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
Status of GSR in the States

- 0 = State with Statute/Law (WI Proposal)
- 1 = State with Regulation (NJ – MA Proposal)
- 7 = States with Policies (NY, IL, IN, MN, WI, CA, OR – MA Proposal)
- 42 = NA

* Based on 2012/2013 ASTSWMO Survey
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.
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

Mass. is 7th Highest

Source: EIA Form 826
$18B Energy Dollars Flow Out of MA
We spend $22B per year on energy; 80% leaves MA

<table>
<thead>
<tr>
<th>MA Energy Imports 2008</th>
<th>$B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel Oil (heating, diesel)</td>
<td>$5.0</td>
</tr>
<tr>
<td>Gasoline</td>
<td>$9.2</td>
</tr>
<tr>
<td>Jet Fuel</td>
<td>$1.4</td>
</tr>
<tr>
<td>Other Petroleum</td>
<td>$0.9</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>$5.2</td>
</tr>
<tr>
<td>Coal</td>
<td>$0.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$22 B</strong></td>
</tr>
</tbody>
</table>

Per Household Average ~ $4,600
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)

– 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.

    • 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

29 states + DC and 2 territories have an RPS (8 states and 2 territories have goals)

- Renewable portfolio standard
- Renewable portfolio goal
- Solar water heating eligible
- Minimum solar or customer-sited requirement
- Extra credit for solar or customer-sited renewables
- Includes non-renewable alternative resources

12/04-05/2013

NEWMOA
MassDEP
• 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
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

<table>
<thead>
<tr>
<th>REMEDIAL SYSTEM</th>
<th>APPROXIMATE NUMBER</th>
<th>ACTIVE IN 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUMP &amp; TREAT</td>
<td></td>
<td>160</td>
</tr>
<tr>
<td>SOIL VAPOR EXTRACTION* (SVE)</td>
<td></td>
<td>162</td>
</tr>
<tr>
<td>AIR SPARGE (AS)*</td>
<td></td>
<td>75</td>
</tr>
<tr>
<td>MULTIPHASE EXTRACTION (MPE)</td>
<td></td>
<td>44</td>
</tr>
<tr>
<td>Supplemental Technology: AIR STRIPPING</td>
<td></td>
<td>60</td>
</tr>
<tr>
<td>Supplemental Technology: Catalytic Oxidation</td>
<td></td>
<td>20</td>
</tr>
</tbody>
</table>

**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
(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.
(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.
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.
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

- Focus: Sustainable Remediation

- 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)

12/04-05/2013
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 checklist, 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?

<table>
<thead>
<tr>
<th>BMPs</th>
<th>QE</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Activities that will reduce the environmental footprint.</td>
<td>• Site-specific numerical estimate of calculated using Footprint Analysis or Life-Cycle Assessment (LCA) analysis.</td>
</tr>
<tr>
<td>• Relies on professional judgment to prioritize and select activities.</td>
<td>• Relies on estimated data inputs to quantify reductions, prior to implementing BMPs.</td>
</tr>
<tr>
<td>• Appropriate at any site, regardless of size or complexity</td>
<td>• Best suited to relatively large-scale or complex cleanups where range of approaches could be implemented</td>
</tr>
</tbody>
</table>
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.)

Step 1
BMP Opportunity Assessment
User identifies BMPs that are potentially applicable

Step 2
BMP Prioritization
User prioritizes BMPs with the greatest potential for reducing the environmental footprint

Step 3
BMP Selection
User evaluates BMPs from prioritized list, selects those that will be applied, and provides rationale for those not to be implemented

Step 4
BMP Implementation
User implements the selected BMPs

Step 5
BMP Documentation
User documents BMPs implemented and rationale for any BMPs not retained during selection or implementation
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 Project's 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)
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
Selected BMPs:

– Target Treatment Zones and select appropriate performance standard to minimize volume, tuck 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

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2 - BMP Prioritization</th>
<th>Step 3 - BMP Selection</th>
<th>Step 4 - BMP Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Potential BMPs</strong></td>
<td><strong>Rationale</strong></td>
<td><strong>Prioritized BMPs</strong></td>
<td><strong>Selected BMPs</strong></td>
</tr>
<tr>
<td>Target Treatment Zone and select standards to minimize treatment volume</td>
<td>BMP likely to have greatest positive influence on multiple core elements and community</td>
<td>Use local biocidal solutions</td>
<td>Use local biocidal solutions</td>
</tr>
<tr>
<td>Use local biocidal solutions</td>
<td>BMP likely to have greatest positive influence on multiple core elements and community</td>
<td>Use local biocidal solutions</td>
<td>Use local biocidal solutions when possible</td>
</tr>
<tr>
<td>Establish green remediation evaluation criteria in selecting contractors</td>
<td>BMP likely to have greatest positive influence on multiple core elements and community</td>
<td>Use local biocidal solutions</td>
<td>Use local biocidal solutions when possible</td>
</tr>
<tr>
<td>Use local biocidal to reduce transportation impacts</td>
<td>BMP likely to have greatest positive influence on multiple core elements and community</td>
<td>Beaumont diesel or phosphate free equipment decontamination</td>
<td>Use local biocidal to reduce transportation impacts</td>
</tr>
<tr>
<td>Beaumont diesel or phosphate free equipment decontamination</td>
<td>BMP likely to have greatest positive influence on multiple core elements and community</td>
<td>Implement site reduction plan</td>
<td>Use local biocidal to reduce transportation impacts</td>
</tr>
<tr>
<td>Implement site reduction plan</td>
<td>BMP likely to have greatest positive influence on multiple core elements and community</td>
<td>Minimize diesel emissions with low sulfur diesel</td>
<td>Use local biocidal to reduce transportation impacts</td>
</tr>
<tr>
<td>Minimize diesel emissions with low sulfur diesel</td>
<td>BMP likely to have greatest positive influence on core elements</td>
<td>Minimize diesel emissions with low sulfur diesel</td>
<td>Use local biocidal to reduce transportation impacts</td>
</tr>
<tr>
<td>Minimize land disturbance by reducing traffic to certified contractors</td>
<td>BMP likely to have greatest positive influence on core elements</td>
<td>Minimize land disturbance by reducing traffic to certified contractors</td>
<td>Use local biocidal to reduce transportation impacts</td>
</tr>
<tr>
<td>Use dedicated materials when possible</td>
<td>BMP likely to result in positive influence on core elements</td>
<td>Use dedicated materials when possible</td>
<td>Use local biocidal to reduce transportation impacts</td>
</tr>
<tr>
<td>Use biodegradable hydraulic fluids where applicable</td>
<td>BMP not likely to result in positive influence on core elements</td>
<td>Use biodegradable hydraulic fluids where applicable</td>
<td>Use local biocidal to reduce transportation impacts</td>
</tr>
</tbody>
</table>

*Table 1.4: Documentation of BMP Process*
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
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:

THANK YOU!

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Mass Department of Environmental Protection (MassDEP) Clean Energy Results Program:  
[http://www.mass.gov/dep/cleanenergy.htm](http://www.mass.gov/dep/cleanenergy.htm)

Mass Department of Energy Resources (DOER)  

Massachusetts Clean Energy Center (CEC)  
[http://masscec.com/](http://masscec.com/)