multivariable optimization, use to document consideration of sustainability and defensibility of option selection







## How is Sustainability Incorporated? Existing Structure

- Remedy selection, implementation, and operation and maintenance
- Use existing evaluation processes
  - Remedy Selection - CERCLA FS/ Proposed Plan/ROD/Construction or RCRA CMS/Decision Document/Construction
  - Remedy Implementation – Value Engineering
  - Remedy Evaluation/Optimization - Remedial System Evaluation, Remedial Process Optimization, Five-Year Reviews



## Remedy Selection Technology, Process, and Alternative Screening Required Existing Framework (NCP)

- Existing framework with implementability, effectiveness and cost as screening criteria
- Two choices
  - Incorporate sustainability into effectiveness (potential impact to human health and the environment, effective use of available resources, minimization of waste generation, etc.)
  - Sustainability another criteria - use screening level (AFCEE Tool Tier I analysis) to obtain sustainability scores for individual options.



## Remedy Selection Detailed Analysis of Alternatives

- Use scoring criteria within framework, NCP threshold and balancing criteria
- Two options:
  - Incorporate sustainability into nine NCP criteria
  - Use sustainable scoring on options as additional balancing criteria - sustainability a “tenth balancing criterion” – not statutory. Use Tier II AFCEE tool.



## Remedy Implementation/Operation and Maintenance Value Engineering Studies, Remedial System Evaluations, Five Year Reviews

- VE, RSE (RPO) studies, FYRs include many sustainability aspects
- Additional off-site aspects, e.g. greenhouse gas emissions, can be added but presently not included.
- VE/RSE studies are optional and typically not performed if contract is PBC
- FYRs required more often – sustainability could be incorporated through remedy optimization
- Sustainability may be in conflict with other VE/RSE/FYR considerations, e.g. cost, site close-out time.



## Guidance Path Forward

- Draft guidance to be completed January 2009.
- Sustainability incorporation tools still in development – guidance will use but not develop tools
- Peer and Corps/Army Headquarters review, 2009; finalization of guidance October 2009.



## Path Forward: Platforms for Adding Sustainability

- Development of add-on sustainability packages
  - Planning – Total Project Planning (Performance Based Management)
  - Investigation – TRIAD
  - Remedy Selection – 10<sup>th</sup> Statutory FS balancing criteria (?), RACER
  - Remedy Implementation – VE Studies
  - Remedy Operation and Maintenance – RSE (RPO) Studies, Five Year Reviews
  - Site Closeout - PWTB 200-1-23, "Guidance for the Reduction of Demolition Waste Through Reuse and Recycling" - package would add other sustainability considerations, i.e. land use



## Conclusions

- Need to incorporate sustainability on installation level (planning, budget, procedures, human resources, training)
- Need platforms from which to incorporate sustainability - NCP criteria, planning, cost estimation, and optimization programs, and FYRs all possible platforms that can support a sustainability evaluation add-on.
- Contracting structure important – PBCs potentially limit incorporation of sustainability in all remedial phases – intermediate decisions difficult. Evaluation of sustainability easier to add than implementation.
- Off-site environmental impacts, e.g. greenhouse gases, most difficult to incorporate in PBCs and may conflict with cost, implementability.
- If comparative frameworks exist, sustainability incorporated into the existing frameworks and rating factors. Or used as another “balancing criteria”.
- If no comparative framework, use modified EMS rating factor matrix
- Mission impact and regulatory impact threshold (veto potential) criteria
- Environmental impact (sustainability) and community response balancing criteria.
- Multi-variable evaluation can be used to weight sustainability to other rating factors and document/justify the results of the decision process



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- Doug Mellema, Bob Pender – USACE, Kansas City District





## Questions

- Contact Carol Lee Dona at (402) 697-2582, [carol.l.dona@usace.army.mil](mailto:carol.l.dona@usace.army.mil)



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# Additional Slides



## Can Sustainability Be Incorporated, Contracts

- Typical Army Contracts
  - Performance-Based – successful completion of outcome prescribed in contract
  - Fixed Price – specific services defined in the statement of work
  - Cost reimbursement – reimbursement for eligible costs
- Army emphasis on PBC (over 50% existing contracts)



## Can Sustainability be Incorporated – Existing Contracts – no Sustainability Clauses

- FP – modification possible during contract (contract modification)
- CR – modification possible (work variance notification)
- PBC – Contractor responsible for project direction to prescribed final outcome
  - Difficult to incorporate sustainability in existing PBCs
  - Contract has already been negotiated with prescribed outcome (successful site remediation) without consideration of sustainability
  - Some sustainability measures possible, particularly those that lower costs; full incorporation difficult



## Can Sustainability Be Incorporated – Future Contracts

- All contracts can incorporate some aspects of sustainability
- Evaluation of sustainability can be prescribed in all contracts
- Full implementation more difficult to ensure in PBCs than FP and CR
- PBC challenges
  - Weighting factors against cost in performance objectives
  - Quantification of measurement criteria for accomplishing performance objectives



## Screening Level Mission Impact

- Time frame adequate to amend existing contracts/SOPs
- Funds sufficient for sustainability evaluation/implementation
- Basic requirements of mission met
- No significant negative impact to mission
- Human resources adequate to oversee evaluation/implementation



## Screening Level Regulatory Impact

- Permitted or expected to be permitted by regulations or no regulatory constraints
- Time frame for regulatory approval within acceptable time frame for completion of action



## Screening Level Environmental Impact

- Evaluate using screening level scoring matrix (Air Force tool, Tier 1 ~ two hours)
- No significant damage to environment
- Balancing criteria – zero score does not automatically eliminate option





## Screening Level Community Concern

- Assess public opinion in project planning
- No wide-spread public opposition
- Balancing criteria – zero score does not automatically eliminate further consideration of option



## Comparison of Sustainability against Other Remediation Criteria

- Detailed evaluation of rating criteria to compare options.
- Approach depends on remediation phase, relevant criteria in phase, and existing frameworks
  - No existing comparative framework: Investigation and Closeout
  - Required existing framework: Remedy Selection (NCP process)
  - Existing but optional framework: Remedy Implementation (Value Engineering) and Operation and Maintenance (Remediation System Evaluation)



## **No Existing Comparative Framework (Investigative, Closeout) – Detailed Analysis**

- Direct use of modified rating factor scoring method
  - Mission impact – relative quality or completion, time and resources expended, enhancements to mission or other missions
  - Regulatory impact – ease of getting regulatory approval, regulatory incentives
  - Environmental impact – detailed analysis (1-2 days Air Force tool, in preparation)
  - Community concern – incentives , e.g. donated land, public approval



## No Existing Comparative Framework (Investigative, Closeout) cont

- Add scores of environmental rating factors – Is there a clear winner?
- No? Establish relative importance of rating factors
- Compare options through multi-variable optimization
  - Normalize scores from scoring matrix to 1 by dividing by highest score
  - Assign weighting factors for relative importance of rating factor
  - Add scores together for each option



## Examples Incorporation of Sustainability into NCP Evaluation Criteria

- Protection of Human Health and the Environment: Worker safety, air emissions (and related renewable energy)
- Long term effectiveness and permanence: Residual risk minimized through waste minimization
- Short term effectiveness – Worker safety, adverse environmental effects from construction (air emissions) and mitigation responses, green space destruction
- Cost – treatment of residuals (air emissions – carbon offsets to treat)



## Existing but optional framework (Remedy Implementation) Value Engineering Studies

- Typically performed after remedy selected but before remedy implementation
- Performed with input from customer throughout process
- VE already includes many sustainability aspects (recycling, use of existing infrastructures and materials, enhancement of remedies to promote ecological well-being, cost reduction, risk reduction, site close-out time, reduced resource consumption, life-cycle costs). Identify any additional sustainability aspects (greenhouse gas emissions).
- Where sustainability incorporation is in conflict with other VE considerations, e.g. cost, identify options. Weighting factors could be used to compare options on relative importance of sustainability to other aspects.
- VE studies typically not performed if contract is PBC.



## Existing but optional framework (Remedy Implementation and Operation and Maintenance) Remediation System Evaluations

- Typically performed after remedy is in place.
- Optimization already includes some sustainability aspects (cost reduction, risk reduction, site close-out time, equipment maintenance, resource consumption) . Identify any further sustainability aspects, e.g. greenhouse gases.
- Where sustainability incorporation is in conflict with other RSE considerations, e.g. cost, identify options. Weighting factors could be used to compare options using different relative importance of sustainability to other aspects.
- RSE studies typically not performed if contract is PBC.



## Acknowledgments

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