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Summary Proceedings

West Coast Remediation Marketplace: Business Opportunities for Innovative Technologies

Sponsored by:

U.S. Environmental Protection Agency
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Washington, DC 20460

and

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Cincinnati, OH 45268

and

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and

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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

The abstracts contained in this Proceedings do not necessarily reflect the views of the Agency, and no official endorsement should be inferred.

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Abstract

The U.S. Environmental Protection Agency's Technology Innovation Office and Risk Reduction Engineering Laboratory are co-sponsoring The West Coast 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 third 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 second, entitled Rocky Mountain Remediation Marketplace was held September 27-28, 1994 in Denver, CO.

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Deputy Secretary, California Environmental Protection Agency

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Manager of Environmental Operations, Technology Funding, Inc.

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James T. Allen, Ph.D.
Chief, Office of Pollution Prevention and Technology Development
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Manager, Nuclear Waste Program, Washington State Department of Ecology

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Walter B. Parker
Chair, Alaska Hazardous Substance Spill Technology Review Council

Session 2: Federal Markets

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James T. Davis
Assistant Manager for Environmental Management and Support, Oakland Operations Office, U.S. Department of Energy

Gerald Katz
Director, Environmental Programs, Western Division, Naval Facilities Engineering Command

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U. S. Export Strategy

James S. Kennedy
Acting Director, San Francisco Office, U.S. and Foreign Commercial Service, U.S. Department of Commerce

California Environmental Technology Exports

Paul V. Oliva
Senior Policy Analyst, California State World Trade Commission
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Attracting Financial Backing **Max Straube**
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Director, Northwest Regional Office, NASA Farwest Regional Technology Transfer Center
(formerly with the Washington Department of Community Trade and Economic Development)

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Associate Department Head for Research and Development, Environmental Protection Department
Lawrence Livermore National Laboratory

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Robert R. Silva, Jr.
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Joseph F. Nemec
Vice President of Operations, Bechtel Hanford, Inc.

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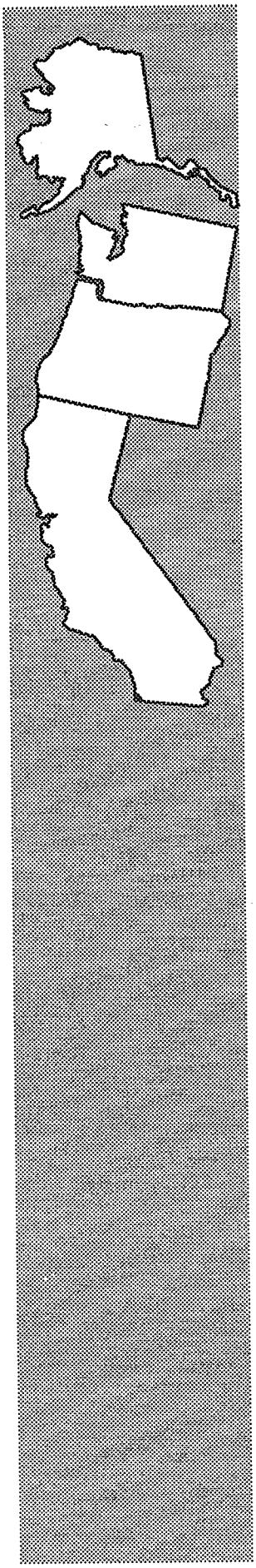

Plenary Session: Perspectives on New Technology Opportunities

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.

Dag M. Syrrist
Manager of Environmental Operations
Technology Funding, Inc.

Speaker Slides/Overheads follow.

The Function of Venture Capital

- To *attract venture capital*, the environmental industry must generate *competitive* rates of investment return
- Venture capital *seeks* innovative and proprietary technologies
- *Profits* are generated by successful *commercialization* of technologies, not from R&D and development

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Our Objective is Simple

- Venture capital investors *only* objective is to generate the highest investment rate of return possible
- Venture investors will take the path of least resistance

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Market Trend and Drivers

- Economics
  - Economic concerns are overtaking regulatory enforcement as the primary driver
  - Full cost accounting and SEC reporting requirements will accelerate this process

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Market Trend and Drivers

- Economics
- Regulations
  - The Clinton administration is seeking increased effectiveness over increased expenditures

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Market Trend and Drivers

- Economics
- Regulation
- Technology
  - Innovative technologies and new solutions is the *only* way to meet new economic and regulatory requirements
  - Technologies will lower costs, long term liabilities, and add directly to earnings

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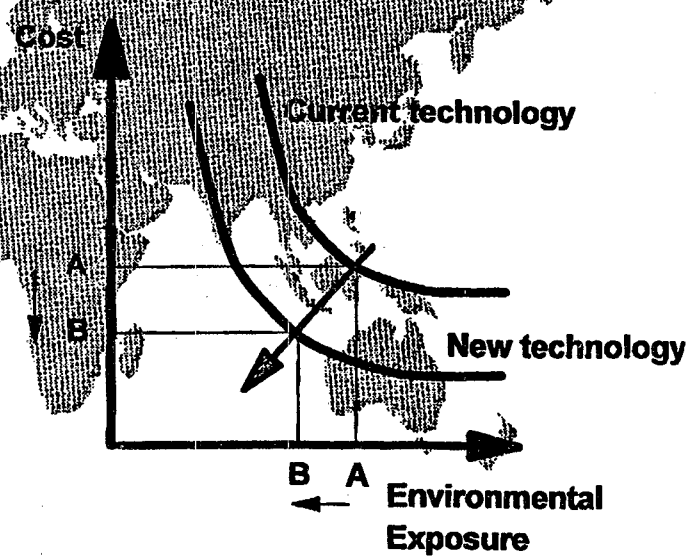
How New Technology Can Win

- New technologies can, and must, reduce cost and lower liabilities



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Technology's Market

Sector	Aerospace	Oil & Gas	Chemical	Auto	Total
Sales	77,211	115,892	69,405	269,458	$531,966
R&D	2,602	6,767	8,372	11,253	$23,994
Earnings ($)	5,330	3,651	5,680	(2,616)	$12,045
1992 Exp	645	3,300	2,130	1,870	$7,845
% of Sales	1%	3%	3%	1%	1%
% of R&D	21%	49%	63%	17%	33%
% of Earnings	10%	90%	38%	n.c.	65%
Est. 1993	165	1,477	885	499	$3,026
Est. 1993-94	410	3,063	1,745	1,022	$6,240
Est. 1993-98	1,035	4,833	3,550	2,489	$11,907
PRP Sites	na	462	308	305	1,075

TRW, G.E., Allied Signal, Chevron, Texaco, Amoco, Unocal, Du Pont, Dow Chemcial, Monsanto, Union Carbide, G.M., Ford, Chrysler Source: 1992 Annual Reports and Form 10K

Interesting, more Specifically

- 1993 *environmental* compliance *expenditures* by Chevron, Amoco, and Texaco:

$3.9 Billion

- 1993 *Microsoft revenues*:

$3.7 Billion

The Issue is One of Timing

- Are the buyers ready to replace internal expenditures with outside *commercial vendors?*
- Do environmental companies have the *performing* technologies, true *cost savings* and *professional management* it takes to create this shift?

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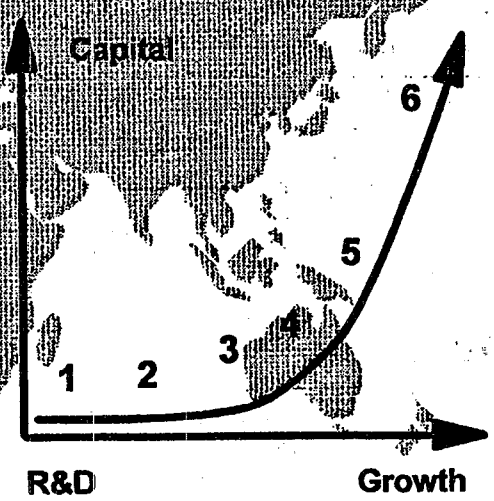
Capital Requirements for Growth

1. Idea development
2. Proof of concept
3. Pilot
4. Prototype
5. Application / Demonstration
6. Commercial sales



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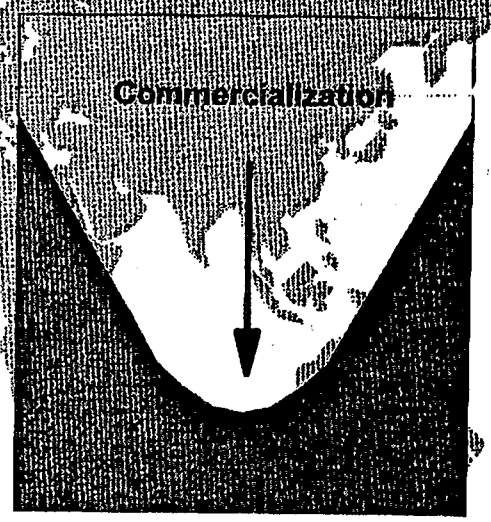
Capital Availability

- To fill this gap with risk capital, we must make it profitable to do so



R&D Growth

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Commercialization Challenges

- Shortage of investment capital
- Lack of accurate information
- No testing and demonstration sites
- Unpredictable permitting process
- Lack of reference sites
- Unproven companies
- No commercialization model

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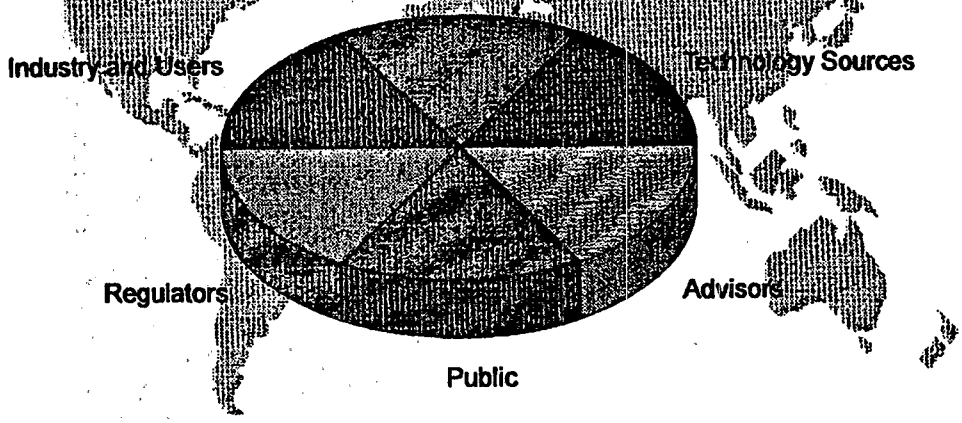
Consensus is Critical



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The Industry Needs

- Successes to emulate
- Large uniform market
- Lower risk for the first user
- Predictable permitting process
- Appropriate liability laws
- SIC codes and commerce data
- Accounting and SEC standards
- Technology protection abroad

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Environmental Companies Needs

- To be a competitive investment alternative
- Have accurate cost and performance data
- Present low technology, and manageable public risk
- A good execution plan for, technical regulatory and capitalization growth
- A credible business model
- Very professional management

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The Investors Needs

- Competitive investment returns
- Successes to emulate
- High *expected* rate of investment return

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Technology Funding

- 200 portfolio companies
- Over $300 million under management
- Leading U.S. environmental venture capital firm
- Proactive government interaction

- A shameless plug;

5th Annual Technology Funding Environmental Conference
(November 10 in San Francisco)

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Advisory Board and Committees

- U.S. Senate
  - Senate Committee on Environment and Public Works
- U.S. EPA
  - National Advisory Committee on Environmental Policy & Tech.
  - Technology, Innovation and Economics Committee (TIE)
  - Technology Diffusion & Regulatory Task Forces
- U.S. DOE
  - ER/WM Executive Round Table
  - Oak Ridge Center for Environmental Technologies
  - Sandia Technology Venture Corporation
- Cal EPA
  - Environmental Technology Advisory Council
  - California Environmental Technology Partnership
  - Nat Lab., Commercialization and Regulatory Working Groups
- Business & Regional
  - Western Governors Association
  - California Environmental Business Council
  - Environmental Business Council of the U.S.
  - California Environmental Opportunity Project
  - Joint Venture: Silicon Valley

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The Opportunities are Enormous for the Pioneers

- In 1993 environmental expenditures were $150 billion, that is 2 X the PC business and equal to 41 Microsoft companies
- This is the largest sector of the economy *without* established leaders
- The technology *standards* and *leaders* are yet to be set and build

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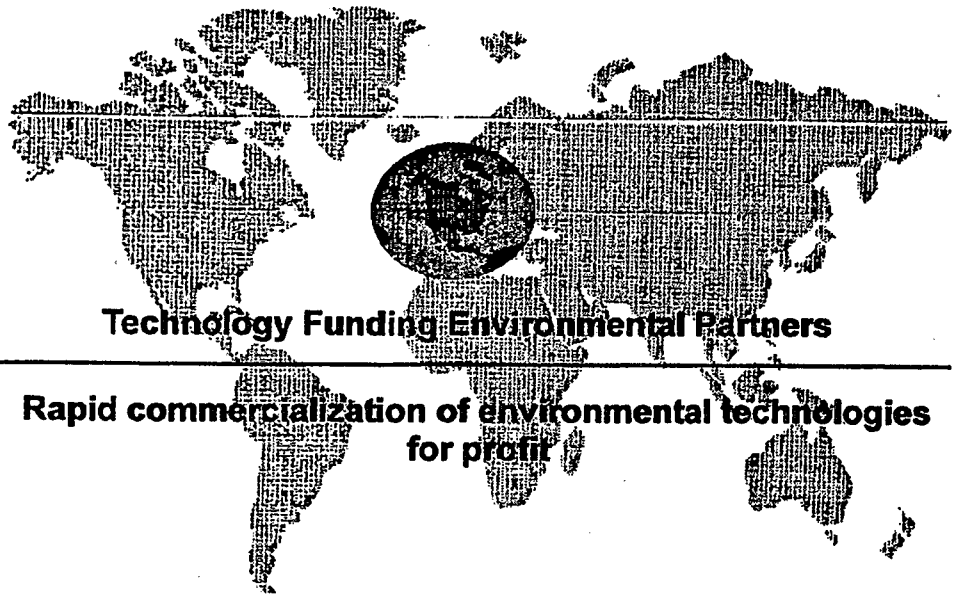
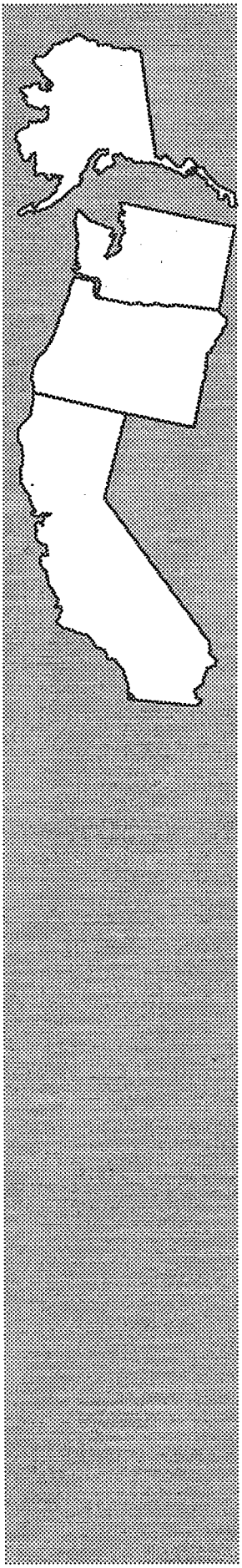


Technology Funding Environmental Partners

Rapid commercialization of environmental technologies for profit



Session 1: State Markets and Regulations

State Markets and Regulations

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California has a longstanding history of innovation in government and of fostering the entrepreneurial spirit that pervades our high-technology companies. As our country reduces the emphasis on military and weapons-related industries, unique opportunities have emerged for the environmental technology industry. California is taking advantage of these opportunities through regulatory reform and new programs that encourage commercialization of environmental technologies, and through a variety of partnerships, activities and projects aimed at increasing stakeholder involvement and the opportunities for performance testing and demonstration.

Speaker talking points follow.

WEST COAST REMEDIATION MARKETPLACE

TALKING POINTS

CALIFORNIA'S PROGRAMS FOR ENCOURAGING INNOVATIVE ENVIRONMENTAL TECHNOLOGIES

James T. Allen, Ph. D., Chief
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INTRODUCTION

- California has a long history of innovation in many areas. High-technology, biotechnology, electronics and semi-conductors, and agriculture are a few of the areas our state is noted for.

- California's reputation in the environmental arena is based mostly on the high standards adopted by state and local programs.

- In recent times we have recognized the needs - and opportunities - presented to California's environmental technology industry.

- The excellence we have achieved in other areas came with support of California state government. The excellence we seek in environmental technology is receiving similar support.

ECONOMIC AND REGULATORY INCENTIVES

- Historically, government has provided only regulatory incentives. However, to have a viable sector of the economy that develops environmental technologies requires economic incentives as well.

- Although the state has provided financial support in the form of grants, the role of state government is clearly not to provide economic incentives to the environmental technology industry. Rather, where government can provide certainty to the industry in the form of clearer objectives and standards, a more "bankable" permit process, and can make the path from technology development to commercialization no longer than absolutely necessary, government will improve the climate for developing innovative technologies. Removing barriers equates to reducing overhead and unnecessary costs.

- Many of the opportunities for lowering barriers to new environmental technologies are tied to permit and regulatory reform. However, many opportunities come through non-traditional mechanisms for accomplishing the work we must do - partnerships between government and industry.

- Partnerships offer a forum for mutual ownership not of the problem of site cleanup but mutual ownership of the development of solutions.

- Partnerships create an opportunity for concerns of the regulatory community and the public to be incorporated in the initial designs of equipment and testing protocols.

- One "vision" for partnerships is to have a clearer identification of regulatory and community requirements not just at a given site but for a host of sites so that testing can meet the requirements of a maximum number of locations and jurisdictions. This is the aim of inter-agency and inter-regional reciprocity, objectives that should be strived for at our National Test Sites not only in California but elsewhere around the country.

- Partnerships are an important part of the Clinton Administration's Environmental Technology Initiative.

PARTNERSHIPS IN CALIFORNIA

- Environmental Process Improvement Center at McClellan Air Force Base. Members include McClellan, USEPA Region IX and Cal/EPA. Focus areas include site remediation and pollution prevention.

- Public/Private Partnership with Clean Sites, Inc. Expands the "EPIC" partnership to include 7 Fortune 500 companies (Dow, Monsanto, Xerox, Southern California Edison, DuPont, AT&T and Beazer East). Objective is to demonstrate site remediation technologies at McClellan.

- CETP. Initiated in fall of 1992, this partnership represents all sectors of California's environmental technology industry. CETP has produced the Strategic Plan report in January of 1994 which lays out the "roadmap" for what government can do to assist in promoting the environmental technology industry. Task Forces under CETP have provided significant support and input to the AB2060 Certification program, the national labs, export, communications and regulatory reform.

- Western Governors' Association Project Western Cleanup (DOIT). A partnership among the DOE, DOD, DOI and USEPA with western states. The objective is to demonstrate new restoration technologies at federal facilities and sites throughout the west. Focus areas include mine wastes, mixed wastes, military bases and munitions.

- Other partnerships formed or being formed:

  ACET

  CE-CERT

  California Enterprise

  ETI Proposal (RREL, Cal/EPA)

  CETC (California Environmental Technology Center) A new initiative to encourage and promote research on environmental technology throughout the UC system. Announced by the Governor in May 1994.

  Network of California Environmental Technology Business Incubators

REGULATORY INCENTIVES

- Permit Streamlining

- AB2060 Certification. First such program in the country. Currently this program is managed by DTSC, and is focussed on hazardous waste environmental technologies (loosely defined). This type of program is being spread to other Cal/EPA agencies and now a certification program has been authorized for the Air Resources Board.

- Military Bases. California's programs for developing innovative cleanup technologies are working closely with the regulatory programs overseeing the cleanup to ensure that "innovative technologies" get fair consideration.

MILITARY FACILITIES/NATIONAL TEST SITES

- The closure of military facilities throughout the country has provided additional motivation for developing new cleanup technologies. We need new technologies for many of the problems at military bases simply because there are not enough established technologies to effect cleanup. There is a high priority placed on returning these bases to productive uses.

- National Test Sites. California has two National Test Sites: McClellan for chlorinated solvents and Port Hueneme for hydrocarbons. We work closely with both bases in their roles as test sites. In fact Cal/EPA is represented on the advisory panel at Port Hueneme (John Wesnousky is on panel).

THE MARKETPLACE

- The "marketplace" for environmental technologies is difficult to define. However, California certainly has its share of cleanup projects ongoing or planned.

- The military facilities around the state - particularly the closing bases - are encouraged by DOD and Cal/EPA to demonstrate new cleanup technologies.

- With CETC, CE-CERT, our national test sites (McClellan and Port Hueneme), ACET, California Enterprise, and other activities California offers the most promising ground for demonstration of new environmental technologies.

- One objective of the CETP Strategic Plan is to make California "The Place" for commercializing - not just demonstrating - environmental technologies.

- California is encouraging this with regulatory programs such as permit streamlining and certification, with active participation in partnerships aimed at demonstrating new technologies, and by incorporating innovation into our mainstream cleanup program.

SUMMARY

- The role of government in environmental regulation is changing. Command and control is not being replaced, but it is being augmented with programs that provide opportunity.

- In the environmental technology area, opportunities are being created in California through regulatory reform, new programs, and through partnerships.

- Opportunities are also being created at a variety of test sites and facilities - including two of DOD's national test sites - to demonstrate new technologies.

- We are all pretty new to the game of developing the "Environmental Technology Industry." Time will tell how successful we will be, and we are sure to learn from some mistakes. However, we in California feel that we are going forward with the best input we can get from all stakeholders - particularly from the industry itself - through our various partnerships.

DEPARTMENT OF TOXIC SUBSTANCES CONTROL
Environmental Technology Certification Program
400 P Street, 4th Floor
P.O. Box 806
Sacramento, CA 95812-0806

CERTIFICATION PROGRAM (AB 2060)
HAZARDOUS WASTE ENVIRONMENTAL TECHNOLOGIES

FACT SHEET
October 1994

INTRODUCTION

On January 6, 1993, Governor Pete Wilson charged the California Environmental Protection Agency (Cal/EPA), working with the Trade and Commerce Agency (TCA), to create the California Environmental Technology Partnership (CETP).

The mission of CETP is to preserve and promote California's high environmental standards, to pursue pollution prevention, and to recognize, assist and promote California-based companies that research, develop, produce, market and export environmental technologies, goods and services. To help guide this effort, a Strategic Plan for the CETP was released in January 1994. This Strategic Plan focuses on preserving and enhancing California's $20 billion environmental technology industry.

As part of the development of the Strategic Plan, four advisory groups were assembled to identify the most significant challenges to California's environmental technology industry. One of these groups was the Financing Barriers Technical Working Group. They found that the permitting process in California's environmental laws and regulations is all-too-often unnecessarily complex and cumbersome. Numerous and overlapping jurisdictions, each having their own requirements, make the path from research and development into commercialization uncertain in terms of process, time and cost. In addition, California's patchwork regulatory framework of multiple jurisdictions has fragmented the potential market for environmental technologies, goods and services.

This market fragmentation, combined with the uncertainty of the current regulatory system, often cause investors to perceive that there is too much risk associated with environmental technology companies in proportion to their potential rate of return. As a result, many in industry and the financial community in California are reluctant to invest their resources and efforts in the commercialization of environmental technologies.

It is, therefore, incumbent upon government and well within its role to provide a maximum level of regulatory consistency to the regulated community. Examples of actions that provide stability include consistent enforcement of regulations, simplified permitting processes, and state-assisted demonstration opportunities for technology commercialization. Reforms to address this challenge include consistent statewide requirements, minimum lifetimes for demonstrated technologies and a technology certification program.

The California Legislature in Assembly Bill 2060 (AB 2060 by Assemblyman Ted Weggeland) has authorized the Department of Toxic Substances Control (Department) to establish a program to certify hazardous waste environmental technologies.

AB 2060 specifies that hazardous waste environmental technologies which may be certified shall include, but are not limited to, hazardous waste management technologies, site mitigation technologies, and waste minimization and pollution prevention technologies.

Technology types which the Department anticipates will fall within this scope include less-polluting raw materials, processes and products; recycling technologies; analysis, monitoring, and process control technologies; computer models; treatment technologies; and site characterization and remediation technologies.

AB 2060 mandates that certified technologies meet certain specified criteria including:

- Technology must not pose a significant potential hazard to public health and safety or the environment if operated in compliance with specified conditions,
- Equipment must be capable of being operated without specialized training and with minimal maintenance, and

(Continued)

- Hazardous waste incineration technologies may not be included in the certification program.

TYPES OF CERTIFICATION

There are two general purposes for certification—regulatory streamlining and performance evaluation.

Regulatory certification – This type of certification streamlines the regulatory requirements associated with use of the technology as well as provides information on the technology's performance. The certification may assist with regulatory requirements in the following ways:

- Certification of suitability for *Conditional Exemption*,
- Certification of suitability for *Conditional Authorization*,
- Certification for *Permit-by-Rule (PBR)* eligibility and other regulatory requirements within the Department's purview.

For technologies potentially eligible for PBR or suitable for conditional authorization or conditional exemption, AB 2060 mandates that the technology must be as safe and as effective as the processes already subject to regulation under those tiers.

Performance certification – Under this type of certification, the State will provide a high-quality evaluation of the efficacy and efficiency of a technology's performance. This certification can be used by the applicant to support marketing of their hazardous waste environmental technology, domestically or abroad. The results of a performance certification may also be used to provide information to regulatory agencies in support of a permit or other activity. Certification may provide estimates of performance in areas such as:

- Efficacy and efficiency for a specified application,
- Percent reductions in constituent/waste concentrations,
- Reductions in constituent/waste concentrations to specified levels or thresholds,
- Accuracy, precision, detection limits for measurement of specified constituents (e.g., for monitoring and detection technologies), and
- Other performance criteria.

PROGRAM COMPONENTS

AB 2060 specifies that an application for certification of a hazardous waste environmental technology must include any information required by the Department to make a determination on the certification application. AB 2060 also specifies that all certifications must include:

- A statement of the technical specifications applicable to the technology,
- A determination of the composition of the hazardous wastes or chemical constituents for which the technology can appropriately be used,
- An estimate of the efficacy and efficiency of the technology in regard to the hazardous wastes or chemical constituents for which it is certified, and
- A specification of the minimal operational standards the technology is required to meet to ensure that the certified technology is managed properly and used safely.

PROGRAM OBJECTIVES

The Department has identified the objectives for the AB 2060 environmental technology certification program to include:

- Protect public health and safety and the environment,
- Facilitate and streamline compliance with hazardous waste regulations,
- Encourage pollution prevention,
- Foster growth and stability of California's environmental technology industry,
- Ensure the safety, efficacy and efficiency of environmental technologies used in California,
- Ensure treatment and recycling technologies are available in California as alternatives to land disposal,
- Increase acceptance of environmental technologies by regulators, users, responsible parties and the public, and

(Continued)

- Provide a mechanism to communicate to the public the safety, efficacy, and efficiency of environmental technologies used in California.

PILOT PROGRAM

In the few short months since AB 2060 became effective on January 1, 1994, the Department has established a pilot certification program, and entered into technology evaluation and certification agreements with thirteen companies.

In addition, the Department has completed the review of data packages, made preliminary certification determinations, and noticed the proposed certification in the California Regulatory Notice Register on April 29, 1994 for the first five of these companies.

The pilot program is providing valuable information for program and regulation development. These first certifications will be limited in scope and are meant to give the Department some quick feedback to develop the regulations. To date, over 300 companies have contacted the Department expressing interest in the certification program.

CRITERIA AND PREFERENCES FOR SELECTION OF PILOT PROGRAM TECHNOLOGIES

Technologies were selected for the pilot program based on the following criteria and preferences:

- Certification determination can be made in-house,
- Availability and completeness of high quality data,
- Performance-based certification,
- High probability of acceptance by all stakeholders,
- Contribution to program objectives and implementation,
- Limited number of technologies,
- Technology/waste/application type and relationship to others selected,
- Low resource requirements.

CERTIFICATION QUALITY

Certifications by the State must be of a quality which will meet standards for peer-review by national and international organizations. Data quality objectives will be established based on the types of certification and the specifics of the technology and its application.

The process used to certify a technology and the information used to support the certification must be documented to meet peer-review standards. Trade secrets will be protected under applicable statutes and regulations.

PROGRAM SUPPORT (FEES)

AB 2060 specifies that the Department shall charge fees to recover the actual costs of the Department to review and certify the technology.

For pilot certifications, initiated prior to promulgation of the regulations, fees will be negotiated with the applicant and will likely be based on existing fee-for-service programs already established within the Department.

GLOSSARY

Conditional Authorization – Conditional authorization is one of the five permitting tiers established by law or regulation (see Health and Safety Code (HSC), Section 25200.3) and was designed to alleviate the administrative and technical requirements of a full hazardous waste facility permit in certain select situations. It authorizes generators or transportable treatment unit operators to perform onsite treatment using some specified technologies and waste streams. For most waste streams, treatment can not exceed 5,000 gallons or 45,000 pounds per month.

Conditional Exemption - Conditional Exemption is one of the five permitting tiers established by law or regulation (see HSC, Section 25201.5). It was designed to allow certain businesses to perform onsite treatment without needing to obtain authorization from the Department for: 1) small quantities of specified hazardous waste streams using specified technologies, or 2) specific waste streams deemed to pose a lower risk.

PBR - Permit-by-rule is one of five permitting tiers established by law or regulation (see California Code of Regulations, Title 22, Section 67450.1, et. seq.). This tier is for more hazardous and higher volume waste streams and processes than provided for under Conditional Authorization or Conditional Exemption. It authorizes generators or transportable treatment unit operators to perform onsite treatment using some specified technologies and waste streams.

Tiers - The five permitting tiers established by law or regulation include: 1) Full Permit; 2) Standardized Permit; 3) Permit-by-Rule; 4) Conditional Authorization; and 5) Conditional Exemption.

State Markets and Regulations

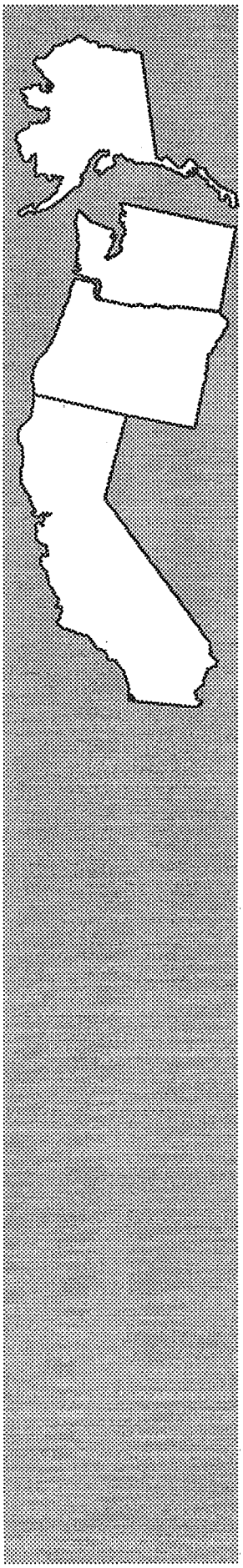
Drusilla Butler
Manager, Nuclear Waste Program
Washington State Department of Ecology

The State of Washington Department of Ecology plays a lead role in Hanford's cleanup. This cleanup will take decades and cost in excess of $100 billion. Congress and the public demand near term environmental results in order to continue their funding commitment. Contractors must work in close partnership with the regulators to develop needed innovative and cost efficient remediation technologies. Risk must be shared and regulatory processes must be streamlined. Contractors and regulators should recognize their common interests.

Walter B. Parker
Chair
Alaska Hazardous Substance Spill Technology Review Council (HSSTRC)

The HSSTRC is charged with providing advice to the State of Alaska on the best available technology for preventing and responding to hazardous substance spills. In Alaska, oil is by statute a hazardous substance. The paper covers the range of innovative treatment technologies used in Alaska since the wreck of the Exxon Valdez in March 1989 including those used in responding to the Exxon Valdez spill.

The paper also addresses remaining remediation problems in Alaska, federal, state and private for marine, riverine, and terrestrial environments. Logistical problems of remote sites and their remediation problems will be a special focus. The problems of remediation in cold climates will receive special attention also.



Session 2: Federal Markets

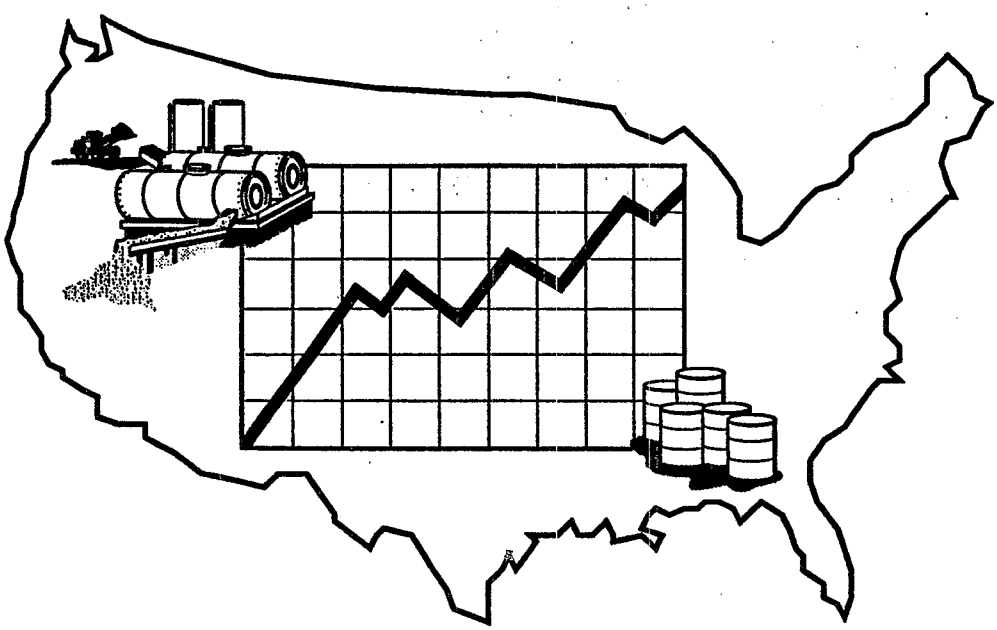
Federal Markets

Walter W. Kovalick, Jr., Ph.D.
Director, Technology Innovation Office
Office of Solid Waste and Emergency Response
U.S. Environmental Protection Agency

Speaker Slides/Overheads follow.

EPA

Cleaning Up the Nation's Waste Sites: Markets and Technology Trends



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. **

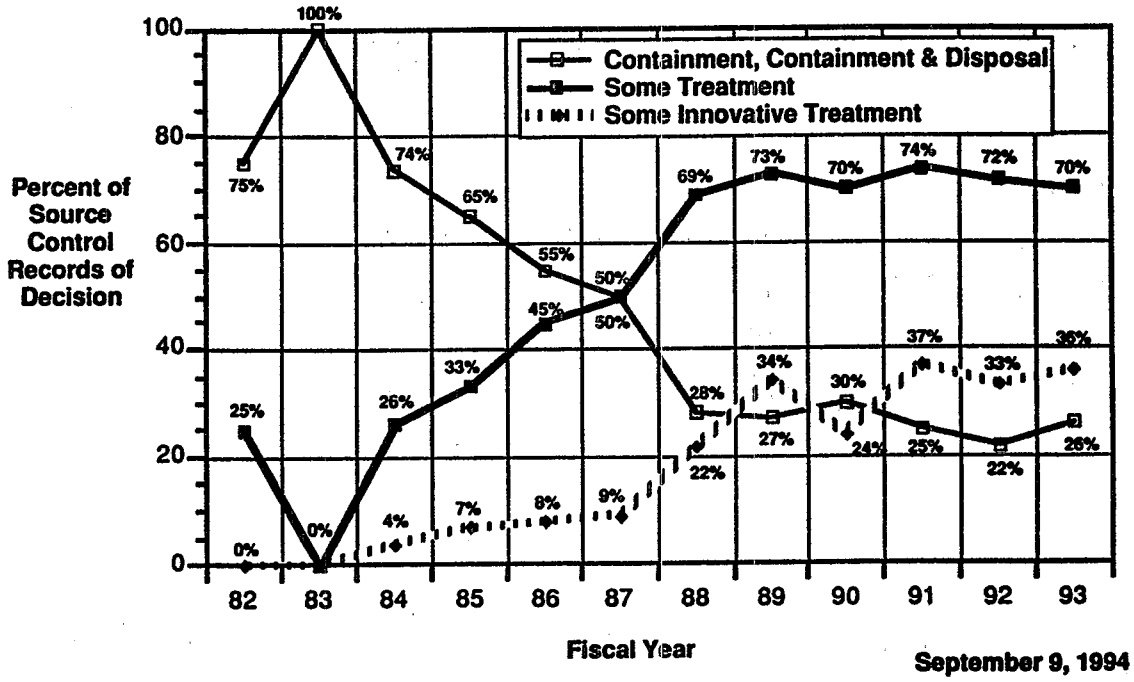
Program	Approximate Number
■ Superfund	1,500 - 2,100
■ RCRA Corrective Action	1,500 - 3,500
■ Underground Storage Tanks (USTs)	295,000
■ Dept. of Defense (DOD)	7,300 (at 1,800 installations)
■ Dept. of Energy (DOE)	4,000 (at 110 installations)
■ Other Federal Agencies	350
■ States	19,000*

** 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	●	O	O	

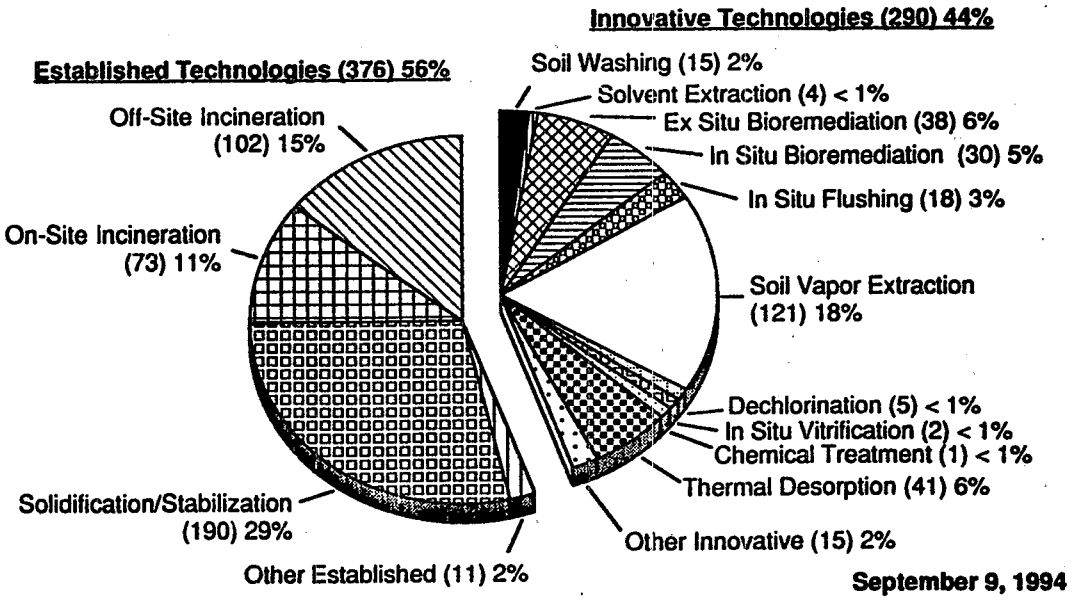
Treatment and Disposal Decisions for Source Control ††



September 9, 1994

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

(Total Number of Technologies = 666)



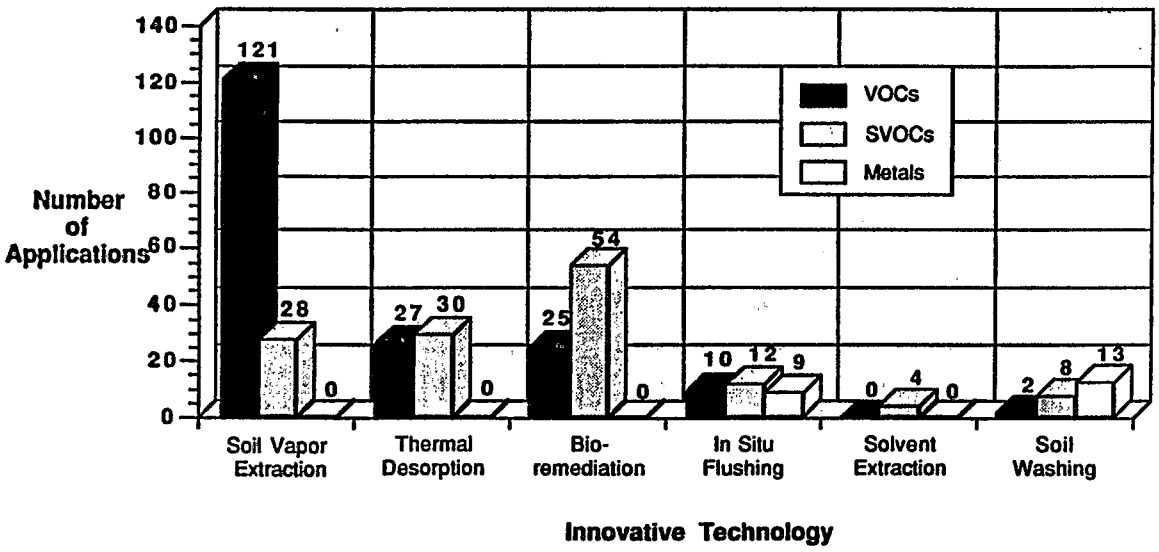
September 9, 1994

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**

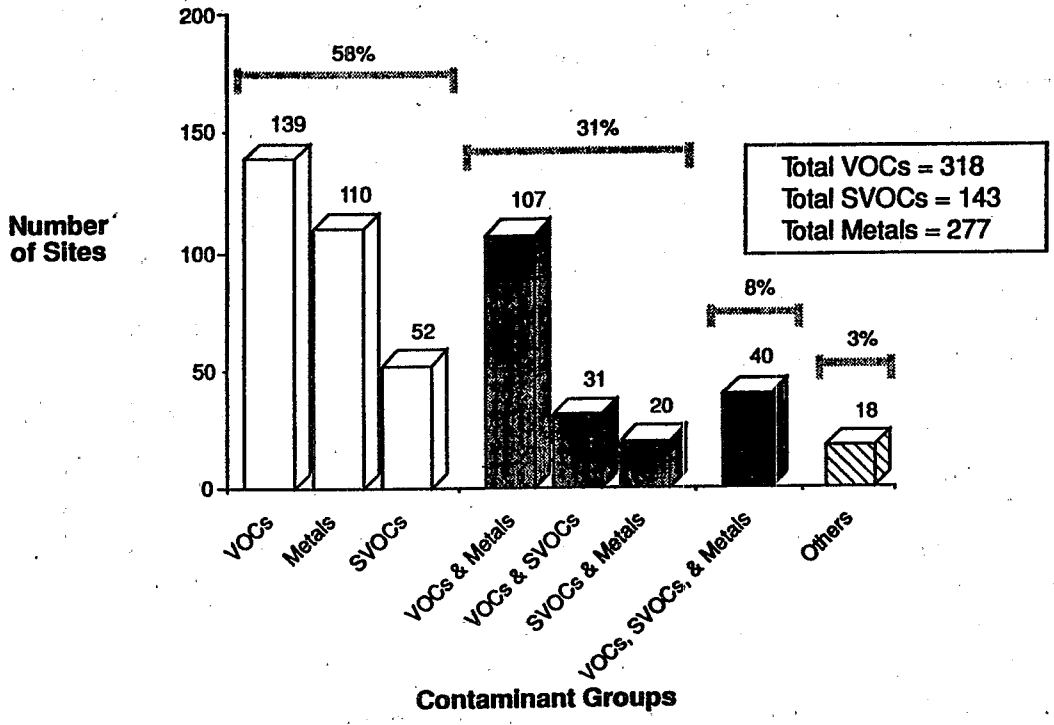
September 9, 1994

Superfund Remedial Actions: Application of Innovative Treatment Technologies ††

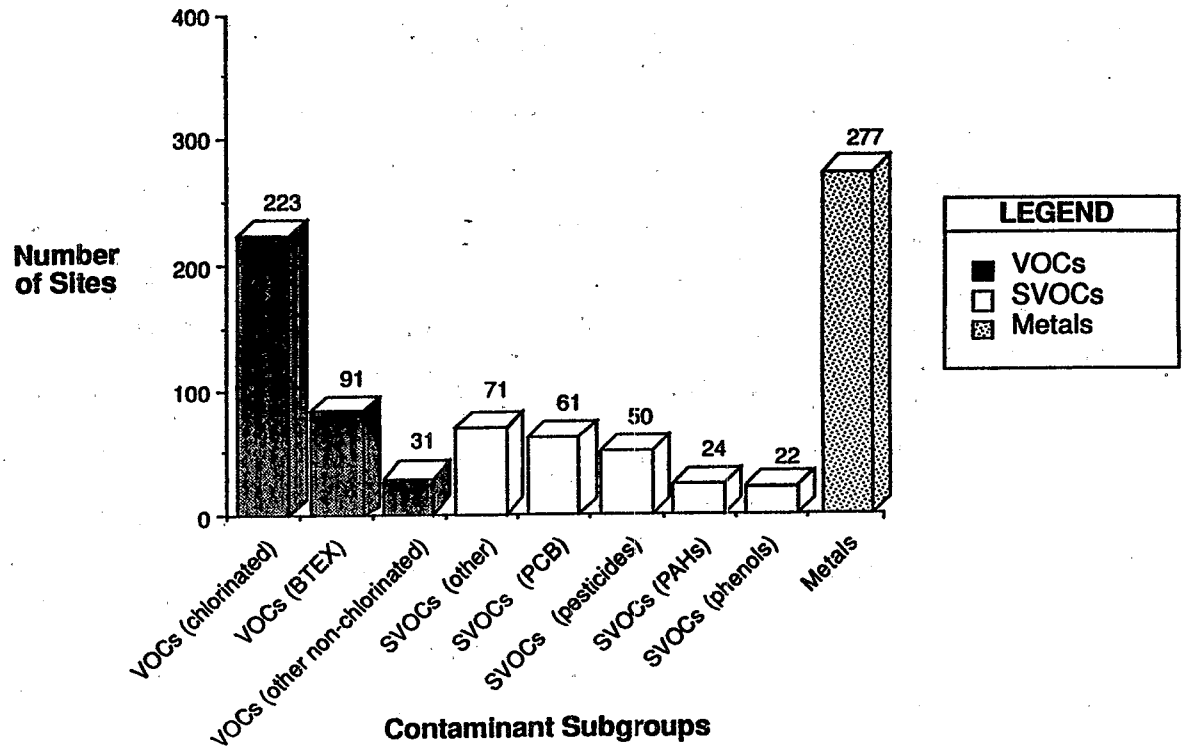


September 9, 1994

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

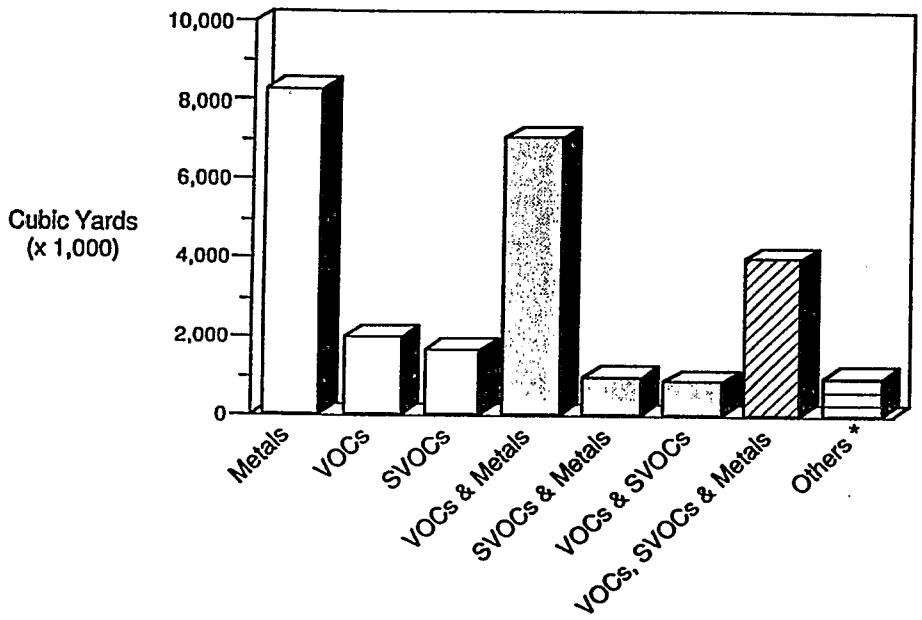


Frequency of Contaminant Subgroups Present in all Matrices at NPL Sites Without RODs **



Estimated Quantities of Contaminated Material **

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

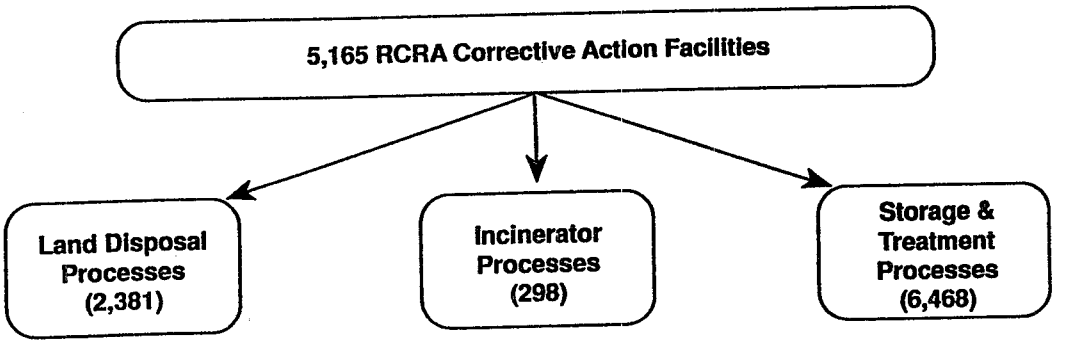


** Includes explosives, radon, nitrates, and other organics*

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

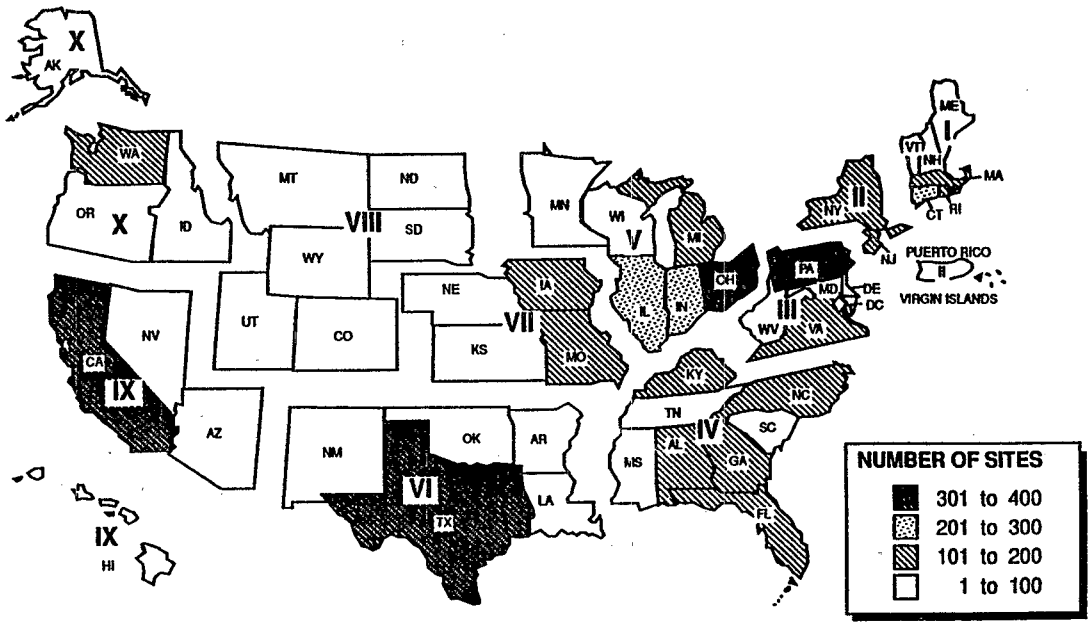
RCRA TSD Processes **



- 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 **

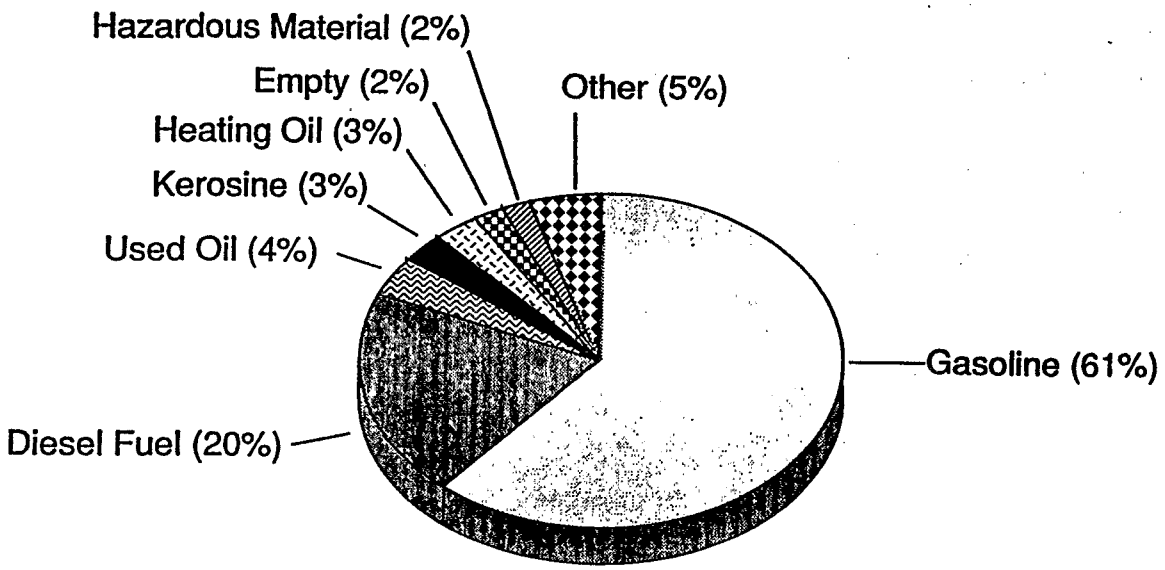


Commonly Managed Wastes in RCRA SWMUs in 1986 **

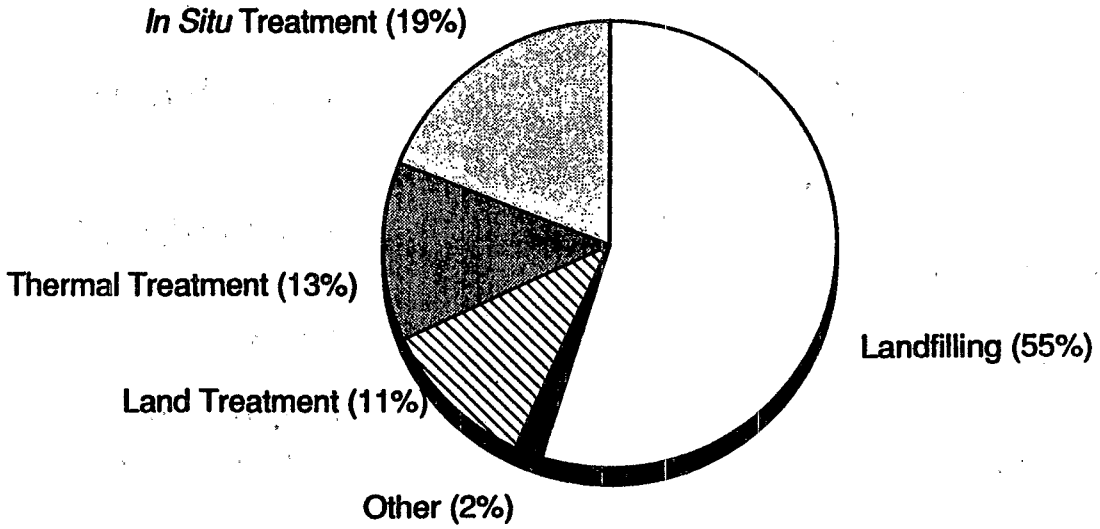
- Ignitable waste
- Corrosive waste
- Reactive waste
- Waste oil
- Spent halogenated/ nonhalogenated solvents
- Metals (lead, chromium, silver)
- Wastewater treatment sludge from electroplating
- Oil-water separator sludge from petroleum refining

SWMU = Solid Waste Management Unit

Contents of Federally Regulated Tanks **



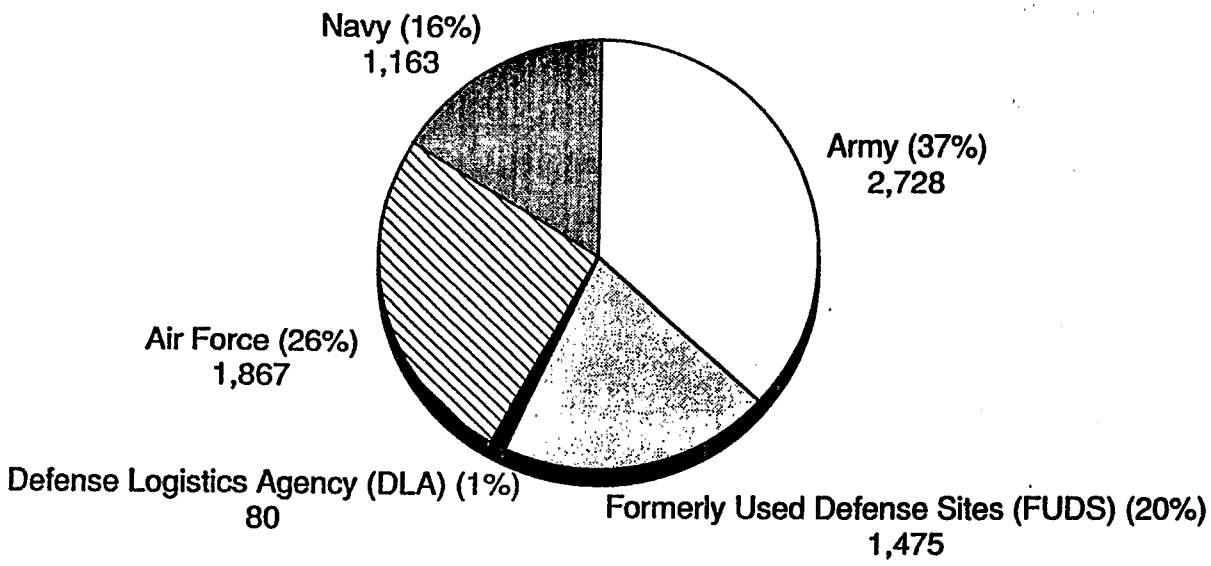
Cleanup of Petroleum-Contaminated Soils**



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 **

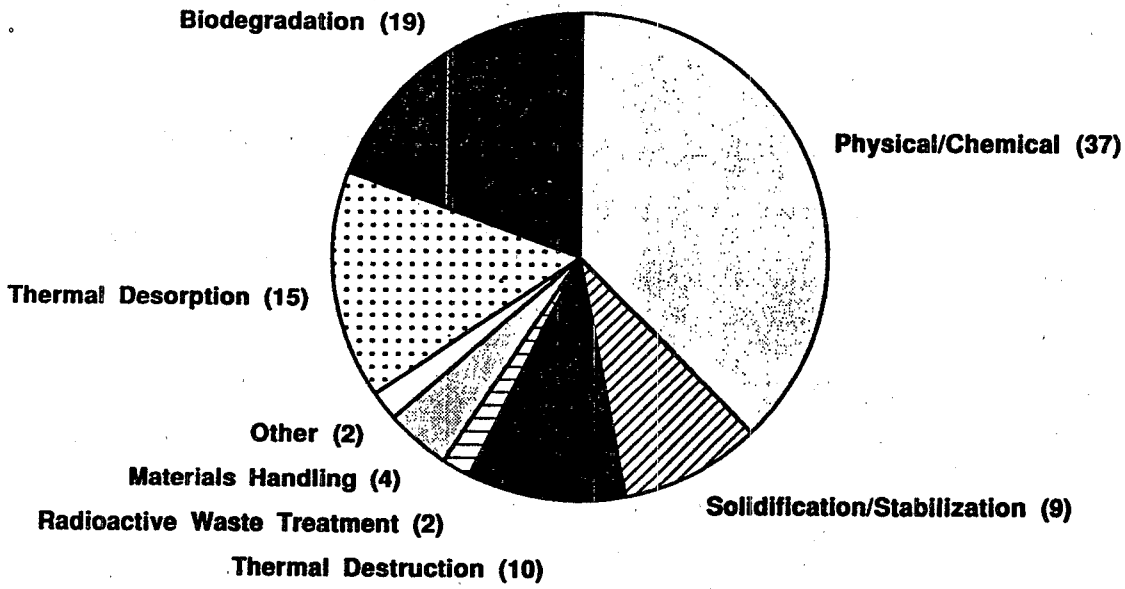
- Of 69,000 sites identified, 19,000 will need some level of action*
- States with the most sites are: Michigan (2,844), Massachusetts (2,224), and Pennsylvania (1,067)
- State trust fund balances totaled $2.2 billion at the end of 1991
- States with the largest totals were New York ($977 million), New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



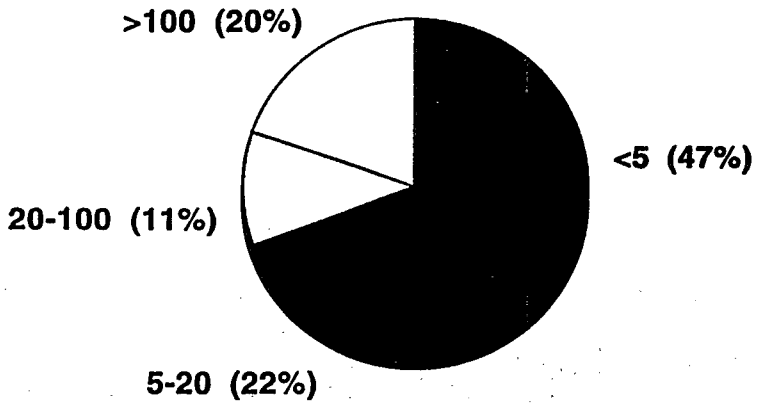
Vendor Information System for Innovative Treatment Technologies (VISITT)

- 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

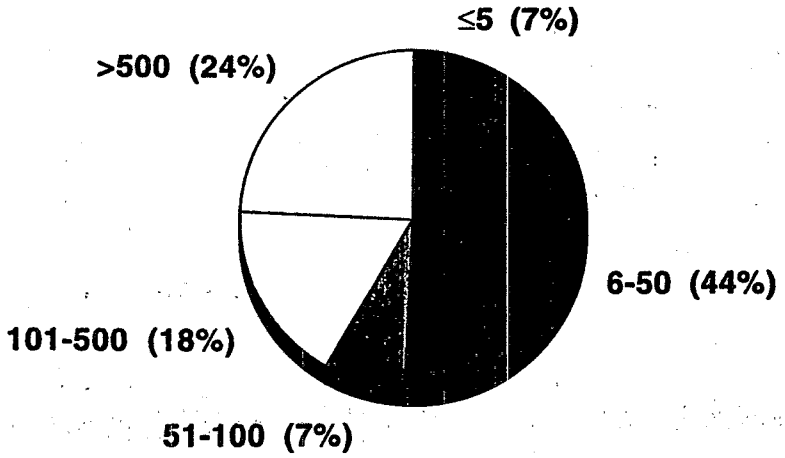
Technology	Frequency
Bioremediation	102
Thermal Desorption	34
Chemical Treatment	22
Soil Washing	19
Acid or Solvent Extraction	17
Soil Vapor or Dual-Phase Extraction	12
Vitrification	11
In situ Thermally Enhanced Recovery	11
Other	49
Total	277

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

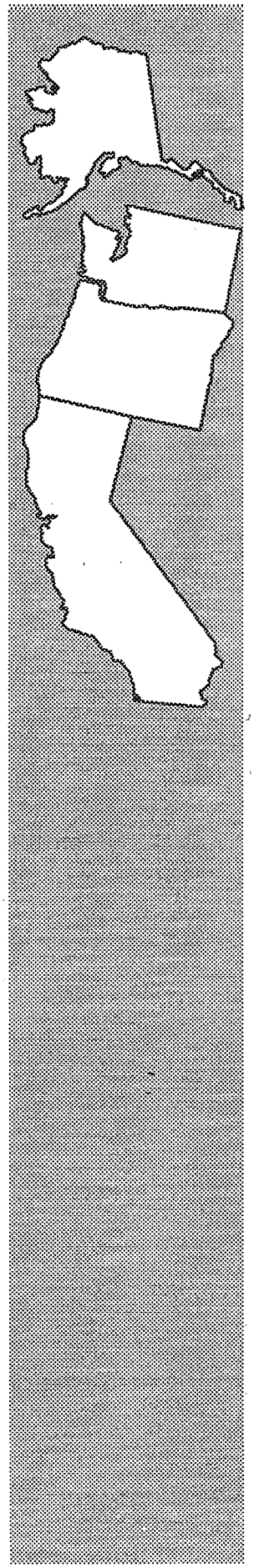
James T. Davis
Assistant Manager for Environmental Management and Support,
Oakland Operations Office, U.S. Department of Energy

Abstract not available at this printing.

Gerald Katz
Director, Environmental Programs
Western Division, Naval Facilities Engineering Command

- Navy's Environmental Program on the West Coast
- Fast track cleanup
- Incorporation of innovative technologies
- California Base Closure Environmental Committee
- The future of Navy environmental business

Mr. Katz will briefly discuss the Navy's environmental program and its organization for performing environmental remediation work on the West Coast. With the President's Five Point Program for Economic Conversion and Reuse of Closing Military Facilities, fast-track cleanup ihitiatives are being implemented. Reuse committees are looking at opportunities to integrate new technologies into cleanup strategies and maximize economic benefits to the community. The efforts of the California Base Closure Environmental Committee, a body comprised of DoD environmental/reuse managers and key regulatory managers will be described. The Navy's environmental program is diverse and continues to grow; where its future lies will be explored.



Session 3: International Markets

U.S. Export Strategy

James S. Kennedy
Acting Director, San Francisco Office, U.S. and Foreign Commercial Service
U.S. Department of Commerce

Speaker Slides/Overheads follow.

U.S. & FOREIGN COMMERCIAL SERVICE

WHO WE ARE WHAT WE DO

MARKET RESEARCH

1. THE NATIONAL TRADE DATA BANK

   *MARKET RESEARCH
   *FOREIGN TRADERS INDEX

2. CUSTOMIZED SALES SURVEY

   *FEE: $500-$3,500

CUSTOMIZED SALES SURVEY

1. *DOES THE PRODUCT HAVE SALES POTENTIAL IN MARKET?*

2. *WHO IS SUPPLYING A COMPARABLE PRODUCT LOCALLY?*

3. *WHAT IS THE USUAL SALES CHANNEL FOR GETTING THIS PRODUCT INTO THE MARKET?*

4. *WHAT IS THE GOING PRICE FOR A COMPARABLE PRODUCT IN THIS MARKET?*

5. *ARE PURCHASES OF SUCH PRODUCTS PRIMARILY INFLUENCED BY PRICE OR OTHER COMPETITIVE FACTORS, SUCH AS CREDIT, QUALITY, DELIVERY, SERVICE, PROMOTION, BRAND, ETC.?*

6. *WHAT IS THE BEST WAY TO GET SALES EXPOSURE IN THE MARKET FOR THIS TYPE OF PRODUCT?*

7. *ARE THERE ANY IMPEDIMENTS TO SELLING THIS TYPE OF PRODUCT IN THIS MARKET, SUCH AS QUOTAS, DUTIES, OR LOCAL REGULATIONS THAT MIGHT IMPEDE SALES?*

8. *WHO MIGHT BE INTERESTED AND QUALIFIED TO REPRESENT OR PURCHASE THIS COMPANY'S PRODUCT IN THIS MARKET?*

9. *IF A LICENSING OR JOINT VENTURE STRATEGY SEEMS DESIRABLE FOR THIS PRODUCT, WHO MIGHT BE AN INTERESTED AND QUALIFIED PARTNER FOR THE U.S. FIRM?*

TRADE LEADS

- o FOREIGN TRADERS INDEX

  --OBTAINED FROM DATA BASE OF FOREIGN COMMERCIAL SERVICE

  --AVAILABLE ON NTDB

- o TRADE LEADS FROM FOREIGN COMMERCIAL SERVICE

  --AVAILABLE ON NTDB, IN JOURNAL OF COMMERCE, AND ON EBB (202-482-1986)

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- EVALUATES POTENTIAL TRADING PARTNERS

  --BACKGROUND INFORMATION
  --STANDING IN LOCAL COMMUNITY
  --CREDIT WORTHINESS
  --SUITABILITY

- COST: $100.

- MOST IMPORTANT, ITEM 28:

  EVALUATION BY FOREIGN SERVICE:
  Narrative description of subject firms operations, facilities, and competence of management; historical background, legal status, general reputation, and position in business community.
  Financial data, assets, liabilities, profits, and sales (in local currency) to the extent these data are readily available.
  Recommendation of post concerning the firm's suitability as a trade contact for U.S. firm.

TRADE SHOW RECRUITMENT

- CATALOG SHOWS

  Advantage: Inexpensive but Effective
  Disadvantage: Physical Product Not Available; Firm Rep. Not On-Site.

- MATCHMAKERS

  Advantage(s): Product Avail. For Demo. By Firm Rep.;
  Face-to-Face Meetings With Pre-screened buyers.

  Disadvantage: Expensive.

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US&FCS OBJECTIVE

IF YOU ARE NOT EXPORTING, TO HELP YOU BECOME AN EXPORTER;

IF YOU ARE EXPORTING TO ONE MARKET, TO HELP YOU EXPORT TO MORE THAN ONE MARKET.

California Environmental Technology Exports

Paul V. Oliva
Senior Policy Analyst, California State World Trade Commission
International Trade and Investment Division
California Trade and Commerce Agency

Abstract not available at this printing.

Tim Ogburn
Manager, Environmental Technology Export Program
Office of Pollution Prevention and Technology Development, Department of Toxic Substances Control
California Environmental Protection Agency (Cal/EPA)

In September 1992, Governor Wilson charged Cal/EPA, with the assistance of the Trade and Commerce Agency to create the California Environmental Technology Partnership. The purpose of the partnership is to join the public and private sectors in California into a strategic partnership that capitalizes on the complimentary nature of environmental protection and economic progress. The ultimate goal of the partnership is to establish and maintain a balance between environmental protection and the economic prosperity of California. A ten-year Environmental Technology Strategic Plan was completed in January of 1994. One of the major components of the Strategic Plan is the California Environmental Technology Export Program (CETEP).

While the Strategic Plan was being developed, legislation was introduced by Assemblyman Sher and subsequently signed by the Governor. This bill, AB 1315, prescribes and empowers Cal/EPA to establish an environmental technology export program and to coordinate this program with the Trade and Commerce Agency. AB 1315 provides for Cal/EPA to make available technical assistance, to organize and lead trade missions, to receive reverse trade missions, to provide trade referral services, and to notify California-based environmental technology companies of export opportunities and trade shows. The legislation provides for Cal/EPA's Environmental Technology Export Program to participate in federal and other non-state funded technical exchange programs, and to increase foreign buyers' interest in California's environmental technologies. It requires coordination of export activities within state government, with the federal government, and other governments to take advantage of trade promotion assistance for California-based environmental technology companies.

Regarding the specifics of the Environmental Technology Export Program, the Program has been operational since February 1994. The mission of the Program is to increase export sales of California environmental technologies, products and services to international markets, and to create jobs in California. The program is housed within the Department of Toxic Substances Control's Office of Pollution Prevention and Technology Development. It is

organized as a partnership within Cal/EPA, whereby the Export Program provides the export expertise while each board and department within Cal/EPA has assigned a scientific/ engineering technical liaison to the Export Program to facilitate a problem-solving team approach to the exporting of environmental technologies. One of the primary differences of exporting environmental technologies relative to other types of exports, such as leather, shoes, or equipment, is that environmental technology exports are generally the culmination of a scientific and engineering problem-solving process in which the exported environmental technology is a solution to a specific technical and often complex environmental problem. Furthermore, foreign governments and buyers of environmental technologies are more comfortable dealing with agencies and representatives that have both environmental expertise and capabilities as well as direct access to companies which can provide environmental solutions.

A major focus of the Environmental Technology Export Program is to maximize its efforts through partnering with various private, non-profit, and other federal and state agencies. For example, the program is currently working with the Trade and Development Agency in Washington, DC; USAID in Washington, DC; NASDA and USAEP in Washington, DC; and USAEP in Hong Kong, Thailand, Indonesia and Korea. It is also working with the Southeast Asia Business Council, the Hong Kong Trade Development Office, the Foreign Trade Associations of Southern California, the US Department of Commerce, Foreign Commercial Officers, the new Assistant Secretary for Department of Commerce Environmental Technology Export Program, Ms. Ann Alonzo, and so on.

One of the initial significant accomplishments of the program is a directory which contains the names, addresses, and other pertinent information of over 1,400 California environmental technology companies that wish to export their environmental technologies.

The Program hosts delegations from various foreign countries and as such is involved in technology transfer. It has recently hosted delegates from Korea, Taiwan, China, and the Hong Kong EPD. These delegates are given presentations on California environmental regulations and also visit sites to view demonstrations of California's environmental technologies.

The Program is also working with NASDA to sponsor individual companies for $20,000 Environmental Technology Fund grants. Each grant generates a minimum of 4 jobs and $250,000 in business. Currently, we have 10 such grants pending with NASDA in Washington, DC which will generate a minimum of 40 jobs and $2.5 million dollars in business.

The Export Program recently conducted one-on-one business meetings at the May 1994 Competitive Advantage Through Environmental Technology Conference and Exposition in San Diego. The Export Program was successful in arranging over 125 one-on-one meetings between California Environmental technology companies and buyers from China and Mexico.

In summary, the Environmental Technology Export Program sees itself as a catalyst which will ultimately improve California's economy by increasing sales of California's environmental technologies which will therefore create additional jobs in California.

Speaker Slides/Overheads follow.

Office of Pollution Prevention and Technology Development
Environmental Technology

EXPORT PROGRAM

PURPOSE: To increase California's share of the national and international markets for environmental goods, products and services.

EXPORT PROGRAM

- Serve as clearinghouse for collecting and disseminating information to assist California environmental companies in market research, funding opportunities, etc.
- Maintain a directory of California environmental technology companies who wish to receive export information.
- Notify California environmental companies of foreign delegations coming to the United States.
- Assist California environmental companies in networking with federal, state, and local agencies on commercialization necessary to provide assistance; such as, economic profiles, market research, funding opportunities, etc.

- Provide a variety of information by country; such as, economic profiles, key contacts in government and trade organizations, trade barriers, regulations, calendar of trade events, import/export data, investment climates, etc.

- Establish strategic partnerships between technology developers and potential users of those technologies.

- Partner with other organizations on trade missions.

- Will co-host the California Environmental Technology Conference and Exhibition in San Diego, California, May 4-6, 1994.

The Worldwide Market for Environmental Goods and Services

Is estimated to be between $200 and $300 Billion

And growing at least 6% annually

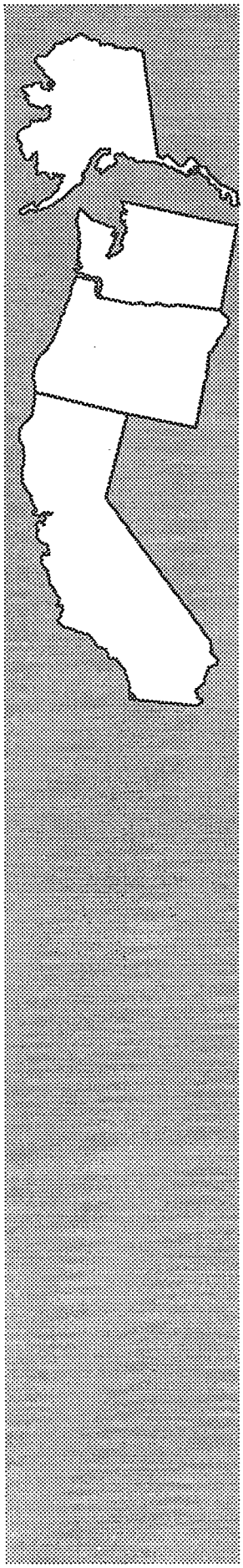
With California's environmental industry capturing an estimated 17% of U.S. revenues

7.5% of worldwide revenues

Directory and Database of California Environmental Businesses

First Edition of the Directory published in January 1994

Database is operational now



Session 4: Business Planning

Small Business Opportunities in Environmental Technologies

Allan S. Mandel, Ph.D.
Director, Office of Economic Development and Rural Affairs
Small Business Administration

Abstract not available at this printing.

Successful Commercialization

John T. Schofield
President, Thermatrix Inc.

The start up, early stage development and commercialization phases of an environmental technology company requires careful planning to be successful. In the same way that marketing a product requires knowledge of the marketplace, successful fund raising requires knowledge of funding sources. Practical suggestions will be put forward to improve the success rate and reduce the frustration associated with commercialization.

Speaker Slides/Overheads follow.

1991-93 Entrepreneurial Investment

Private Equity Financings Completed by Venture-backed Companies
($ millions)

Industry	1991 # Deals	1991 $ Raised	1992 # Deals	1992 $ Raised	1993 #Deals	1993 $ Raised
Communications & Networking	112	$605.9	116	$537.4	139	$698.1
Electronics & Computer Hardware	128	$415.0	108	$317.1	83	$293.9
Software & Information Services	148	$409.2	182	$482.2	152	$496.1
Semiconductors & Components	41	$164.5	43	$190.8	39	$189.2
Health Care Services	24	$90.2	43	$156.1	44	$280.8
Biotech & Pharmaceuticals	126	$592.7	139	$725.2	140	$806.5
Medical Devices & Equipment	90	$349.1	106	$437.3	90	$392.8
Retailing & Consumer Products	42	$239.1	47	$186.6	65	$473.3
Environmental	11	$43.7	18	$77.9	11	$31.0
Other	39	$142.4	85	$437.8	96	$546.7
Total Investment	761	$3,051.7	887	$3,547.3	859	$4,208.3

Source: VentureOne

Thermatrix Inc.

Comparable Company Analysis

			IPO Information				
Issuer	Symbol	Date	Offer Price	Shares (000's)	Deal Size (000's)	Total Shares Out. (000's)	Market Cap. (000's)
Molten Metal Technology, Inc.	MLTN	2/10/93	$14.00	3,000	$42,000	21,235	$297,542
Catalytica, Inc.	CTAL	2/18/93	$7.00	3,000	$21,000	14,696	$102,872
Energy BioSystems Corporation	ENBC	3/12/93	$6.00	2,400	$14,400	9,373	$56,238
N-Viro International Company	NVIC	10/12/93	$9.50	2,000	$19,000	8,000	$76,000
EnSys Environmental Products	ENSY	10/20/93	$10.00	1,800	$18,000	5,643	$56,430
Purus, Inc.	PURS	11/9/93	$14.00	1,800	$25,200	5,968	$83,552

Thermatrix Inc.

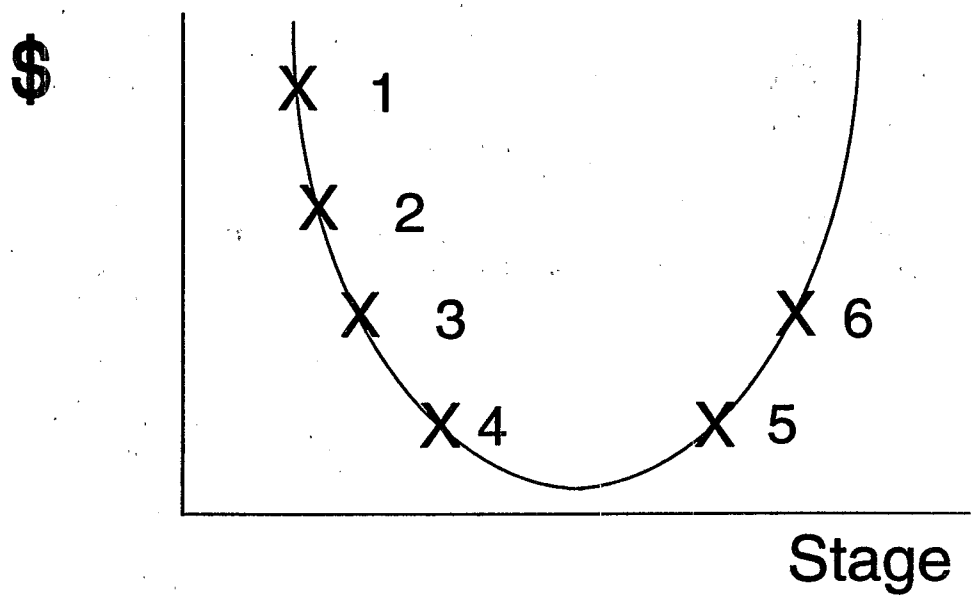
Comparable Company Analysis

			Present Value		Value @ Stock High			Value @ Stock Low		
Issuer	Symbol	Closes @ 9/23/94	Shares Out. (000's)	Market Cap. (000's)	Date	Price	Market Cap.	Date	Price	Market Cap.
Molten Metal Technology, Inc.	MLTN	$23.50	21,870	$513,945	2/23/94	$30.00	$637,590	4/6/93	$10.50	$223,157
Catalytica, Inc.	CTAL	$4.50	14,948	$67,266	5/20/94	$8.75	$128,590	9/23/94	$4.00	$59,792
Energy BioSystems Corporation	ENBC	$7.50	9,997	$74,977	8/26/93	$14.25	$133,565	3/25/94	$6.63	$62,096
N-Viro International Company	NVIC	$2.75	8,112	$22,308	10/13/93	$9.63	$77,000	5/27/94	$2.50	$20,000
EnSys Environmental Products	ENSY	$5.50	5,850	$32,175	10/26/94	$10.25	$57,841	8/8/94	$3.25	$18,340
Purus, Inc.	PURS	$5.00	6,236	$31,180	12/3/93	$14.50	$86,536	7/29/94	$4.13	$24,648

SIX STEPS OF COMMERCIALIZATION

1. Idea Development
2. Proof of Concept
3. Pilot
4. Prototype
5. Application/Demonstration
6. Commercial Sales

CAPITAL AVAILABILITY



Technical Phase

Steps 1 through 3

Business Focus

Technology

Technical Leadership

Commercial Phase

Steps 4 through 6

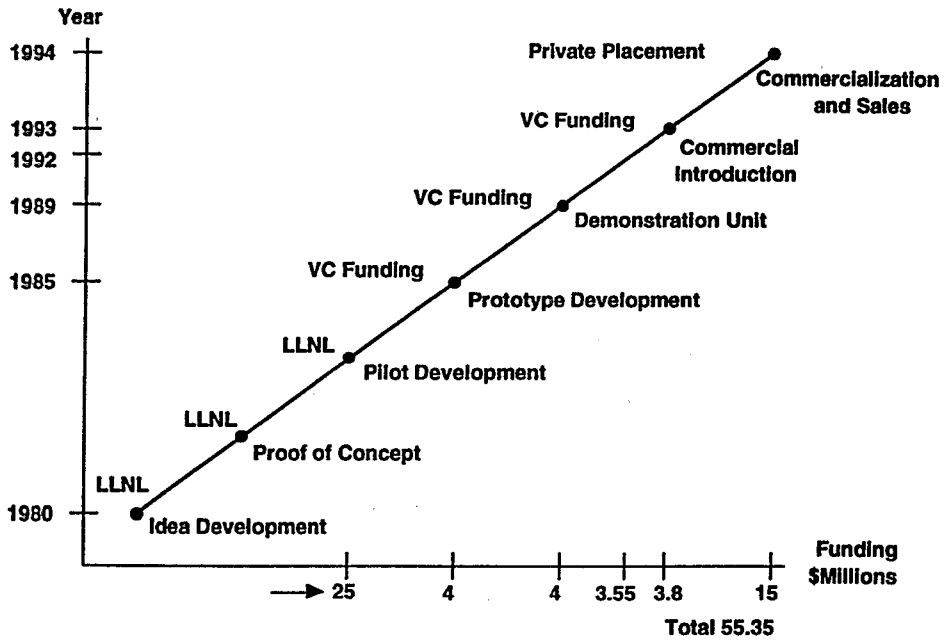
Business Focus

Management

Market

Proprietary Technology

Thermatrix Development



Success Factors

Image

- Management
- Market
- Technology
- Investors

Management

- Competence
- Clear Strategy
- Realistic Market Assessment
- Healthy Balance Sheet
- Cash Flow

Market

Size

Longevity

Global

Compliance Driven

Technology

Strong Patents

Unfair Advantage

Product Pipeline

Investors

Access to Money

Network of Connection

Business Building Experience

Attracting Financial Backing

Max Straube
Principal
Robertson, Stephens & Company

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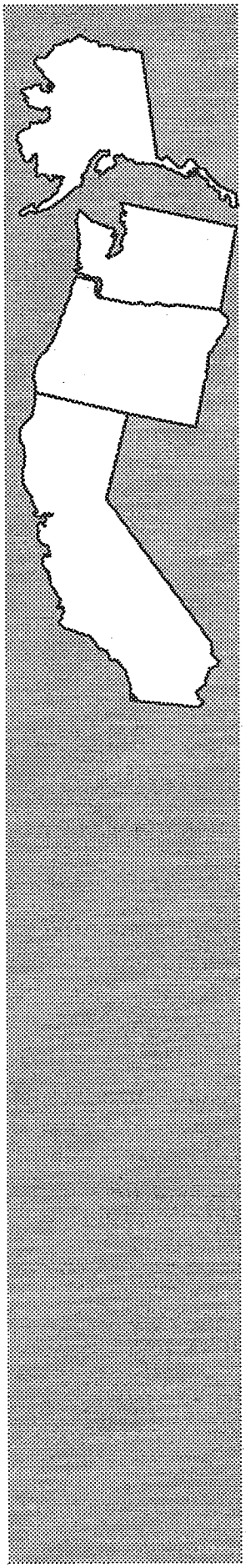


Session 5: Public/Private Partnerships

Public/Private Partnerships in Washington State

Barbara A. Campbell
Director, Northwest Regional Office
NASA Farwest Regional Technology Transfer Center (formerly with the Washington Department of Community Trade and Economic Development)

The State of Washington and Battelle Pacific Northwest Laboratory (Richland, WA) joined together to develop a Cooperative Research and Development Agreement to assist small and medium size environmental companies in the State of Washington. Both the State of Washington and Battelle-PNL are committed to restoring the environment and bringing into compliance, the Hanford site. While at the same time, to partner with industry to transfer technologies from and to the laboratory for the clean up efforts.

Therefore the State of Washington and Battelle-PNL joined together to develop a state-wide technology network that would provide information on emerging technologies, referral sources for technical assistance and provide business support, advice and counseling to strengthen businesses contribution to the development, demonstration, and deployment of environmental technologies. The success of this program has allowed the State and Battelle-PNL to expand this program to the other states in the Northwest and Canada.

Environmental Technologies and Partnerships

Richard Ragaini
Associate Department Head for Research and Development
Environmental Protection Department
Lawrence Livermore National Laboratory

Lawrence Livermore National Laboratory (LLNL) is committed to providing environmental technologies that are safer, more effective, and less costly in meeting the environmental needs of the Department of Energy (DOE) and the country. LLNL conducts research and development to demonstrate, implement, and ultimately commercialize, through public/private partnerships, innovative technologies for solving environmental problems. These technologies include: air pollution control; soil and groundwater remediation; waste treatment; waste minimization, pollution prevention; characterization and monitoring; and environmental computational tools.

LLNL is developing partnerships with other DOE Laboratories, the Department of Defense and other federal organizations, universities and industry to accelerate the development of these technologies, carry out field demonstrations, and facilitate the applications of these technologies in the marketplace. There are several mechanisms for implementing these partnerships, including cooperative research and development agreements, licensing arrangements, personnel exchanges, small business programs, work-for-others contracts, and formations of consortia.

A new type of partnership is the California Environmental Enterprise (CEE), a DOE-funded joint project of the California DOE Laboratories: LLNL, Lawrence Berkeley Laboratory, and Sandia National Laboratories, in coordination with the California Environmental Protection Agency (Cal/EPA). The CEE is envisioned to be a statewide environmental technology services network linking the DOE Laboratories with private industry, state regulatory agencies, universities, and environmental organizations. One key objective of the CEE is to facilitate the remediation, restoration, and reuse of contaminated property. The CEE is collaborating with Cal/EPA and the nonprofit Institute of Environmental Solutions to seek ways of applying DOE innovative technologies to California environmental restoration problems.

Examples of innovative environmental technologies under development will be discussed, including demonstrations, and partnerships.

Environmental Technologies: Coupling Economic Development to Environmental Protection

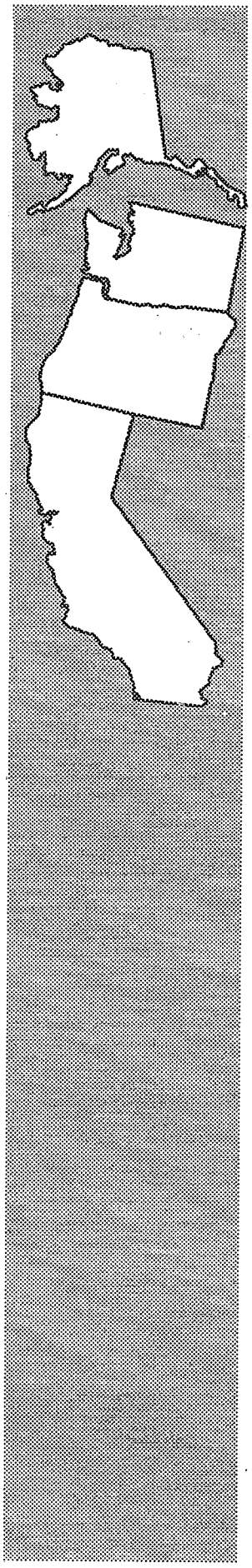
Steven L. Jarvis
Director, Office of Strategic Technology
California Trade and Commerce Agency

Environmental technologies are a new industry cluster for defense conversion in California. They provide an important migration pathway for defense conversion activities. Federal funding sources also recognize these technologies as a growing, dynamic business area.

The Office of Strategic Technology (OST) of the California Trade and Commerce Agency, uses technology as a tool for economic development in California. OST administers the Defense Conversion Matching Grant Program, as well as the California Manufacturing Excellence Program, the Regional Technology Alliances and the California Information Infrastructure.

OST is a partner with the California Environmental Protection Agency in the California Environmental Technology Partnership, a cooperative public and private sector effort providing assistance, guidance and direction to developers of environmental technologies. OST also advises the newly established California Environmental Technology Center in strategic technology areas. OST works closely with Cal/EPA on the establishment of California Environmental Business Incubators statewide.

The Office is working on a new project called E-LYNX for Environmental-technology Leveraging Network eXchange: A Working Model for a National Domestic Diffusion System of environmental technologies. E-LYNX will service environmental technology producers, users, regulatory community and policymakers.



Session 6: Cleanup Opportunities at Federal Facilities

Hanford Site, Washington

Robert R. Silva, Jr.
Manager, Technology Transfer and Infusion
Westinghouse Hanford Company

The Hanford Site, located in the southeast portion of the state of Washington, is a 1,450-hectare (560 square miles) reservation that was selected by the U.S. Government in 1942 for production of the world's first nuclear weapons materials. For more than 40 years, defense production operations at Hanford generated hazardous and radioactive materials and wastes that for the most part remain there today. Environmental restoration of the Hanford Site is the primary mission of the Westinghouse Hanford Company (WHC) and it is also the thrust of the "Tri-Party" agreement among the U.S. Environmental Protection Agency, the Washington State Department of Ecology and the U.S. Department of Energy.

The Site restoration effort includes management of enormous quantities of highly radioactive waste materials. It is estimated that 440,000 cubic meters (117 million gallons) of high-level liquid/solid waste are contained in 177 underground storage tanks. Current plans call for separation of the high- and low-level constituents from the liquid wastes held in the tanks, and stabilizing them in a fused borosilicate glass for permanent disposal. It has been estimated that the Site cleanup mission will require more than 50 billion dollars and at least 40 years to complete. It is clear that for such a huge task in this modern era of regulatory rigor and public involvement in environmental issues, those estimates are optimistic without significant advances in the technologies that are available for dealing with the cleanup mission at the Hanford Site. Therefore, high priority levels are being assigned to efforts to define needs and obtain innovative solutions that can meet the daunting challenges ahead.

The longstanding Hanford culture, established by a defense production mission that required a high level of secrecy, called for developing any needed technologies "behind the fences" or obtaining them outside using specifications that were written so as to reveal nothing of the applications.

As the Hanford mission has shifted to site restoration, so too has the role of the private sector changed. The time for secrecy has passed, we now need to get private business involved in dealing with our environmental challenges and clearly, this is a new way of doing business at Hanford.

Joseph F. Nemec
Vice President of Operations
Bechtel Hanford, Inc.

Abstract not available at this printing.

Naval Air Station North Island, California

Morgan Rogers
Remedial Project Manager, Southwest Division
Environmental Department, Naval Facilities Engineering Comand

Navy Environmental Leadership Program (NELP) Charter - NELP was established by the Chief of Naval Operations Environmental Quality Management Board in May 1993. The NELP Charter outlined Navy roles and responsibilities for NELP implementation.

NELP Objective - The objective of NELP is to identify, test, and evaluate new and innovative technologies, management methods applicable to any or all environmental areas of concern, export successes and lessons learned throughout the Navy.

NELP Activities - Two Navy activities were selected to implement NELP, Naval Air Station (NAS) North Island in San Diego and Naval Station (NAVSTA) Mayport, Florida. Selection was based on the activities' representative environmental programs to other Navy activities and thus facilitates greater distribution and use of successes and lessons learned.

NAS North Island Overview - NAS North Island has 12 Installation Restoration (IR) sites, 147 underground storage tanks, 340 air permits, 65 stormwater outfalls, 79 90-day hazwaste accumulation sites, 8 berthing piers, aircraft operations and maintenance activities, and an industrial waste treatment plant.

NELP Implementation - NELP addresses all aspects of environmental programs which are divided into four primary elements; environmental cleanup (IR), compliance, pollution prevention, and natural resources conservation. The NELP approach is to establish partnerships between the Navy, regulators, and the community and identify and implement innovative technologies and focused management within the environmental programs.

NELP Strategy - The NELP implementation strategy includes identifying problems, identifying innovative solutions, screening and selecting appropriate solutions, identifying resources requirements, implementing the solution (treatability study, field demonstration, and/or full scale), evaluating and documenting the solution, and exporting the solutions and lessons learned.

NELP Initiatives - NELP initiatives pursued include:

- EPA SITE Program
- Southwest Naval Facility (NAVFAC) New Technologies Solicitation
- NAS North Island Bioremediation Treatment Unit
- Comprehensive Management Action Plan
- Restoration Advisory Board
- Pollution Prevention Plan Prototype
- 3-d Seismic Modelling
- Site Characterization and Analysis Penetrometer System
- Misc.

NELP Summary - Through the NELP efforts at NAS North Island and NAVSTA Mayport, the Navy will become an environmental leader with Navy environmental actions being accomplished better, faster, and cheaper.