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ASTM E2893-16 Greener Cleanup Self-Declaration at Marine Corps Base Camp Lejeune



June 28, 2018

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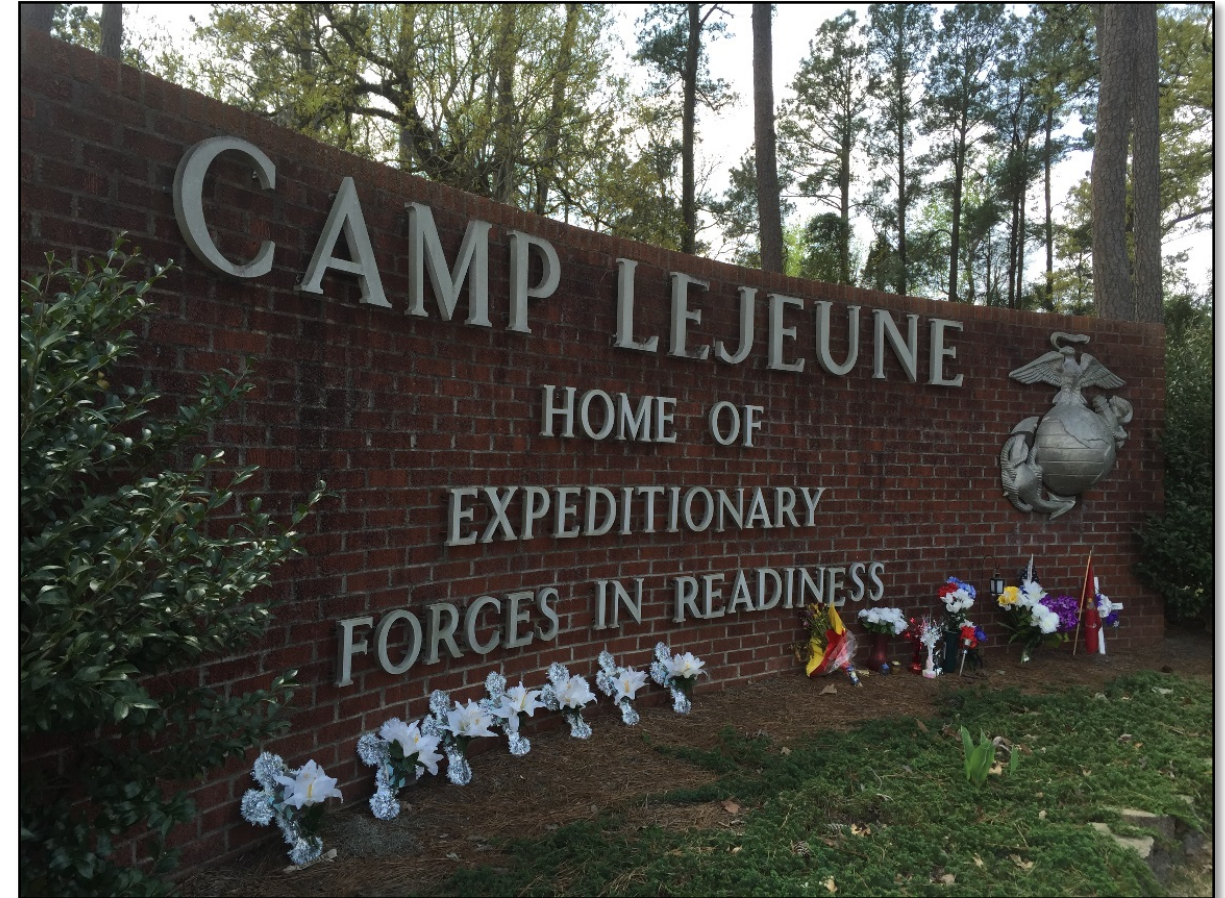
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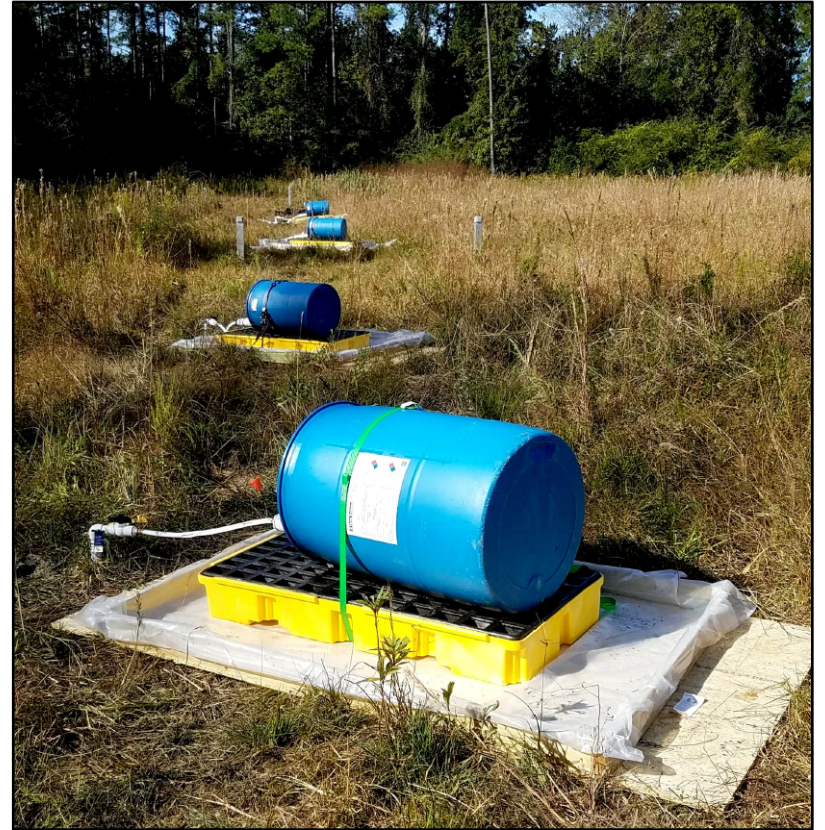
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Agenda

- Review ASTM E2893-16: Standard Guide for Greener Cleanups Process
- Present MCB Camp Lejeune Self-Declaration
- Discuss Benefits of Self-Declaration





What is the Standard Guide for Greener Cleanups?

Overview of ASTM E2893-16: Standard Guide for Greener Cleanups

- The act of cleanup creates its own environmental impacts
 - Energy requirements
 - Air pollution
 - Water use
 - Material production/waste disposal
 - Land and ecosystem impacts
- Standard provides process for identifying, evaluating, incorporating, and documenting best management practices (BMPs) during cleanup



Overview of ASTM E2893-16: Standard Guide for Greener Cleanups

BMP Process

1. Opportunity Assessment
2. Prioritization
3. Selection
4. Implementation
5. Documentation

TECHNICAL MEMORANDUM

ch2m:

Greener Cleanup Self Declaration, Marine Corps Base Camp Lejeune and Marine Corps Air Station New River, North Carolina

PREPARED FOR: Marine Corp Base Camp Lejeune and
Marine Corps Air Station New River

PREPARED BY: CH2M HILL, Inc.

DATE: October 31, 2017

CONTRACT: CTO-WE10 Clean 9000
Contract N62470-16-D-9000
NC Engineering License No. F-0699



1 Introduction

This technical memorandum was prepared to document that Marine Corps Base (MCB) Camp Lejeune and Marine Corps Air Station (MCAS) New River's Installation Restoration Program (IRP), Military Munitions Response Program (MMRP), and Solid Waste Management Unit (SWMU) sites are in conformance with the *Standard Guide for Greener Cleanups* (ASTM International, 2016), which allows MCB Camp Lejeune to self-declare that these programs implement greener cleanup practices. As defined in American Society for Testing and Materials (ASTM) E2893-16, greener cleanup self-declaration is complete once this technical memorandum has been made available to the public.

2 General Information

User's name and organization: Charity Delaney and Thomas Richard; MCB Camp Lejeune — Environmental Management Division (EMD)

Date: October 18, 2017

Property Name: MCB Camp Lejeune and MCAS New River

Site Location: Camp Lejeune, Onslow County, North Carolina

USEPA ID: NC6170022580

Cleanup programs: CERCLA; RCRA

Lead oversight agencies: United States Environmental Protection Agency (USEPA) and North Carolina Department of Environmental Quality (NCDEQ)

3 Site Status Information

Overview of ASTM E2893-16: Standard Guide for Greener Cleanups

BMP Process

- 1. Opportunity Assessment**
2. Prioritization
3. Selection
4. Implementation
5. Documentation

Opportunity Assessment

- Review 114 listed BMPs
- Organized by category
 - Buildings
 - Materials
 - Power
 - Residual Waste
 - Vehicles
- Identify applicable BMPs

Overview of ASTM E2893-16: Standard Guide for Greener Cleanups

BMP Process

1. Opportunity Assessment
- 2. Prioritization**
3. Selection
4. Implementation
5. Documentation

Prioritization

- Based on ability to reduce footprint
 - Low
 - Medium
 - High
- Professional judgement
 - Supported by quantitative evaluation, if appropriate

Overview of ASTM E2893-16: Standard Guide for Greener Cleanups

BMP Process

1. Opportunity Assessment
2. Prioritization
- 3. Selection**
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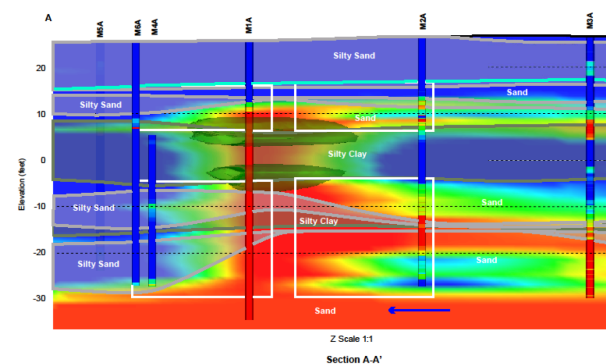
Selection

- Based on potential footprint reductions
- Considers typical comparison criteria
- Reasons for exclusion
 - Technology screened out
 - Inability to meet project requirements
 - Negative effect on core element
 - Less impact with standard approach

Overview of ASTM E2893-16: Standard Guide for Greener Cleanups

BMP Process

1. Opportunity Assessment
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Overview of ASTM E2893-16: Standard Guide for Greener Cleanups

BMP Process

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- 5. Documentation**
 - a) For each cleanup phase
 - b) Public submittal

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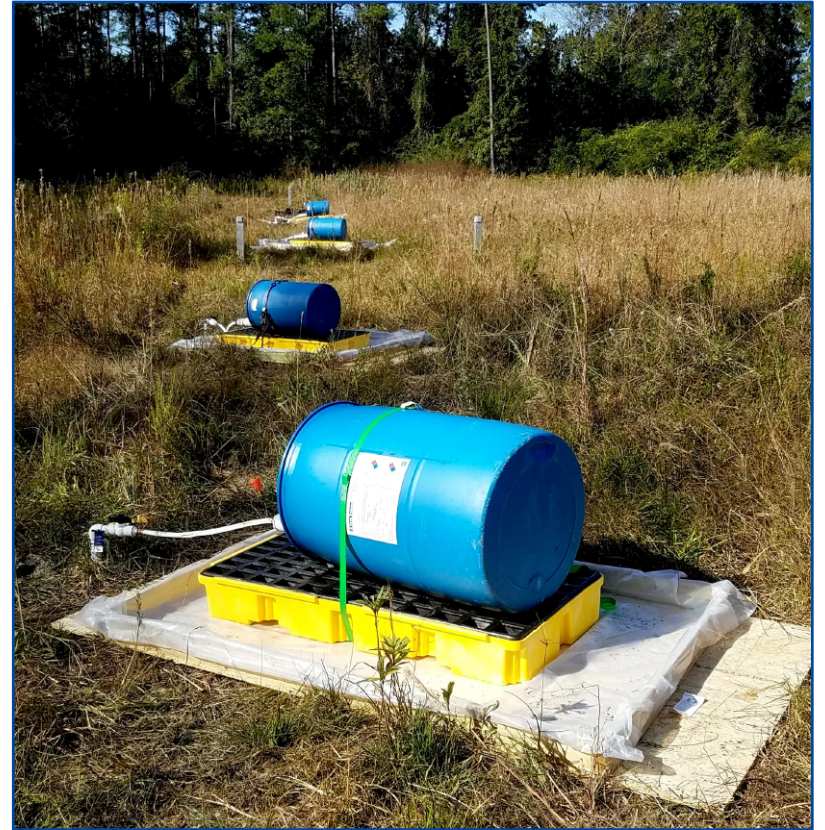
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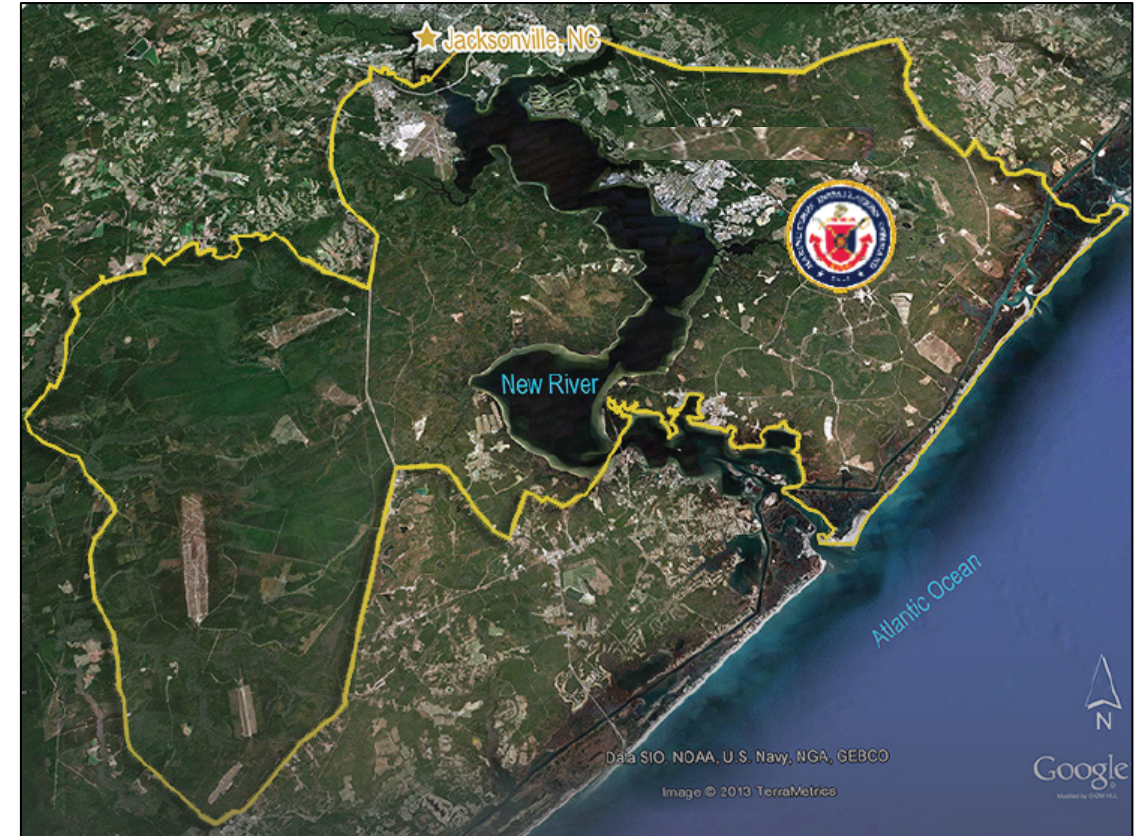
Category	Best Management Practice	Prioritization Level	Required by Local, State, or Federal Law	Excluded? (If yes, rationale included)	Implementation Details	Core Element Addressed (at Site Level)					Remediation Technology													
						Energy	Air	Water	Materials and Waste	Land and Ecosystems	Soil Vapor Extraction	Air Sparging	Pump and Treat	In situ Chemical Oxidation	Bioremediation/MNA	In situ Thermal Treatment	Phytotechnology	Subsurface Containment and Treatment Barriers	Excavation and Surface Restoration	Ex situ Bio/Chemical Oxidation	Landfill Covers and Caps	Vapor Intrusion Mitigation		
Buildings	Reuse existing structures for treatment system, storage, sample management, etc.	Medium	No	No	Site 73 AS system conex box was moved to SWMU 350.	X			X	X	X	X												
Materials	For ISTT using ERH, co-locate electrodes and recovery wells in the same borehole, particularly in the saturated zone, to minimize the total number of wells and land disturbance	Medium	No	Yes, technology screened out during the FS.	Not implemented.	X	X	X	X	X						X								
Materials	For ISTT, when insulating the surface of the TTZ to reduce energy losses, use greener insulation alternatives such as LECA beads (rather than polyurethane foam)	Medium	No	Yes, technology screened out during the FS.	Not implemented.	X			X							X								
Materials	For landfill covers, use minimum slope while maintaining proper drainage to reduce the volume of fill material required	High	No	No	The Site 69 Remedial Design specified a minimum slope of 5% and a maximum slope of 33% to maintain drainage while minimizing fill requirements.				X	X								X				X		
Materials	For the reactive component of permeable subsurface treatment barriers, use locally available materials (for example, mulch/compost), byproducts (for example, slag, flue gas desulfurization gypsum), or less-refined materials (for example, apatite, natural zeolites) in place of refined chemicals (for example, zero-valent iron, hydrogen reducing compounds) or materials, where possible, without compromising site-specific performance and longevity goals	High	No	No	Site 89 pilot study PRB used locally available mulch (approximately 155 cubic yards).				X											X				



Marine Corps Base Camp Lejeune's Self-Declaration

MCB Camp Lejeune Greener Cleanup Self-Declaration

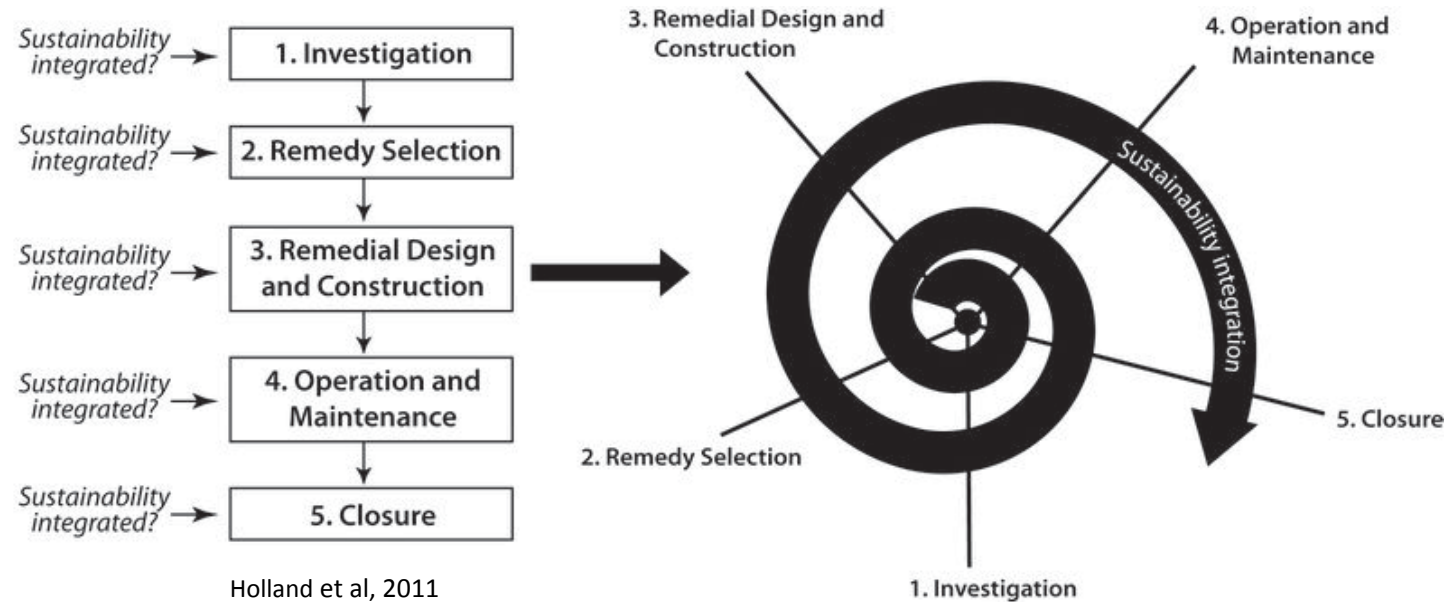
- MCB Camp Lejeune
 - **Mission:** Maintain combat-ready warfighters for expeditionary deployment
 - Second largest Marine Corps Base in the USA (approximately 236 square miles)
 - 49 active environmental sites



MCB Camp Lejeune Greener Cleanup Self-Declaration

- Self-declaration completed in 2017

- BMP evaluation
 - 29 potentially applicable
 - 18 implemented
 - 2 user-defined
- Complemented strategy to achieve remedy objectives
- All phases of site work



Project Highlights



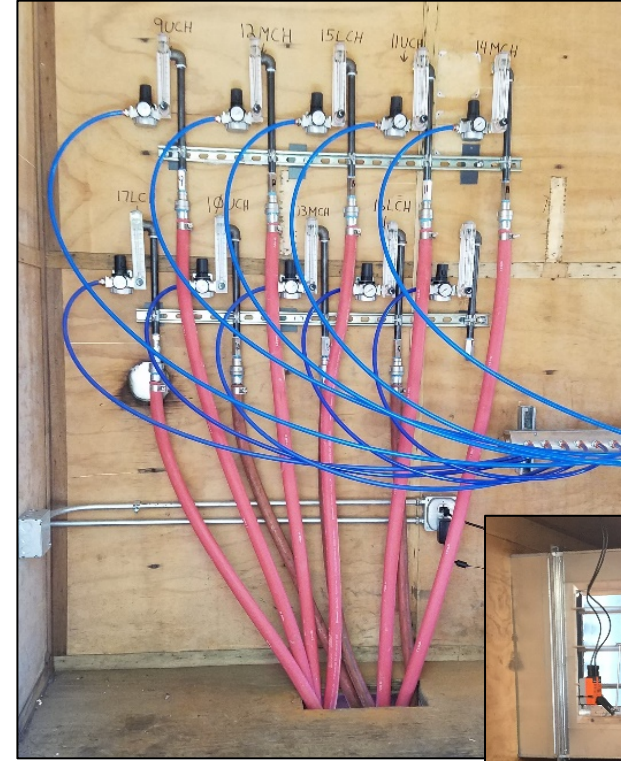
Solar Powered Subgrade Biogeochemical Reactor

- Applicable BMPs
 - Biobased and non-refined materials (locally sourced mulch and soybean oil)
 - Uncontaminated site soil for backfill
 - Solar powered pump
- Impacts
 - Reduced landfill waste and greenhouse gas emissions
 - Maximized use of renewable energy
 - Reduced concentrations in source area and potential time to site closure



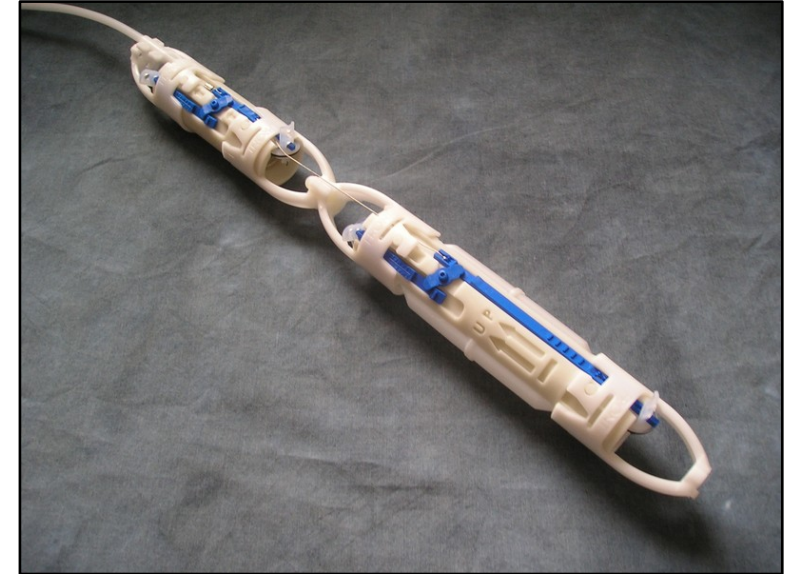
Air Sparging Remedial Actions

- Applicable BMP
 - Set milestones to system shut down
 - Equipment reuse
- Impacts
 - Savings of ~800,000 kilowatt hours per system per year per system
 - Reduced cost and GHG emissions associated with electricity production
 - Avoided O&M vehicle travel



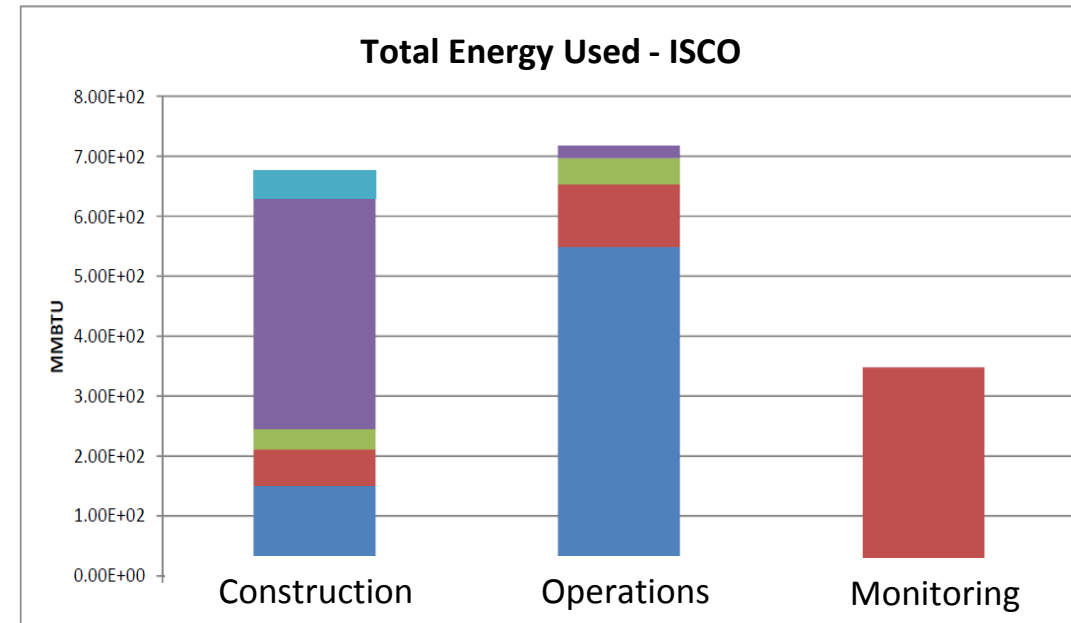
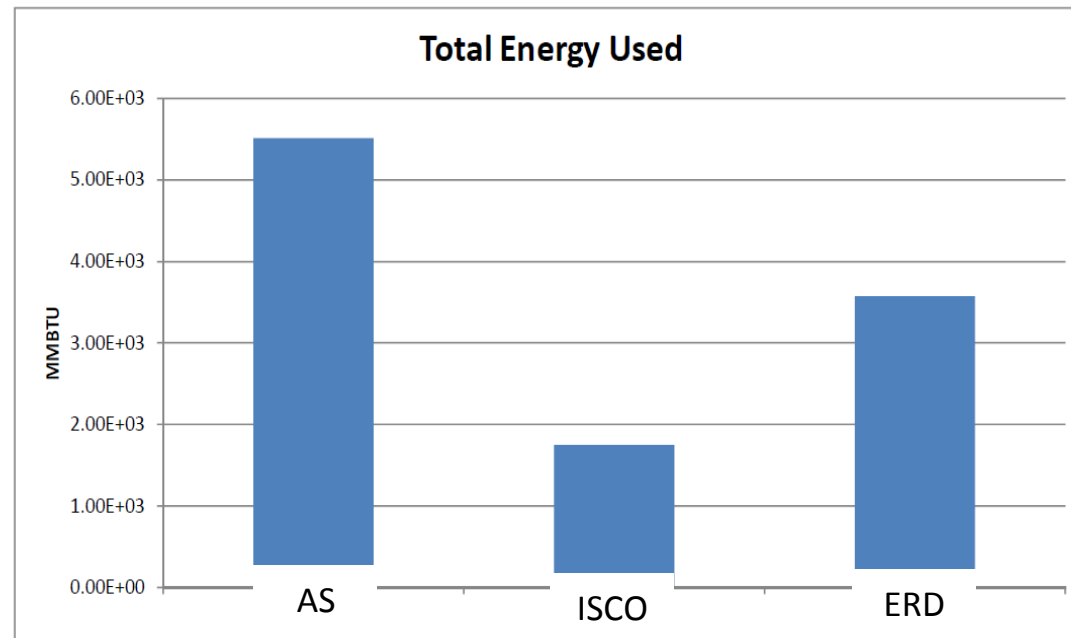
Long Term Monitoring Program

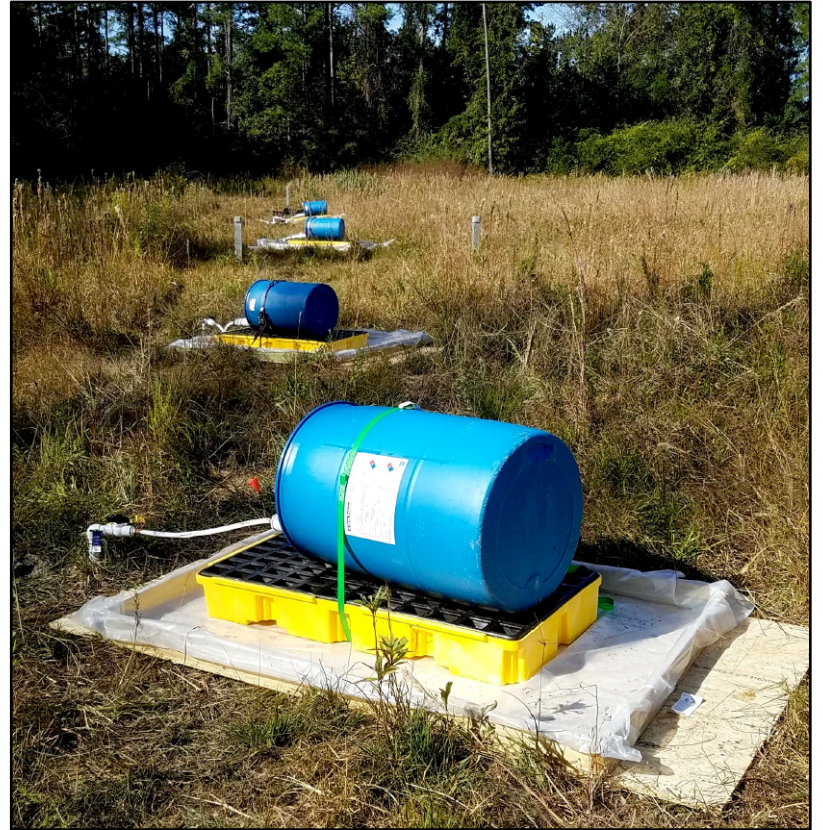
- Applicable BMPs
 - No purge technology, 300 wells/year
 - Optimized well network and utilized existing wells
- Impacts
 - Minimized waste management
 - Avoided ~1,500 gallons aqueous waste/year
 - Eliminated need for ~15,000 feet of tubing/year
 - Reduced greenhouse gas emissions related to transportation
 - Reduced time and cost
 - ~600 hours or \$32,000/year



Sitewise Analysis

- Remedy Selection
 - Compare alternatives in terms of a consistent set of sustainability metrics
 - Conducted at 8 sites
- Remedy Implementation
 - Identifies opportunities to reduce footprint during design

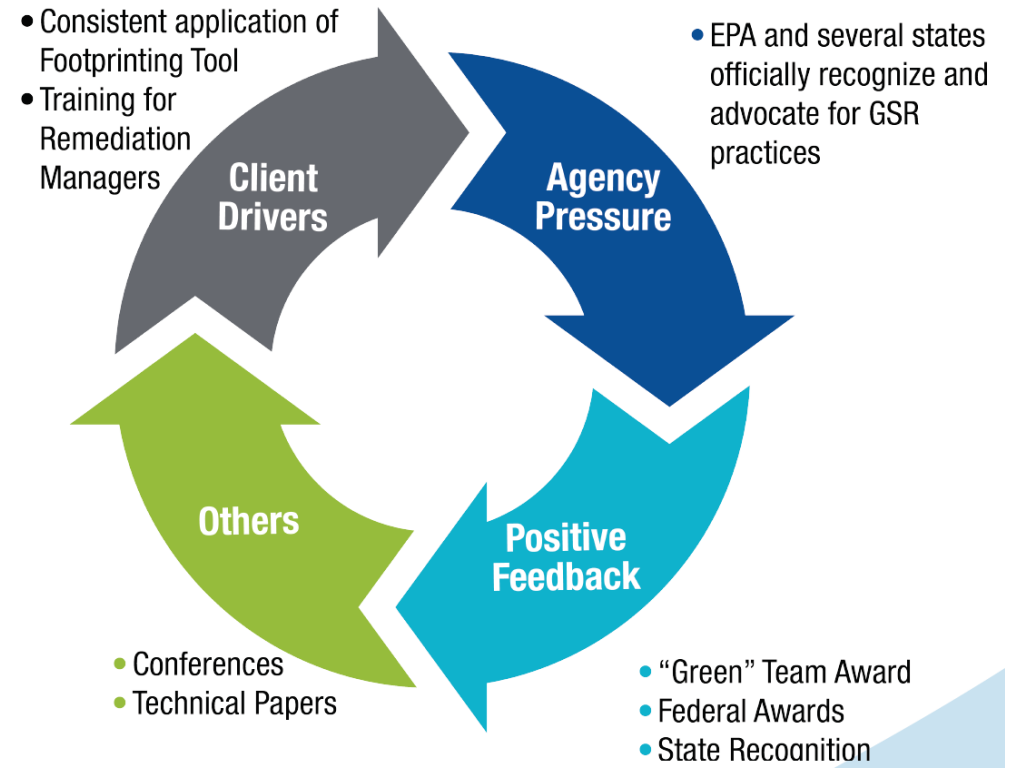




Why Self-Declare?

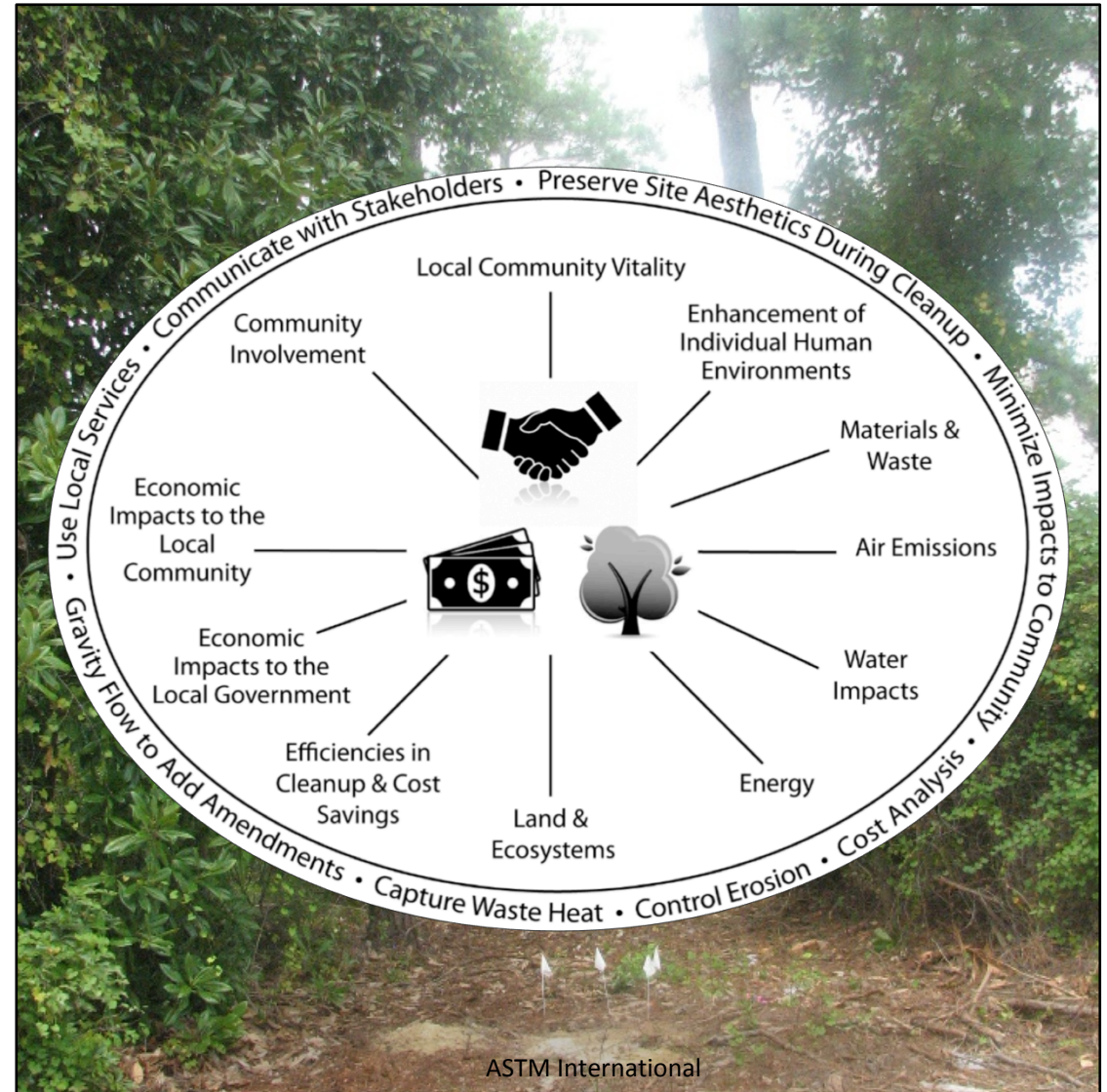
Benefits to Self-Declaration

- Get recognition for BMPs already being applied at sites
- Optimize existing remedies to reduce time, cost, and environmental impacts of cleanup
- Minimize environmental impacts for future cleanup actions
- Trigger “The Virtuous Cycle”



Conclusions

- ASTM E2893-16: Standard Guide for Greener Cleanups Process
 - A useful tool to document successes
- Self-declaration at MCB Camp Lejeune
 - Documented past successes
 - Will continue to utilize BMPs moving forward
- Establish a culture of green sustainable remediation
 - Trigger the virtuous cycle



Thank you!

Monica L. Fulkerson, P.E., ENV SP

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