



Cleanup of Contaminated Sites: Overview of End States, Challenges and Opportunities

An Army Perspective

Briefing to Federal Remediation Technology Roundtable

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Our mission is to lead and execute environmental programs and provide expertise that enables Army training, operations, acquisition and sustainable military communities.

ENABLING MISSION READINESS



Army Cleanup Program Objectives

- **DoD goals for Cleanup Program:**
 - *90% of IRP¹ and MMRP² sites at Response Complete by 2018*
 - *95% of IRP and MMRP sites at Response Complete by 2021*
- **Optimize Out-Year Liabilities**
 - *Army active sites IRP Cost to Complete as of FY 12 ~ \$1.25 B*

¹ Installation Restoration Program (IRP)

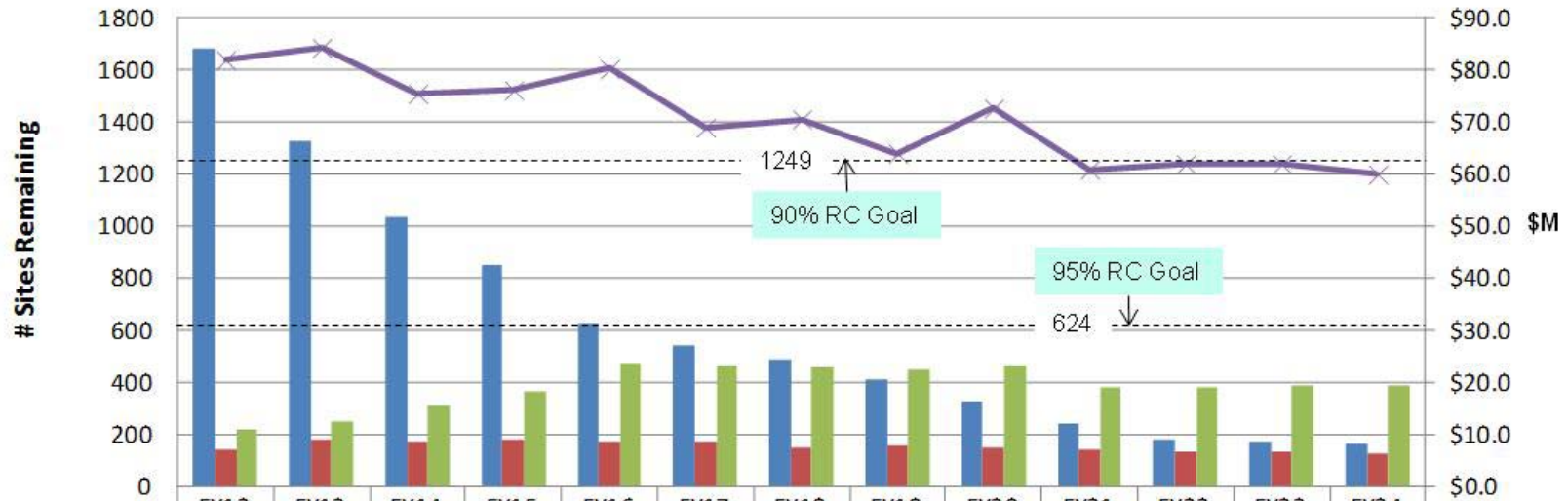
² Military Munitions Response Program (MMRP)



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Active Sites Projected RC and Long-Term Costs



	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24
# Open Sites	1683	1325	1032	851	627	544	486	411	325	239	177	171	165
# RAO Sites	143	180	174	177	172	170	151	154	149	140	134	131	126
# LTM Sites	216	245	306	360	473	464	460	448	462	378	379	383	387
RAO/LTM (\$M)	\$82.0	\$84.3	\$75.5	\$76.2	\$80.3	\$69.0	\$70.6	\$64.0	\$72.7	\$60.9	\$62.0	\$62.0	\$60.0



Initiatives

- **Independent Technical Reviews**
 - *Identified technical impracticability as a likely end state at sites with complex hydrogeology and DNAPL*
- **Various internal reports on technical impracticability**
 - *What is it? How is it used? How many sites have TI waivers?*
- **Funded two National Research Council (NRC) studies**
 - *Contaminants in the Subsurface (NRC, 2005a)*
 - *Alternatives for Managing the Nation's Complex Contaminated Groundwater Sites (NRC, 2012)*



Alternatives for Managing the Nation's Complex Contaminated Groundwater Sites (NRC, 2012)

Study Charge:

1. Size of the Problem

- *At how many sites does residual contamination remain such that site closure is not yet possible?*
- *At what percentage of these sites does residual contamination in groundwater threaten public water systems?*

2. Current Capabilities to Remove Contamination

- *What is technically feasible in terms of removing a certain percentage of the total contaminant mass?*
- *What percent removal would be needed to reach unrestricted use or to be able to extract and treat groundwater for potable reuse?*
- *What should be the definition of “to the extent practicable” when discussing contaminant mass removal?*



Alternatives for Managing the Nation's Complex Contaminated Groundwater Sites (NRC, 2012)

Study Charge:

3. Correlating Source Removal with Risks

- *How can progress of source remediation be measured to best correlate with site-specific risks?*
- *Recognizing the long term nature of many problems, what near-term endpoints for remediation might be established?*
- *Are there regulatory barriers that make it impossible to close sites even when the site-specific risk is negligible and can they be overcome?*

4. The Future of Treatment Technologies

- *The intractable nature of subsurface contamination suggests the need to discourage future contaminant releases, encourage the use of innovative and multiple technologies, modify remedies when new information becomes available, and clean up sites sustainably.*
- *What progress has been made in these areas and what additional research is needed?*



Alternatives for Managing the Nation's Complex Contaminated Groundwater Sites (NRC, 2012)

Study Charge:

5. Better Decision Making

- *Can adaptive site management lead to better decisions about how to spend limited resources while taking into consideration the concerns of stakeholders?*
- *Should life cycle assessment become a standard component of the decision process?*
- *How can a greater understanding of the limited current (but not necessarily future) potential to restore groundwater be communicated to the public?*