Facilitating Reuse at RCRA Sites: Innovative Technologies for Groundwater Characterization and Cleanup

Introduction

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The Land Revitalization Initiative

- Emphasizes that cleanup and reuse are mutually supportive
- Reflects EPA belief that that property reuse should be an integral part of the way EPA does business
- Applies regardless of whether a property is a Superfund site, an operating waste disposal site, a petroleum facility, a former gas station, or an abandoned industrial facility

Under this new initiative, revitalization and reuse will be a formal part of our planning at every single site we clean up under every single program we manage– it's not discretionary, and it's not a pilot program." - Marianne Lamont Horinko, April 2003

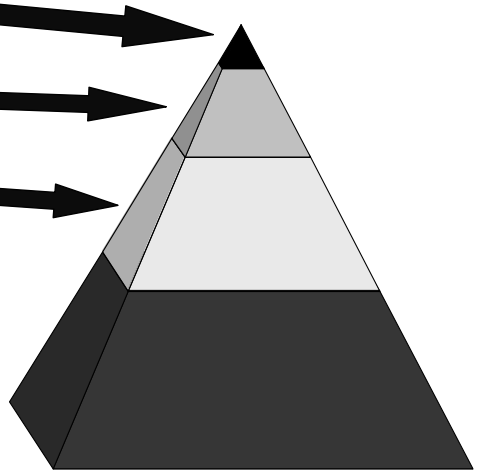
Fair Market Value of Real Estate vs. Risk Management Costs

Tier 1:
+ $3 to $5 mln.

Tier 2:
$0 to + $3 mln.

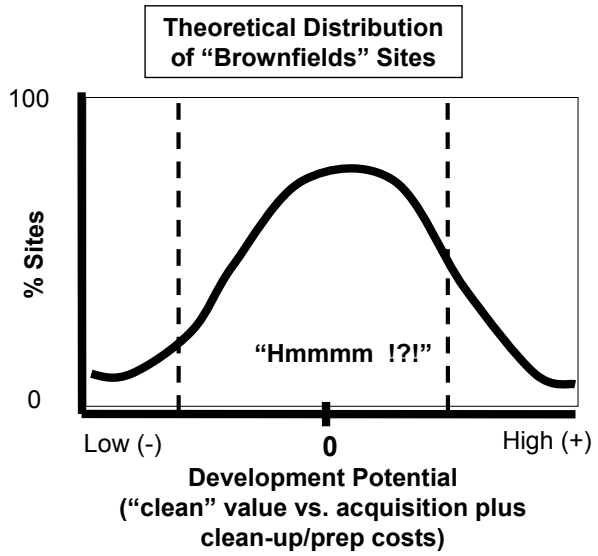
Tier 3:
Value unknown

Tier 4:
- **"Off the radar screen"**
- **Neutral to negative value**
- **No market:**
  - **Size**
  - **Location**

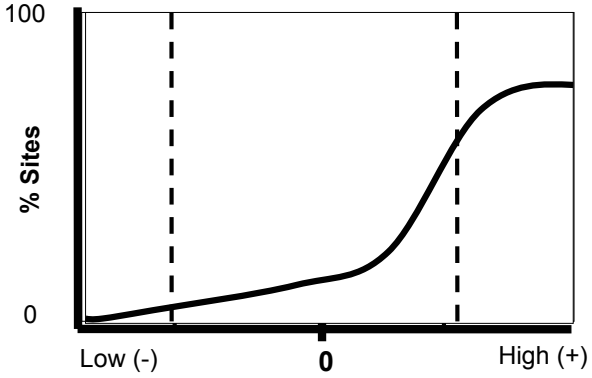


Site Redevelopment: The Role of Cleanup Technology

- *Technologies can support successful redevelopment at Brownfields:*
  - **By changing standard assumptions of what is possible:**
    - **Cost**
    - **Time**
    - **Site conditions, issues, etc.**
  - **By affecting decisions:**
    - **Purchase price + site prep < "clean" value**
    - **Site prep includes investigation and clean-up (risk management)**
    - **Lower costs can significantly affect equations**
      - **More "positively positioned" properties**
      - **More "public" redevelopment**


Theoretical Distribution
of "Brownfields" Sites
100
% Sites
0
"Hmmmm !?!"
Low (-)
0
High (+)
Development Potential
("clean" value vs. acquisition plus
clean-up/prep costs)

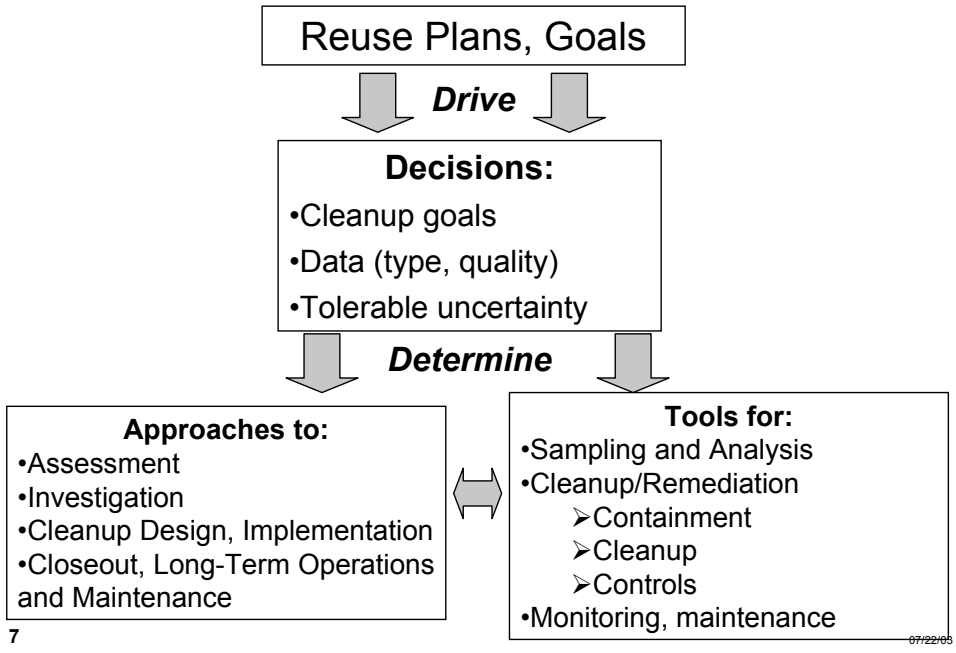
Theoretical Distribution of "Brownfields" Sites



Development Potential ("clean" value vs. acquisition plus clean-up/prep costs)

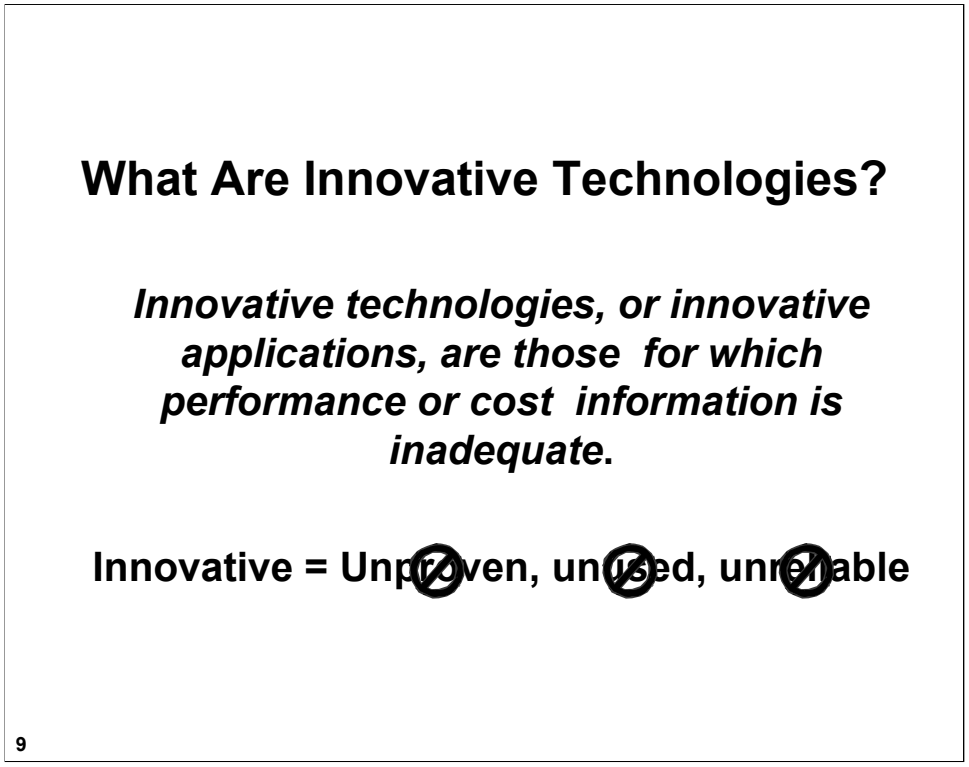
Potential with innovative approaches?

Understanding the Context of Cleanup



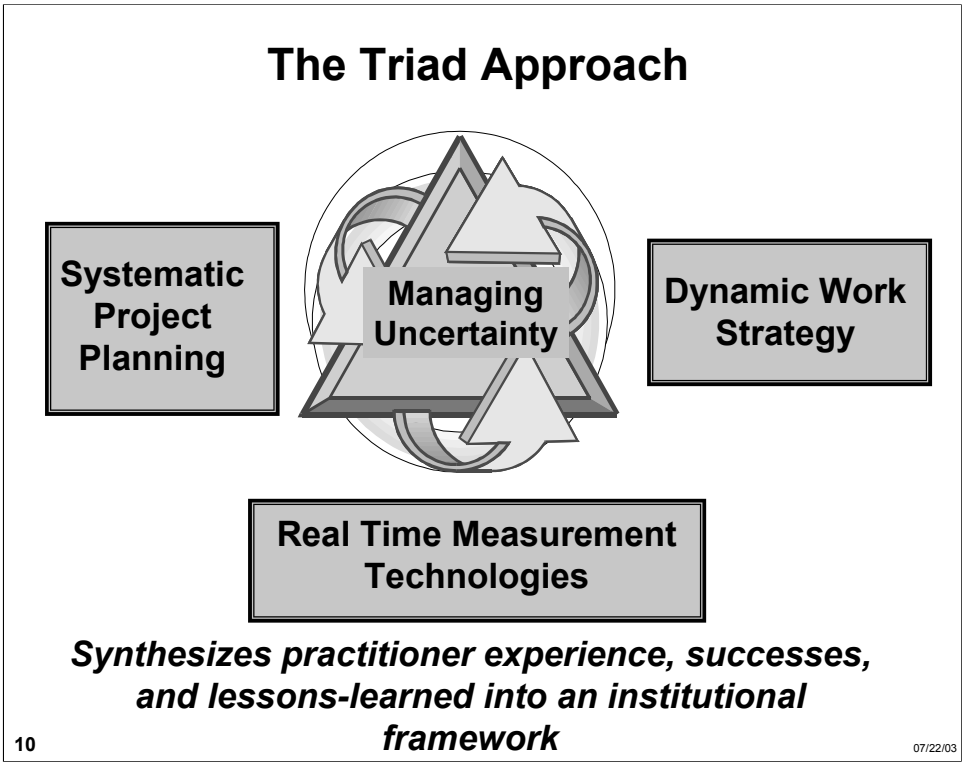
Technology Opportunities

- Investigation, characterization, monitoring (*If only we could quickly but reliably determine if the site is (still) contaminated*)
  - Field analytics
  - Innovative sampling
  - Long-term monitoring/compliance
  - Dynamic decision making, expedited characterization
- Treatment technologies (*Standard options just won't work with the proposed reuse*)
  - *In-situ* treatment
  - Volume reduction
  - Contaminant destruction
  - Groundwater (?)



There are no written standards on what "adequate" information levels are. However, repeated successful full-scale applications are a good indication that a technology in reaching maturity.

For this reason TIO recently removed thermal desorption and soil vapor extraction from the list of innovative technologies. There have been 55 and 178 full scale applications respectively in the Superfund program alone through 1997.



Systematic Planning

Site and decision-specific issues; charts best course to reach project goals

Dynamic Work Plans

Field based decision making allows for a seamless flow of site activities = fewer mobilizations

Guides data collection to support CSM

On-site Analysis Definitions of terms used during the course

Benefits of the planning process

Major planning steps

Applications of field-based sampling and analytical technologies

Documentation of accelerated approaches

Support Implementation of dynamic work plans

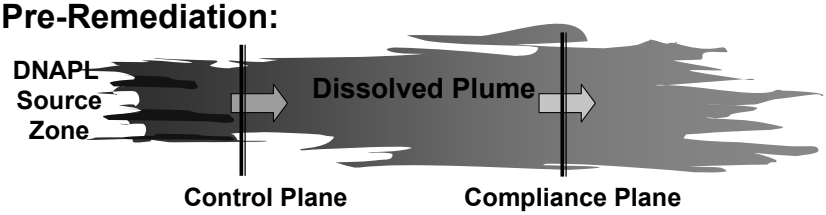
Technology/Methods/QC are based on data use and on-site decision making in mind

Innovative Analytical and Sampling: Opportunities for Cost Savings, TODAY

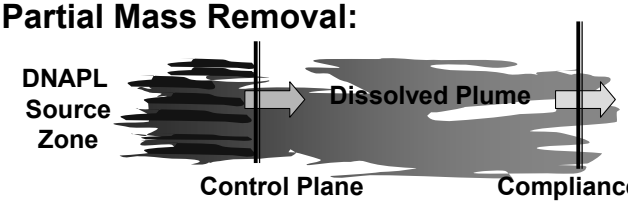
- An excellent target for innovative approaches
  - New but not unproven (approaches and technologies)
  - Technology allows improvement
    - Increase sampling density…AFFORDABLY
    - Support rapid decisionmaking
  - Not all sites are candidates for treatment, but all sites require monitoring and measurement activities
- Impacts total project costs
  - Accurate characterization results in "remedy" savings (e.g. removal, treatment) by reducing uncertainty about cleanup goals and which remedy is most appropriate and cost effective
  - Monitoring and measurement activities occur from site assessment through site closeout, reuse

Groundwater Plume Response

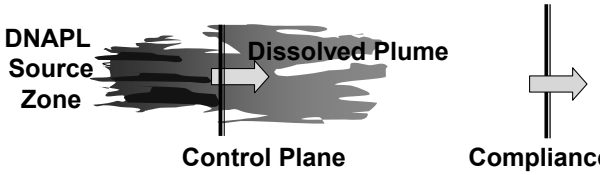
Pre-Remediation:



Partial Mass Removal:



Partial Mass Removal + Enhanced Natural Attenuation:



NAPL Site Characterization

- Essential component of the remedial package
- Currently tool-limited for more complex scenarios
  - Large facilities/chlorinated solvents/heavier PAHs
- Subject of future technical information transfer efforts
- EPA/Army COE/DOE--Argonne actively investing in the rollout of the “Triad” approach to site monitoring

Rethinking Source Term vs. Plume Management

- Potential source term control solutions
  - Steam/Heat
  - Chemical oxidation
  - Surfactant-cosolvent flushing
- Outstanding issues
  - Science
  - Policy
  - Other (Economic – Public and Private sector)

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ESTCP Demonstration and Comparison of Transport Optimization Techniques for Pump and Treat Systems

Three DOD pump and treat sites will be included in the study. Three different mathematical approaches to optimizing the pump and treat systems will be used and compared at each site. Umatilla Army Depot has been selected as the first site. The two additional sites will be selected by the end of May but are anticipated to be Tooele Army Depot and George Air Force Base or Shaw Air Force Base.

Optimization analyses have begun on Umatilla Army Depot and will conclude in July 2001. Optimization of the remaining two sites will begin in June 2001(site 2) and August 2001(site 3). Results for all three sites are anticipated by December 2001.

The final report for this project will include the results of the three optimization analyses for each pump and treat site (in a case study format). A comparison of the different approaches will also be included in the final report. The final report is anticipated in April 2002. An addendum to the final report will be prepared to summarize the implementation and field validation of optimization modeling. The addendum is anticipated in September 2002.

Resources - Brownfields/Reuse

Brownfields Technology Support Center
http://www.brownfieldstsc.org

- Publications
- Request site specific support (Local, State, Regional staff)
- Reports on past projects
- Events
  - ➔Training
  - ➔Workshops

Brownfields TSC- Direct Support

Home
Request Support
Project Status
Completed Projects
Publications
Events
Links

- Who? Government users
  - **Local**
  - **State**
  - **EPA Regions**
  - **No consultants, NGOs (can work through localities)**
- Normal support services
  - **Technology scoping**
  - **Technology review, literature, descriptions**
  - **Procurement issues**
  - **Education/training**
  - **Plan review - technology focus**
  - **Help identify "non-technology" support, expertise**