

Promoting Greener Cleanups in Massachusetts

NEWMOA

“Moving Toward More Sustainable Remediation”

Wednesday, December 4, 2013 – Dayville, CT

Thursday, December 5, 2013 – Westford, MA

Thomas M. Potter

MADEP's *Acting* Clean Energy Director

AGENDA

- 1. Promoting Greener Cleanups in the 2014 “New” MCP**
- 2. Overview of ASTM’s Standard Guide for Greener Cleanups**



Promoting Greener Cleanups in the 2014 “New” MCP

a.k.a. “Green Remediation”
(and sustainable remediation)

What is . . .

- **Green Remediation**
 - Greener Remediation
 - Green Cleanups
 - Greener Cleanups
- “Green”
- **Sustainable Remediation**
 - Green and Sustainable Remediation (GSR)

Sustainable vs. Green (What's the Difference?)

- Sustainable Remediation
- “Triple Bottom Line”

1. **Environmental** Impacts

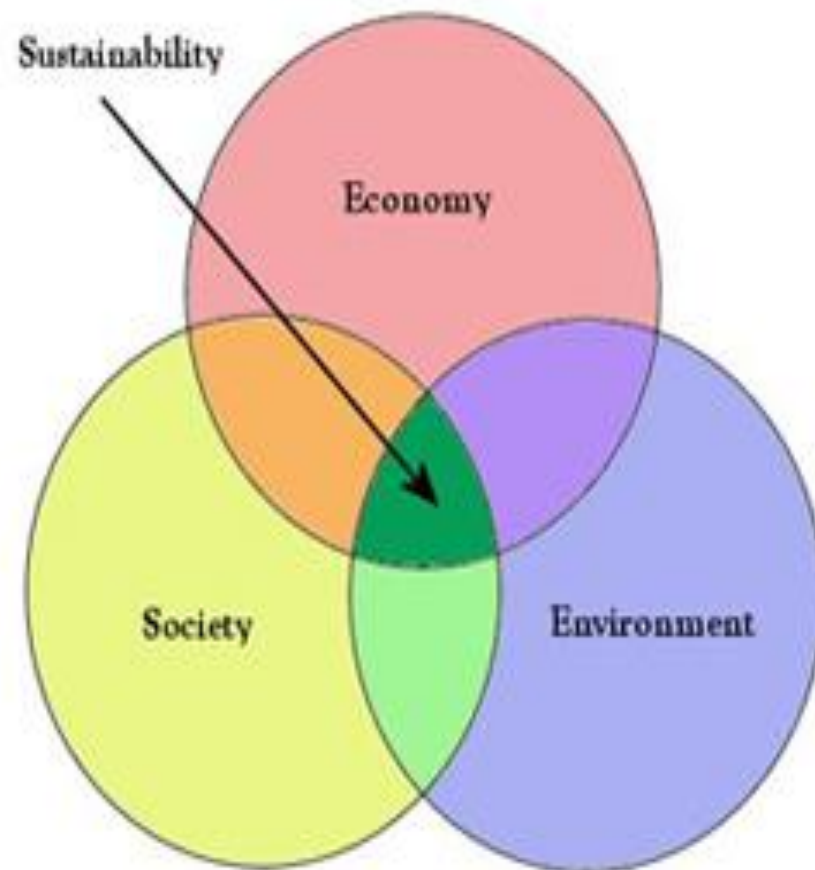
- Energy, Emissions, Water, Materials, Ecosystems (core elements)

2. **Economic** Viability

- Jobs, property value, taxes

3. **Societal** Impacts

- Community input, equity, education



Massachusetts

- Hazardous Waste Site Cleanup Regulations – The Massachusetts Contingency Plan (MCP), 310 CMR 40.0000
- “Provide for the protection of health, safety, public welfare and the environment . . . Through:
 - Prevention
 - Notification
 - Assessment
 - Evaluation/Implementation of Remedies or releases

Green Remediation

- **Sub-Set** of Sustainable Remediation
- **Green Remediation** maximizes the net environmental benefit of cleanup/remedies
- **5 Core Elements**
 - Key elements for potentially reducing the environmental footprint of a cleanup.



Environment

5 Core Elements of Greener Cleanups

The 5 core elements promote:

1. Minimizing total **energy** use and maximizing renewable energy use;
2. Minimizing air pollutants and greenhouse gas **emissions**;
3. Minimizing **water** use and impacts to water resources;
4. Reducing, reusing and recycling of **materials and waste** reduction;
5. Protecting **land and ecosystems**.



Minimizing Total **Energy** Use And Maximizing Renewable Energy Use

- Minimize energy consumption
- Power on-site cleanup equipment through on-site renewable energy
- Purchase commercial energy from renewable resources.



Minimizing Air Pollutants And Greenhouse Gas Emissions

- Minimize the generation of GHGs
- Minimize generation and transport of airborne contaminants and dust
- Maximize use of machinery equipped with advanced emission controls
- Use cleaner fuels



Minimizing Water Use And Impacts To **Water** Resources

- Minimize water use
- Capture, reclaim, and store water for reuse
- Employ best management practices for storm water



Reducing, Reusing And Recycling Of Materials And Waste Reduction

- Minimize consumption of virgin materials
- Minimize waste generation
- Use recycled products and local materials
- Segregate and reuse or recycle materials such as soil, C&D debris, buildings



Protecting Land And Ecosystems

- Minimize areas that need use limitations
- Minimize soil and habitat disturbance or destruction
- Use native species to support habitat

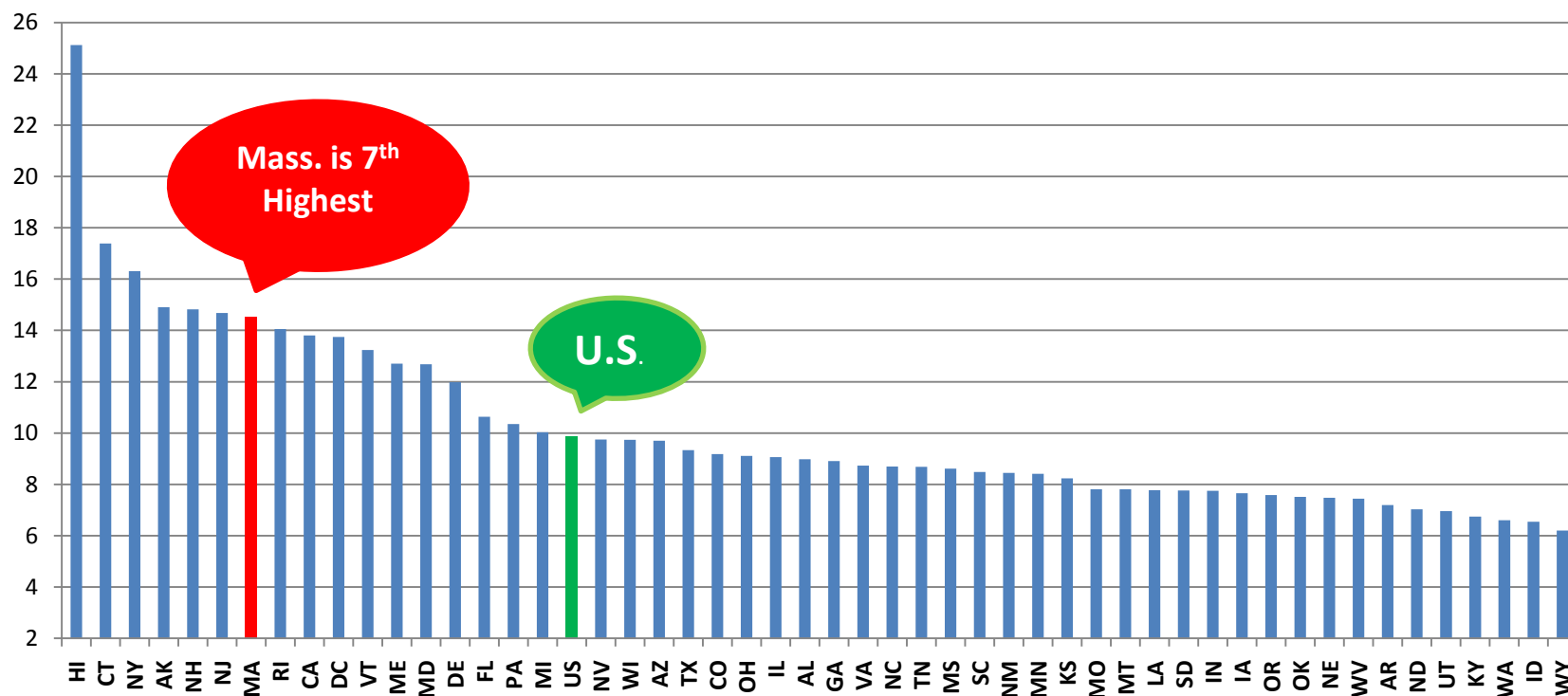


Massachusetts

Focus on Energy

Mass. Has High Electricity Prices!

2010 Average Retail Electricity Price c/kWh



Source: EIA Form 826

\$18B Energy Dollars Flow Out of MA

12/04-05/2013

We spend \$22B per year on energy; 80% leaves MA

MA Energy Imports 2008	\$B
Fuel Oil (heating, diesel)	\$5.0
Gasoline	\$9.2
Jet Fuel	\$1.4
Other Petroleum	\$0.9
Natural Gas	\$5.2
Coal	\$0.3
Total	\$22 B
Per Household Average ~ \$4,600	

**Oil & Natural Gas
- Canada**

**Natural Gas
- U.S. Gulf Coast**

**Oil & Natural Gas
- Middle East**

**Natural Gas
- Caribbean**

Coal - Colombia

Oil - Venezuela

Mass Clean Energy Mandates

- 2007 Top Priority for Patrick Administration
- **2008 Global Warming Solutions Act**
 - Comprehensive Program -> Climate Change
 - Goal 25 % Below 1990 GHG levels by 2020
- **2008 Green Communities Act (GCA)**
 - Supports Development of Clean Energy Resources
 - Expands Efforts to Promote Energy Efficiency
 - **Increased the Renewable Energy Portfolio Standard**

Renewable Energy Portfolio Standard (RPS)

Renewable Energy Portfolio Standard (RPS)

- 2003 Statutory obligation for energy suppliers to obtain energy from new renewable sources
- 2003 obligation of 1% (increasing by 0.5% per year)
- 2008 GCA – increased to 1% per year
- 2013 – currently at 8%

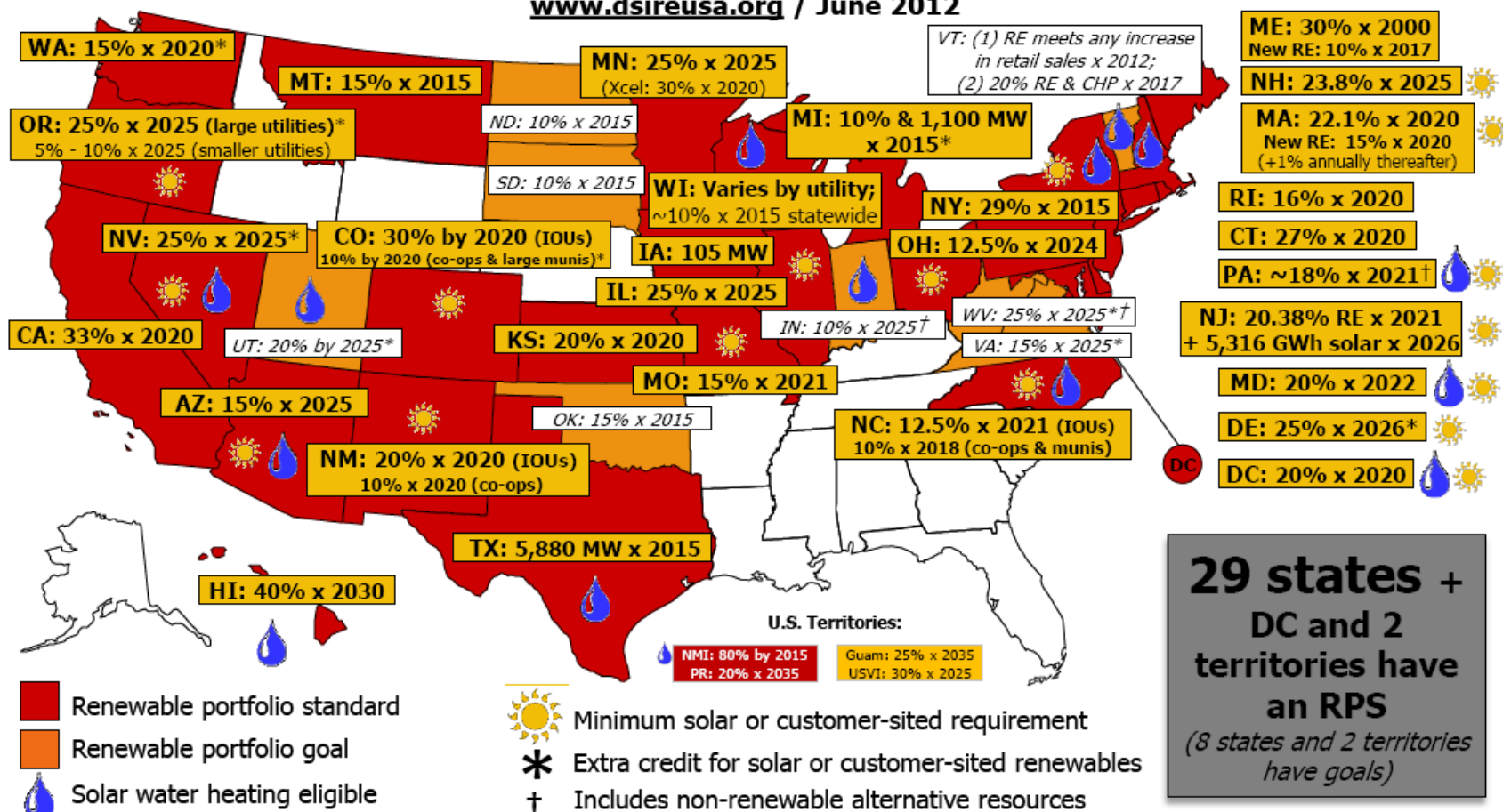
Administration Clean Energy Goals

- 15% of Massachusetts electricity supplied from new renewable sources by 2020.
 - **Solar: 250 MWs installed by 2017, 400 MWs generated by 2020** (347 MW as of 11/27/13)
 - *May 2013 New Solar Goal of 1,200 additional MW's*
 - **Wind: 2,000 MWs by 2020** (103 MW as of 11/27/13)

RPS Programs Nationally

RPS Policies

www.dsireusa.org / June 2012



CLEAN ENERGY RESULTS

Advancing renewable energy & energy efficiency in the Commonwealth

- Launched November 16, 2011
- New Chapter in Integrating Energy and Environment
- Unique MassDEP / DOER / MassCEC Partnership
- Formalized Role for MassDEP in Promoting Clean Energy
- **Create economic growth and employment opportunities**



Through CERP, MassDEP:

- Supports DOER and MassCEC in Achieving Commonwealth Clean Energy Goals
- Promotes Clean and Efficient Sources of Energy at MassDEP Regulated Sites (where we have authority or control)
- Maximizes MassDEP's Unique Expertise to Overcome Permitting & Siting Obstacles
- Addresses Public Health Concerns Using Sound Science

What Projects are Targeted?

- * RPS/APS, including:

- Solar Photovoltaic
- Wind
- Anaerobic Digestion
- Sustainable Biomass
- Landfill Gas
- Hydropower

- * Energy Efficiency

- * Energy Conservation



Commissioner's CERP GOALS

- November 2011
- Updated December 2012

Commissioner's BWSC Specific Goals

1. **Promote the use of Green Remediation at STATE and FEDERAL regulated contaminated sites**
 - Maximize the net environmental benefit
 - Considering: remedy energy requirements, efficiency of on-site activities, reduction of impacts on surrounding areas.

Our Initial Efforts . . .

- **STATE “21E” Sites:**
 - Evaluating Universe of sites w/active remedial systems (estimated at 400 +/- or 13% of active systems)
 - Focus on energy efficiency and renewable opportunities (*CERP RPS eligible projects*)
 - Work with PRPs/LSPs on specific projects/sites
- **FEDERAL Superfund Sites:**
 - EPA doing optimization reviews at several sites
 - **Superfund Site Technical & Financial Feasibility Study for Solar Photovoltaic** (*Powering Remedial System*)

STATE: Active Remedial Systems

- **40.0006 Active Remedial System**
 - means a remedial action that relies upon the continual or periodic use of an on-site or in-situ mechanical or electro-mechanical device.
 - **Remedial Action** means any containment or removal
 - **Remove and removal** each means the cleanup or removal of released oil or hazardous materials from the environment.

ACTIVE REMEDIAL SYSTEMS

- 400 at state sites (13% of “open” cleanups)
- Technologies implemented to cleanup impacted soil and groundwater releases
- Primarily 4 types of technologies used:
 - Groundwater Recover and Treatment (aka Pump & Treat – NAPL & dissolved phase)
 - Soil Vapor Extraction (SVE-soil Volatilization)
 - Multiphase Extraction (MPE – soil & groundwater)
 - Air Sparging (injected air - enhances recovery)

Active Remedial System Technologies Installed Between 400 State Sites

REMEDIAL SYSTEM	APPROXIMATE NUMBER ACTIVE IN 2012
PUMP & TREAT	160
SOIL VAPOR EXTRACTION* (SVE)	162
AIR SPARGE (AS)*	75
MULTIPHASE EXTRACTION (MPE)	44
Supplemental Technology: AIR STRIPPING	60
Supplemental Technology: Catalytic Oxidation	20

NOTE: The above technologies are often applied in combination to address contaminated media (e.g. soil, groundwater or both)

Superfund Site Technical & Financial Feasibility Study for Solar Photovoltaic



“Powering the Remedial System”

REGULATIONS?

REGULATION

- **Establishing a Regulation (2013/2014)**
 - “~~First~~ Second in the Nation Regulation”
 - NJ “encourages”
 - To promote consideration of green/sustainable investigative and remedial practices in the performance of response actions, including incorporation of renewable energy sources.
 - Added to LSP “Response Action Performance Standard (RAPs) at 310 CMR 40.0191
 - NOT a requirement
 - Added to “Remedy Selection Criteria” at 310 CMR 40.0858

310 CMR 40.0191

Response Action Performance Standard (RAPs)

- (3) The application of RAPS shall be protective of health, safety, public welfare and the environment and shall include, without limitation, in the context of meeting the requirements of this Contingency Plan, consideration of the following
- (e) eliminating or reducing to the extent practicable and consistent with response action requirements and objectives, total energy use, air pollutant emissions, greenhouse gases, water use, materials consumption, and ecosystem and water resources impacts resulting from the performance of response actions through energy efficient and renewable energy use, materials management, waste reduction, land management, and ecosystem protection.

5 Core Elements of Green

- eliminating or reducing, to the extent practicable and consistent with response action requirements and objectives, **total energy use, air pollutant emissions, greenhouse gases, water use, materials consumption, and ecosystem and water resources impacts** resulting from the performance of response actions through energy efficient and renewable energy use, materials management, waste reduction, land management, and ecosystem protection.

310 CMR 40.0858

Detailed Evaluation Criteria (for Remedy Selection)

- (4) The comparative costs of the alternatives, including:
- (a) costs of implementing the alternative, including without limitation: design, construction, equipment, site preparation, labor, permits, disposal, operation, maintenance and monitoring costs;
 - (b) costs of environmental restoration, potential damages to natural resources, including consideration of impacts to surface waters, wetlands, wildlife, fish and shellfish habitat; and
 - (c) ***the relative total consumption of energy resources in the implementation and operation of the alternatives, and externalities associated with the use of those resources, including air pollutants and greenhouse gas emissions.***

Regulatory Comments Received May 2013

1. *XXXX does not support the inclusion of sustainability criteria in the definition of RAPs. These goals, while commendable, are not tied to achieving a condition of No Significant Risk in response to a release. Responsible parties and LSPs should not need to demonstrate the extent to which such measures are practicable in the context of protecting health, safety, welfare and the environment.*

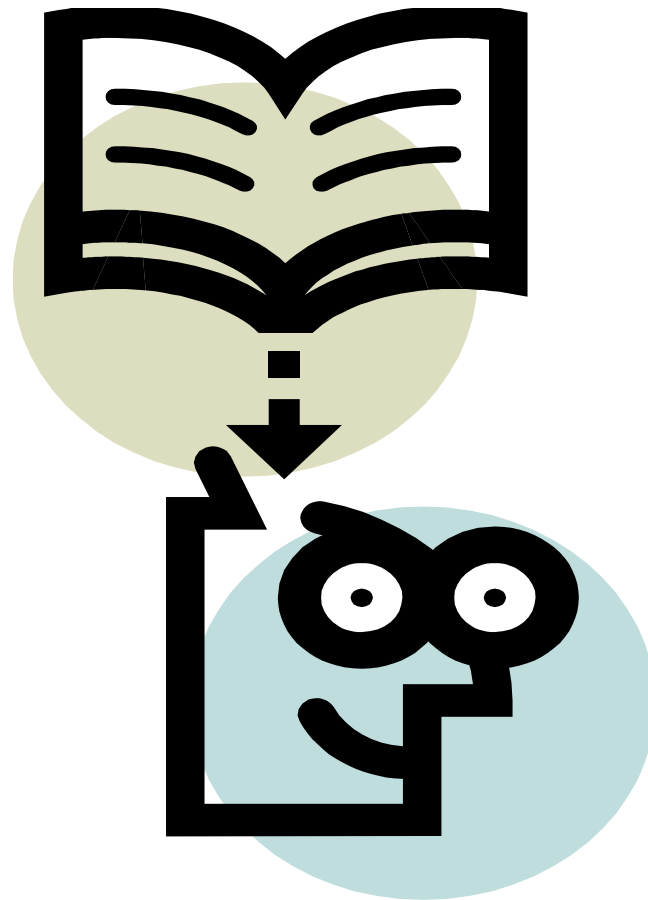
Suggestion: *XXXX thinks this is a laudable goal but it does not belong in the RAPS section. It is more appropriate in Phase III. This is too broad a requirement that will add to the complexity of MCP submittals. Moreover, this does not streamline the MCP process – it doesn't go back to the main purpose of the MCP to reduce risk at release sites.*

Regulatory Comments Received May 2013 (cont.)

2. *Although a laudable goal, the one concern with this requirement is how one documents how they completed their consideration and to what degree based upon the scope or level of the response action.*

The Regulatory Proposal . . .

- Is specific to addressing the Core Elements of Green Remediation
- Does not negate a Sustainable Approach
- Acknowledges
 - 70% MCP sites are “small”
 - Within MCP practitioners “skill set”



POLICY Statement: “Sustainability”

- “While MassDEP encourages the selection of effective sustainable remedies that maximize the net environmental benefit of the cleanup, the MCP requires timely actions to eliminate and prevent certain conditions. These conditions include Imminent Hazards, Conditions of Substantial Release Migration, Substantial Hazards, and the elimination and control of Oil and Hazardous Material sources. **Sustainability considerations may not be used to override the requirement to implement a remedy that results in the timely elimination or prevention of such conditions.**”

GUIDANCE for Implementation

Evaluating Implementing Guidance Options

- NOT likely to draft state guidance
- LIKELY to issue a policy statement referencing guidance(s) created by others
- LIKELY require use of selected guidance to qualify for incentives (e.g. Fee Reductions)



Guidance Considerations

The US Sustainable Remediation Forum (SURF) “Framework for Integrating Sustainability Into Remediation Projects” (Summer 2011) Document

- Focus: Sustainable Remediation

The Interstate Technology & Regulatory Council (ITRC) Technical/Regulatory Guidance “Green and Sustainable Remediation: A Practical Framework” (November 2011) Document

- Focus: Sustainable Remediation

The ASTM International “Standard Guide for Integrating Sustainable Objectives into Cleanup” (Available July 2013)

- Focus: Sustainable Remediation

The ASTM International “Standard Guide for Greener Cleanups” (Available November 22, 2013)

- Focus: Green Remediation
- MassDEP Collaboration

ASTM International

“STANDARD GUIDE FOR
GREENER CLEANUPS”

ASTM - EPA/States Workgroup

Key Team Members

- Carlos Pachon, OSRTI
- Deb Goldblum, Region 3 RCRA
- Patricia Overmeyer, OBLR
- Elisabeth Freed, OECA
- Sara Rasmussen, ORCR
- Robin Parker, OUST
- Marc Thomas, CPA
- Ginny Lombardo, R1 FedFacs
- Mickey Young, R3 Brownfields
- Brad Bradley, R5 Brownfields
- Karen Scheuermann, R9 RCRA
- Heather Nifong, Illinois
- Thomas Potter, Massachusetts

Purpose of Greener Cleanup Standard

- Provides a process and technical direction on conducting a green cleanup including how to reduce the environmental footprint of a cleanup
- Creates a protocol that can serve as a basis for contracting purposes and state cleanup programs
- May also serve as an incentive to implement greener cleanups



Greener Cleanup Standard Timeline

- Sept 2008: EPA/State Greener Cleanup Standard Workgroup
- Aug 2009: Greener Cleanup Principles
- Sept 2009: ASTM Kick-off Meeting
- April 2010: Mathy Stanislaus letter to ASTM
- Aug 2010 thru Sept 2011: 3 Ballots (Green and Sustainable together)
- March 2012 thru March 2013: 4 Ballots (Greener Cleanup Standard Only)

Greener Cleanup Standard Outline

- Section 1: Scope
- Section 2: Referenced Documents
- Section 3: Terminology
- Section 4: Significance and Use
- Section 5: Planning and Scoping
- Section 6: BMP Evaluation Process
- Section 7: Quantitative Evaluation Process
- Section 8: Documentation and Reporting
- Appendices: Resources, Technical Summary Form, BMP Table, Information on QE

Administrative Overview

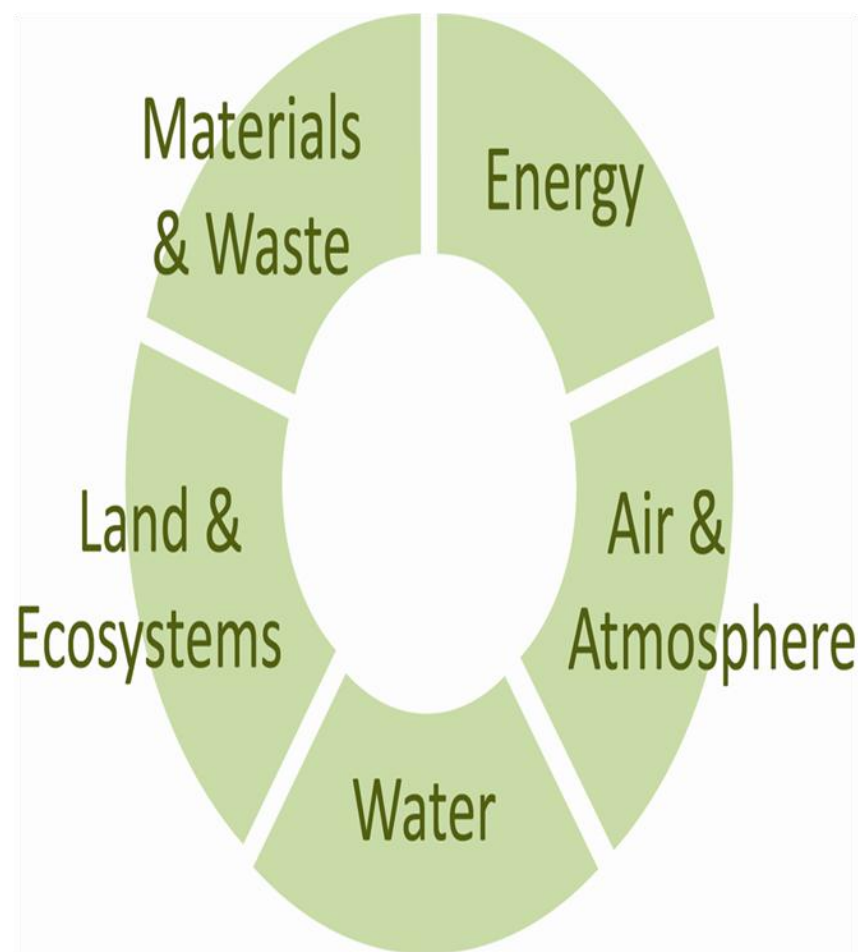
- Relies on EPA's Greener Cleanup Principles **CORES ELEMENTS** as foundation
- Complements regulatory and voluntary cleanup programs (e.g. MCP)
- Accommodates application to each phase of a cleanup (e.g. MCP Response Actions)
- Provides a process for review, justification and reporting of BMPs or a quantitative evaluation



Administrative Overview (cont.)

Documentation/Reporting:

- Mandatory reporting structure to demonstrate achievement of greener cleanup
 - Results reported across all core elements (e.g. Create TABLES to document BMP process)
 - Self-declaration of conformity (e.g. signed & dated statement by “user”)
 - Public availability of process and outcomes (filed at MassDEP - online file viewer)



Technical Overview

- Focuses on BMP process with quantitative evaluation option
- Organizes 160+ BMPs into 10 management categories
- Links BMPs to greener cleanup core elements and remediation technologies
- BMP sources include: EPA Clu-in fact sheets, USACE check list, consultant's documents, and remediation technology experts



Technical Overview (cont.)

- Quantitative evaluation supports: EPA's footprint methodology, LCA, and other quantitative tools
- See <http://www.clu-in.org/>
- ASTM consideration for electronic format for easy selection/documentation
- Proposal: BMP list as “living” document with annual updates



Q: Select Best Management Practices (BMPs) process or perform a Quantitative Evaluation (QE) in conjunction with BMPs?

BMPs

- Activities that will reduce the environmental footprint.
- Relies on professional judgment to prioritize and select activities.
- Appropriate at any site, regardless of size or complexity

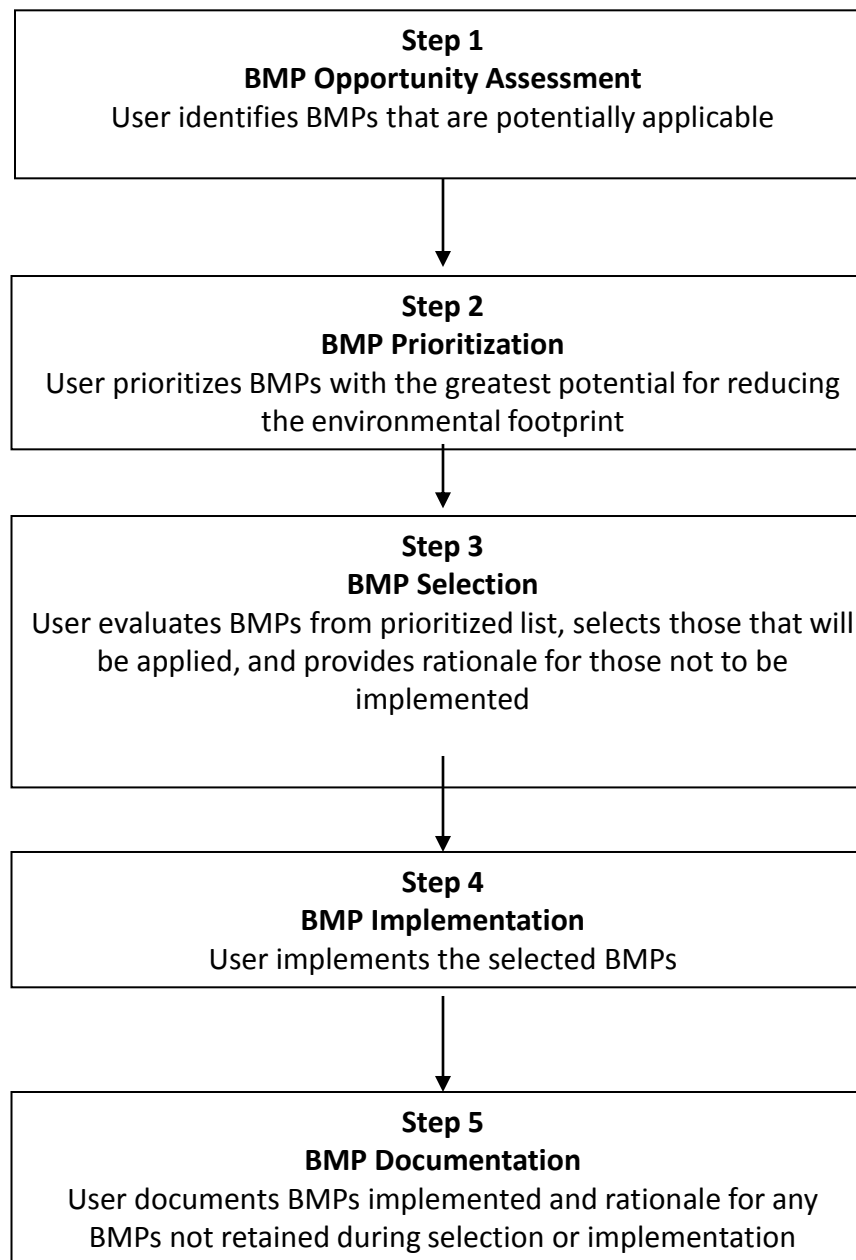
QE

- Site-specific numerical estimate of calculated using Footprint Analysis or Life-Cycle Assessment (LCA) analysis.
- Relies on estimated data inputs to quantify reductions, prior to implementing BMPs.
- Best suited to relatively large-scale or complex cleanups where range of approaches could be implemented

BMP Process

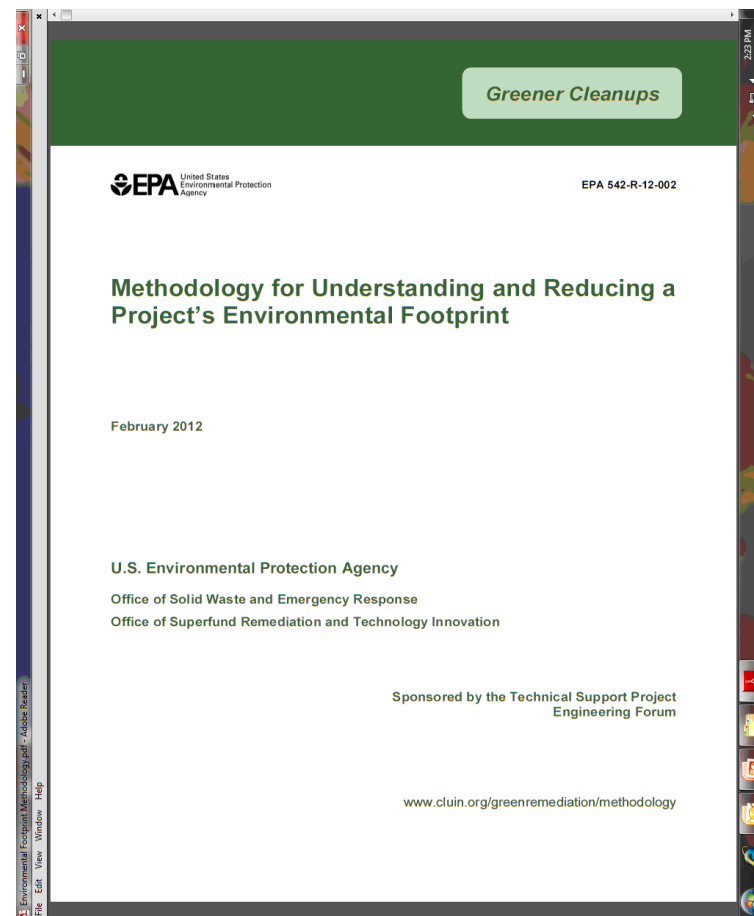
- Systematic protocol
- Identify, Prioritize, Select, Implement and Report
- Use of BMPs
- To reduce the environmental footprint of clean up activities.

BMP Process (cont.)



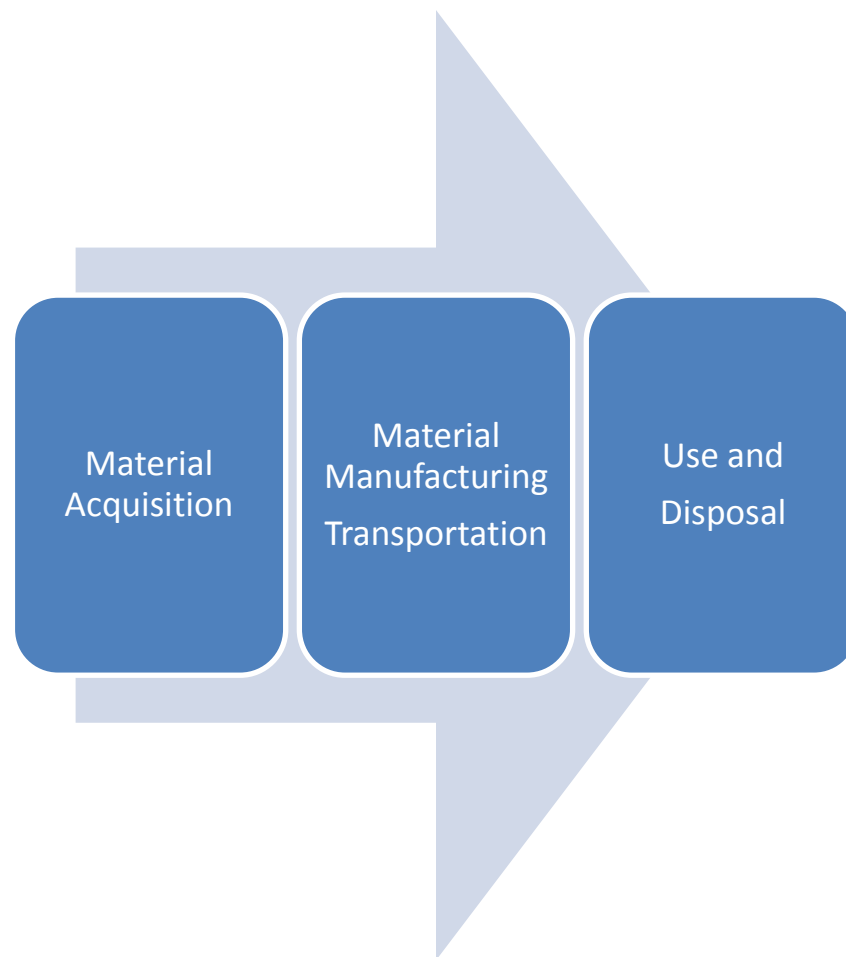
QE: Footprint Analysis

- Considers condensed boundaries of cleanup (e.g. cleanup components).
- “Footprint” = quantification of a specific metric (e.g. “carbon footprint”)
- “Environmental Footprint analysis” = compilation of inputs and outputs to estimate potential impacts (e.g. emissions or resource).
- Reported in terms of emissions quantities and resource use (e.g. water, energy) mapped to core elements.
- TOOL: USEPA’s Methodology for Understanding and reducing a Projects' Environmental Footprint (2012)



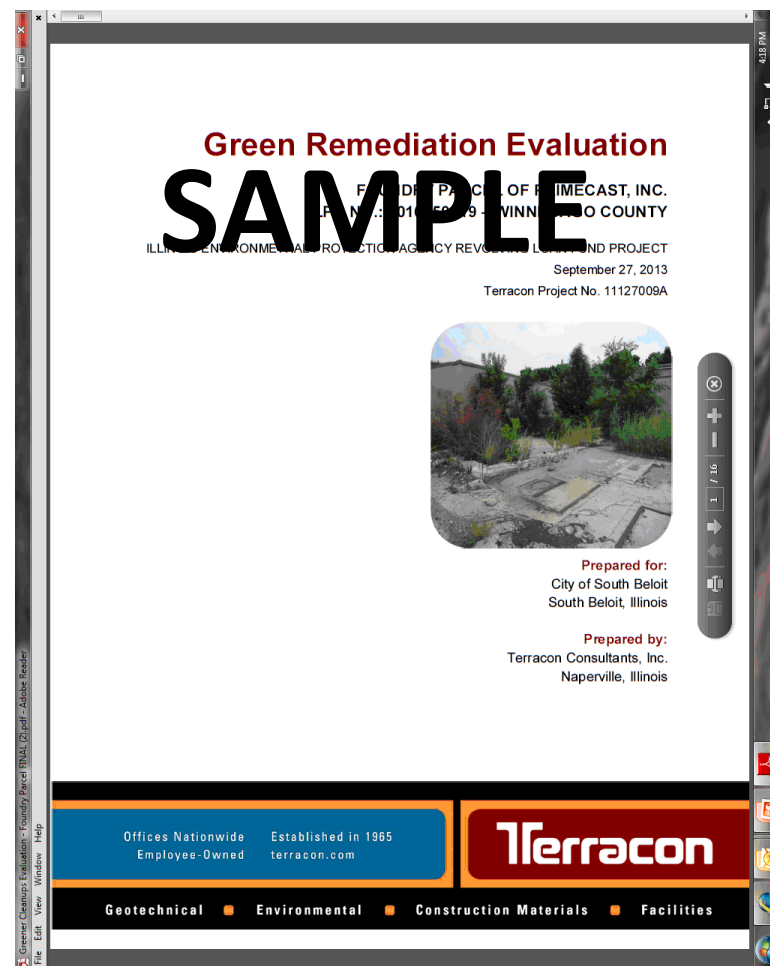
QE: Life Cycle Assessment

- Considers full life-cycle of the components of a cleanup
- Compilation and evaluation of inputs and outputs to estimate impacts (e.g. Raw Materials Utilized, Air Emissions)
- Reported as impact categories (e.g. global warming, respiratory effects – human health and environmental impacts) mapped to core elements. (e.g. global warming = emissions)
- TOOL: USEPA's Life Cycle Assessment: Principles and Practices (2006)



BMP Case Study No. 1

- Future site use not defined
- Status: Remedy Selection – remedial excavation/backfill with engineered barriers and institutional controls
- BMP Opportunity Assessment Conducted (no QE)
- Summary tables prepared:
 - Potential BMPs
 - Prioritization of BMPs
 - Selection of BMPs
 - No Implementation at this stage



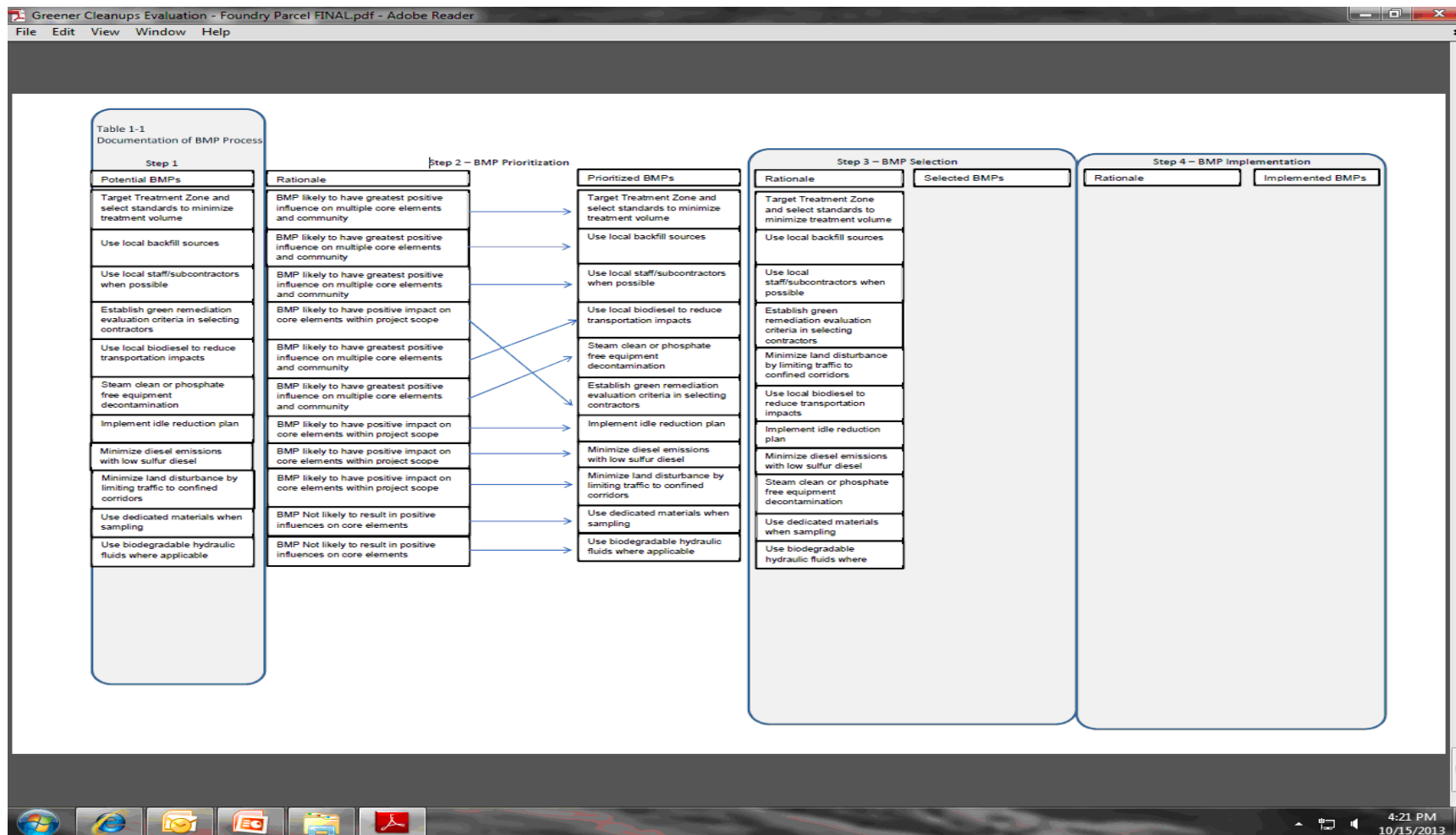
BMP Case Study No. 1

Selected BMPs:

- Target Treatment Zones and select appropriate performance standard to minimize volume, truck trips, emissions, etc.
- Use nearby clean backfill
- Use local staff/contractors
- Use local biodiesel
- Implement idle reduction
- Establish green requirements for subcontractor selection.

BMP Case Study No. 1 (cont.)

BMP Table Summary



MASSACHUSETTS POLICY (Under Consideration)

- For Use of ASTM Standard Guide for Greener Cleanups as tool meet regulator objectives.
- Would provides regulatory program feedback on application of Guide (e.g. “cleanup activates” = “response Actions”)
- Would addresses ASTM reporting requirement
- Would address application of regulatory program specific policies

MASSACHUSETTS

INCENTIVES (Under Consideration)

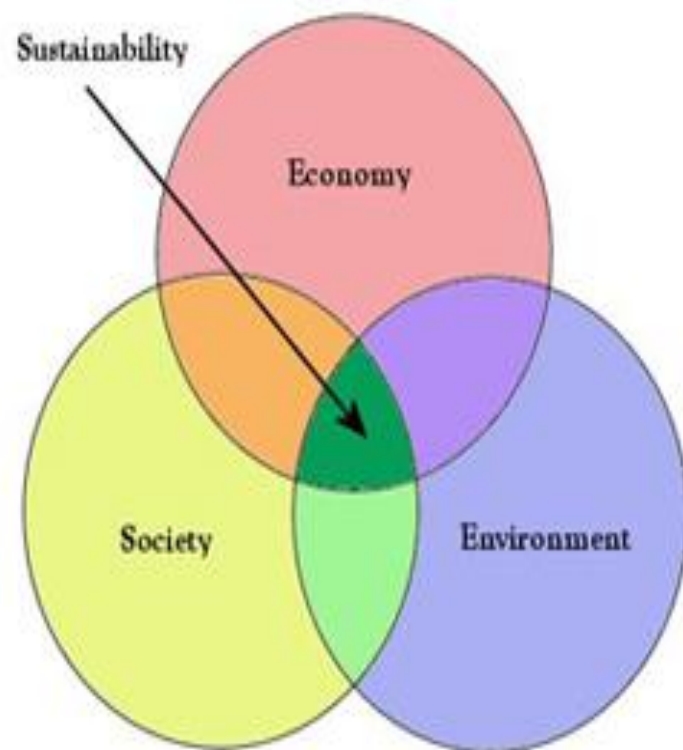
- Existing Energy Efficiency Program Incentives:
 - DOER
 - Mass Office of Technical Assistance & Technology (OTA)
- BWSC Annual Compliance Fee (ACF) Reductions
 - Considering % reduction(s)
 - Based on documentation/application of “green” elements
 - HOLD for experience with implementation
- 21J Regulations (Petroleum Cleanup Fund)
 - Considering Expedited Reviews
 - Considering % increase on reimbursements for application
- Public Recognition for Projects
- Certification Program for LSPs (e.g. Eco-Brokers)

ASTM International

Standard Guide for Integrating Sustainable Objectives into Cleanup, July 2013

USE?

- Provides a broad framework for integrating elements of environmental, economic, and social aspects into cleanups
- Greener Cleanups Guide can be used to assist with Sustainability Guide
- Sustainable benefits must be over and above those achieved by existing regulatory requirements
 - Stakeholder Involvement
 - Cost Considerations



MASSACHUSETTS BROWNFIELD EFFORTS

“Brownfield Support Teams”

- Sustainable effort between MA state agencies/programs
 - Environmental Cleanup
 - Community Involvement
 - Economic Rehabilitation



MassDEP Resources for Green Remediation

- TAB: “Facilities & Sites”
- TAB: “Contaminated Land & Brownfields”
- LINK: “Superfund & Green Remediation” – USEPA Resource
- LINK: “Sustainable Remediation – FAQs” – MassDEP resource posted in 2009.



OUTREACH OPPORTUNITIES

- **Green Remediation Workgroup Meetings**
 - 2012: 09/25, 12/11
 - 2013: 03/12, 6/11, 9/10, **12/10**
 - Meetings and Meeting Notes available online:
 - <http://www.mass.gov/eea/agencies/massdep/news/advisory-committees/green-remediation-workgroup.html>

THANK YOU!

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Mass Department of Environmental Protection
(MassDEP) Clean Energy Results Program:

<http://www.mass.gov/dep/cleanenergy.htm>

Mass Department of Energy Resources (DOER)

<http://www.mass.gov/eea/grants-and-tech-assistance/guidance-technical-assistance/agencies-and-divisions/doer/>

Massachusetts Clean Energy Center (CEC)

<http://masscec.com/>