



# Optimizing Remedial Action Operation and Monitoring – Navy Guidance

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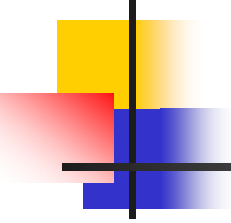
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# Navy Guidance Documents

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- DON Environmental Restoration Optimization Workgroup guidance documents
  - Remedy Selection, Evaluation and Design (April 2004)
  - Optimizing Remedial Action Operation (2002)
  - Groundwater Monitoring (2001)
- Guidance documents are available from  
<http://enviro.nfesc.navy.mil/scripts/WebObjects.exe/erbweb.woa>  
Support / Work Groups / RAO/LTMgt workgroup
- CNO Policy 23 April 2004 – requires evaluation and optimization for all IR site



# Remedial Action Operation Optimization Guidance

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- Step 1: Review and Evaluate Remedial Action Objective
- Step 2: Evaluate Remedial System
  - Remediation effectiveness - contaminant removal
  - Operates as designed
- Step 3: Evaluate Cost Effectiveness of Existing System
- Step 4: Identify System Modifications /Alternatives
- Step 5: Develop and Prioritize Optimization Strategies
- Step 6: Develop Optimization Report
- Step 7: Implement Optimization Strategy

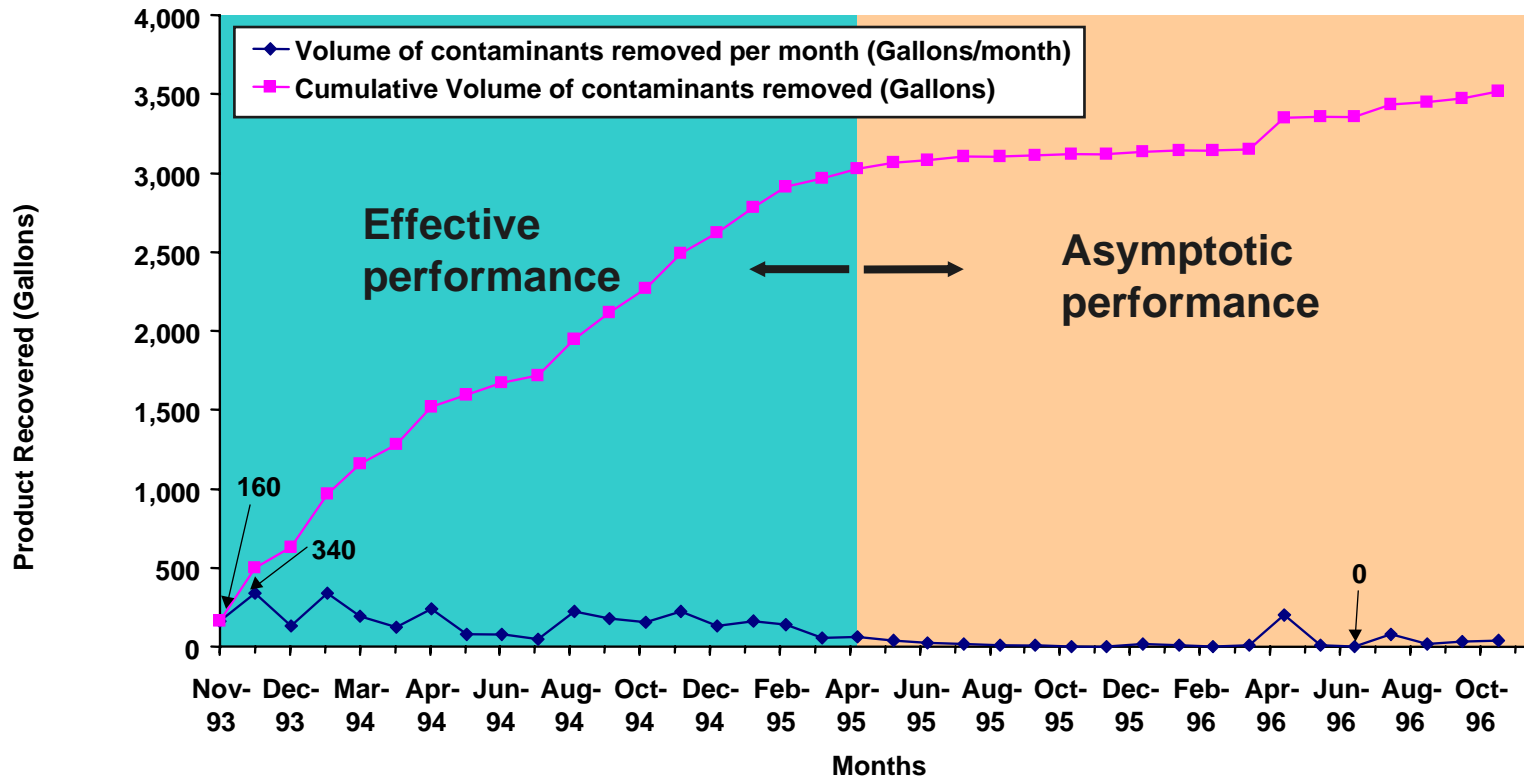


# Remedy Performance Evaluation

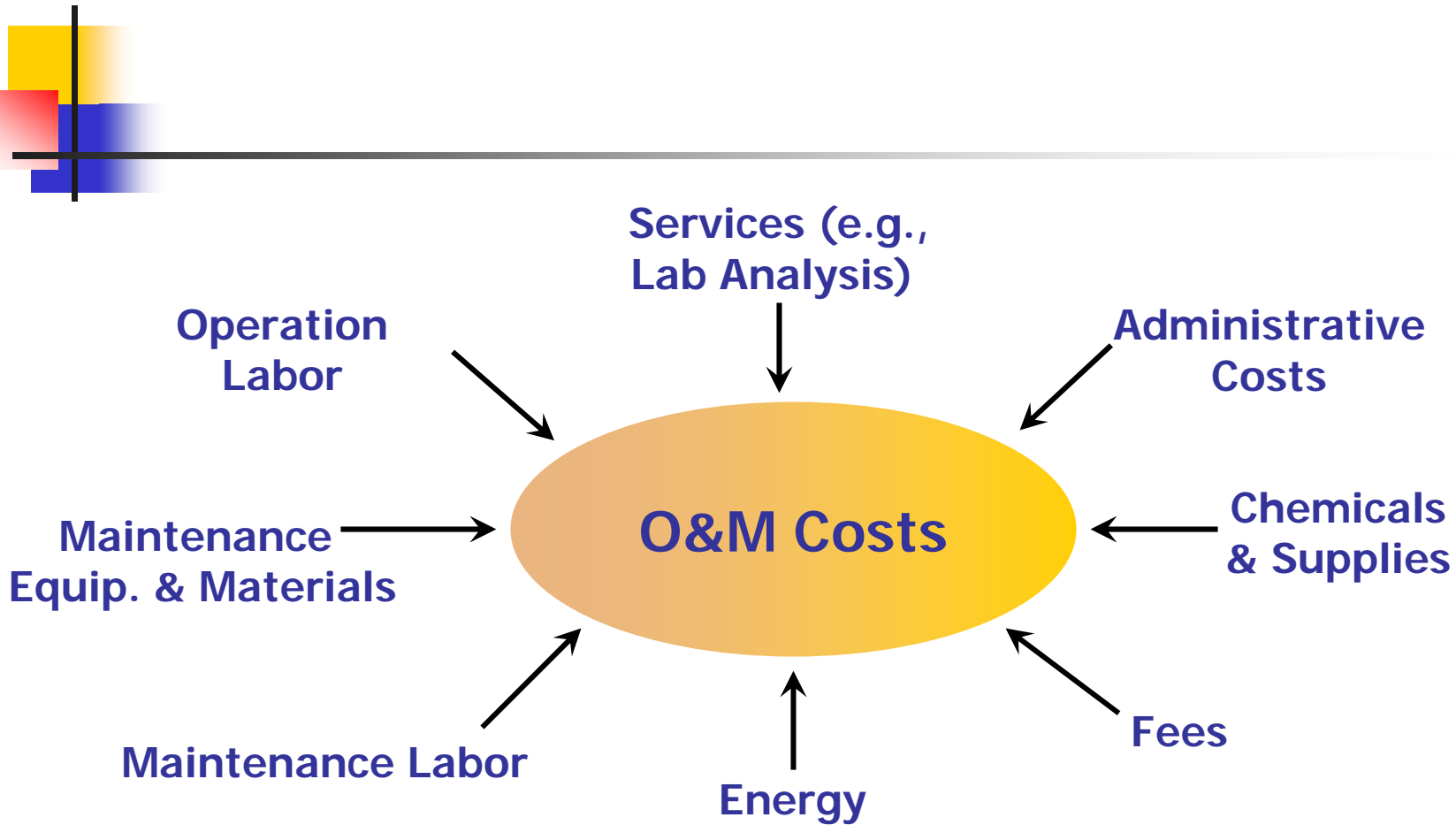
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- Some Considerations for Performance Evaluation
  - Are project goals well defined ?
  - Will objectives be achieved within a reasonable timeframe as predicted or estimated?
  - Is there a definite trend indicating progress toward cleanup objectives?
  - Plume contained, stable or shrinking?
  - Subsurface contaminant concentrations trending downward?
  - Sufficient mass removal?

# Time Series Plot – Asymptotic Trend



# O&M Cost Components





# Monitoring Optimization

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- Qualitative Approach
- Optimization process requires answers to the following:
  - 1) What is the goal of the monitoring program?
  - 2) How many monitoring points do I need?
  - 3) How often should I monitor?
  - 4) What contaminants do I need to monitor?
  - 5) How should I collect the samples?
  - 6) How do I present my data so it's easy to understand?



# Implementation of Recommendations

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- Monitoring program optimization – From our case studies - usually acceptable to stakeholders
  - Make sure conclusions are supported by data
- For remedy change, may need a focused feasibility study for detailed analysis
- Regulatory agency and public buy in
  - Memo to file
  - Explanation of significant differences
  - ROD modification – major changes in remediation strategy



## Current Projects for Monitoring

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- Well comparison study – performance of conventional wells vs. direct push wells – rigorous statistical data analysis
- Diffusion samplers – materials other than polyethylene for a broader range of contaminants
  - Looks very promising for organics, inorganic, & ordnance compounds
  - Possible for radio nuclides?
- Geostatistical modeling for monitoring optimization