

John Kingscott  
December 1, 2003

# Status Report - Technology Cost and Performance Activities



*Federal*

*Remediation  
Technologies  
Roundtable*



- ◆ Treatment Technologies
- ◆ Site Characterization
- ◆ Multi-Site Assessments
- ◆ Long-Term Management/Optimization

# New Products

## ◆ Fact Sheets

- Update on overall Cost and Performance efforts
- Remediation Technology (Multi-Site) Assessment reports

## ◆ CD-ROM (4<sup>th</sup> edition) including

- 342 Treatment Technology case studies
- 121 Site Characterization and Monitoring case studies
- 52 Remediation Technology (Multi-Site) Assessment reports

## ◆ Abstracts Report – Volume 7

- 29 new Treatment Technology case studies

# TREATMENT TECHNOLOGIES

# Treatment Technology Case Studies

## Media and Contaminants Treated

(Total for All 342 Case Studies)

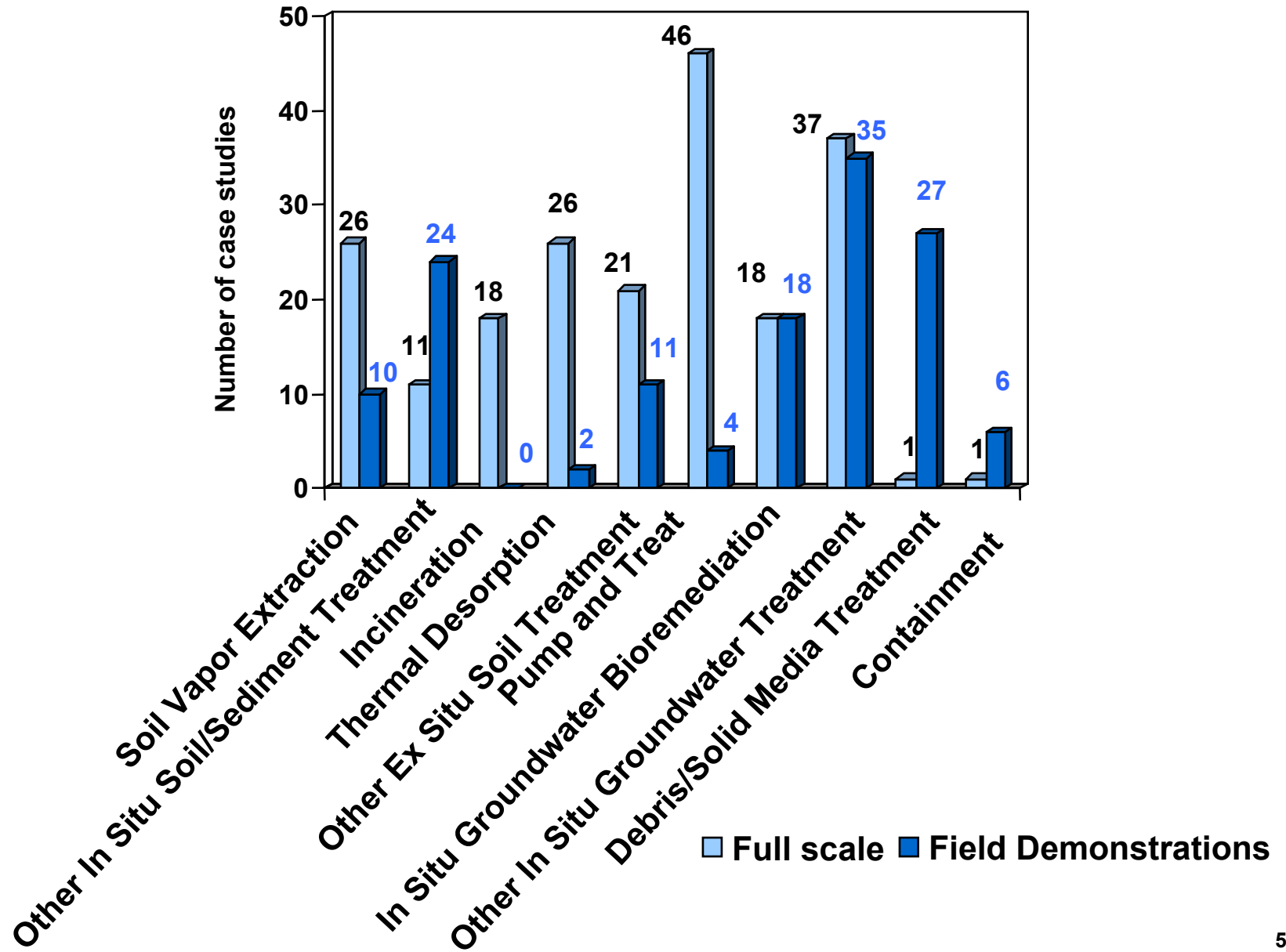
Types of Contamination	Media		
	Soil	Groundwater	Debris/Solids
Halogenated Volatiles	63	107	3
BTEX and/or TPH	47	51	3
Heavy Metals	40	29	9
Radioactive Metals	15	10	23
PAHs	24	7	2
PCBs	15	6	3
Pesticides/Herbicides	12	4	2
Explosives/Propellants	5	3	3
<b>TOTAL*</b>	<b>221</b>	<b>217</b>	<b>48</b>

Note: Some case studies address more than one media/type of contamination

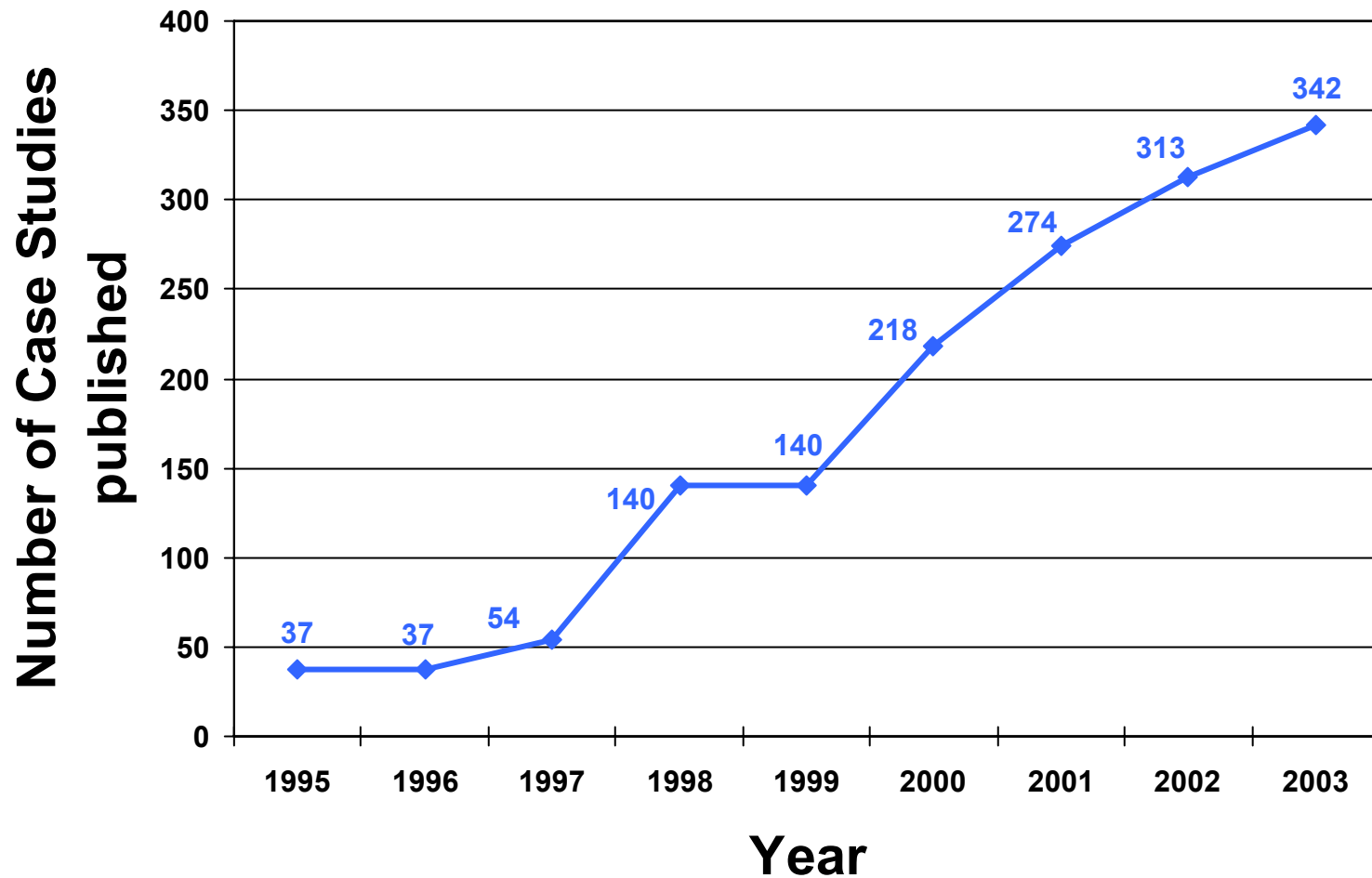
\*Containment technologies not included

# Scale of Projects

(All 342 Treatment Technology Case Studies)



# Number of Remediation Case Studies Published Between 1995 and 2003



Note: No new case studies were added in 1996 and 1999

## Potential New Case Studies Identified for Spring 2004

Agency	New Case Studies Identified as of November 2003	
	Remediation Case Studies	Site Characterization and Monitoring Case Studies
<b>Army</b>	0	0
<b>Navy</b>	0	0
<b>Air Force</b>	0	0
<b>ESTCP</b>	2	0
<b>DOE EM-40</b>	0	0
<b>EM-50</b>	0	0
<b>EPA TIO</b>	9	2
<b>SITE</b>	0	0
<b>SCRD – Dry cleaner profiles</b>	7+	0
<b>NASA</b>	0	0
<b>ITRC</b>	0	2

Note: Initial projections based on web site checks as of November 2003

# Federal Agency Points of Contact

Organization	Point of Contact
Army AEC	Rick Williams
USACE	Greg Mellema
Navy	Charles Reeter
Air Force	Jim Gonzalez
ESTCP	Andrea Leeson
DOE EM-40	Previous contact was at Sandia
DOE EM-50	Skip Chamberlain
EPA	John Kingscott
NASA	Mark Schoppet



# **SITE CHARACTERIZATION**

# Site Characterization and Monitoring Case Studies by Technology (Based on 121 total reports)

◆ Contaminant Analyses	
– Organic Chemical Characterization	25
– Inorganic Chemical Characterization	13
– PCB/Pesticides Characterization	11
– Explosives Characterization	7
– Radionuclide Characterization	13
– Unexploded Ordnance Characterization	3
◆ Triad/Field-Based Site Characterization	
– Field-Based Strategies/Techniques	5
– Cone Penetrometer/Drilling/Direct Push	18
◆ Geophysical Techniques	
– Surface (EM, Radiation, GPR)	19
– Geophysical Techniques – In Situ/Borehole	4
◆ Miscellaneous/Leak Detection	3

**REMEDICATION  
TECHNOLOGY (MULTI-SITE)  
ASSESSMENTS**

# Remediation Technology (Multi-Site) Assessments of Treatment Technologies

- ◆ Documents are based on assessment of performance and cost at multiple sites
- ◆ Includes State (ITRC) reports
- ◆ Documents support technology selection and design
- ◆ Documents that include only presumptive remedies, technology descriptions, literature surveys, application surveys, or regulatory assessments

## Multi-Site Technology Assessment and Remedial Design Reports (52 Documents Total\*)

Technology	Agency	Number of Reports
<b>Ex Situ Soil Treatment</b> Thermal desorption, bioremediation – land treatment, incineration (on-site), soil washing	EPA, ITRC, ESTCP, NFESC, USACE	8
<b>In Situ Soil Treatment</b> Soil vapor extraction, bioventing, phytoremediation, solidification/ stabilization	EPA, ITRC, Navy, AFCEE, DoD	8
<b>In Situ Groundwater Treatment – Bioremediation</b>	EPA, ESTCP	5
<b>In Situ Groundwater Treatment (Abiotic)</b> Permeable reactive barrier, flushing, phytoremediation, air sparging, chemical oxidation, multi-phase extraction, in-well air stripping	EPA, USACE, ESTCP, DoD, AFCEE, ITRC	18
<b>In Situ Groundwater Treatment – Monitored natural attenuation</b>	EPA, ITRC, ESTCP	4
<b>Containment</b>	ESTCP, USACE	2

\* 7 documents assess technologies to treat a particular contaminant

# Next Steps

- ◆ Compile new case studies
  - EPA will continue to check web sites for all categories of reports
  - Agencies to identify available reports/documentation
  - EPA can help reformat documents into case studies based on information provided by federal agencies
- ◆ Final case studies required by April 1 for inclusion in Spring 2004 update
- ◆ New reports added continuously to web site as they are received
- ◆ Use Fact Sheets and CD-ROMs to inform/support the remediation community

# **LONG-TERM MANAGEMENT/ OPTIMIZATION**

# Long-Term Management/Optimization

- ◆ Federal Agencies sponsored first optimization conference in St. Louis – June 1999
- ◆ Cleanup programs are concerned with 5-year reviews, improved efficiency, and closure
- ◆ Several technologies require long-term management
  - Pump and Treat
  - Monitored Natural Attenuation
  - Containment
  - Phytoremediation
  - Reactive Barriers
  - Groundwater Monitoring
  - Soil Vapor Extraction
  - (bioremediation, bioventing?)
- ◆ “Optimization” is one of three major components of the FRTR web site
  - RSE/RPO process; overview reports; technology descriptions
  - Currently, there is no centralized collection and exchange of case studies



# Long-Term Management/Optimization of Remediation Systems Summary of 74 Case Studies

## **Results:**

- Identified 74 case studies covering long-term management/optimization of remediation systems

## **Examples of techniques used in these case studies:**

- Capture zone analysis of pump and treat systems
- Additional delineation of contaminant plume
- Use of groundwater flow models to optimize extraction
- Evaluating and switching to alternate remedies, for example, MNA, PRB, or in situ bioremediation
- RSE/RPO

# Proposed Criteria for Compiling Long-Term Management/Optimization Case Studies

- ◆ Criteria for Including Studies:
  - Technologies are in the field and operating
  - Recommended improvements may or may not have been implemented
  - Site-specific (single- or multi-site)
  - Could also appear elsewhere as an FRTR case study
  - Rationale for recommended improvement is clearly documented (e.g., could include detailed 5-year review reports)
- ◆ Do not include the following (located elsewhere on FRTR):
  - Design reports
  - Computer models/user documentation for models
  - Documents that include only general information about optimization policy, techniques or procedures (checklists, RSE/RPO procedures)

# Next Steps for Long-Term Management/ Optimization

- ◆ FRTR member agencies to review preliminary list of reports
  - Report back by January 30, 2004 (kingscott.john@epa.gov)
- ◆ Revise FRTR web site to serve as an area for centralized collection/exchange of case studies
- ◆ Array/organize available long-term management/optimization case studies into a key-word based, searchable format; technology, techniques, other?
- ◆ Have a working system available for Spring 2004 FRTR update and June 2004 optimization conference in Dallas