EPA Optimization: It's Not Just for P&T Anymore

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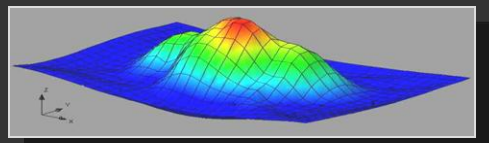
17 June 2010

E2S2 Conference



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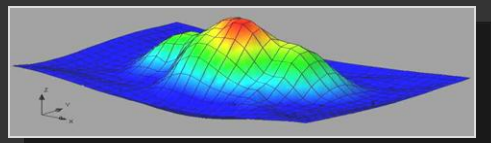
Presentation Overview

- Brief background on Superfund optimization efforts
- Lessons learned from P&T optimization
- Expanding optimization beyond P&T
  - Independent Design Reviews (IDRs)
  - Responsible Party sites
  - Green remediation
- Developing a Superfund national strategy for optimization

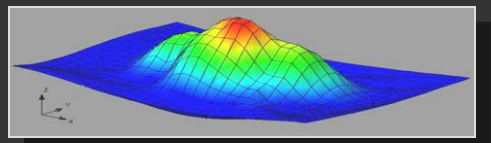


Why Optimization

- There may be many microscopes on EPA for each remedy, including:

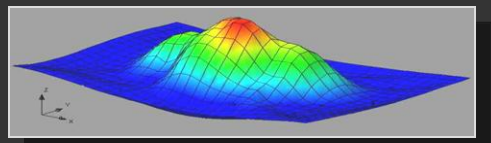
Local community	***State***	***Press***
PRPs	***Taxpayer/Congress***	***NGOs***

- Remediation is an inexact science
  - Continuously evolving understanding of the science
  - Continuously advancing technologies
  - Changing regulatory targets (arsenic, dioxin)
  - Limited data in even the best of scenarios
  - Opinions varying from professional to professional
- Challenging conditions for EPA staff
  - Keeping up with limited resources (funding and staff)
  - Keeping up with staff and management turnover
  - Aging infrastructure
  - Preparing properties for reuse
  - Managing and using massive amounts of site data



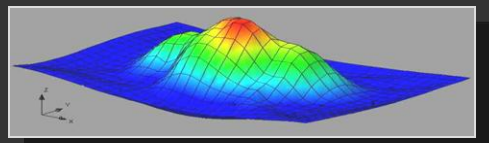
Optimization at EPA

- Comprehensive and systematic review of a site's past, current, and planned clean-up activities by a team of independent technical experts to identify cost efficiencies and protectiveness improvements
  - Utilize 3-person optimization teams independent from the site
  - Support provided through OSRTI or regional contracts
  - Reviews typically completed within 6 months
- Early focus on Fund-lead P&T sites through Remediation System Evaluations (RSEs)
- Recently, optimization expanded to other points in pipeline



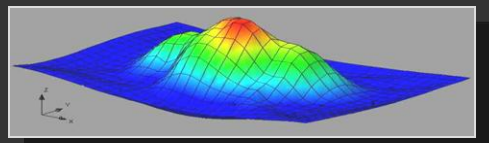
Brief History

- 2000 – Piloted optimization at 20 Fund-lead P&T sites
- 2002 – Began applying LTMO for ground water sites
- 2004 -- Superfund adopted the “Action Plan for Remedy Optimization” for Fund-lead P&T sites
- 2007 – Began applying optimization earlier in the clean-up process (IDRs)
- Currently - green remediation, PRP-sites, and Five Year Review assistance all incorporated into optimization



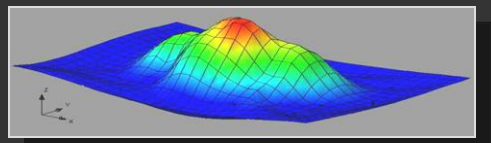
Optimization Findings

- Benefits and results of optimization have been widely documented
  - Optimized nearly 100 sites (mainly P&T)
  - Identified >$350M in potential cost savings/avoidance
  - Prepared 20+ documents and 10+ internet seminars to communicate lessons learned
  - Trained EPA staff in all 10 Regions
  - Trained thousands of contractors and other professionals
  - Developed tools and protocols to be used by RPMs



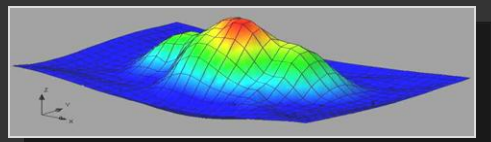
A Sample of Sites Evaluated

- 12 wood treating sites
  - P&T systems
  - NAPL recovery, thermal remediation
  - Sediment capping
  - Biosparging
- 31 former industrial facilities, landfills, etc.
  - P&T systems
  - Soil capping
  - NAPL recovery, chemical oxidation
  - Air sparging / soil vapor extraction/ groundwater recirculation
  - Barrier walls
  - Constructed wetlands
- 2 mining sites (acid mine drainage and mine tailings)
  - Surface water collection and treatment, water diversion
  - P&T systems



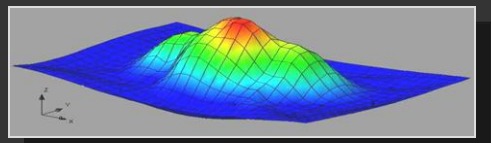
Optimization Results

- Based on an analysis of 52 of the optimized sites…
  - 83% of sites had cost savings opportunities identified through optimization
  - 52% of sites had cost savings opportunities > $1 million
  - At one site, cost savings opportunities were > $11 million
- Based on the same set of 52 of the optimized sites…
  - 62% of sites benefitted from recommendations to help improve or confirm control of plume migration
  - 33% benefitted from recommendations to help eliminate or confirm no human exposures
  - 19% benefitted from recommendations to help eliminate or confirm no ecological exposures
  - Similarly positive findings for other studies



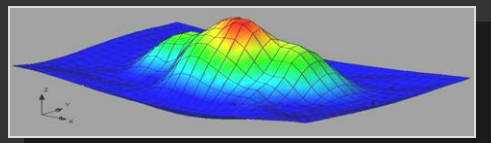
Lessons Learned – Beyond Cost and Protectiveness

- Site team and management provided with a valued third-party perspective
  - Helps provide confidence in path forward
  - Helps provide a structured strategy for moving forward
  - Helps weigh pros and cons of various options
  - Helps build consensus among various stakeholders
  - Helps balance technical input from sole site contractor
- Helps cross-pollinate expertise among sites
- Can identify expedited path for site closure
- Can facilitate transfer of LTRA sites to States

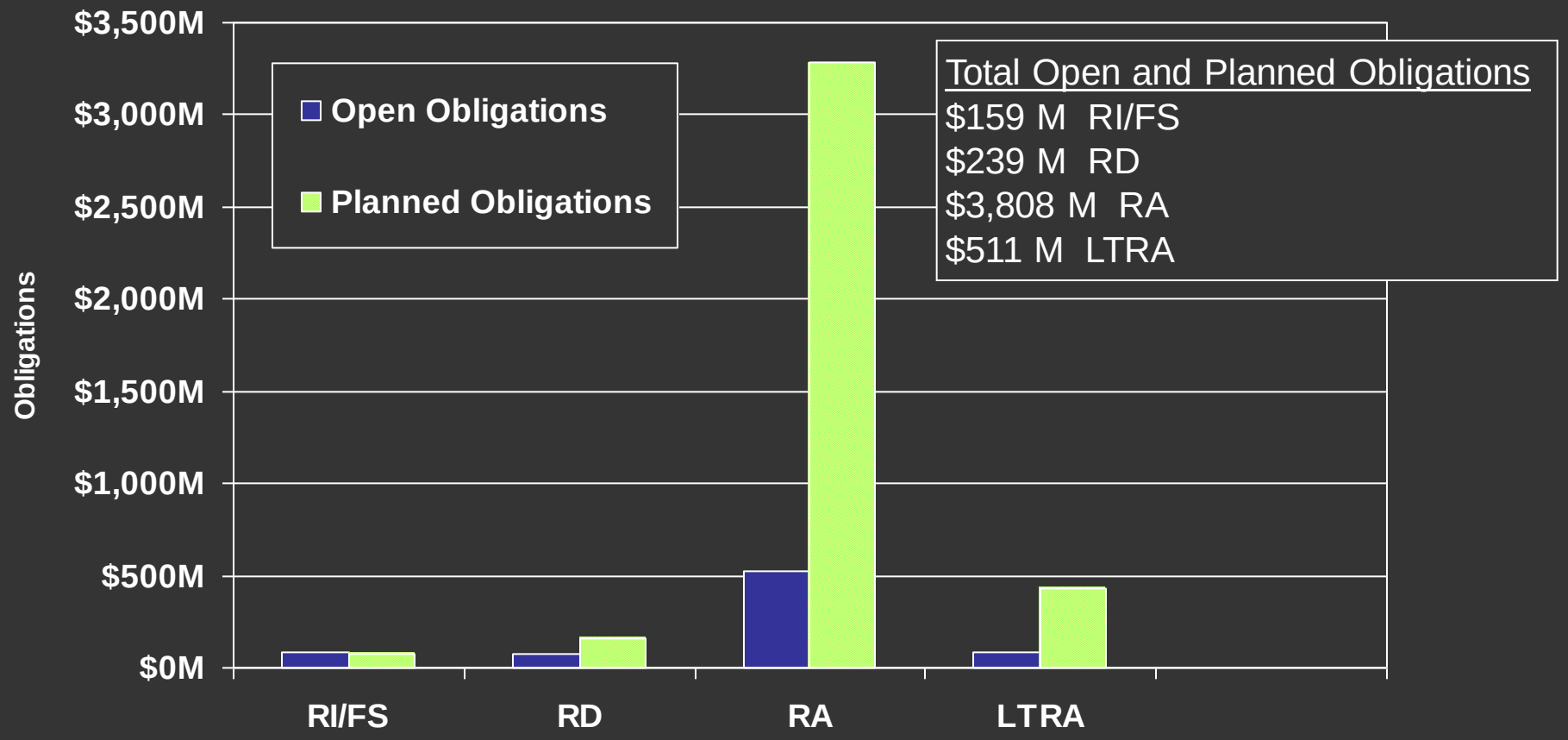


Lessons Learned (cont.)

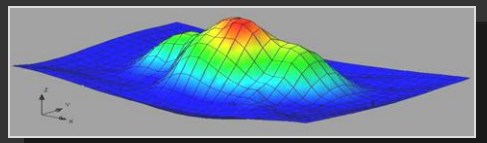
- Conclusions regarding a potential path forward
  - Optimization might provide equal or improved benefit during the remedy selection and remedy design stages
  - Responsible Party sites could also benefit from EPA-led optimization



Open and Planned Obligations For Our Fund-Lead Universe



Information based on CERCLIS queries conducted March 23 to 28, 2006



Independent Design Reviews

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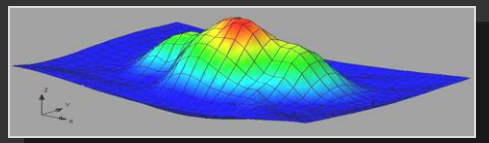
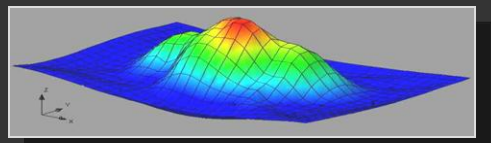


Independent Design Reviews

- Similar in scope to RSE
  - Third-party review by team of experts
  - Consider life-cycle cost, effectiveness, and protectiveness
  - Document review, site visit, draft report, and final report
  - ~$35K
- Review conducted during
  - Remedy selection
  - Remedy design
  - Remedy “re-design”
- Review includes additional follow-up to
  - Make process more dynamic
  - Keep communication lines open between review team and site team
  - Allow review team to comment on results of suggested items

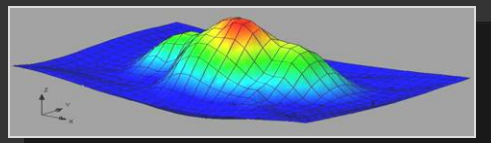


IDR Pilot Summary

- Cost: Potential for substantial cost savings
  - Potential to substantially reduce RA costs by assisting with remedy selection and design (millions of dollars at one site))
  - Potential to reduce contractor costs by providing a check on scope and cost estimates (hundreds of thousands at 3 sites)

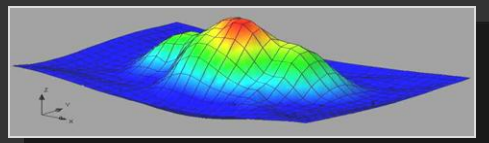
- Time: Potential to move sites more quickly through the program
  - Potential to move sites closer to O&F or start of LTRA clock in an accelerated time frame)

- Information: Potential to provide significantly more information for RPM decision making
  - More confidence when negotiating with PRPs
  - More confidence that risks to human health and the environment are being addressed
  - More confidence that the most cost effective path is chosen



IDR Pilot Summary

- Promising results so far at PRP and Fund-lead sites at various stages of the clean-up process
- Optimization plays an important role with technical assistance that is often not available to RPMs
- Recommendation to offer IDR support to more sites/RPMs



Green Remediation and Optimization

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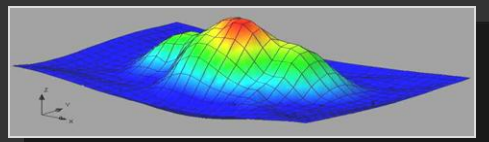
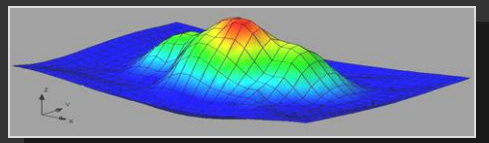


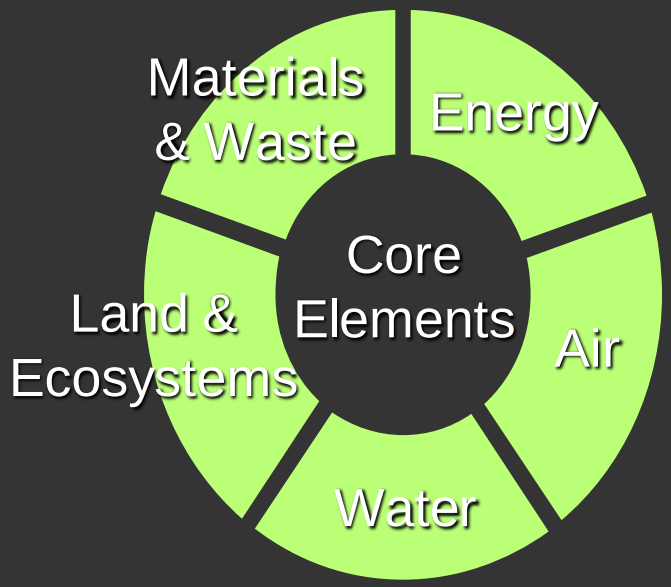
Green Remediation

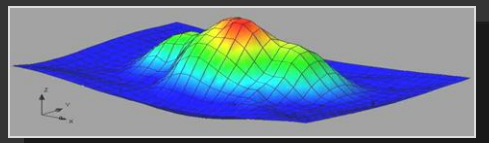
- Green remediation is linked with optimization for several reasons
  - Evaluating the environmental footprints of a remedy provides another perspective during remedy review…
  - The input for green remediation evaluation is often collected during optimization reviews… doing them together avoids duplication of effort
  - Green remediation is synonymous with efficiency, which is a core component of optimization



Green Remediation

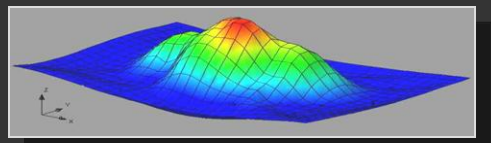
- Technical documents www.cluin.org/greenremediation)
  - Best management practices by technology
    - P&T
    - Site investigation
    - Excavation/surface restoration
- EPA methodology for conducting environmental footprint analyses
  - Energy and atmosphere (in progress)
  - Water (in progress)
  - Materials use and waste generation (in progress)





Green Remediation

- Green remediation evaluations
  - Detailed footprinting analyses conducted for lessons learned independent of optimization efforts
    - Romic (in process)
    - BP Wood River (in process)
    - Travis AFB (planned)
  - As a component of optimization
    - Mill Creek Dump Superfund Site
    - Alaric, Inc. Superfund Site
    - 10th Street Superfund Site
    - Shepley's Landfill (Army)



Expanding Optimization to More Superfund Sites

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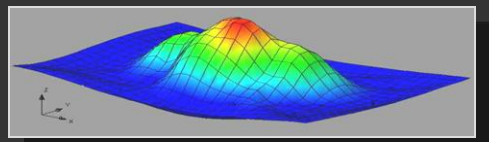
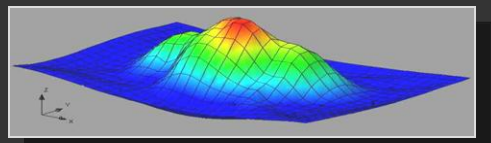


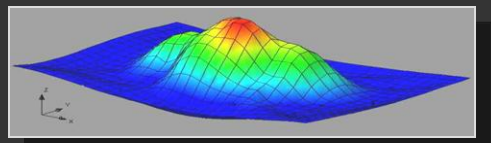
Expanding Optimization

- Excellent results for optimization conducted to date, but…
  - Only approximately 10% of the 1500 Superfund NPL sites have been evaluated; therefore, only a small fraction of potential time, monetary and energy savings, and added public health protection have been realized.
  - Need to determine how EPA will identify resources for optimization
  - Need to do a better job of involving management in optimization



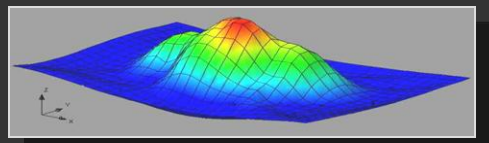
Expanding Optimization

- Considering implementing a multi-year optimization strategy that…
  - Uses the optimization tools, lessons learned, and expertise of Superfund Program and optimization contractors
  - Bridges Triad and optimization technical support
  - Blends Regional and HQs resources
  - Involves Regional and HQ management
  - Has clear comprehensive, nationwide objectives
  - Tracks results
  - Looks a lot like AFCEE's ERP-O Program



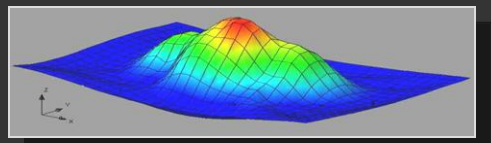
Schedule

- Approval to move forward
- Working on briefings for OSWER and EPA Regional offices
- Planning a collaborative effort to develop strategy
- National strategy to be developed and fully implemented by 2012
- Core elements of the national strategy
  - Planning
  - Communication and training
  - Implementation
  - Measurement



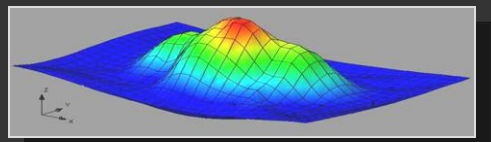
Take Home Messages

- It makes sense to get a 2nd opinion for complex remedial activities at Superfund sites
- RPMs cannot be expected to be experts in policy, engineering, chemistry, geochemistry, statistics, cost-engineering, etc.
- Don't rely only on the site contractor
- Optimization studies - remember to
  - Keep evaluations independent
  - Use qualified optimization review teams
  - Don't consider it a one-time event
- Potential for expanding EPA optimization through a national strategy



EPA Optimization Documents

- *Elements for Effective Management of Operating Pump and Treat Systems*, 2002
- *Cost-Effective Design of Pump & Treat Systems, 2005*
- *Effective Contracting Approaches for Operating Pump and Treat Systems*, 2005
- *O&M Report Template for Ground Water Remedies (with Emphasis on Pump and Treat Systems),* 2005
- *Roadmap to Long-Term Monitoring Optimization, 2005*
- *Optimization Strategies for Long-Term Ground Water Remedies (with Particular Emphasis on Pump and Treat Systems)*, 2006
- *Options for Discharging Treated Water from Pump & Treat Systems*, 2007
- *A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems*, 2008



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