2003 AFCEE Technology Transfer Workshop

Air Force Real Property Agency (AFRPA)

Jim Gonzales
Science & Engineering Division
HQ AFCEE/ERS

Presentation Overview

- What's new?
- Who are we?
- Success?
- What about the Future?

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- AFCEE Contractors Invited
- Reception / Exhibit Hall
- Greater variety of topics
- Shorter discussions
- 150% Greater Attendance
- We're back on the River!

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- AFCEE early to recent days
  - Major R. Miller → Major J. Cornell
  - Reduce technology life-cycle
  - Risks: allowed & encouraged
  - AF/ILEV & AFRPA-funded
- Science & Engineering Division
- Technology Transfer Branch
  - Formulate: requirements
  - Demonstrate: new technology
  - Validate: cost & performance
  - Educate: publish results (Praise or bury Caesar, it doesn't matter)

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- Cost Avoidance
- Tools Produced
- Publications
- What about lately?

One Measure of Success …

Technology (# Sites)	Savings	ROI
Bioventing (138)	$24.0M	3:1
Natural Attenuation (45)	$525.0M	45:1
Internal Combustion Engine Soil Vapor Extraction (6)	$3.5M	2:1
Bioslurper (33)	$15.5M	6:1
Risk-Based Site Closure (22)	$10.1M	5:1
Diffusion Sampler (18)	$2.4M	8:1
Remedial Process Optimization (18)	$39.0M	7:1
Phytotechnologies (8)	$7.0M	6:1

Total Savings (eight initiatives) = $636M AVG ROI = 12:1

Sites cleaned / closed = 130+

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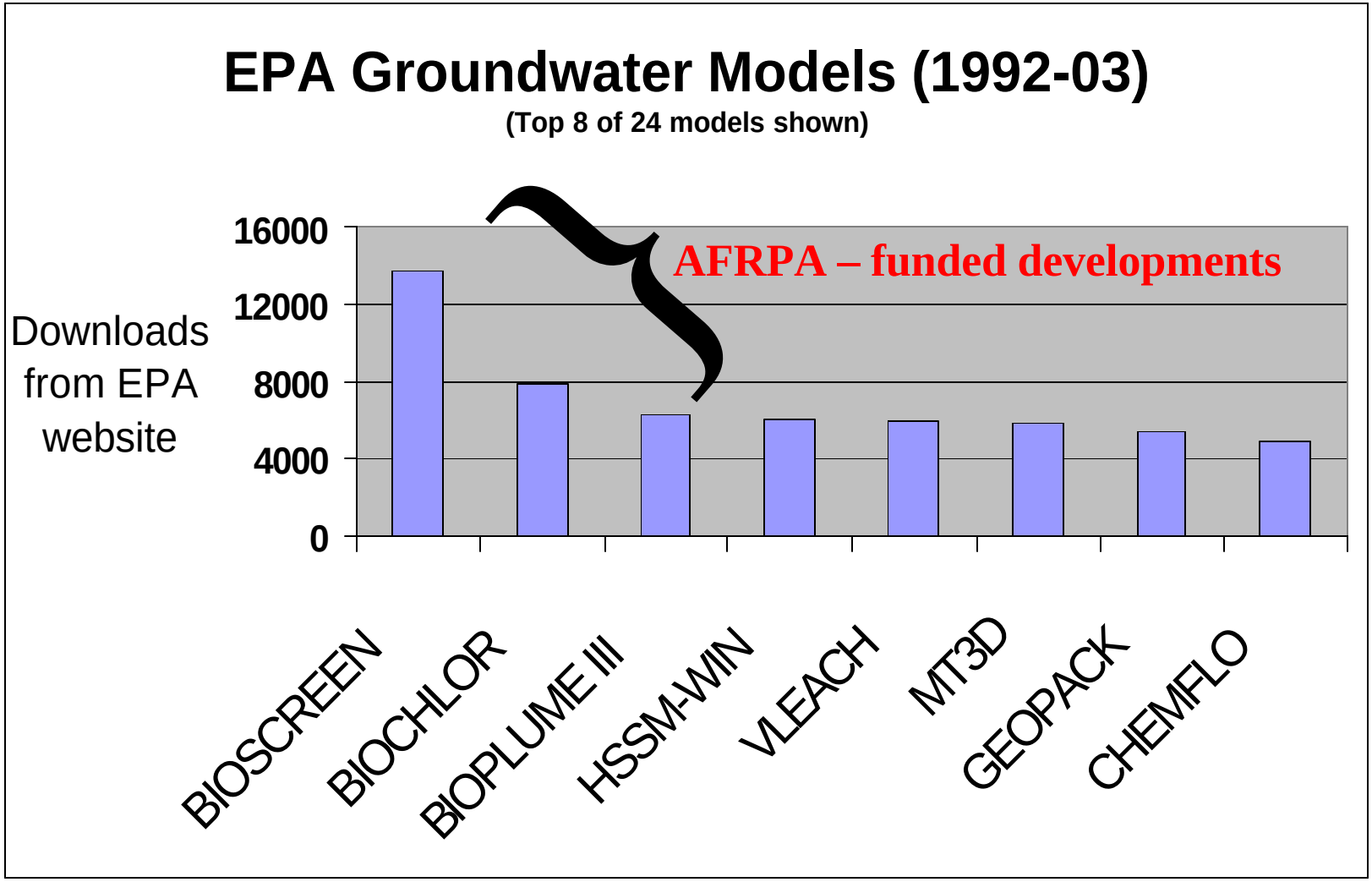
AFCEE – AFBCA Software Tools



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Selected Publications

- Fuels MNA Protocol
- Chlorinated Solvents MNA Protocol
- Principles and Practices of Bioventing
- Risk-based Approach to Petroleum Hydrocarbon Cleanup
- Evapotransporation Landfill Covers
- Remedial Process Optimization (RPO) Handbook

} Industry Standard

- New Enhanced Bioremediation Protocols:
  - Vegetable Oil
  - Hydrogen Sparge
  - Molasses
  - Tri-Service/ESTCP Principles & Practices Manual

} Available later this year

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Other Opportunities

- **Long-Term Monitoring (LTM)**
  - **Passive Diffusion Bag Samplers (PDBS) → Interstate Technology Regulatory Council (ITRC)**
  - **But it's not just HOW you take the sample**
  - **It's also a matter of TIME and SPACE!**

Long-Term Monitoring

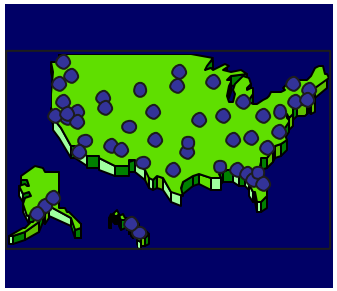
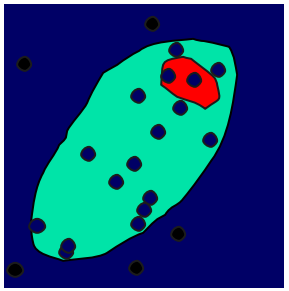
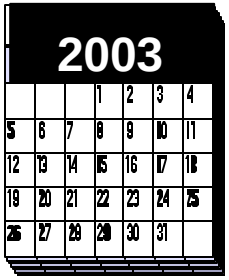
Diffusion Bag Samplers

Monitoring & Remediation Optimization System (MAROS)

} **AFRPA-funded**

What about Time & Space?

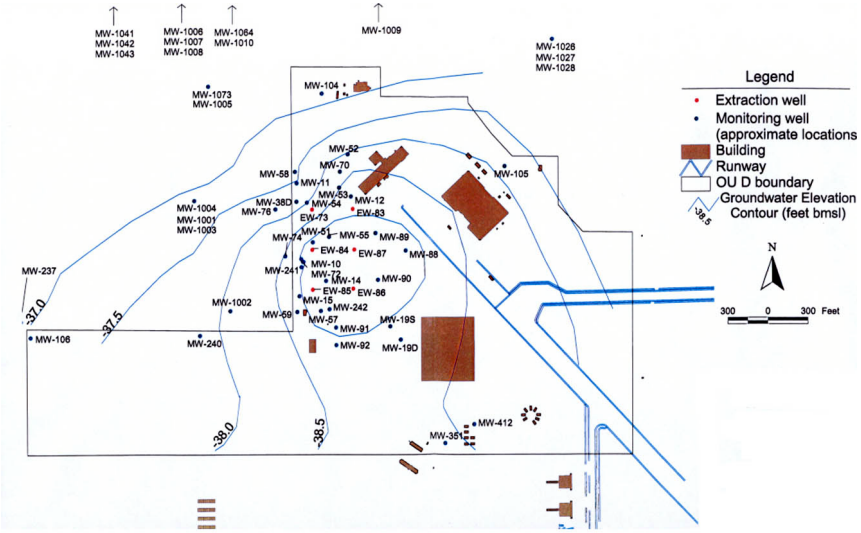
The Calculus of Long-Term Monitoring

	Number of Sites		Number of Wells		Frequency, Duration of Sampling		Cost Per Well
LTM Cost ($) =		X		X		X	
Addressed by MAROS?	***NO*** → **Program Level**		***YES*** → **Site Level**		***YES*** → **Site Level**		**(Passive Diffusion Bag Samplers)** ***NO*** → **Well Level**

McClellan AFB OU-D Groundwater Monitoring Program

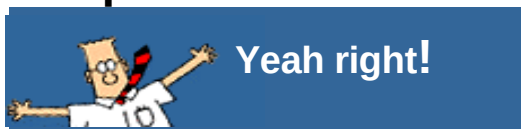
- Semiannual Sampling → Annual Sampling
- 56 Wells – VOCs → 16 Wells - VOCs & EDB
- 42 Wells- TVPH,TEPH, & EDB
- Est. Annual Cost = $85,000 → $15,000

Study Cost = $5-7K/site

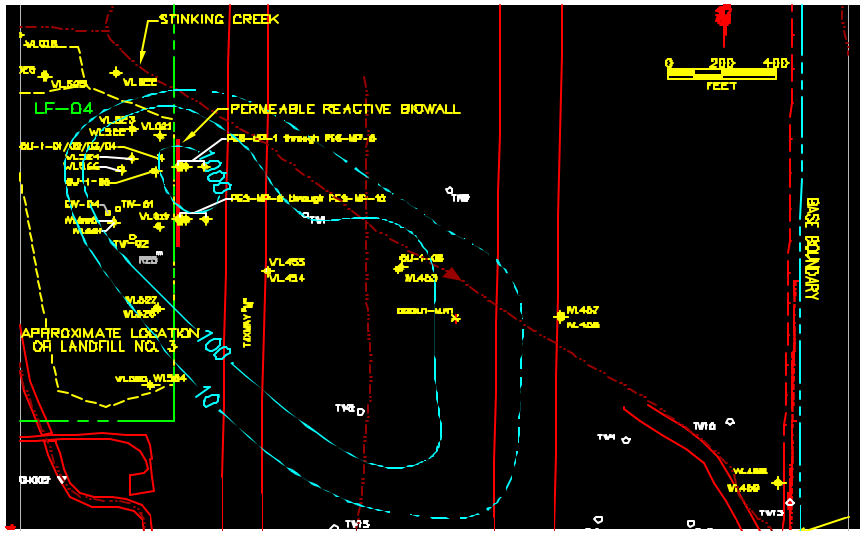


Enhanced Bioremediation: Altus AFB OU-1 Biowall

- 4,000 ft TCE/DCE plume
- Most common responses:
  - Pump and Treat
  - Fe Permeable reactive barrier
  - Landfill Cap
  - MNA



- Recycled Christmas Trees!
  - AF / City of Altus Partnership
  - Free low-cost carbon
  - Permeable reactive barrier
  - $87K construction costs
  - Results: gotta go to the briefing
- Malmstrom AFB being planned
  - $7-10M cost avoidance!



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- Funding
- Over-reliance on technology
  - low-cost, well understood, risk-based strategies
  - high-cost, less understood thermal & chemical oxidation trials
- New Challenges
  - lower TCE standards
  - perchlorate
  - energetics
  - force protection

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We're Glad Your Here!

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- **THANK YOU!**