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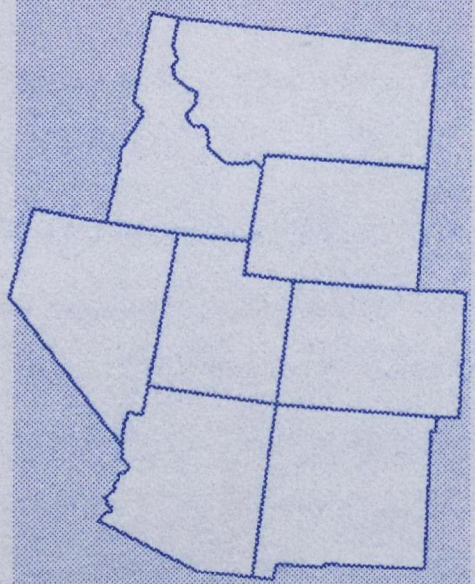
Summary Proceedings

Rocky Mountain Remediation Marketplace: Business Opportunities for Innovative Technologies



September 27 - 28, 1994
Denver, Colorado

Summary Proceedings

Rocky Mountain Remediation Marketplace: Business Opportunities for Innovative Technologies

Sponsored by:

U.S. Environmental Protection Agency
Technology Innovation Office
Washington, DC 20460

and

Risk Reduction Engineering Laboratory
Cincinnati, OH 45268

and

Western Governors' Association

and

Regional States

Denver, Colorado
September 27-28, 1994

Acknowledgements

This conference was conducted under the direction of Ms. Linda Fiedler, work assignment manager for the U.S. Environmental Protection Agency's Technology Innovation Office. Mr. Thomas R. De Kay, Ph.D. is the Project Officer.

Special acknowledgement is due the Regional and state staff who assisted with the conference and whose names appear on the List of Speakers. They provided the detailed information in this document. Their cooperation and willingness to share their knowledge and expertise on marketing and business opportunities for innovative treatment technologies encourages the development and application of those technologies.

Notice

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Abstract

The U.S. Environmental Protection Agency's Technology Innovation Office and Risk Reduction Engineering Laboratory are co-sponsoring The Rocky Mountain Remediation Marketplace conference, with the Western Governors' Association and states in the region to provide an opportunity for developers and vendors of innovative treatment technologies to explore business opportunities and markets for cleaning up waste sites. The information presented includes specific data on the number and types of contaminated sites in each state and nationwide, international markets, pertinent state regulations and contacts, and sources of technology development and commercialization funding and guidance. The conference attendees include vendors of innovative treatment technologies, entrepreneurs, private clean-up contractors, as well as federal and state officials responsible for remediation.

This conference is the second in a series of conferences exploring regional markets for remediating contaminated sites. The first conference, entitled Northeast Remediation Marketplace, was held December 7-8, 1993 in Hartford, CT, and the third for the West Coast Remediation Marketplace, is scheduled for November 15-16, 1994 in San Francisco, CA.

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Peter D. Robertson
Deputy Assistant Administrator, Office of Solid Waste and Emergency Response, U.S. EPA

Gordon M. Davidson
President, Capital Environmental

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Deputy Director, Utah Division of Environmental Quality

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Director, Technology Innovation Office, Office of Solid Waste and Emergency Response, U.S. EPA

Rear Admiral Richard Gulmond
Principal Deputy Assistant Secretary, Environmental Management, Department of Energy

Colonel Jim Owendoff
Office of Deputy Undersecretary of Defense, Environmental Security

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Moderator: Linda Fiedler, Technology Innovation Office, Office of Solid Waste and Emergency Response, U.S. EPA

U. S. Export Strategy
Jeffrey Hunker
Senior Policy Advisor to the Secretary, U.S. Department of Commerce

Colorado International Trade Program
Morgan Smith
Director, Colorado International Trade Office

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September 28, 1994

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Director, Technology Innovation Office, Office of Solid Waste and Emergency Response, U.S. EPA

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Small Business Assistance Programs — **James Hudson, Ph.D.**
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President, Colorado Venture Management, Inc.

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Moderator: ***David C. Shelton,*** *Executive Director, Colorado Center for Environmental Management*

National Environmental Technology Initiative — **Jonathan Herrmann**
Senior Technical Advisor/Assistant to Director, Risk Reduction Engineering Laboratory, U.S. EPA

Committee to Develop On-site Innovative Technologies — **James Souby**
Executive Director, Western Governors' Association

Colorado Environmental Business Alliance — **James "Skip" Spensley, Esq.**
Co-Chairman, Colorado Environmental Business Alliance

New Mexico Environmental Alliance — **Marsha Oldakowski**
New Mexico Economic Development Department

Session 6: Cleanup Opportunities at Federal Facilities
Moderator: ***Diane Lynne,*** *Attorney, Federal Facilities Enforcement Office, U.S. EPA*

Cleanup Opportunities at Rocky Flats, Colorado — **Leanne Smith**
Deputy Manager, DOE Rocky Flats Field Office

Idaho National Engineering Laboratory, Idaho — **Dirk Gombert, Ph.D.**
Technical Program Manager, Westinghouse Idaho Nuclear Company (WINCO)

Los Alamos National Laboratory, New Mexico — **Tracy G. Glatzmaier**
Project Leader, Environmental Management Programs Office, Los Alamos National Laboratory

Sandia National Laboratory, New Mexico — **Thomas E. Blejwas, Ph.D.**
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Closing Remarks

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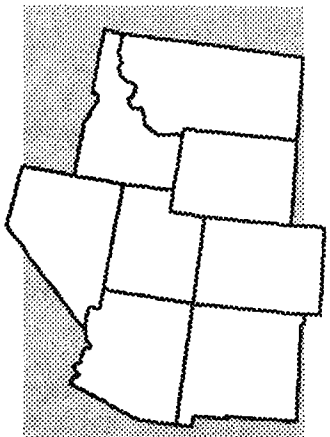


Plenary Session: Perspectives on New Technology Opportunities

Keynote Addresses

Peter D. Robertson
Deputy Assistant Administrator, Office of Solid Waste and Emergency Response
U.S. Environmental Protection Agency

The successful future of the U.S. EPA's cleanup programs will be heavily dependent upon the development and use of innovative regulatory and technological approaches. EPA's commitment to cleaning up contaminated sites must be combined with an aggressive search for technologies that are more cost-effective, help us reach an endpoint faster, are acceptable to the public, and provide answers where today there are no clear technical solutions. The goal of more cost-effective, improved environmental protection can only strengthen U.S. businesses as they expand into global environmental markets.

Some important changes have been made or are underway at EPA that are meant to speed up and reduce the cost with which innovative environmental technologies are introduced and accepted in the marketplace. The goals of the new Environmental Technology Initiative are: to support technology commercialization; break down regulatory barriers to technology development and use; provide third party evaluations of the performance and cost of innovative technologies; and, diffuse commercial innovative technologies here and abroad. Other recent Agency actions have made it easier to test technologies on hazardous waste, and to use innovative technologies to meet restrictions on land disposal of hazardous waste. The EPA also has promulgated a permanent exemption of underground storage tank petroleum-contaminated media and debris from designation as RCRA hazardous waste.

Lastly, two bills being considered by Congress will give the Agency new tools to use to promote environmental technology. Under the new Superfund bill, the government would share with private parties the risk of employing innovative technology to cleanup sites. And the National Environmental Technology act is designed to better focus federal government efforts to promote environmental technology.

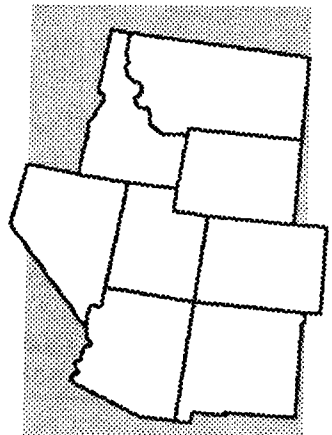
Technology Innovation in the Environmental Marketplace: Fears Innovation/Repels Capital - Does It or Doesn't It?

Gordon M. Davidson
President
Capital Environmental

Although federal and state governments are making a concerted effort to support the development of environmental technologies, the public and private financing markets are still hesitant to wade in with infusions of capital. The downturn in the marketplace generally and the drop in stock price of key innovative technology stocks specifically, has left the financial community feeling that, in spite of government policy and funding, the environmental marketplace seems to fear innovation and repel capital.

The question is, why is this view held and how valid is it? What are the reasons for this view and what impact is it having on the development of innovative technologies?

This talk will address these and similar questions, including covering the factors that are current barriers to entry into the environmental market. It will also cover the factors that the financial community assesses in determining whether or not to invest in a business or technology. Finally, it will address some of the actions being taken by the government and private industry that are key to invigorating the environmental technology market.



Session 1: State Markets and Regulations

Colorado Markets and Regulations

Thomas Looby
Director
Colorado Office of Environment

Abstract not available at this printing.

Cleanup Needs and Opportunities in the State of Idaho

Lance Nielsen
Remediation Bureau Chief
Idaho Division of Environmental Quality

Introduction: Major sources of contamination in the state of Idaho include: leaking underground and aboveground petroleum storage tanks (PSTs), active and inactive mining sites, the Idaho National Engineering Laboratory (INEL) and solvents from past industrial/commercial activities. Contaminated groundwater is of paramount concern to Idahoans because groundwater is the predominant water source for most of the drinking water systems.

Background: The Idaho Division of Environmental Quality (DEQ) is a decentralized organization with six regional offices located throughout the state. Most of the investigations and cleanups of contaminated sites are overseen and administered by the regional offices. Persons who own or are considering purchase of a contaminated site, which may need cleanup, should contact the Regional Administrator and negotiate an agreement to proceed with investigation and cleanup of the site. DEQ is committed to the protection of Idahoans and our environment. DEQ will work with you to ensure a timely investigation, and where appropriate, cleanup of the site.

Policy: DEQ does not refer citizens to specific consultants. Idaho requires certification of petroleum underground storage tank installers/retrofitters, tank decommission, and tank testers. A roster of certified technicians is made available to tank owners upon request.

- Approaches to Cleanup -

General Information: Idaho is relatively under-industrialized. As a result, we do not suffer from the variety and magnitude of contamination problems experienced by many states.

Petroleum Contamination: Over 700 petroleum contaminated sites have been cleaned up in Idaho. DEQ staff have streamlined permitting requirements, standardized reporting formats and will soon publish a "Contractor's Handbook" to clearly articulate Idaho's requirements for the investigation and cleanup of petroleum contaminants.

Mining Sites: Over 5,000 inactive and abandoned mining sites exist in Idaho. Many of these sites contain significant sources of sulfide ores which generate acid mine drainage. Heavy metal contamination exists at many of the mine sites, and in the tributaries downstream of the mines.

Cleanup Needs and Opportunities in the State of Idaho, cont'd.

Voluntary Cleanups: Idaho is experiencing steady growth. New industry is relocating to Idaho at a steady pace. Growth in population and industry has spawned a need to transfer property and to re-develop former commercial sites for new industry. In many cases, the property identified for commercial or residential (re)development has some contamination present. Usually, the contamination must be assessed and remediated before the property can be sold and/or developed. The Idaho voluntary cleanup program draws on existing statutes and cleanup standards and allows for timely investigation and cleanup of the property so economic development can occur. Voluntary cleanups represent the largest opportunity for the marketing of remediation in Idaho.

- Summary -

Idaho DEQ welcomes and encourages the investigation and cleanup of sites within our state. We are open to the use of innovative technologies, and focus on the performance standards rather than the proposed technology.

Driving the Cleanup Market in New Mexico

David Coss
Director, Environmental Protection Division
New Mexico Environment Department

Business opportunities for consulting firms and contractors involved in environmental assessment and restoration in New Mexico have never been better. The development of vigorous hazardous waste, Superfund, and water quality programs has fostered environmental awareness on the part of private industry. Recent emergence of state-funded or state-administered cleanup programs, particularly in the realm of underground storage tanks, has served to further enhance opportunity for the "environmental entrepreneur."

Regulations and the government programs that administer them are often thought of as make-work programs for environmental consultants. While this may be so, technology innovation spurred by agencies has become a major force in opening new markets for the imaginative and innovative firm. For example, New Mexico's Underground Storage Tank Bureau has actively solicited faster, better, and cheaper ways to assess and clean up leaking UST sites. Several emerging alternative (i.e., non-pump and treat) cleanup technologies, such as air sparging/soil venting, have been developed in New Mexico especially for UST sites in response to the agency's steadfast refusal to permit "tried-and-true," but demonstrably ineffective, cleanup systems. This in turn has encouraged small consulting firms to take the risks inherent in applied research and development. A proliferation of small local firms taking the lead in technology innovation has resulted in environmental benefits from well-conceived and effective cleanup systems.

Utah Markets and Regulations

Kent P. Gray
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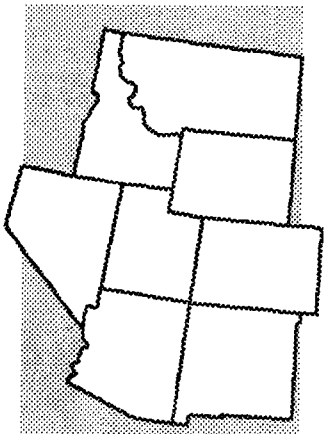

Session 2:
Federal Markets

Federal Markets

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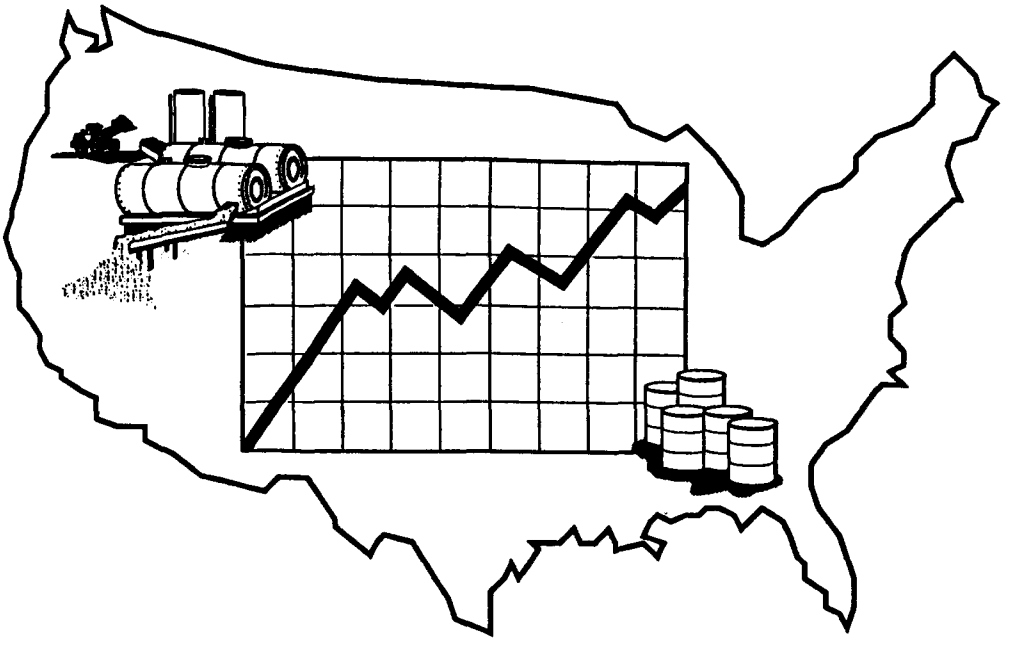
Speaker Slides/Overheads follow.



Market Study Overview **

- Assist developers/investors by characterizing future demand
- View remediation as an opportunity for new firms
- Focus on site characteristics rather than costs
- Use existing information plus an analysis of Superfund

Sites/Facilities to be Cleaned Up in the U.S. **

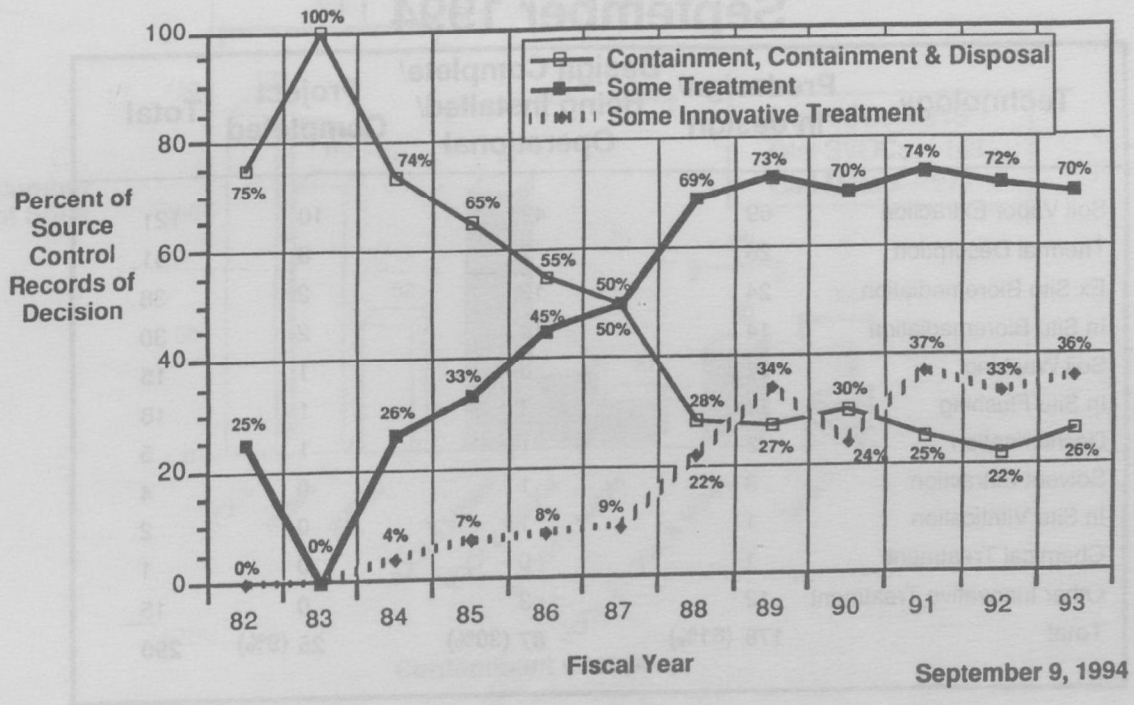
Program	Approximate Number
■ Superfund	1,500 - 2,100
■ RCRA Corrective Action	1,500 - 3,500
■ Underground Storage Tanks (USTs)	295,000
■ Dept. of Defense (DOD)	7,300 (at 1,800 installations)
■ Dept. of Energy (DOE)	4,000 (at 110 installations)
■ Other Federal Agencies	350
■ States	19,000*

** Sites needing some further investigation that might lead to cleanup*

Available Information for Market Analysis **

Cleanup Program	Site Identification	Site Characterization	Technology Analysis	Historical Selection Trends
Superfund	●	●	●	●
Dept. of Defense	●	●	●	
UST	●	●	●	
Dept. of Energy	●	●		
RCRA	●	●		
Other Federal Agencies	●			
States	●	○	○	

Treatment and Disposal Decisions for Source Control ††



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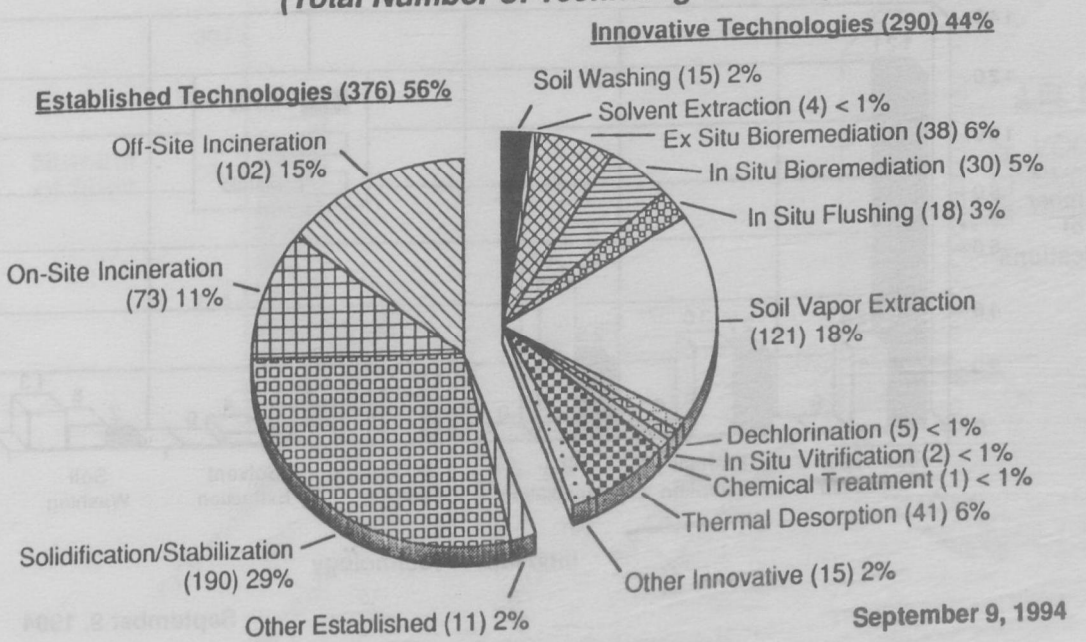
Superfund Remedial Actions: Summary of Alternative Treatment Technologies Through Fiscal Year 1993 ††

(Total Number of Technologies = 666)



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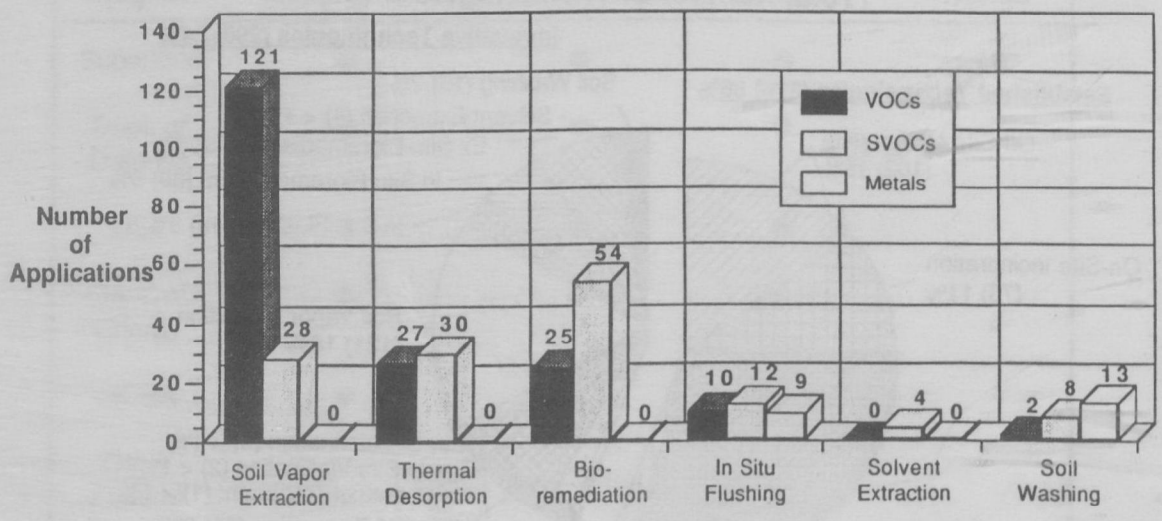
Project Status of Innovative Treatment Technologies at NPL Sites as of September 1994 ††

Technology	Predesign/ In design	Design Complete/ Being Installed/ Operational	Project Completed	Total
Soil Vapor Extraction	69	42	10	121
Thermal Desorption	26	7	8	41
Ex Situ Bioremediation	24	12	2	38
In Situ Bioremediation	14	14	2	30
Soil Washing	11	3	1	15
In Situ Flushing	14	3	1	18
Dechlorination	3	1	1	5
Solvent Extraction	3	1	0	4
In Situ Vitrification	1	1	0	2
Chemical Treatment	1	0	0	1
Other Innovative Treatment	12	3	0	15
Total	**178 (61%)**	**87 (30%)**	**25 (9%)**	**290**

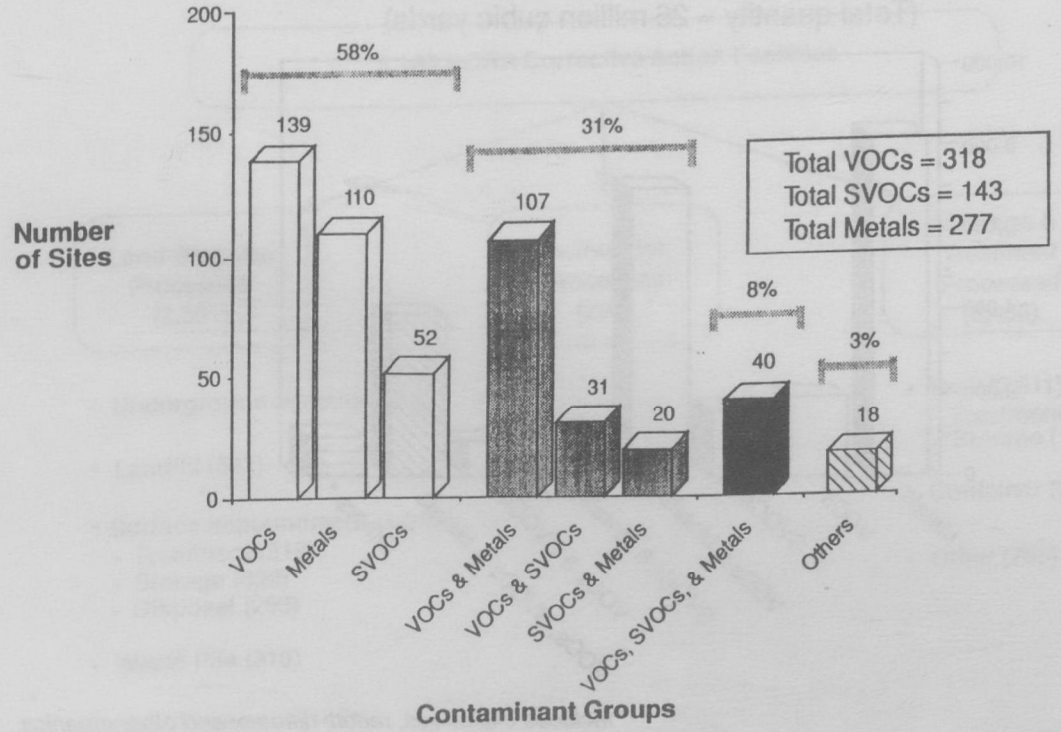
September 9, 1994

Superfund Remedial Actions: Application of Innovative Treatment Technologies ††

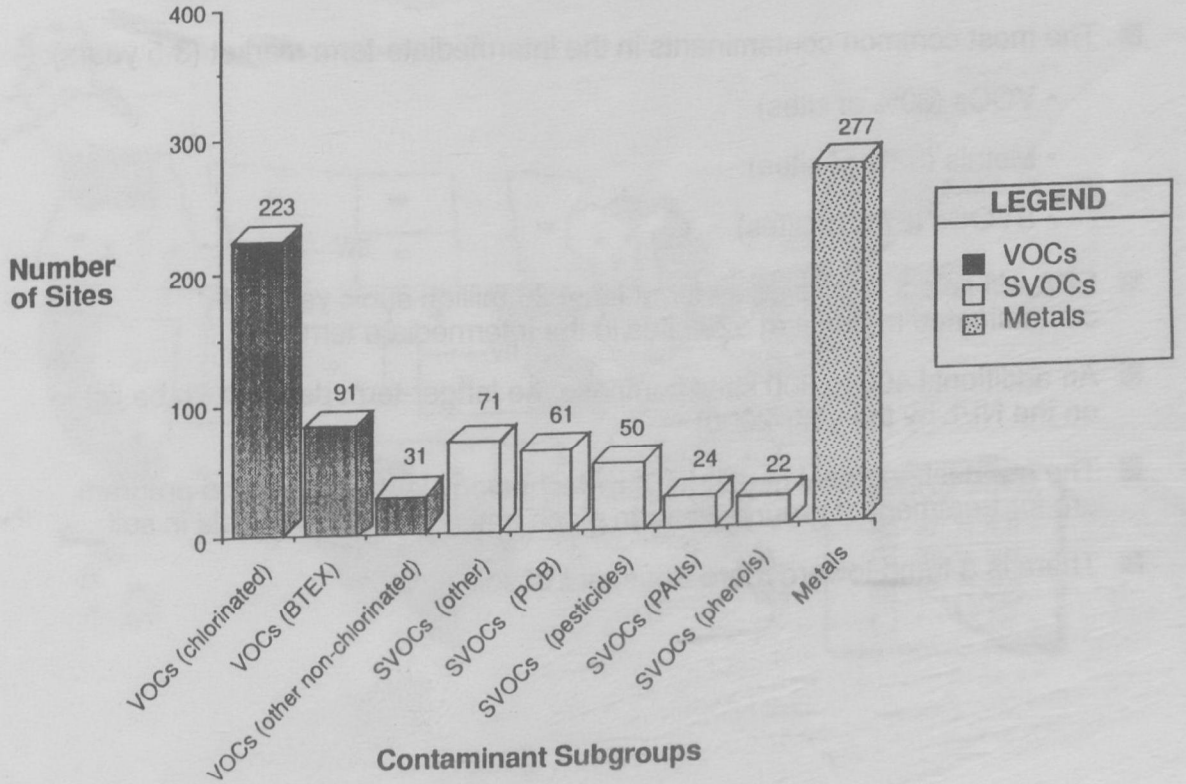


September 9, 1994

Frequency of Volatile Organic Compounds, Semi-volatile Organic Compounds, and Metals at NPL Sites Without RODs **

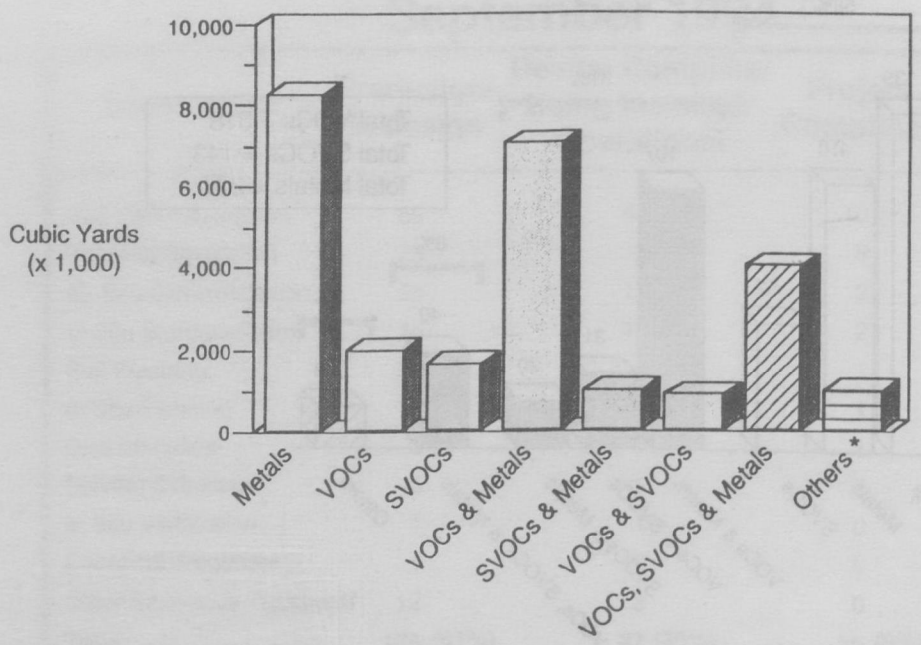


Frequency of Contaminant Subgroups Present in all Matrices at NPL Sites Without RODs **



Estimated Quantities of Contaminated Material **

Intermediate-Term Market
(Total quantity = 26 million cubic yards)

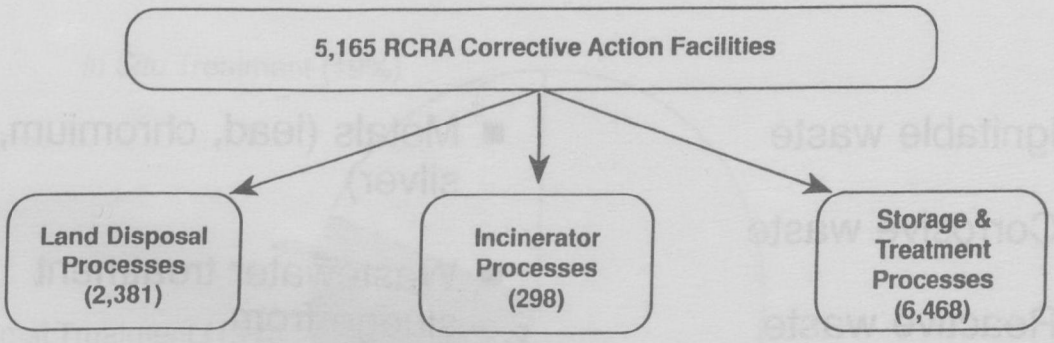


** Includes explosives, radon, nitrates, and other organics*

Findings for Future Superfund Markets **

- The most common contaminants in the intermediate-term market (3-5 years):
  - VOCs (60% of sites)
  - Metals (53% of sites)
  - SVOCs (27% of sites)
- EPA will select technologies for at least 26 million cubic yards of contaminated material at 523 sites in the intermediate term
- An additional 400 to 800 sites compose the longer-term demand (to be listed on the NPL by the year 2000)
- The greatest potential needs for new technology in the Superfund program are for treatment of ground water in place and treatment of metals in soil
- There is a trend toward more treatment of soil in place

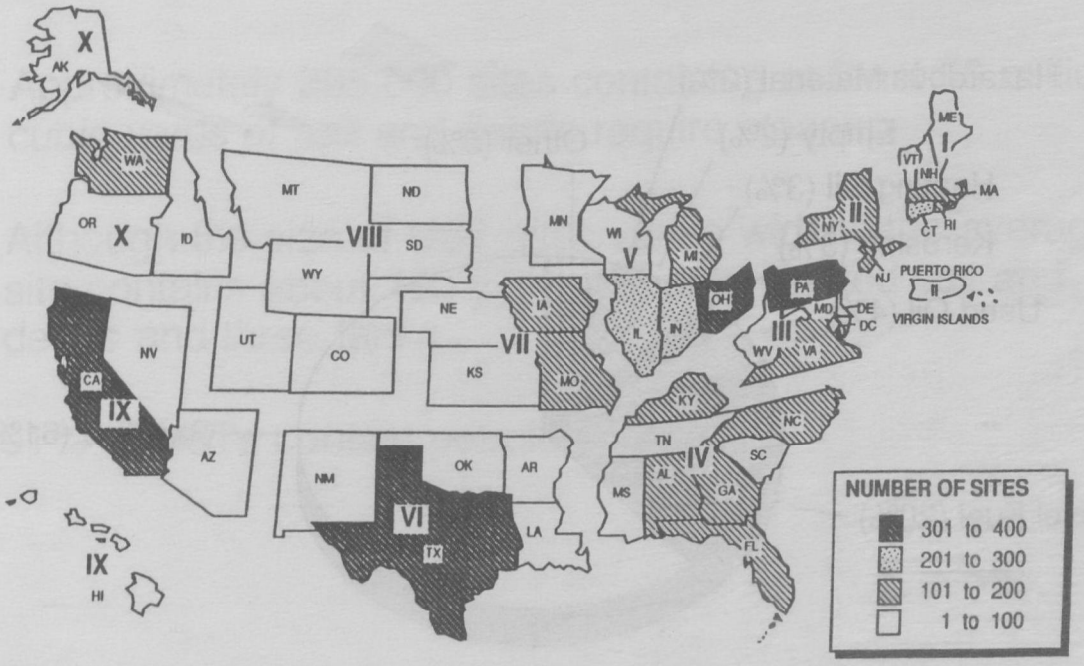
RCRA TSD Processes **



- Underground Injection (88)
- Landfill (531)
- Surface Impoundment (1,307)
  - Treatment (319)
  - Storage (689)
  - Disposal (299)
- Waste Pile (310)
- Land Treatment (145)

- Tank (2,611)
  - Treatment (783)
  - Storage (1,828)
- Container (3,152)
- Other (705)

Location of RCRA Treatment, Storage, and Disposal Facilities **

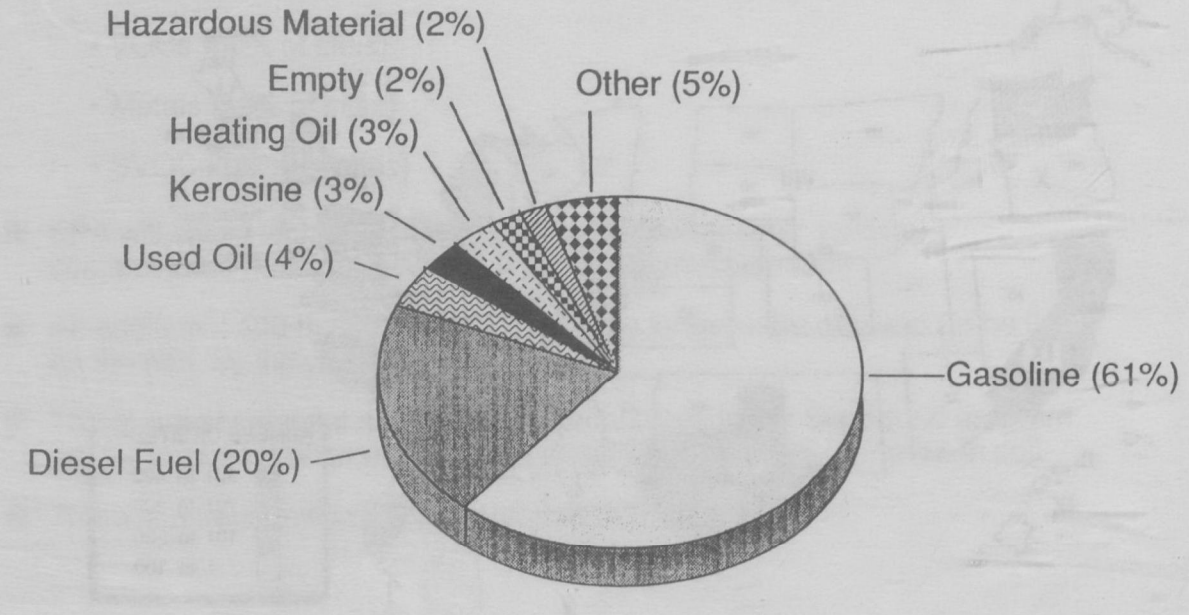


Commonly Managed Wastes in RCRA SWMUs in 1986 **

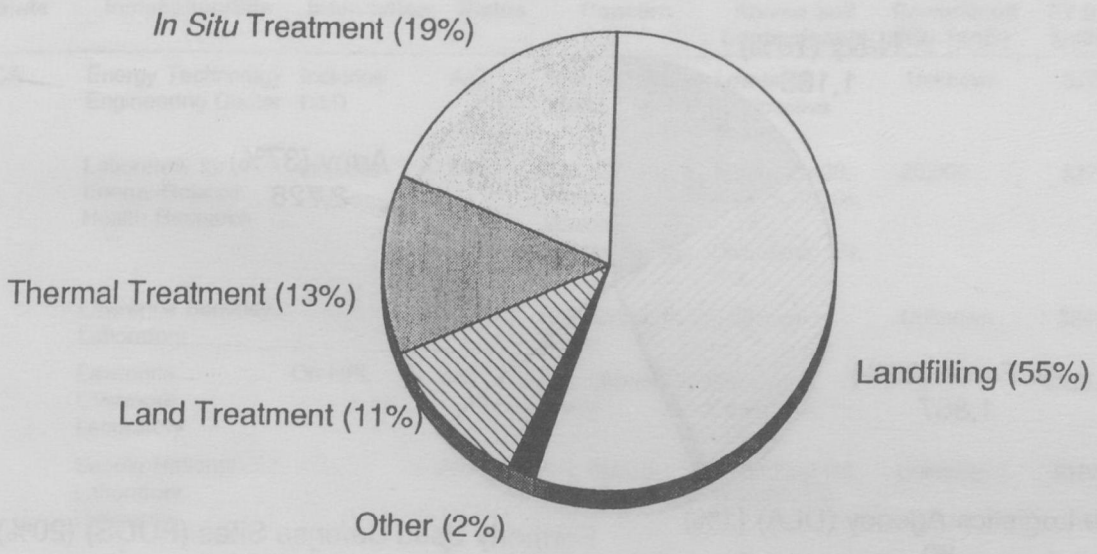
- Ignitable waste
- Corrosive waste
- Reactive waste
- Waste oil
- Spent halogenated/ nonhalogenated solvents
- Metals (lead, chromium, silver)
- Wastewater treatment sludge from electroplating
- Oil-water separator sludge from petroleum refining

SWMU = Solid Waste Management Unit

Contents of Federally Regulated Tanks **



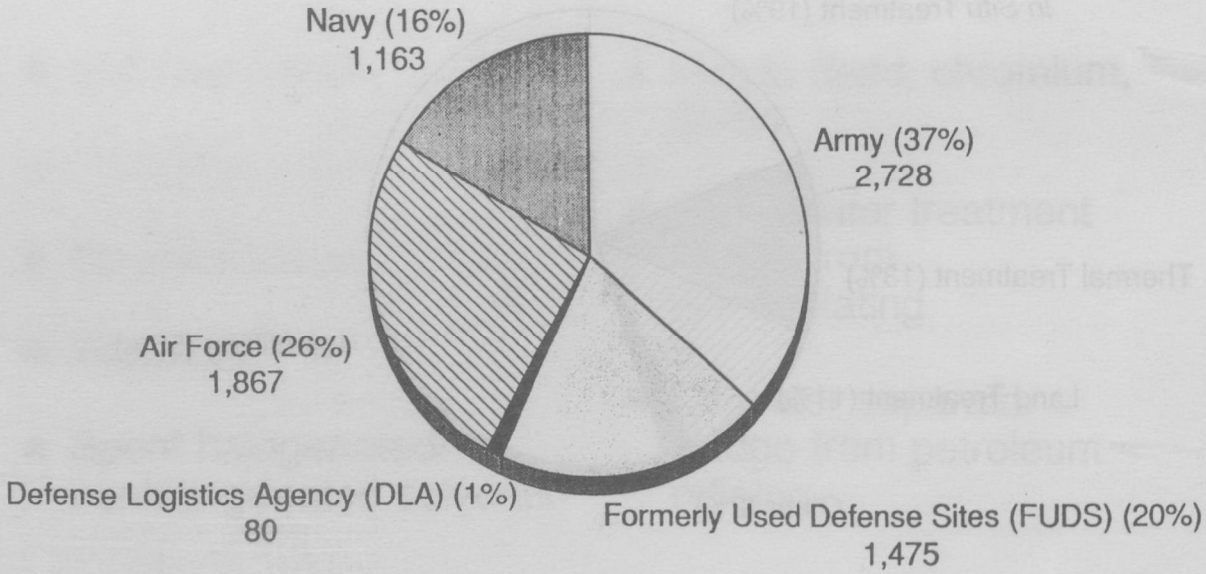
Cleanup of Petroleum-Contaminated Soils**



Cleanup Required at UST Sites**

- Approximately 295,000 sites containing at least 56 million cubic yards of soil and debris require cleanup
- Although the size of UST sites varies widely, the average site contains about 190 yards of contaminated soil and debris and three tanks
- 91% of USTs contain petroleum products

Number of DOD Sites to be Cleaned Up**



Top Four Contaminant Groups at DOD Sites**

- Petroleum, oil, lubricants, or sludge are found at 42% of Navy sites, 36% of Air Force sites, and 31% of Army sites
- Heavy metals are found at 25% of Army sites, 11% of Navy sites, and 2% of Air Force sites
- Solvents are found at 22% of Navy sites, 14% of Army sites, and 11 % of Air Force sites
- Pesticides are found at 7% of Army sites, 7% of Navy sites, and 2% of Air Force sites

DOD has not identified all contaminants at about half of the sites

Examples of DOE Installations To Be Cleaned Up **

State	Installation/Site	Program Information	Status	Matrices of Concern	Examples of Known Soil Contaminants	Est. Soil Vol. To Be Remediated (Cu.Yards)	Est. Cost FY 94-98 $millions
CA	Energy Technology Engineering Center	Includes D&D	A/C	Soil, Ground Water	Low-level Radioactive Waste	Unknown	$25.7
	Laboratory for Energy-Related Health Research	Includes D&D	A/C	Soil, Ground, Water, Masonry, Metals, Sludge	Nitrate, Sr-90, Ra-226, VOCs, C-14 Chlordane, Cr, H-3	20,000	$27.5
	Lawrence Berkeley Laboratory		A/C	Soil, Ground Water	Unknown	Unknown	$24.2
	Lawrence Livermore Laboratory	On NPL	A/C	Soil, Ground Water	Gasoline, Explosives, VOCs		$353.9
	Sandia National Laboratory - Livermore		A/C	Soil, Buried Material	Diesel Fuel Oil, Benzene, Pb	Unknown	$18.5
	.	.	.	.	.	.	.
	.	.	.	.	.	.	.
	.	.	.	.	.	.	.

A/C = Assessment and characterization activities in progress
D&D = Decontamination and decommissioning

Number of Federal Agency Sites Needing Cleanup **

Agency	Total Sites Evaluated	Sites Needing Cleanup
Department of Agriculture	91	73
Central Intelligence Agency	1	0
Department of Commerce	9	2
Environmental Protection Agency	15	5
General Services Administration	18	3
Health and Human Services	5	1
Department of the Interior	337	168
Department of Justice	9	7
National Aeronautics and Space Admin.	12	10
Postal Service	5	0
Small Business Administration	1	0
Tennessee Valley Authority	17	3
Department of Transportation	101	74
Department of the Treasury	2	0
Veterans Administration	11	3
Total	**634**	**349**

State Hazardous Waste Cleanup Programs **

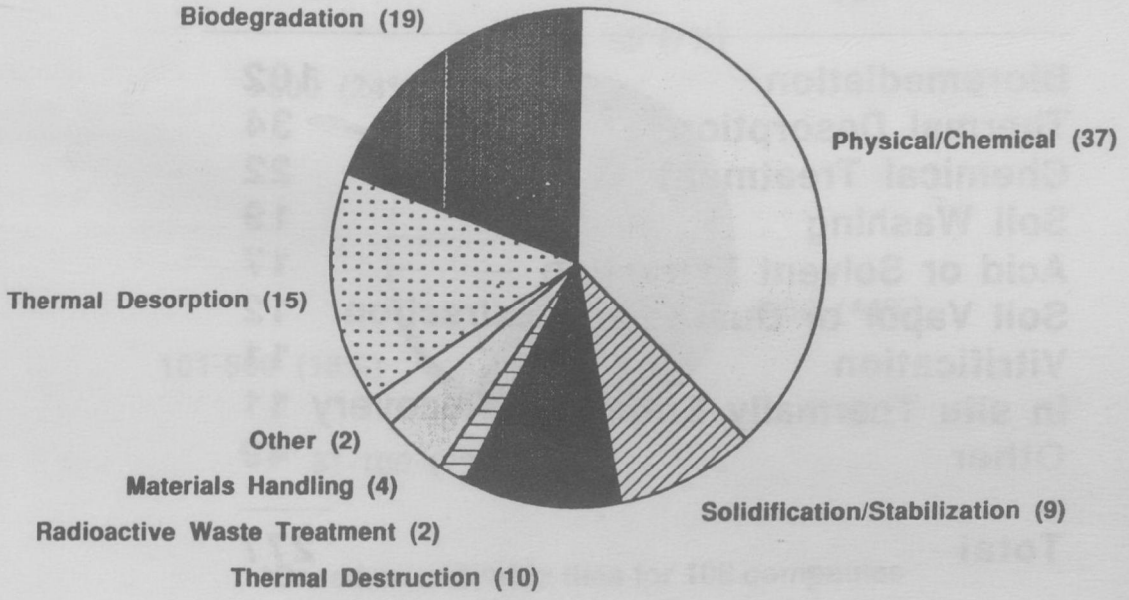
- Of 69,000 sites identified, 19,000 will need some level of action*
- States with the most sites are: Michigan (2,844), Massachusetts (2,224), and Pennsylvania (1,067)
- State trust fund balances totaled $2.2 billion at the end of 1991
- States with the largest totals were New York ($977 million), New Jersey ($410 million), and Michigan ($398 million)

Action may range from further investigation to cleanup. Many will not require remedial action.

Superfund Innovative Technology Evaluation (SITE) Program

- Demonstration Program, in its 9th year, tests technologies almost ready for commercialization
- Pilot and full scale demonstrations conducted at contaminated sites
- Emerging Technologies Program, in its 7th year, funds evaluation of bench and early pilot scale technologies in the laboratory and field
- EPA provides up to $150K/year for up to two years

SITE Demonstration Program Technologies
(Total = 98)



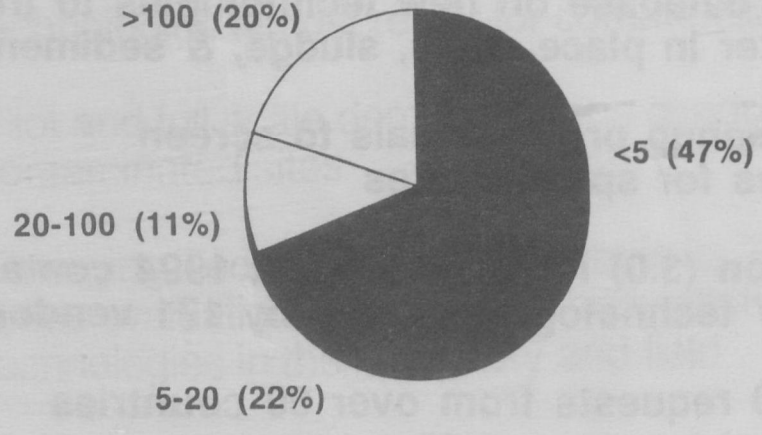
Vendor Information System for Innovative Treatment Technologies (VISITT)

- Automated database on new technologies to treat ground water in place, soils, sludge, & sediments
- Used by cleanup professionals to screen technologies for specific sites
- Third version (3.0) released August 1994 contains data on 277 technologies offered by 171 vendors
- Over 10,000 requests from over 60 countries
- Fax orders to (513) 891-6685

SUMMARY OF VISITT 3.0 TECHNOLOGIES

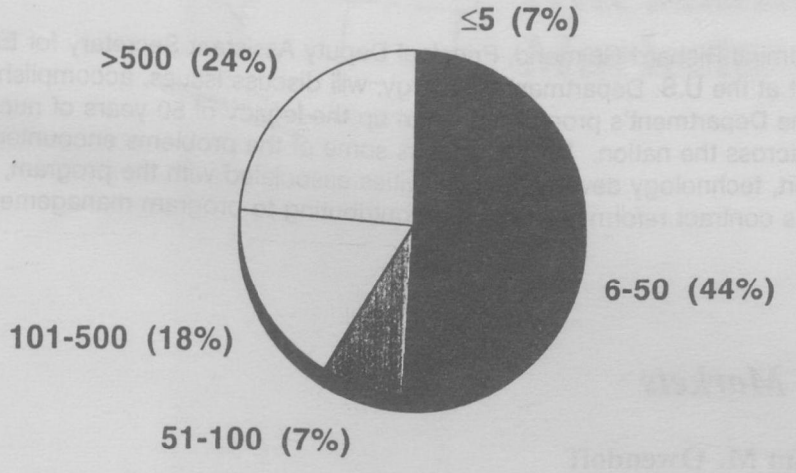
Technology	Frequency
Bioremediation	102
Thermal Desorption	34
Chemical Treatment	22
Soil Washing	19
Acid or Solvent Extraction	17
Soil Vapor or Dual-Phase Extraction	12
Vitrification	11
In situ Thermally Enhanced Recovery	11
Other	49
Total	277

Vendor Sales Data for Innovative Technology Vendors (1993)*



*Based on available data for 107 companies
Sales are in millions of dollars

Vendor Size by Number of Employees for Innovative Technology Developers (1993)*



*Based on available data for 108 companies

** U.S. EPA, Technology Innovation Office, *Cleaning Up the Nation's Waste Sites: Markets and Technology Trends*, PB93-140762, April 1993. Available from the National Technical Information Service (NTIS) at 703-487-4600.

†† U.S. EPA, Technology Innovation Office, *Innovative Treatment Technologies: Annual Status Report* (Sixth Edition) at printer, EPA-542-R-94-005, September 1994. Available in November 1994 from EPA at 703-308-8800.

Federal Markets

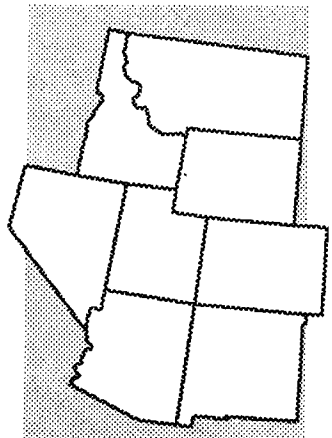
Rear Admiral Richard Guimond
Principal Deputy Assistant Secretary, Environmental Management
Department of Energy

Rear Admiral Richard Guimond, Principal Deputy Assistant Secretary for Environmental Management at the U.S. Department of Energy, will discuss issues, accomplishments and plans relating to the Department's program to clean up the legacy of 50 years of nuclear weapons production across the nation. He will discuss some of the problems encountered in the massive cleanup effort, technology development activities associated with the program, and how the Department's contract reform activities are contributing to program management and execution.

Federal Markets

Colonel Jim M. Owendoff
Office of Deputy Undersecretary of Defense
Environmental Security

Abstract not available at this printing.



Session 3: International Markets

U.S. Export Strategy

Jeffrey Hunker
Senior Policy Advisor to the Secretary
U.S. Department of Commerce

Abstract not available at this printing.

Colorado International Trade Program

Morgan Smith
Director
Colorado International Trade Office

The Colorado International Trade Office was established by the Colorado General Assembly in 1983 with two goals - to attract to Colorado the kind of foreign investment that will create jobs here and to promote the export of Colorado goods and services. Our main office is in Denver and we also have representatives in Japan, Korea, and the United Kingdom. In addition, we are in the process of opening an office in Guadalajara, Mexico.

Our principal focus is on export promotion and we do this in a variety of ways including: counseling individual companies; preparing market research; helping organize trade-related conferences, seminars and educational programs; and, attracting buying missions to Colorado. In addition, we participate in 15-20 trade shows around the world each year and organize numerous Colorado trade missions.

The environmental industry has been one of our target industries. Although we have taken Colorado environmental delegations to at least a dozen countries, our major focus for the last two years has been Mexico. Our effort there has been twofold: to help individual companies find agents, distributors and other forms of business partners, and; to promote Colorado more generally as a center for environmental research, technology and services.

I want to focus on the latter because I think it is a critical but often overlooked element of the export process.

The United States has been struggling with environmental issues for at least twenty five years. To a degree, it has been a trial and error process and we've made both many mistakes and much progress. The result, however, is an enormous reservoir of experience that could be made available to countries like Mexico that are in the early stages of environmental remediation and that are seeking to avoid our time consuming mistakes.

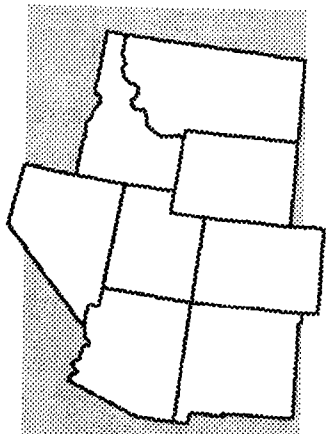
Our plan, therefore, has been to identify those environmental areas where Colorado is a leader, to initiate a series of interchanges of scientific personnel and to make available to Mexico's environmental leaders the many years of experience available here.

Colorado International Trade Program, cont'd.

We initially chose the field of air pollution because Mexico City and Denver have very common geographic characteristics - high altitude, mountains that tend to trap the air pollution, and winter inversions. We formed the Colorado - Mexico City Air Quality Initiative and acted as a liaison for a number of exchanges of scientific personnel, some for as short as three days, others involving lengthy processes of consultation.

In mid June 1993, we entered into an Environmental Cooperation Agreement with Mexico City's environmental office and in June 1994 we formed a similar agreement with CONCAMIN, a confederation of industrial chambers of commerce with about 360,000 member companies. We're now discussing similar agreements with officials in Ciudad Juarez, Mexico; Santiago, Chile; and Quito, Ecuador.

Our belief is that forming these types of partnerships and making available our many years of experience can help other countries dramatically accelerate their processes of environmental remediation. In addition, it will help us build Colorado's reputation as a center for environmental remediation and develop the kinds of personal relationships that will eventually give Colorado companies a unique entry into those new environmental markets.



Session 4:
Business Planning

Small Business Loans for Environmental Technology Companies

David Leavitt-Augustine
Assistant Regional Administrator for Economic Development
U.S. Small Business Administration

The Small Business Administration is the federal government's primary source of financial and technical assistance to small business. In Region VIII alone the agency has a current loan portfolio of $1.6 billion; this strong level of entrepreneurism is growing $60 million per month.

Traditionally, bank and non-bank loan guarantees for environmental technology, pollution prevention processes, energy conservation, and other sustainable development investments have not been seriously considered as part of the overall loan package. Today, however, it is apparent that the return-on-investment, and payback periods for environmental investments are equivalent or superior to traditional working capital and asset investments like inventory, labor, buildings, machinery, etc. Also, the efficiency of traditional assets can be improved dramatically by a simple retrofit or relatively inexpensive substitute (solvents, motors, etc.). This efficiency can improve profits,.not adversely impact them as is commonly assumed by the financial community.

Also, SBA must recognize that education which only includes time-honored business skills like accounting, marketing, finance, etc. often fails to acknowledge the importance of responding to both a business and planetary need for long term survival. Indeed, Region VIII SBA is teaming with the USDOE to include the environment and energy as part of the traditional business curricula, not some idea or concept peripheral to business culture.

Small Business Assistance Programs

James Hudson, Ph.D.
Director
Lakewood, Colorado Small Business Development Center

The purpose of this talk will be to summarize a number of general business and technology-oriented resources that are currently available to assist Colorado-based companies.

Attracting Financial Backing

Peter Bloomer
President
Colorado Venture Management, Inc.

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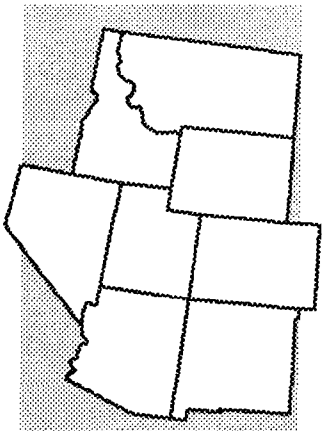

Session 5: Public/Private Partnerships & Industry Alliances

EPA's Environmental Technology Initiative: The Role of the Private Sector

Jonathan Herrmann
Senior Technical Advisor/Assistant to the Director
U.S. Environmental Protection Agency

In February of 1993, President Clinton outlined his Environmental Technology Initiative (ETI) during his State of the Union address. The goals of ETI are to spur the development and use of innovative environmental technologies to protect the environment, and enhance the competitiveness of the United States environmental technology industry. In February of 1994, Administrator Browner announced EPA's FY 1994 Program Plan in support of the President's ETI goals.

ETI was funded at $36 million in FY 1994 and a proposed $80 million in FY 1995. EPA's Innovative Technology Council (ITC) coordinates ETI activities agency-wide. The Council is working closely with a broad network of interested parties including other federal agencies, the environmental technology industry, non-profit groups, universities, state and local governments, and others. "Environmental technologies" include technologies, goods, and services whose development is triggered primarily by environmental improvement objectives. These include: products and services to monitor and assess pollutant releases and exposure levels; innovative technologies which prevent pollution, control air and water pollution levels, safely manage waste and remediate contaminated soil and groundwater; and, manage environmental data.

EPA has just completed the process of soliciting FY 1995 project proposals. In this first solicitation, EPA sought environmental technology proposals from federal agencies, state governments (including state colleges that are departments of state agencies), and tribal governments (including Alaska Native Villages). The second solicitation will seek proposals from non-profit groups, universities, and their partners. The third solicitation will be aimed at Phase 3, Small Business Innovation Research (SBIR) projects. Candidate projects must have already completed Phases 1 and 2 of the SBIR process. There are opportunities for the private sector to be actively involved in ETI. This is true for the areas of gaps in, and barriers to, the diffusion of environmental technologies, and in the verification of environmental technologies at a number of verification entities that will be piloted in the next few years. Technology vendors and technology users are an integral part of ETI and the role they play, either direct or indirect, should not be underestimated.

Speaker slides/overheads follow.

EPA's ENVIRONMENTAL TECHNOLOGY INITATIVE

The Role of the Private Sector

Jonathan G. Herrmann, P.E., DEE
U. S. Environmental Protection Agency
Risk Reduction Engineering Laboratory

U.S. Environmental Protection Agency
Risk Reduction Engineering Laboratory
Cincinnati, Ohio

ETI

Presentation Outline

√ What is it?

√ How does it work?

√ Who are the players?

√ Where do I sign up?

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ENVIRONMENTAL TECHNOLOGY INITIATIVE (ETI)

President Clinton's 1993 Initiative to:

- **Accelerate Environmental Protection**
- **Strengthen America's Industrial Base**
- **Increase Exports of Technology**

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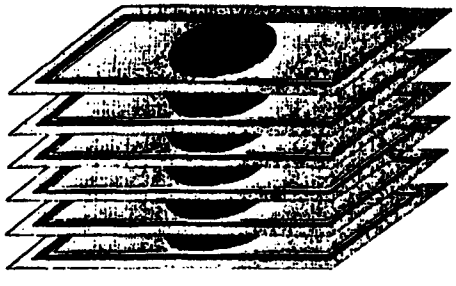
ETI



- **1994 - -$36 Million**
- **1995 - -$80 Million**
- **EPA plans to give about 50% away**

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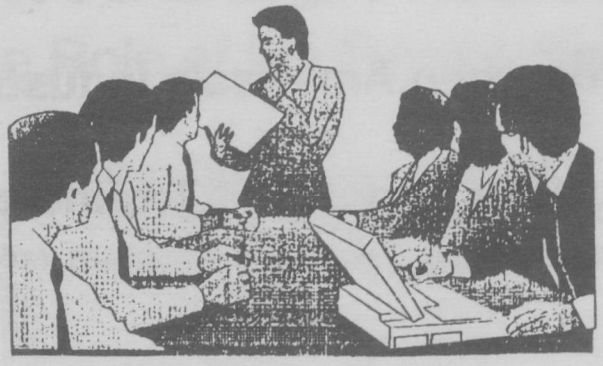
ETI

- **EPA administers ETI through the Innovative Technology Council (ITC)**



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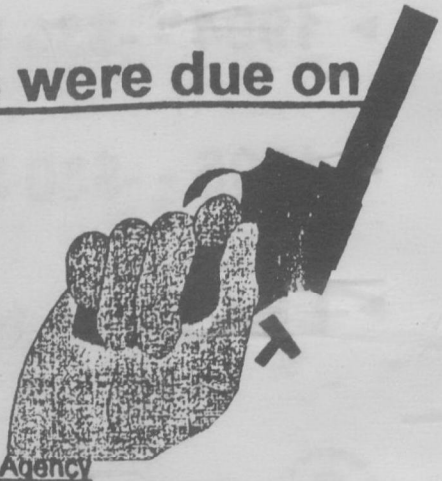
ETI

- **National solicitation was issued on July 8, 1994**

- **Seven-page proposals were due on September 21, 1994**



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ETI

EPA is targeting six areas

- **Policy Framework**
- **Innovation Capacity**
- **Environmental Technologies**
- **Pollution Prevention Technologies**
- **Domestic Diffusion**
- **International Diffusion**

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WHO MAY PROPOSE?

- **Federal Agencies**
- **State governments**
- **State Universities (*that are a department under the State government*)**
- **Tribal governments**

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NOT INCLUDED ARE:

- Municipalities
- Universities and Colleges
- Private Sector

However, all these can partner!!!

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ETI RULES

- One year funding only guarantee
- Range $50k to $2 Million, typical $300k
- ***Partnership a plus!!!!***

- ***Leverage funds!!!***

- Try for a 50% match

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ETI

- **Environmental Technologies**
  - **Monitoring systems**
  - **Municipal control technology**
    - Drinking water, recycling, wastewater, landfill methane control
  - **Industrial control technology**
    - Particulate, indoor air, NOx, Biomass, Air toxics, non-point sources
  - **Remediation technologies**
    - In-situ treatment, biotechnology

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POLLUTION PREVENTION TECHNOLOGIES

- **INDUSTRIAL SECTORS**
  - **Metals**
  - **Electronics**
  - **Dry cleaning**
  - **Printing**

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POLLUTION PREVENTION TECHNOLOGIES

- **UNIT OPERATIONS**
  - **Cleaning and degreasing**
  - **Coatings and solvents**
  - **Refrigerants**

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POLLUTION PREVENTION TECHNOLOGIES

- **FUNCTIONAL AREAS**
  - **Green chemistry**
  - **Process controls and feedback systems**
  - **Green buildings**

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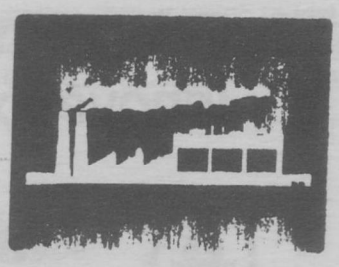
COMMON SENSE INITIATIVE

- Automobile assembly
- Electronics
- Iron and Steel
- Metal plating and finishing
- Petroleum refining
- Printing



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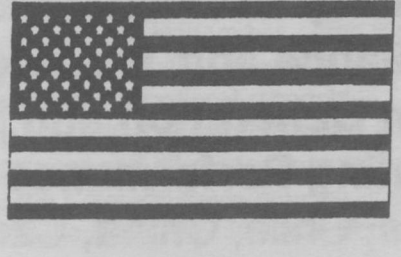
ENVIRONMENTAL TECHNOLOGY INNOVATION, COMMERCIALIZATION, AND ENHANCEMENT



(EnTICE)

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EnTICE

Focus Areas in FY95

- Verify Environmental Technologies
- Support Test Facilities
- Provide Business Planning and Technical Support
- Convene and Support Partnerships
- Overcome Non-Regulatory Barriers to Innovation

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INTERNATIONAL DIFFUSION (US TIES)

- **Int'l Regulatory Development**
- **Tech Assistance and Training**
- **Information Generation and Dissemination**
- **Demonstrating Performance**
  - Argentina, Chile, China, Czech Republic, Hong Kong, South Korea, Poland, or Tiawan

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Committee to Develop On-site Innovative Technologies

James Souby
Executive Director
Western Governors' Association

In December of 1992 a federal advisory committee was formed by western governors and the senior cabinet officials from DoD, DOE, Interior, and USEPA. The committee, called the Committee to Develop On-site Innovative Technologies (DOIT), is establishing a more cooperative approach to the development of technical solutions to environmental restoration and waste management problems shared by states, commercial entities, and the federal government. To obtain the views of a broad array of interests, the DOIT Committee created regional stakeholder working groups to develop new models/approaches to the development, testing, and commercialization of innovative remediation technologies. The Committee has also approved demonstration sites at which to test and evaluate these new approaches. The results or the demonstration of these new approaches will be reported to the Committee in 1996. It is anticipated that the results will lead to changes in state and federal policy to embrace the successful new approaches.

Colorado Environmental Business Alliance

James "Skip" Spensley, Esq.
Co-Chairman
Colorado Environmental Business Alliance

Colorado has something many other states yearn for - major environmental opportunities with national prominence and with the federal government engaged in their fate. These opportunities are the familiar former federal defense facilities like Rocky Flats and the Rocky Mountain Arsenal, which no longer serve a military mission and which have been viewed as liabilities, not assets. In the spirit of reinventing a government paradigm, Colorado now has the opportunity to turn these "lemons into lemonade" in the words of our Governor.

Recently, a group of business leaders has come together in Colorado to tackle these challenges by forming a cluster of environmental businesses dedicated to making Colorado the national center of environmental commerce with international recognition. Under the leadership of the Denver World Trade Center, the group co-chaired an effort to solicit environmental companies in Colorado to unite and consolidate our resources and efforts to promote Colorado in the international marketplace. From these beginnings, the Colorado Environmental Business Alliance (CEBA) was born with the support and assistance of the Denver World Trade Center and twenty other environmental businesses.

The New Mexico Environmental Alliance: An Environmental and Economic Partnership for Opportunity

Marsha Oldakowski
New Mexico Economic Development Department

New Mexico, the Land of Enchantment, is also a center of scientific activity with a growing mission - technology transfer. With support from Governor King and the state legislature, the state government is a catalyst in building partnerships among internationally recognized research laboratories and universities, and the private sector. The state promotes economic diversification while preserving its quality of life, with increasing focus on technology commercialization, maquila opportunities, and global markets.

Among the state's key industries, the environmental and manufacturing sectors are the focus of several important partnerships for New Mexico's future growth.

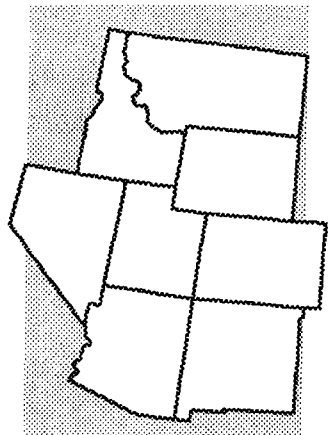
New Mexico Industry Network Corporation (NM-INC) - a recently created public/private partnership which coordinates strategic resources among 64 partner organizations for regional job creation, job redeployment, and job preservation.

New Mexico Manufacturing Extension Program (MEP) - Under NM-INC, MEP helps to increase the productivity and global competitiveness of regional manufacturing companies, facilitated by an upcoming information technology delivery system. Serving New Mexico and EL Paso, Texas, MEP is funded by DoC/NIST, the state of New Mexico, and partners of NM-INC.

New Mexico Environmental Alliance (NMEA) - NMEA is one of New Mexico's strategic alliances to help stimulate industry cluster development. The Alliance is an innovative partnership of industry, science and government working in a common forum to meet environmental and economic challenges. NMEA links resources needed to meet environmental/industrial needs:

- a single contract for environmental issues and assistance
- access to technical resources and facilities
- a working laboratory to test and demonstrate innovative technologies
- networking, partnership and commercialization opportunities
- shared costs and risks
- NMEA, as the environmental arm of NM-INC, adds benefit to industry as it integrates cost-effective environmental opportunities with NM-INC's ongoing industrial assistance and manufacturing services.

In October 1994, the New Mexico Environmental Alliance, with support from EPA Region 6 and the state of New Mexico, will launch a statewide Integrated Pollution Prevention Program. The program helps businesses to be responsive, cost-effective and competitive in global markets as they identify and implement pollution prevention strategies and technologies into their operations. NMEA's emphasis is on regional outreach to industry and communities, coordination of pollution prevention resources, and integration of ongoing efforts. Industry guidance and participation is critical. NMEA is already working with industry, NM-INC and other partners from state and regional agencies, research laboratories, universities, community colleges and service providers to ensure significant benefit to industry.



Session 6: Cleanup Opportunities at Federal Facilities

Cleanup Opportunities at Rocky Flats

Leanne Smith
Deputy Manager
Rocky Flats Environmental Field Office

The Rocky Flats Environmental Technology Site (formerly the Rocky Flats Nuclear Weapons Plant) is undergoing significant change - change that could signal significant opportunity.

With its weapons production mandate completed, the Site now looks to its present day mission to "manage waste and materials, clean up and convert the Rocky Flats site to beneficial use in a manner that is safe, environmentally and socially responsible, physically safe, and cost-effective."

The evolution of Rocky Flats includes changing the mission to environmental cleanup and economic development, opening up large portions of the site, communicating openly and honestly with stakeholders, restructuring the work force for the new mission, awarding work to the most cost-effective performers, measuring performance on tangible results, and placing high value on innovation. The Site wants to do work faster, better and more cost-effectively.

Contract reform plays a significant role at Rocky Flats. The Site is in the process of soliciting proposals for a Performance Based Integrating Contractor to replace the Maintenance and Operations Contractor system. No longer will a single, large contractor be responsible for the vast majority of work done at Rocky Flats. The Integrating Contractor will be expected to locate and contract with those companies that do certain tasks well. This could mean many opportunities for companies interested in doing cleanup work at Rocky Flats.

This summer, Rocky Flats hosted its Vendors Conference '94, which sought to solicit creative, innovative technologies and approaches to clean up Rocky Flats, invite and encourage participation in environmental commerce in Colorado, describe the new business environment at Rocky Flats, provide information on how to become involved, and facilitate the exchange of information among vendors regarding capabilities and opportunities for potential teaming. The technical areas in which proposals were sought during Vendors Conference '94 were environmental restoration, waste management, decontamination and decommissioning, computing services, telecommunication services, and economic development.

The Site is greatly interested in innovative ideas that link economic conversion with cleanup, as evidenced by the National Conversion Pilot Project now underway at Rocky Flats. The Site is committed to working alongside the state and with private companies to help make Colorado a model for environmental technology development in the United States.

Idaho National Engineering Laboratory, Idaho

Dirk Gombert, Ph.D.
Technical Program Manager
Westinghouse Idaho Nuclear Company

The Idaho National Engineering Laboratory (INEL) is committed to environmental restoration, and deletion from the National Priorities List by 2019. With a history of nuclear reactor research and fuel reprocessing dating back to just after World War II, we face many challenges to mitigate the risks to human health and the environment due to heavy metals, and solvents, as well as radioactive contamination. While the most significant risk-drivers are fission products (Cs^{137} and Co^{60}) in soils, and plutonium in buried wastes shipped from DOE's Rocky Flats facility, we must also evaluate treatments for many other materials in specific locations, including mercury, chromium, TCE, and carbon tetrachloride. Through an innovative multi-track system, we have made significant progress in a short time, gathering only the characterization data necessary to estimate risks - thereby allowing us to eliminate inconsequential sites, and focus resources on sites of true concern.

Removal actions have eliminated compelling risks at several sites, also providing data to evaluate technologies under controlled conditions. The DOE has chosen Lockheed Idaho Technologies Company to manage the INEL starting October 3, 1994, and significant emphasis will be placed on technology development and collaboration with industry to expedite our restoration schedule. Through a variety of technology transfer mechanisms, private industry can make use of federal facilities and technical support to improve, test, and potentially demonstrate their better ideas for environmental restoration. Available DOE facilities, including engineering and scientific support can be used at cost to develop new concepts. In addition, collaborative research and cost-shared contracts are examples of how private and government funding can be leveraged to bring technologies to market more rapidly. We welcome new ideas, and look forward to partnering with private enterprise to produce the next generation of remediation technologies.

Speaker slides/overheads follow.

Rocky Mountain Marketplace Business Opportunities for Innovative Technologies

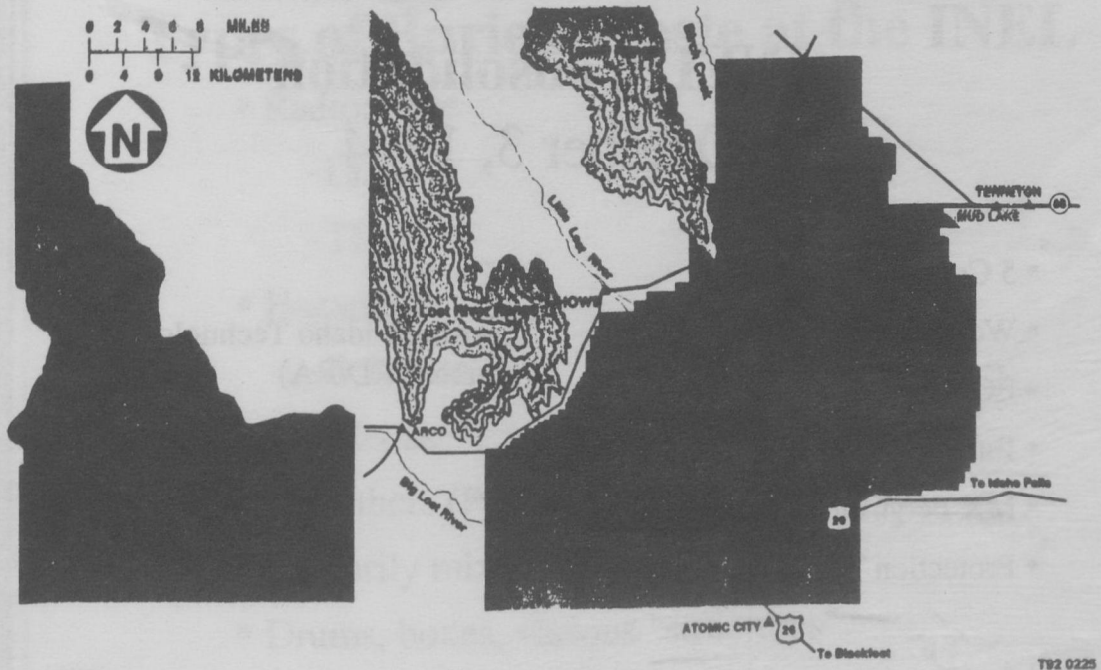
September 27-28, 1994

Dirk Gombert
Idaho National Engineering Laboratory

A94 0888

INEL
Idaho National Engineering Laboratory

Location of the INEL



Compliance History of INEL

- Consent Order Compliance Agreement (COCA), July 1987
- National Priorities List (NPL), November 1989
- Federal Facility Agreement/Consent Order (FFA/CO) December 1991
  - Agreement among State of Idaho, EPA Region 10 and DOE-ID

A94 0892

INEL

INEL Consolidation
October 3, 1994

- 5 Contracts
- Westinghouse Idaho Nuclear
- EG&G Idaho
- Babcock & Wilcox Idaho
- MK Ferguson of Idaho
- Protection Technology Idaho

1 Contract

Lockheed Idaho Technologies (Parsons RD/RA)

A94 0891

INEL

Amounts of Buried Waste at the INEL

- Low-level waste (1952-1992) - 5.1Mft^3
- TRU waste (1954-1970) - 2.2Mft^3
- "Stabilized" liquids (solvents) - 88K gal.
- Other? (Unknown)
- Interstitial soils - 12.6Mft^3
- Total waste in SDA - 20Mft^3

A94 0894

INEL

Types of Buried Waste at the INEL

- Radioactive
  - LLW
  - TRU
- Hazardous
  - Solvents
  - Metals
  - Others (PCB's, asbestos, unknowns)
- Primarily mixed wastes
- Drums, boxes, various "structures"

A94 0893

INEL

Contaminated Soils at the INEL:

- Estimated volume of contaminants soil - 2.5 x 10^5 m^3
- Mode of contamination:
  - Cooling water discharge
  - Process/piping leaks/spills
  - Stack plume deposition
  - Waste disposal in lined trenches
- Also 5 x 10^5 m^3 mixed soil and debris

A94 0195

Soil Contaminants at the INEL

- Radionuclides: Cs^{137}, Sr^{90}, Co^{60}, U, TRU
- Heavy metals: Cr, Pb, Hg, Cd
- Acids: HNO_3, H_2SO_4, HF
- Hydrocarbons - diesel, fuel oil
- Solvents - TCE, benzene
- PCB's

A94 0196

Soil Treatability Testing

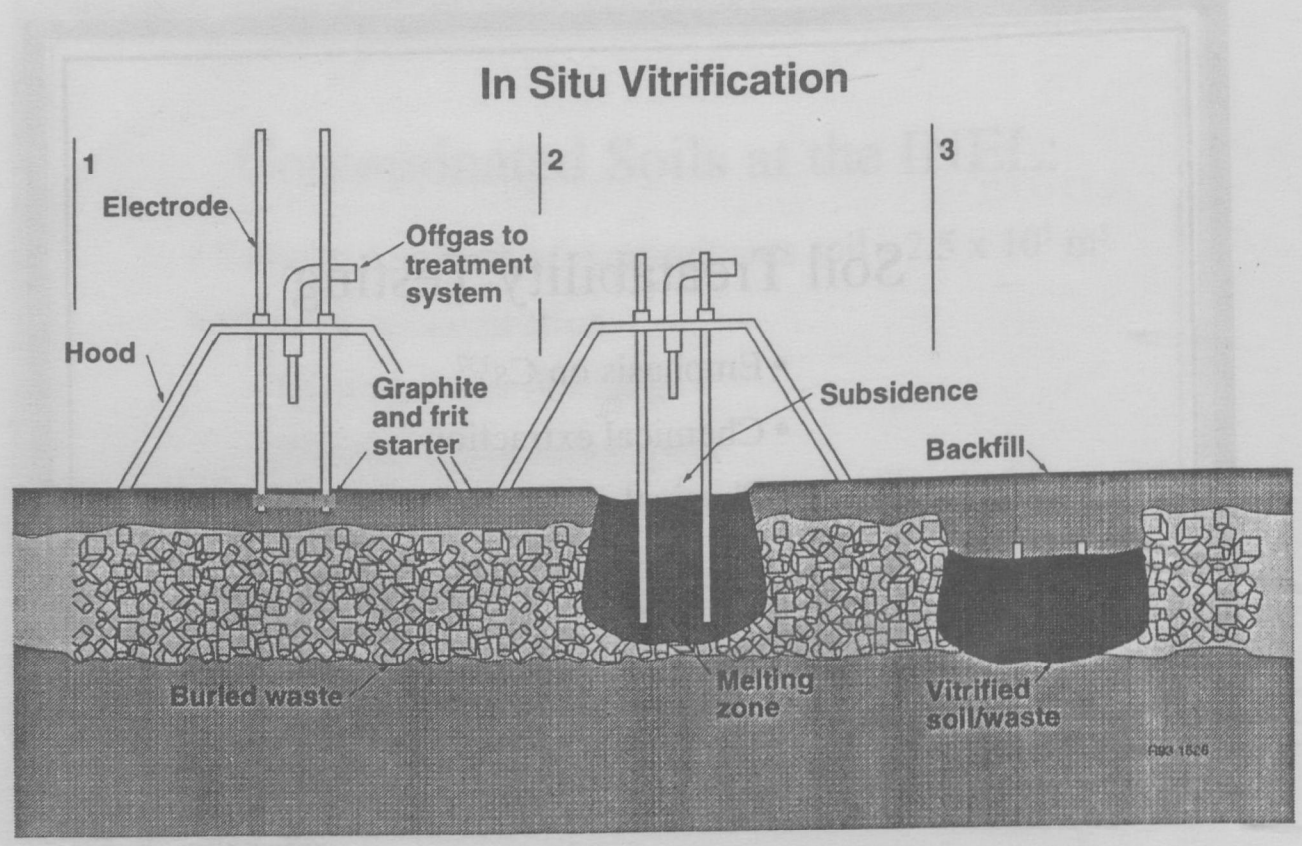
- Emphasis on Cs^{137}
- Chemical extraction
- Physical separation

A94 0198

Other Potential Treatments

- In-situ vitrification - soils, buried wastes
- Vapor vacuum extraction - solvents
- Plasma arc - buried waste (Pit 9)
- Pump-and-treat, ion-x, carbon - GW
- Thermal desorption - Hg, hydrocarbons

A94 0199

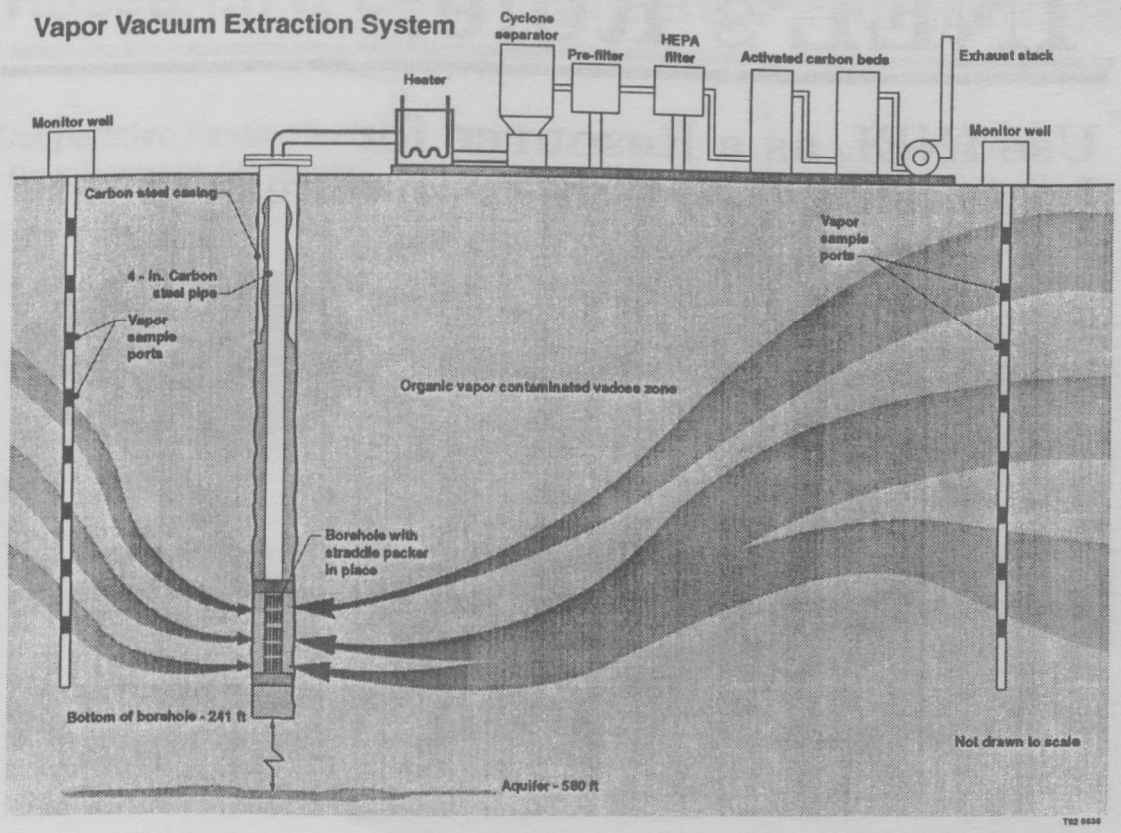


Status of In-Situ Vitrification at INEL

- Successful commercial demonstration required before it will be considered for use

A94 0193

INEL
Idaho National Engineering Laboratory



Vapor Vacuum Extraction

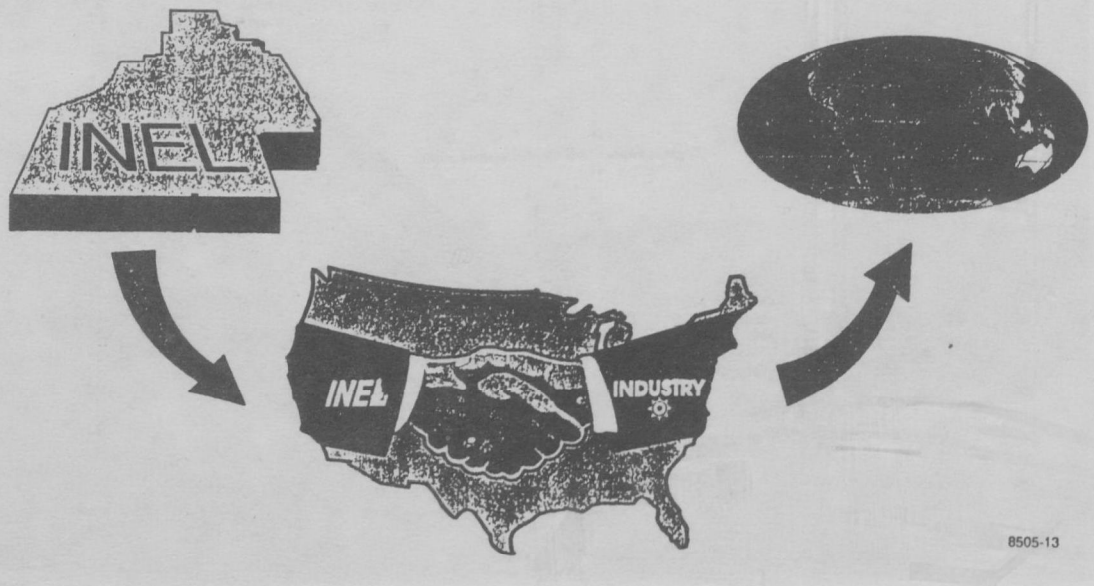
- Status at INEL
  - RI/FS for VOC's at Radioactive Waste Management Complex underway
  - Primary technology in proposed plan
  - Secondary treatment catalytic oxidation
  - Public comments - April, 1994
  - Record of Decision - September, 1994

A94 0190

INEL
Idaho National Engineering Laboratory

INEL's Role:

Use INEL as a Resource for Increasing U.S. Competitiveness



8505-13

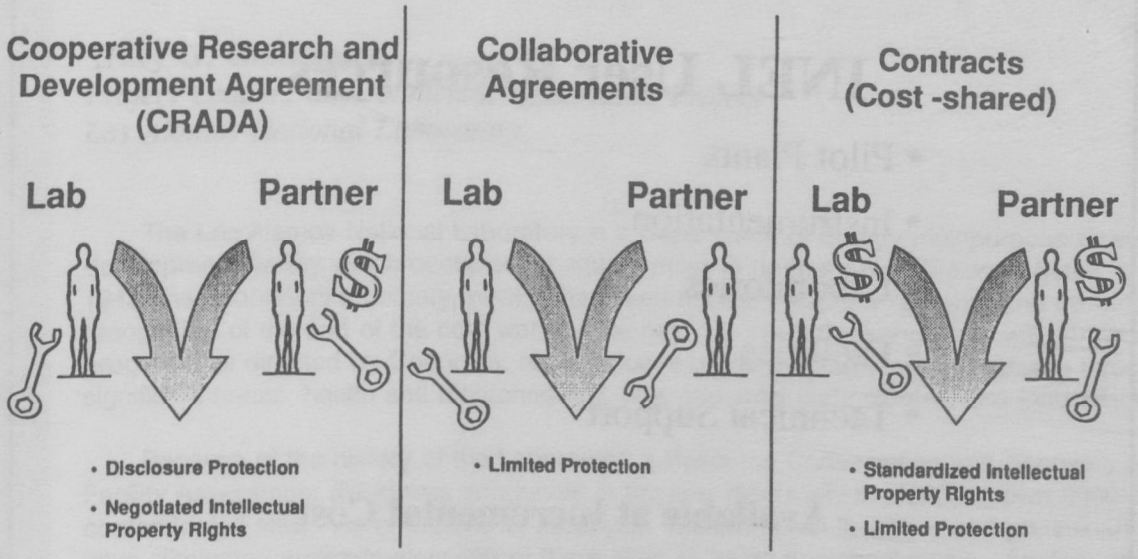
Mechanisms for Partnering

CRADAs
Joint Proposals
MOU's
SPIN-OFFS
Contracts
Work-for-Others
Licenses
Personnel Exchanges
User Resources
Technical Assistance
MOA's

Bottom line: If there's a need, there's a way!

8505-15

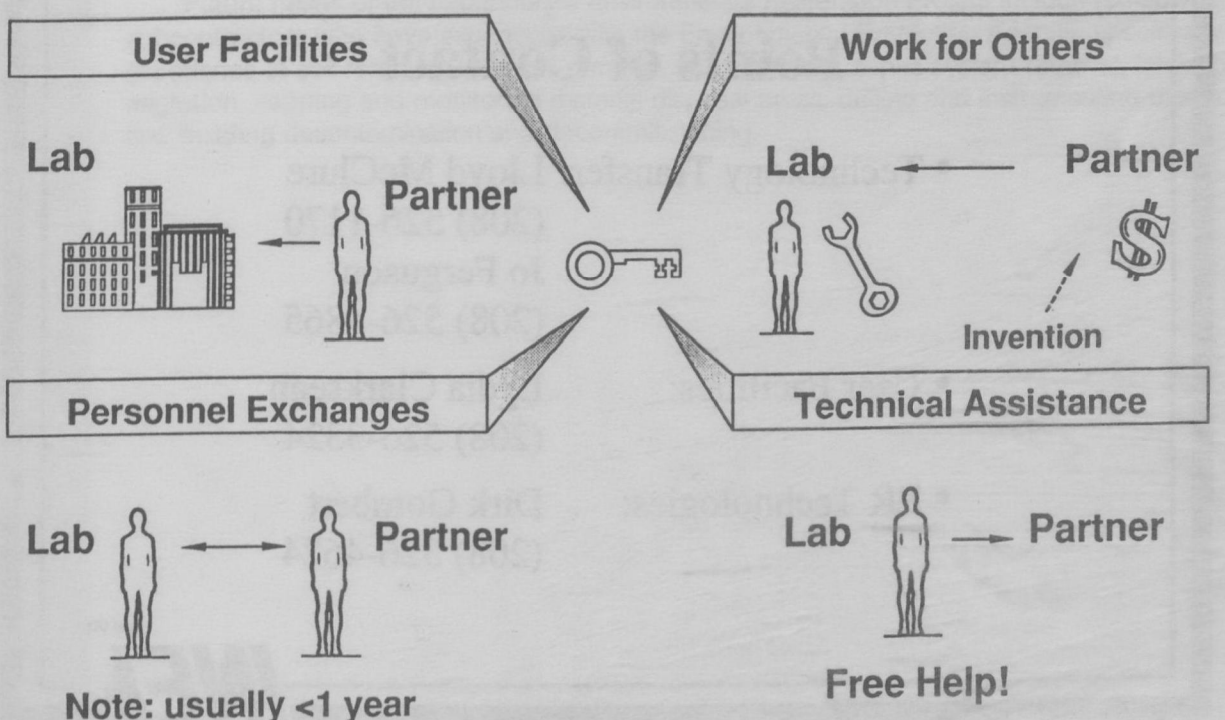
Research & Development Partnerships



Labs under DOE, NASA, and DOD aim to devote 10-20% of budget to R&D partnerships with industry.

B94 0018

Access and Use



Note: usually <1 year

R93 1608

INEL User Resources

- Pilot Plants
- Instrumentation
- Laboratories
- Facilities
- Technical Support

- Available at Incremental Cost

A94 0890

INEL

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A94 0889

INEL

Remediation Options for the Environmental Restoration Project at Los Alamos National Laboratory

Tracy G. Glatzmaier
Project Leader, Environmental Restoration Project
Los Alamos National Laboratory

The Los Alamos National Laboratory is a Department of Energy multipurpose research and development facility which occupies 43 square miles in northern New Mexico. Since its inception in 1943, the Laboratory's primary mission has been nuclear weapons research and development. In recognition of the end of the cold war, for the next 3-5 years the Laboratory will continue its defense programs as directed by Congress, and will focus on developing new programs in three nationally significant areas: health and biotechnology, environmental technologies, and industrial partnerships.

Because of the history of the Laboratory, a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was conducted in the late 1980's which identified over 2000 potentially contaminated sites. As of the end of fiscal year 1994, archival searches and preliminary investigations have eliminated approximately 600 of these sites as being non-problematic. Another approximately 200 are likely to be recommended for no further action after a few confirmatory samples are obtained. The remaining sites being investigated consist of active and inactive firing sites, above-ground and buried material disposal areas, outfalls, discrete units such as septic tanks, drainlines, and random sites such as areas contaminated by cooling tower drift.

Currently, the Environmental Restoration Project is primarily in the characterization phase for these remaining sites. Some early remediation is being conducted in the townsite areas (formerly occupied by the Laboratory), and at some areas where the remediation is obvious and cost-effective. The remaining sites are potentially contaminated with radionuclides, metals, organics and high explosives; creating waste types of radioactive, hazardous, mixed and buried transuranic waste.

Future needs of the Laboratory's Environmental Restoration Project include remedial action subcontractors who have experience with the Environmental Protection Agency, specifically Region 6; experience in soil removal, shrapnel removal, soil treatment, septic system removal, inhibition of migration, capping and monitoring material disposal areas, drilling and instrumenting monitoring wells and building decontamination and decommissioning.

Cleanup Opportunities at Federal Facilities

Thomas E. Blejwas, Ph.D.
Sandia National Laboratories, New Mexico

The Environmental Restoration (ER) Project at Sandia National Laboratories was recently re-engineered. The re-engineering began with a review of our project by a team of cleanup experts from around the country. Based on plans that grew out of this review, we are able to project significant cost reductions by reducing the size of our base program and cleaning up our many small ER Project sites as quickly as practical. The review team suggested a de-emphasis on new technologies because adequate technologies for our sites already exist. Although ongoing budget-reduction exercises may affect our life-cycle cost reductions, we hope to save $100M or more by acting quickly with voluntary corrective measures and assertive negotiations with our regulators for "no further actions."

Our ER Project is presently funded at about a $30M-per-year level. In addition to a staff of about 35 Sandia employees, we have support through over a dozen contractors. The contractual arrangements include personnel contracts, task-order contracts, and task-specific contracts, some of which are performance based. As our site-investigation efforts come to completion over the next few years, we expect to see a shift toward task-specific contracts and away from the use of in-house staff. Because, in part, of our re-engineering effort, we will require the services of one or more remediation contractors within the next one or two years. One area that is highly uncertain is the management of wastes generated by our cleanup activities. Volumes and types of wastes are very difficult to estimate prior to site characterization and, therefore, our needs, which may include the application of new technologies, are difficult to predict.

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