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ENVIRONMENTAL CLEANUP TECHNOLOGY TRANSFER INITIATIVES

by

Laurel A. Muehlhausen

ABSTRACT This white paper provides brief descriptions of environmental cleanup technology transfer initiatives and points of contact for further information. The summaries describe the mission and goals, the "modus operandi" or actual activities and projects implemented to achieve the goals, the source and amount of funding for the initiative, and other general information.

The "initiatives" are programs, committees, organizations, and demonstration projects that promote development of innovative environmental cleanup technologies and help ensure the transfer of lower cost technologies into full-scale use. Opinions differ on the meaning of "innovative technology." Most of the initiatives described here consider a technology "innovative" if it has been demonstrated at the pilot scale but performance and cost data are lacking. Innovative technologies do not get widely used for many reasons such as risk of failure to meet cleanup standards or unknown cost information. Even if the cleanup succeeds, the project could fail if the public or the regulatory agency distrust a new and different technology. Federal and State agencies, legislatures, and private firms are working to reduce the barriers to technology innovations and commercialization through the initiatives described here.

Lower cost technologies are needed to meet environmental cleanup standards in a time of shrinking budgets. Federal lands (military bases, defense production and research facilities, park, forest, and range lands) contain thousands of past disposal sites. The Federal government is committed to the environmental cleanup of these sites although estimates of the cleanup cost exceed $250 billion. Adding in the further cleanup costs of state and private waste sites, the nation's total cleanup estimates exceed $750 billion. ("EPA Needs to Better Focus Cleanup Technology Development," General Accounting Office, September 1992.) The initiatives described in this paper strive to develop and commercialize environmental cleanup technologies that could reduce these costs.

METRIC CONVERSION FACTORS

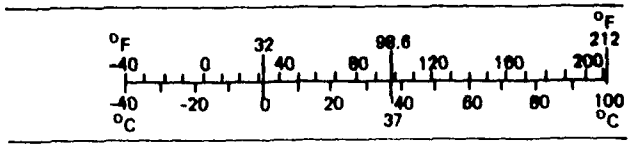
Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2,000 lb)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
^oF	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	^oC

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1,000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
^oC	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	^oF



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This white paper provides brief descriptions of environmental cleanup technology transfer initiatives and points of contact for further information. The summaries describe the mission and goals, the "modus operandi" or actual activities and projects implemented to achieve the goals, the source and amount of funding for the initiative, and other general information.

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ENVIRONMENTAL CLEANUP TECHNOLOGY TRANSFER INITIATIVES

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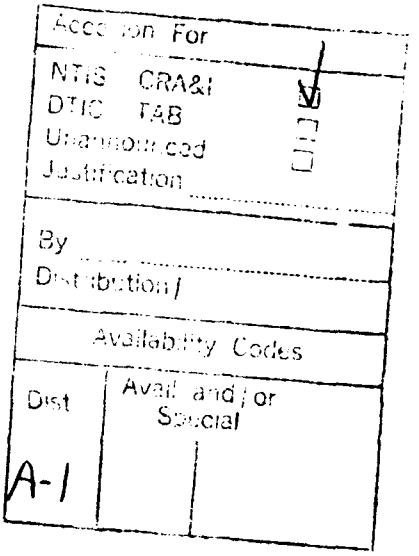
No paper is perfect and there are undoubtably some environmental cleanup technology transfer initiatives that are not included. NFESC plans to update this document periodically and welcomes contributions. Send information to: Rebecca Biggers, NFESC, Code 414RB, 560 Center Drive, Port Hueneme, CA 93043.



A. FEDERAL REMEDIATION TECHNOLOGIES ROUNDTABLE

1. Mission/purpose statement

The purpose of the Roundtable is to exchange information and provide a forum for joint activity regarding the development and demonstration of innovative technologies for hazardous waste site remediation. The exchange synthesizes the technical knowledge that Federal Agencies have compiled and provides a more comprehensive record of performance and cost of innovative technologies.

2. Goals/objectives

The Roundtable serves Federal programs that develop new remediation technologies with improved efficiency and lower costs. Thereby the Roundtable supports the demonstration of innovative technologies and strives to increase their use.

3. Modus operandi

The Roundtable has three main activities: hold semi-annual meetings to exchange information among several federal agencies and take action on items of mutual interest, publish information on remediation technology, and provide a basis for joint efforts in specific issue areas.

Roundtable members include the major federal developers and users of these technologies: the Department of Defense (DoD), Department of Energy (DOE), Department of Interior (DOI), and the Environmental Protection Agency (EPA). This Roundtable of senior executives from these agencies meets as a steering committee two times each year. Ad Hoc meetings address special issues and occur more frequently and may be open to government agencies, private industry, and public interest groups. The committee establishes a process for applied technology information exchange and considers cooperative efforts of mutual interest. Specific activities could be undertaken by ad hoc subcommittees, through existing training and education mechanisms, and through co-sponsored meetings.

The Roundtable publishes three documents: 1) "Accessing Federal Data Bases for Contaminated Site Clean-Up Technologies," 2) Federal Publications on Alternative and Innovative Treatment Technologies for Corrective Action and Site Remediation," and 3) "Synopses of Federal Demonstrations of Innovative Site Remediation Technologies." The "Bibliography of Federal Publications on Alternative and Innovative Treatment Technologies for Corrective Action and Site Remediation" which is updated annually. These publications promote innovative technology by publicizing and disseminating information gathered from EPA, the Navy, Army, Air Force, DoD, National Technical Information Service (NTIS) DOE, Enviroline, and other databases. These publications also help to coordinate research initiatives in cleanup and remediation technology. Publications may be ordered from NTIS by calling 703-487-4650.

Contracts developed through the Roundtable also facilitated compilation of the "Comprehensive Guide to IR Site Remediation Technologies," an update of the "Remediation Technologies Screening Matrix" first written by the EPA and the Air Force. The newer Guide features input from the member agencies of the DoD Environmental Technology Transfer Committee (ETTC), i.e. the EPA, DOE, DOI, Navy, Army, and Air Force. The Guide strives to reduce individual efforts among the services by combining results from seven different programs.

The Roundtable subgroup on Cost and Performance Information recently prepared a draft "Strategy for Documenting Cost and Performance Data from Completed Site Remediation Projects." One impediment to using innovative technology is the lack of cost and performance data. This strategy will guide the agencies in documenting this data in a consistent manner, thereby getting more acceptance for a given innovation. EPA, DOE, and DoD are collecting cost and performance data and the Roundtable seeks to coordinate these data sets by defining common terminology, establishing minimum data sets to describe waste characteristics and technology operating conditions, and documentation of measuring methods. EPA prepares cost and performance reports for Superfund sites, and DoD or DOE prepares the reports for remediation projects at military facilities.

4. Funding

EPA-TIO contributes most of the Roundtable budget; other member agencies contribute small sums (a few thousand each) to offset meeting costs.

Total annual budget is around $50,000, most of which is spent on organizing meetings and publishing the three Roundtable documents.

5. Program initiator

The EPA Technology Innovation Office (TIO) initiated this program on their own, not in response to specific legislation.

6. Interaction with other gov't agencies

Representatives from all of the major federal agencies involved in developing cleanup technologies comprise the Federal Remediation Technologies Roundtable so the agency interaction is extensive.

7. Time period of program

The Roundtable began in May 1990 and will continue as long as necessary.

8. Contact names

Daniel Powell, EPA-TIO Wash DC	703-308-8827
Walter W. Kovalick, Jr., PhD., EPA-TIO Wash DC	703-308-8800
Roundtable publications, NTIS	703-487-4650

B. ENVIRONMENTAL TECHNOLOGY TRANSFER COMMITTEE (ETTC)

1. Mission/purpose statement

Ensure the exchange of programmatic and technical information among DoD, other Federal agencies, and industry. Act as a conduit for technology transfer between the laboratory and user community.

2. Goals/objectives

The Committee will ensure maximum transfer of programmatic and technical information throughout DoD installations and other Federal agencies in several areas including cleanup, compliance, conservation and pollution prevention technologies; implementation and transfer of environmental technologies; coordinating sites for cleanup technology demonstrations and implementations; and Tri-Service coordination with EPA, DOE, and other Federal agencies through common technical information networks.

3. Modus operandi

Principal committee members come from the Deputy Under Secretary of Defense for Environmental Security, the Army, Navy, Air Force, Defense Logistics Agency. Representatives of the DOE, EPA, DOI and the Coast Guard may also participate. Other interested Federal organizations are encouraged to attend and participate in meetings and working groups. Subcommittees and ad hoc working groups may be formed to investigate specific areas or problems of Tri-Service interest. The ETTC chairmanship rotates with the Tri-Services Reliance chair.

Formerly the Installation Restoration Technology Coordinating Committee (IRTCC), the name was changed in 1993 to ETTC to emphasize the committee's involvement with pollution prevention and base closure in addition to IR (environmental cleanup).

ETTC areas of concern and/or involvement: SERDP, National Test Center, IR Technologies Handbook, SCAPS (Site Characterization and Analysis Penetrometer System), solvents in soil and groundwater, explosives contaminated soil and groundwater.

The ETTC facilitated compilation of the "Comprehensive Guide to IR Site Remediation Technologies," an update of the "Remediation Technologies Screening Matrix" first compiled by the EPA and the Air Force. The newer Guide features input from the member agencies of the DoD Environmental Technology Transfer Committee (ETTC), i.e. the EPA, DOE, DOI, DoD, Navy, Army, and Air Force. The Guide provides guidance and information on proven cleanup technologies to field activities and remedial project managers (RPMs). The Guide can reduce individual efforts among the services by compiling results from seven different programs.

4. Funding

The DoD rotating chair organization supports the administrative cost of the ETTC activities. The parent organization of each principal member and each alternate member are responsible for travel and per diem costs of member attendance at all meetings.

5. Program initiator

The ETTC was initiated by all three DoD services, i.e. the Army, Navy and the Air Force. Broad authority for the Committee comes from CERCLA and the Pollution Prevention Act of 1990.

6. Interaction with DoD, DoE, EPA and other gov't agencies

Multi-agency organization.

7. Time period of program

Began late 1980s; name change occurred in 1993. Not scheduled to end.

8. Contact Names

Edward Engbert, Army, Aberdeen, MD 410-671-1575

Jeff Grovhoug, NCCOSC, NRaD	619-553-5475
Joe Kaminski, NAVFAC	703-325-0314

C. STRATEGIC ENVIRONMENTAL RESEARCH & DEVELOPMENT PROGRAM (SERDP)

1. Mission/purpose statement

A joint, multi-agency effort that funds environmental research, development, demonstration programs. SERDP will increase efficiency and avoid duplication among the services' environmental technology research and development programs.

2. Goals/objectives

Emphasize joint programs among the services, other government agencies, academia, and private sector. Support multi-agency basic and applied research and development of technologies that enhance the capability to meet EPA environmental obligations. Identify research, technologies, and other information developed for national defense purposes that would help government and private organizations in developing technologies for addressing environmental concerns. Furnish government and private organizations with data and enhanced data collection and analytical capabilities for conducting envrionmental research, including global environmental change research. Share research, technologies, and other information with government and private organizations.

3. Modus operandi

SERDP funds government laboratories, academic, and private industry research and development of technologies needed by DoD, DOE, and EPA in the Technology Thrust Areas. The SERDP Technology Thrust Areas are: Cleanup (Installation Restoration), Compliance, Conservation, Pollution Prevention, Global Environmental Change, Energy Conservation/Renewable Resources. Funding takes many forms: requests for proposals (RFPs), broad agency announcements (BAAs), grants, technical assistance agreements, cooperative research and development agreements (CRADAs), and the Federal Small Business Innovation Research (SBIR) Program.

SERDP Participating Facilities are: the Army, Navy, Air Force, Coast Guard, DOE, EPA, OSD (Office of the Deputy Under Secretary of Defense (Environmental Security)), ARPA (Advanced Research Projects Agency), DNA (Defense Nuclear Agency), and DDR&E (Department of Defense Research and Engineering).

4. Funding

SERDP funding must be approved by Congress each year.

Projected Funds, in $1000:

	FY94	FY95	FY96	FY97	FY98
Cleanup	40,257	34,170	32,026	34,582	38,212
Compliance	17,642	14,911	13,559	14,564	13,925
Conservation	8,764	7,242	7,482	9,384	11,468
Energy/Renew Res	10,380	10,094	9,280	9,281	9,003
Global Envtl Chg	45,645	24,966	14,222	15,090	14,509
Pollution Prevent	27,423	20,524	17,202	14,620	13,180

5. Program initiator

Congress initiated SERDP through PL 101-510 in 1990 (10 USC 2901-2904). Also guided by DoD under direction from Congress in the House Armed Services Report #102-60 given with the FY92 Defense Authorization Act: "The committee directs DDR&E (R&AT) E&LS to develop a comprehensive plan that provides objectives, an investment strategy, and technology transfer mechanisms for a tri-service wide environmental program that will be largely performed by U.S industry in conjunction with the services." The Department of Defense, in a Defense Management Report Decision (DMRD 920) directed the services to "assure that all future DoD environmental RDT&E (Research, Development, Test and Evaluation) efforts are consistent with the requirements and priorities of a DoD-wide strategic plan."

6. Interaction with DoD, DoE, EPA and other gov't agencies

Extensive; but may be more in appearance than reality in some cases. The DNA and the Coast Guard do not actively participate although they would like to more than they do. SERDP focuses on tri-service initiatives.

7. Time period of program

Established 1990; currently planned through 2001.

8. Contact Names

SERDP Information Line,	John Ruptik	703-525-5300, ext. 546
Dr. John Harrison, SERDP executive director		601-634-3227

Cleanup Thrust area contacts:

Army	Dr. John Cullinane	601-634-3723
Navy	Dr. Shun Ling	703-325-6463
Air Force	LTC Robert LaPoe	904-283-6244
Cst Guard	LCDR Zack Sikorsky	202-267-1944
DOE	Dr. Steve Lien	301-903-7911
EPA	Mr. Alfred Galli	202-260-2583
OSD	Mr. Jim Marsh	202-426-2081
DNA	Dr. David Auton	703-325-7618

D. TRI-SERVICE PROJECT RELIANCE

1. Mission/purpose statement

Integrate the science and technology projects of the research and development (R&D) laboratories (6.1, 6.2, 6.3A) of the three Services (Army, Air Force, Navy) into a single Tri-Service program. Eliminate duplicative R&D; each of the three Services will rely on a designated lead Service for a given technology area. Fulfill the DoD R&D objective to provide technology development and transfer to solve our most pressing environmental problems, as soon as possible, and at least cost.

2. Goals/objectives

Eliminate duplication and overlap of capabilities. Coordinate related technology efforts. Gain efficiency through collocation of in-house work. Preserve services' mission essential capabilities.

Develop "world class" products. Enhance the science and technology program.

3. Modus operandi

Reliance provides an organizational structure to reduce duplication in science and technology research. Technology transfer is not a focus of Reliance but does occur within the current phase of the program. Reliance is a two-step program. During the study phase of 1990/1991, Tri-Service working groups set goals and a framework to transition the services from informal cooperation to an increasing level of mutual reliance.

Under Reliance, a framework of six categories was used to analyze the Services' science and technology research programs. A primary objective of Project Reliance was to move from Category 1 activities to Category 2, 3, or 4 whenever possible. That is, Reliance sought to move the three services toward consolidation or collocation in the areas of science and technology basic research. The categories are:

Category 1. Coordination: information exchange, separate funds, separate sites. Used most frequently prior to Reliance.

Category 2. Joint Efforts: common/linked objectives, joint plans, separate funds, multiple sites for execution.

Category 3. Collocation: separate funds, single in-house site at each Service; program may be joint or independent.

Category 4. Consolidation: lead Service manages all work with all S&T funds transferred to lead Service.

Category 5. Competition: in-house performer decisions made competitively across services, separate funds, independent control.

Category 6. Service Unique: other Services lack need for this S&T or requirements peculiar to one service, work funded by affected service.

The second, current phase of Reliance is implementation. The Joint Engineers was created to implement Reliance for environmental quality and civil engineering. The Environmental Quality Panel believes that each service must retain the capability to comply with environmental laws and regulations to carry out its mission while still addressing Reliance. There are seven technology subareas within environmental quality: installation restoration, noise abatement, pollution prevention, base support, atmospheric compliance, global marine compliance, and terrestrial and aquatic assessment. The Army is the lead agency for installation restoration (IR).

Within IR, innovative technology development and utilization is a goal. Products of the IR subarea are in the form of field-demonstrated site characterization and waste site remediation technologies, equipment, and methods. A Tri-Service technical note on IR technologies will be published to transfer recently developed technologies to Tri-Service users. Innovative treatment technologies are also being developed to treat contaminants under the Pollution Prevention subarea.

4. Funding

Total funding FY94:	N--$14.5M	AF--$43M	A--$18M
Total funding FY98:	N--$7M	AF--$10M	A--$22.5M

Installation Restoration funding:	FY94--$31M	FY98--$12M
Pollution Prevention funding:	FY94--$22M	FY98--$8.5M
Air Compliance funding:	FY94--$2.3M	FY98--$1.7M

5. Program initiator

Department of Defense, in a Defense Management Report Decision (DMRD 922) tasked the Services to proceed with plans for restructuring and streamlining their RDT&E (Research, Development, Test and Evaluation) activities.

6. Interaction with DoD, DoE, EPA and other gov't agencies

Reliance dictated for the Army, Navy, and Air Force to interact, consolidate and rely on the expertise of one another for environmental science and technology research.

7. Time period of program

Began in 1989-1990; planned to continue.

8. Contact names

Dr. John Cullinane, WES, MS	601-634-3723
Dr. George Wu, NFESC, CA	805-982-1294
LTC Robert Lapoe, Tyndall AFB, FL	904-283-6244

E. NAVAL FACILITIES ENGINEERING SERVICE CENTER (NFESC)

1. Mission/purpose statement

Provide specialized engineering, scientific, and technical products and services to the Navy, Marine Corps, DoD customers and other federal agencies on a worldwide basis.

2. Goals/objectives

Provide technical specialists in shore, ocean and waterfront facilities, energy and utilities, and environmental engineering. Deliver quality products and services in the shortest possible time at the lowest possible cost. Provide research, consulting, and field engineering services. Develop and transfer technology. Compliment the missions and capabilities of the rest of the NAVFAC team.

3. Modus operandi

The West Coast NFESC components, formerly NCEL (Naval Civil Engineering Laboratory) and NEESA (Naval Energy and Environmental Support Activity), are located at the Naval Construction Battalion Center in Port Hueneme, CA. The East Coast components, formerly Facilities Project Offices 1 and 2, are located at the Washington Navy Yard in Washington, DC. NFESC is comprised of five departments: 1) Environmental Department, 2) Energy & Utilities Department, 3) Ocean Facilities Department, 4) Shore Facilities Department, and the 5) Amphibious & Expeditionary Department. Technology transfer is accomplished through consultation and technical assistance, patent license agreements, Cooperative Research and Development Agreements (CRDAs), and through direct rapid response to the fleet.

The Environmental Department (Code 40) provides customized technology and services to meet the environmental requirements of the Naval Shore Establishment. Efforts focus on environmental restoration (cleanup) and compliance, environmental data management, waste management, pollution prevention, indoor air management, oil spill prevention and contingency planning, and environmental technology transfer. Three divisions and one office comprise the Environmental Department: 1) Environmental Restoration (Cleanup) Division, 2) Technology Implementation and Customer Liaison Office, 3) Pollution Prevention Division, and 4) Air Division.

The Environmental Restoration Division provides complete services in the assessment and cleanup of substances that pose a potential threat to human health or the environment. The Technology Application Branch facilitates technology transfer by publishing the "Environmental Cleanup Technology Transfer Initiatives," by creating a Technology Implementation Working Group of Navy personnel, and by coordinating with other services, EPA, DOE, and other agencies. This Branch also administers Remedial Action Contracts and provides OSHA required health and safety classes for environmental cleanup field personnel. The Restoration Development Branch tests, evaluates, and implements promising cleanup technologies. The Consultation Information Management Branch operates the Site Characterization and Analysis Penetrometer System (SCAPS), manages remedial investigations/feasibility studies (RI/FS), and conducts preliminary assessments of Navy properties on the Federal Facilities Docket. This Branch also manages the Navy's Restoration Management Information System (RMIS), and produces the Remedial Project Manager (RPM) newsletter.

The Technology Implementation and Customer Liaison Office seeks to reduce barriers to innovative cleanup technologies. For example, this Office serves on the Environmental Technology Transfer Committee (ETTC) and assists with the Navy Environmental Leadership Program (NELP). The Pollution Prevention Division disseminates pollution prevention information and enables technology transfer through services like the Pollution Prevention Bulletin Board. Pollution Prevention provides direct activity support by assessing pollution prevention opportunities and developing pollution prevention plans. This Branch also performs research and development, and full scale demonstrations of industrial processes that reduce pollution. The Air

Division guides compliance with both indoor and outdoor air quality regulations.

Technology transfer is also conducted by the Energy and Utilities Department which is responsible for the Naval Shore Energy Program.

4. Funding

The FY95 NFESC projected budget totals $110 million. This total includes $36 million for the Environmental Department.

5. Program initiator (Congress, Navy, etc.)

NFESC was created from NCEL and NEESA to more efficiently provide facilities engineering support Navywide in light of Base Closure and Realignment (BRAC) requirements.

6. Interaction with DoD, DoE, EPA and other gov't agencies

Extensive. Environmental cleanup and compliance requires ongoing interaction with EPA and state regulatory agencies. NFESC coordinates with other government agencies in many areas. For example, NFESC contributes to the Remediation Technologies Screening Matrix, and participates in multi-agency programs like SERDP, National Test Site, and the ETTC (Environmental Technology Transfer Committee).

7. Time period of program

Formed in 1993, NFESC consolidates six Naval Facilities Engineering Command (NAVFAC) components: 1) Naval Civil Engineering Laboratory (NCEL), 2) Naval Energy and Environmental Support Activity (NEESA), 3) Ocean Engineering and Construction Project Office (FPO-1), 4) Communications/Electronics Facilities Project Office (FPO-2), 5) Naval Facilities Engineering Command's Chief Engineer Office (FAC04B), and 6) Assistant Commander for Ocean Facilities (FA07). NCEL was established in 1948 and NEESA was established in 1981. NFESC employs over 500 personnel and is projected to continue indefinitely.

8. Contact Names

Environmental Department, Port Hueneme, CA	805-982-5751
Environmental Technology Transfer, Rebecca Biggers, CA	805-982-2640

F. AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE (AFCEE)

1. Mission/purpose statement

AFCEE is the premier environmental services organization of the Air Force. AFCEE provides environmental restoration, compliance, planning and pollution prevention, environmental technology export, military construction management and facilities design.

Motto: "We Care About Tomorrow, Today"

2. Goals/objectives

Enhance the quality of life of Air Force men, women and their families through aggressive environmental management. Prepare remedial action plans from preliminary assessment through remedial design for hazardous waste cleanup. Provide cradle-to-grave management of environmental restoration activities at Air Force bases. Provide customers with powerful tools and technologies to successfully clean sites for reuse.

3. Modus operandi

AFCEE began with 250 employees in 1991 and has rapidly expanded to a staff of 425. AFCEE is located at Brooks Air Force Base, San Antonio, TX.

Organized into five major directorates/activities including pollution prevention, environmental restoration (includes technology transfer), environmental conservation and planning, construction management (includes environmental compliance), and the design group.

Thrust areas include technology transfer and pollution prevention. AFCEE favors bioventing (the Air Force has over 100 sites undergoing bioventing) and natural attenuation treatments.

AFCEE fulfills many of its responsibilities by contracting with private-sector firms. AFCEE advertises contract opportunities in the Commerce Business Daily; contracts range from $100,000 to more than $200 million.

AFCEE publishes "Center Views" six times per year to publicize and showcase AFCEE projects and accomplishments, distributes fact sheets on environmental cleanup and compliance, and hosts an annual Air Force Pollution Prevention Conference and Exhibition. AFCEE maintains an on-line environmental information hotline called PRO-ACT, available on an electronic bulletin board called DENIX (Defense Environmental Network and Information Exchange). A DENIX login is available from the DENIX data manager (1-800-642-3332) and the access numbers are 1-800-233-HELO (233-4356) or DSN 240-4214.

4. Funding

Monies come from within the Air Force budget; some is DERA (Defense Environmental Restoration Account), some O&M (Operations and Maintenance) funds, some is BRAC (Base Realignment and Closure) money-- all depending on where the project is done. AFCEE people also approach the Pentagon to secure funding for specific projects.

The AFCEE budget fluctuates from year to year and project to project. The FY94 budget for remediation is 1.5 billion. Depending on the amount of command project money, AFCEE estimates that next year's budget will be the same or higher.

5. Program initiator (Congress, Navy, etc.)

Initiated within the Air Force by the Chief of Air Force.

6. Interaction with DoD, DoE, EPA and other gov't agencies

Numerous interagency agreements for joint projects. EX: interagency agreement with NASA to do technology transfer in pollution protection area. AFCEE has similar agreements with Fish & Wildlife and EPA. AFCEE has secured EPA certification for some technologies.

7. Time period of program

Began 1991, planned to continue indefinitely and currently growing rapidly.

8. Contact Name

Mike Hawkins, Brooks AFB public affairs 210-536-3066; DSN 240-3066

G. U.S. ARMY ENVIRONMENTAL CENTER (USAEC)

1. Mission/purpose statement

The U.S. Army Environmental Center (USAEC) provides centralized management, oversight, coordination, and execution of Army-wide environmental programs. The USAEC is tasked to clean up Army installations (installation restoration), to support environmental compliance, and to demonstrate and transfer environmental technology. The USAEC also provides technical support and consultation to Headquarters, Department of the Army; Major Army Commands (MACOMS); U.S. Army Corps of Engineers Headquarters, Divisions and Districts; and individual Army installations.

2. Goals/objectives

Protect human health and clean up the worst sites first.

Give immediate priority to sustained compliance with all environmental laws.

Continue to restore previously contaminated sites.

Reduce or eliminate pollution at the source.

Conserve and preserve natural/cultural resources for future generations.

3. Modus operandi

The four pillars of the Army environmental strategy are compliance, restoration, pollution prevention, and conservation. The USAEC, a Field Operating Agency of the Department of the Army staff, is a major focal point in the program management and support efforts of this Army-wide strategy. Five divisions comprise USAEC: base closure, installation restoration, environmental compliance, environmental technology, and resource management. Headquartered in the Edgewood Area of Aberdeen Proving Ground (APG), Maryland, the USAEC has an authorized staff of more than 200 civilian and military personnel.

The USAEC, integrated with the Corps of Engineers research laboratory capabilities, focuses on the development of innovative and cost-effective technologies for detection, monitoring, and restoration of contaminated sites, and seeks new ways to prevent pollution and reduce hazardous waste generation. For example, USAEC supports advanced demonstration and validation projects to develop and transfer research projects for use in the field.

USAEC supports a broad range of environmental compliance program requirements, and runs the Army's Environmental Compliance Assessment System. It provides regulatory and environmental training information to the field, and assists installations in the areas of hazardous waste minimization, protection of natural and cultural resources, and non-compliance resolution.

USAEC develops the annual and multi-year Installation Restoration workplans for the Army, and performs enhanced and preliminary assessments, site investigations, and remedial investigation/feasibility studies at active Army installations. The USAEC also conducts comprehensive environmental investigations for the Army Base Realignment and Closure (BRAC) process which includes preparation of Statements of Condition once cleanup has been completed by the U.S. Army Corps of Engineers districts.

USAEC provides environmental cleanup information management and dissemination through several activities. USAEC hosts the Army Environmental Research and Development Symposium, held annually since 1976. USAEC publishes reference documents and periodicals, and coordinates the compilation of the "Comprehensive Guide to IR Site Technologies," a Tri-Services update to the Air Force Remediation Technologies Screening Matrix. USAEC maintains the U.S. Army Environmental Hotline (800-USA-EVHL), a comprehensive source for environmental information, including hazardous waste management regulations, forms, training, legal requirements, or any other environmental concerns or questions. The Hotline is available to Army employees worldwide. USAEC's regulatory specialists issue Environmental Alerts, via electronic mail, to the Army community as changes occur in federal environmental laws and regulations.

USAEC supplies legal and public affairs support for all four pillar areas. Public affairs specialists participate as USAEC project team members

by providing public involvement planning and management support to individual commanders. USAEC's Office of Counsel provides legal guidance for all four pillar areas as well.

Special USAEC projects include the Chesapeake Bay Initiative to restore and protect the Chesapeake Bay.

4. Funding

The USAEC receives funding for technology development from several sources such as the Strategic Environmental Research and Development Program (SERDP), Defense Environmental Restoration Account (DERA), and the Innovative Environmental Security Technology Certification Program (ESTCP). The USAEC budget for technology demonstration varies but is generally between $15 to $20 million dollars per year.

5. Program initiator

The USAEC was initiated by the Army. The precursor to USAEC, the Project Manager for Chemical Demilitarization, was established in October 1972 to manage the demilitarization of lethal chemical agents and munitions for disposal. In 1975, the newly established Installation Restoration Program was added to its responsibilities and in 1978 the organization was redesignated the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA). The Research and Technology Development Evaluation Program for Pollution Abatement was added in 1980. In October 1988, USATHAMA transitioned from the HQ U.S. Army Material Command to the U.S. Corps of Engineers and became a separate Field Operating Activity. USATHAMA then became responsible for assisting installations in achieving and maintaining environmental compliance in current operations, and management of the environmental restoration work at installations identified for realignment or closure. In 1993 the Army renamed the organization the U.S. Army Environmental Center (USAEC).

6. Interaction with DoD, DoE, EPA and other gov't agencies

USAEC works with Army and US Army Corp of Engineers personnel and properties worldwide. USAEC also partners with other federal agencies like DOE, EPA, the Soil Conservation Service, the US Geologic Survey, the US Forest Service, and the Bureau of Land Management, as well as the private sector.

7. Time period of program

Ongoing. USAEC has been an evolving organization since 1972; the USAEC name was established in 1993. See also the history of USAEC presented under "Program Initiator" section.

8. Contact Names

Michael Dette, Technology Development & Transfer Branch 410-671-4811/2054

H. U.S. ARMY ENGINEER WATERWAYS EXPERIMENT STATION (WES)

1. Mission/purpose statement

The original mission was to test flood control plans for the Mississippi River following the 1927 flood. The current mission is to conceive and execute engineering and scientific investigations in support of the military and civil programs of the Corps of Engineers, the Army and the nation.

2. Goals/objectives

In the area of environmental cleanup, WES provides cheaper, more rapid, and more effective technologies for site characterization and environmental cleanup of media contaminated with hazardous and toxic materials.

3. Modus operandi

The Waterways Experiment Station (WES) is located in Vicksburg, MS and employs approximately 1500 civilian personnel. WES includes six research laboratories: Hydraulics, Geotechnical, Structures, Environmental, Information Technology, and the Coastal Engineering Research Center. Other WES elements perform a wide range of technical, instrumentation, construction, and administrative support.

The Environmental Laboratory scientists and engineers examine and quantify the interaction between man and the environment and develop methods to minimize harmful impacts while maximizing environmental conservation, stewardship, and restoration. Environmental experts study the ecological interactions and environmental impacts in estuarine, marine, wetland, and freshwater areas; natural and cultural resources management; hazardous materials management; aquatic plant control; and zebra mussel control. They conduct projects relating to the environmental impact of dredging and dredged material disposal; environmental restoration (cleanup); wetlands creation; restoration, delineation, evaluation, conservation, and stewardship; water quality; and contaminated sediments.

WES environmental cleanup research is conducted in four areas: 1) site investigation/characterization, 2) groundwater modeling, 3) environmental fate and effects, and 4) explosives, heavy metals, and organics treatment. Special projects include SCAPS (Site Characterization and Analysis Penetrometer System) and other environmental monitoring technologies and devices. WES is the lead DoD research laboratory for the development of innovative technologies to treat explosives, heavy metals, and selected organic compounds. The Hazardous Waste Research Center (HWRC) develops cost-effective hazardous waste treatment technologies, and supports the DoD's Installation Restoration (IR) Program. The HWRC has been active in the Best Demonstrated Available Technology (BDAT) program for EPA's RCRA program and in conducting treatability testing for DoD and other Federal Agencies. WES conducts SERDP research in the areas of explosives-contaminated soils, wetlands, threatened and endangered species habitat, and groundwater studies.

The Information Technology Laboratory performs research in computer-aided interdisciplinary engineering, computer science, and information technology. In addition to super computing and computer-aided design, this laboratory operates the Corps' largest library.

WES is active in technology transfer. WES established the Advanced Applied Technology Demonstration Facility (AATDF) for Environmental Technology in 1993 with a $20 million grant. The AATDF will accelerate the development of advanced hazardous waste cleanup technologies for DoD and the nation (see also section R of this paper). WES researchers contributed to the Remediation Technologies Screening Matrix. WES provides graduate education opportunities, and distributes hundreds of thousands of technical reports each year. Other technology transfer involves military and civil works projects.

4. Funding

The WES total annual budget is over $360 million with approximately $75 million of that committed to environmental programs. Funding comes from many sources for whom the WES completes reimbursable projects. Project sponsors

include the Army, Air Force, Navy, Federal Emergency Management Agency (FEMA), EPA, Department of Transportation, DOE, and other Federal and State agencies.

5. Program initiator

The Waterways Experiment Station was established under the authority of the Flood Control Act, PL 391, in response to the Mississippi River flood of 1927.

6. Interaction with DoD, DoE, EPA and other gov't agencies

Extensive working relation throughout DoD, DOE, EPA, state agencies, and academia.

7. Time period of program

The Waterways Experiment Station began in 1929 and is ongoing.

8. Contact Names

Billy C. Bridges, Public Affairs, WES 601-634-2504
Dr. John Cullinane, Environmental Quality/Installation Cleanup, WES 601-634-3723
Norman Francingues, Environmental Restoration, WES 601-634-3703

I. NATIONAL DEFENSE CENTER FOR ENVIRONMENTAL EXCELLENCE (NDCEE)

1. Mission/purpose statement

"Technology for environmentally responsible manufacturing"
"Make it clean/keep it clean"

2. Goals/objectives

Identify, evaluate, demonstrate, and transfer environmentally-acceptable manufacturing processes to private clients.

Provide a location for full-scale manufacturing technology demonstrations and transfer.

Provide information on environmentally acceptable solutions for government and industry manufacturing processes.

3. Modus operandi

The NDCEE is operated by Concurrent Technologies Corporation, a nonprofit, for the DoD. CTC assists the nation's industrial base to achieve world-class manufacturing agility and competitiveness. CTC operates four National Centers for Excellence: 1) National Defense Center for Environmental Excellence, 2) National Center for Excellence in Metalworking Technology, 3) National Applied Software Engineering Center, and 4) National CALS Shared Resource Center.

Issues addressed by the NDCEE include environmental restoration, waste minimization, waste management, materials recycling, risk assessment, and medical waste management. A key resource is a 185,000 square foot Demonstration Factory, which incorporates production-scale, state-of-the-art equipment that enables the NDCEE to perform process demonstrations, validations, education, and training activities.

By end of 1995, NDCEE predicts to have completed 25 proven technology processes.

NDCEE has established an Environmental Information Network to assimilate, organize, review, and integrate pollution prevention information and environmental regulations.

4. Funding

Congressional appropriation of DoD monies; annual budget is in the millions but varies widely from year to year.

5. Program initiator (Congress, Navy, etc.)

DoD established NDCEE in 1990.

6. Interaction with DoD, DoE, EPA and other gov't agencies

Strong and growing.

7. Time period of program

Began in 1990, ongoing.

8. Contact Names

Dale Denny, PhD, Johnstown, PA	814-269-6820
Diana (Punkie) Garretson, Johnstown, PA	814-269-6491

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J. DEPARTMENT OF ENERGY (DOE) OFFICE OF ENVIRONMENTAL MANAGEMENT; DOE OFFICE OF TECHNOLOGY DEVELOPMENT

1. Mission/purpose statement

Motto: "Using today's technologies better"

Develop new technologies that are safer, faster, more effective, and less expensive than current methods. Provide visibility, focus, and accountability for DOE's waste management and cleanup efforts.

2. Goals/objectives

Identify and develop high-payoff environmental restoration and waste management technologies that can: 1) clean up the 1989 inventory of DOE nuclear component manufacturing sites; and 2) manage DOE-generated waste faster, better, safer, and cheaper than is possible with current environmental cleanup technologies.

Reduce risks to the environment and improve worker and public safety within realistic financial constraints.

3. Modus operandi

DOE is responsible for waste management and clean up of more than 100 contaminated installations in 36 states and territories. Much of the contamination resulted from nuclear weapons development, testing, and production. DOE has set a goal to cleanup and bring all sites into compliance with applicable environmental regulations by the year 2019.

The DOE Office of Technology Development (EM-50), a subset of the DOE Office of Environmental Management (EM), has program responsibilities for the development of better, faster, cheaper, and safer technologies for meeting DOE's goals for environmental restoration and waste management, and for managing crosscutting activities. The DOE-EM Office of Environmental Restoration (EM-40) has program responsibilities for remediation of inactive hazardous and radioactive waste sites at all DOE installations and some non-DOE sites, including remedial actions and decontamination/decommissioning activities. Other EM branches include the Office of Waste Mangement (EM-30), the Office of Oversight and Self-Assessment (EM-20), the Office of Planning and Resource Management (EM-10), the Office of Facility Transition and Management (EM-60), and the Office of Policy and Program Information (EM-4).

DOE provides a range of programs and services to assist universities, industry, and other private-sector organizations interested in developing or applying environmental technologies. EM uses several mechanisms to identify, integrate, develop, and adapt emerging technologies. These mechanisms include contracting and collaborative arrangements, procurement provisions, licensing of technology, consulting arrangements, reimbursable work for industry, and special consideration for small business. More specifically, EM uses Cooperative Research and Collaborative Arrangements (CRADAs), Research Opportunity Announcements (ROAs), Interagency Agreements (IAG) and Program Research and Development Announcements (PRDAs). The Federal Register and the Commerce Business Daily publish these announcements and other financial assistance awards called "Program Rules". CRADAs were created by Congress under the Federal Technology Transfer Act (FTTA) of 1986 (PL 99-502) to enhance and facilitate collaboration between governmental agencies and commercial firms. The FTTA provides the authority and an effective mechanism to enter into joint research and development projects. CRADAs benefit the public by transferring know-how and technology from government laboratories, thereby encouraging the development of innovative technology.

The EM Small Business Technology Integration Program (SB-TIP) seeks the participation of small businesses in the EM Research, Development, Demonstration, Testing and Evaluation programs. The EM SB-TIP provides information on opportunities for funding and collaborative efforts relative to advancing technologies for DOE environmental restoration and waste management applications. It has also established a special EM procurement set-aside for small firms to be used for applied research projects. EM SB-TIP serves as the EM liaison to the DOE SBIR (Small Business Innovation Research) program

office. Call the toll free number (1-800-845-2096) for DOE environmental technology development activities, procurement information, and cooperative research information.

The Offices of Research and Technology Application (ORTA) serve as technology transfer agents at the Federal laboratories, and provide an external point of contact for industry and universities. To fulfill this dual purpose, ORTAs license patents and coordinate technology transfer activities for the laboratory's scientific departments. The ORTAs provide technology commercialization assistance to their respective lab scientists and engineers to do market research, patent searches, licensing information and intellectual information management.

The DOE-EM Office of Technology Development publishes an annual technology catalogue to report on technologies successfully demonstrated in the field under DOE programs. The three to four page entries describe the technology, its performance and cost data, applications, and points of contact. The Office of Technology Development also runs Research, Development, Demonstration, Testing, and Evaluation (RDDT&E) programs to serve the needs of DOE Environmental Restoration and Waste Management operations.

The DOE Office of Environmental Restoration sponsors semiannual National Technology Information Exchange (TIE) Workshops. The National TIE Workshops target the DOE and contractor field personnel doing the actual work. The workshops include panel and poster presentations, open discussion periods, more focused concurrent sessions, video interactive teleconferencing, and a tour of the host site. These workshops promote more effective use of environmental restoration technologies throughout DOE by providing a forum for establishing technical contacts, learning about technologies used by others, and gaining feedback from peers on technology applications that worked or did not work at their respective sites.

Under contract for the DOE Office of Environmental Restoration, Virginia Tech publishes the "TIE Quarterly," a newsletter that reports on the workshops and IR lessons learned from workshops. The TIE Quarterly communicates the availability of new and innovative technologies among the DOE Office of Technology Development, Environmental Management (EM) workers.

The Center for Environmental Management Information opened in Washington, DC in January 1994. The Center has a toll-free information number, a library of general and technical documents, videos, and an interactive database network. Information on DOE EM programs may also be obtained through the Center.

4. Funding

DOE monies; for FY93 the total funding appropriated to the EM Office of Technology was $383 million. This amount is approximately 6% of the total EM appropriation of 6.4 billion for FY93. The technology budget request for FY95 is $426 million, or about 7% of the total Environmental Management budget request.

5. Program initiator

Lead Agency is the DOE, Office of Environmental Restoration. DOE established the Office of Technology Development (EM-50) within Environmental Management (EM) in 1989. DOE initiated the National TIE workshops after the 1991 mid-year review of the Office of Technology Development indicated a need.

6. Interaction with DoD, DoE, EPA and other gov't agencies

DOE-EM encourages interaction between DOE employees, academia, and industry through CRADAs, various procurement mechanisms, and personnel exchanges. National TIE Workshops are open to all; EPA and DoD personnel often do attend.

7. Time period of program

DOE established the Office of Technology Development (EM-50) within Environmental Management (EM) in 1989. The first National TIE Workshop was held November 1991; two workshops are held each year. These programs are

ongoing with no termination date.

8. Contact Names

DOE Center for Environmental Management Information	1-800-7-EM-DATA (736-3282)
DOE Technology Transfer, Tom Parker	301-903-7924
Workshops and courses, Executive Enterprises	800-831-8333
TIE Quarterly, Virginia Tech, Angie Smibert	703-231-3572
TIE Quarterly, Virginia Tech, Cindy Malfi	703-231-4253

K. EPA TECHNOLOGY INNOVATION OFFICE (EPA-TIO)

1. Mission/purpose statement

To increase the development and use of innovative treatment technology by government and industry to treat contaminated waste sites, soils, and groundwater. The TIO defines innovative treatment technologies as those that lack cost and performance data which inhibits their routine selection and use to remediate contaminated sites.

2. Goals/objectives

Remove regulatory and institutional impediments that prevent the use of innovative remedial technologies.

Enhance incentives to use innovative technologies.

Encourage commercialization of innovative technologies and move them from labs/vendors into waste cleanup programs.

Disseminate information on innovative technologies.

3. Modus operandi

The TIO is part of EPA's Office of Solid Waste and Emergency Response; TIO serves as the technology advocate for EPA waste program offices and the EPA Office of Research and Development. The TIO staff numbers 23 persons. TIO activities include Superfund sites, RCRA corrective action sites, and UST cleanups. The EPA-TIO promotes innovation in thermal methods, bioremediation, physical/chemical techniques and groundwater extraction and treatment technologies. As a secondary priority, the TIO promotes innovative monitoring methods. TIO does not focus on waste streams, waste minimization or recycling, nor on land disposal, rotary kiln incineration, conventional stabilization, or other methods where sufficient performance and cost information are available.

TIO established the Federal Remediation Technologies Roundtable (see section A this paper) to maximize the sharing of Federal experience with lower cost, innovative treatment technologies. TIO disseminates information on innovative technologies through training programs, and by publishing in newsletters, brochures, and trade journal articles, and by creating electronic resources like VISITT and CLU-IN (see databases, page 47 this paper).

In order to gain acceptance for innovative technologies, TIO is working to develop minimum data sets to use as yardsticks during testing of innovative technologies. TIO also collects and publishes cost and performance data for remediation projects, screens technology types and vendors and assists in implementation of technology demonstrations under the SITE program (Superfund Innovative Technology Evaluation).

TIO works closely with Clean Sites, Inc. (see section M this paper) to assist private industry and government groups to form partnerships and networks to apply innovative technology to actual cleanups in the field. TIO also helps support activities with private industry like the Center for Site Characterization (CSC), and Federal Technology Transfer Act (FTTA) Cooperative Research and Collaborative Arrangements (CRADAs). TIO interaction with technology vendors includes the VISITT database, the Developers Guide to Support Services, the Environmental Technology Initiative, SBIR programs, and research and development like the SITE program. Through these programs, TIO seeks to provide Superfund and other hazardous waste site information to technology vendors, and publicize "incubator" facilities that provide a full range of services from testing and evaluation to assistance in commercializing technologies. "Incubators" may be nonprofit or for-profit.

4. Funding

The TIO funds come from Congress as part of the annual operating costs of the EPA. The annual TIO budget for exernal activities is around $7 million, $1.0 million of which goes to train EPA project managers.

5. Program initiator

EPA initiated the EPA-Technology Innovation Office as a result of the

1989 Superfund Mangement Review.

6. Interaction with other gov't agencies

Extensive. The EPA-TIO contributes and facilitates several activities with other federal agencies, states, academia, and private industry.

7. Time period of program

The EPA-TIO was formed in early 1990 and is ongoing, expected to last another 20 years or more.

8. Contact Names

Daniel Powell, EPA-TIO, Wash, DC	703-308-8827
Margaret Kelly, EPA-TIO deputy director	703-308-8800

L. WESTERN GOVERNORS ASSOCIATION; DOIT COMMITTEE

1. Mission/purpose statement

The Western Governor's Association (WGA) seeks to provide strong regional leadership and to develop and advocate policies that reflect regional interests. Established in 1984 through the merger of two governor's organizations, the WGA is an independent, nonpartisan organization of governors from eighteen western states, two Pacific territories, and one commonwealth.

The DOIT Committee seeks to employ a regional, cooperative approach to find technical solutions for environmental restoration and waste management problems shared by States, commercial entities, and the Federal government. Encourage cooperation and communication among the federal agencies and the western governors in research, development, and demonstration of cost-effective waste management technologies germane to Federal lands and facilities in western States and insular areas.

Purpose of the DOIT committee is to advise Federal agencies on the development of IR solutions and technologies, the regulatory/government barriers to technology development, and work force issues related to waste management and cleanup. The DOIT Committee was created in 1992 to bring together the senior executives of state and federal agencies together to address the barriers to developing and using innovative cleanup technologies.

2. Goals/objectives

The WGA has six basic objectives: develop and communicate regional policy; serve as a leadership forum; build regional capacity; conduct research ad disseminate findings; form coalitions and partnerships to advance regional interests; build public understanding and support for regional issues and policy positions.

The DOIT Committee has several objectives. Protect the environment and public health by speeding the safe cleanup of federal waste sites in the West. Convert present waste sites to productive future use through reduction of remediation time and effective land use planning. Increase public participation and involve local stakeholders to build public trust in innovative technologies and cleanup of Federal facilities. Reduce the administrative costs of cleanup so more money can be spent on the actual cleanup effort. Expedite the development and commercialization of innovative technologies in a manner which is acceptable to all stakeholders. Improve competitiveness of U.S. technology and remediation firms in world markets. Reduce regional labor surpluses through education, retraining, and development of opportunities in remediation and environmental technology fields. Review technology demonstrations arranged by the DOIT committee and use their influence to change state or federal policy governing technology demonstrations and site cleanups. Develop a model process for regional acceptance of innovative IR technologies which reduces the need for duplicative or redundant testing in separate States or federal agencies.

3. Modus operandi

WGA members: ND, SD, NE, KS, TX, NM, CO, WY, MT, ID, UT, AZ, NV, CA, OR, WA, AK, HI, North Mariana Islands, American Samoa, and Guam.

WGA seeks to accelerate deployment of innovative technologies for cleanup in the West by providing demonstration sites and developing protocols that can be shared across state boundaries. WGA encourages reciprocity--if a technology is permitted in one state, the permit would be honored in the other states and is working toward gaining acceptance from the states.

WGA forms regional working groups, conducts public roundtables, and conducts innovative technology demonstrations. WGA roundtables include the Commercialization Roundtable, and the Institutional Barriers Roundtable. WGA has established the Joint Federal/Western States Cooperative Environmental Restoration and Waste Management Program.

In 1991 WGA created a Federal Advisory Committee to Develop On-Site Innovative Technologies for Environmental Restoration (called the DOIT Committee). DOIT will demonstrate and commercialize cost-effective cleanup methods at federal sites. DOIT is comprised of four representatives from the WGA (currently the governors of Utah, Nevada, California, and Idaho), and the secretaries of DOI, DOE, DoD, and EPA.

The Committee has formed working groups to develop recommendations to address four problem areas: mixed waste, mine wastes, closing military bases, and munitions sites. The working groups include members from all stakeholders: federal, state, tribal, and local agencies; regulatory bodies; service and manufacturing industries; academia; public interest and environmental groups; technology developers; and venture capitalist.

Through a contract with Clean Sites Inc., DOIT ranks problems and screens technologies for candidate demonstration sites in the western United States. In addition to technology innovation, DOIT seeks to test new approaches to creating effective stakeholder partnerships, collecting standard cost and performance data, improving interstate/interagency permitting reciprocity, dealing with liability, streamlining approvals, and commercializing technologies.

DOIT has prepared a standardized format for technology information sharing among western state regulators to facilitate technology demonstration, approval, and reciprocity. This evaluation format will be compatible with other existing models like the EPA-SITE program, the EPA-TIO Initiative, the Air Force Evaluation Matrix, and the Pacific Northwest Labs Protech Model.

Several demonstration sites were selected as of January 1994: AFCEE/Brooks AFB, TX; Black Hills Ordnance Depot, SD; Rocky Flats Plant, CO; Los Alamos National Lab, NM; Kirtland AFB, NM; Williams AFB, AZ; Yuma Proving Ground, AZ; Hill AFB, UT; Idaho National Engineering Lab, ID; Port Hueneme, CA; Fort Ord, CA; McClellan AFB, CA; Jefferson Proving Ground, IN.

4. Funding

The WGA receives funding from the state membership dues (13%), federal grants (72%), non-federal grants (5%), and other sources (10%). The FY93 expenses totalled $3.2 million, with 64% or $2 million going toward environmental management. Future budgets: FY94 = $5.9 million; FY95 = $6.5 million. The FY94 environmental funding includes $1.7 million from DOE and $1.3 million from EPA.

DOIT federal funding as of 1992:
DOE gave $500k for the initial two years plus funding for 2 FTEs.
EPA gave $150k plus loaned 1 FTE.
DOIT committee annual operating cost estimated at $500k in original charter.

5. Program initiator

The western governors formed the WGA.

The WGA initiated the DOIT committee pursuant to the Federal Advisory Committee Act (FACA) 5 USC App2, Section 9(c). The DOIT Committee supports the DoD, DOI, DOE, and EPA in fulfilling their responsibilities under CERCLA section 120 and RCRA section 6001. The lead Agency is the DOE.

6. Interaction with DoD, DoE, EPA and other gov't agencies

Extensive.

7. Time period of program

WGA formed in 1984, ongoing organization. DOIT was chartered in 1991 and is currently slated to end in 1996 but the MOU may be renewed.

8. Contact Names

WGA headquarters, Denver: 303-623-9378; fax 303-534-7309
WGA Executive Director: James Souby
WGA environmental program managers: Christopher McKinnon, Ronald Ross
Tim Holman, WGA rep to the Federal Roundtable: 303-355-5492

M. CLEAN SITES INC.

1. Mission/purpose statement

To improve and expedite the cleanup of our Nation's hazardous waste sites.

2. Goals/objectives

Bridge the gaps between private companies, government, environmental organizations, and community groups.

Provide a neutral team of technical professionals.

Encourage collaboration among Potentially Responsible Parties (PRPs) at Superfund sites.

Facilitate cooperation among a site's stakeholders, i.e. PRPs, surrounding communities, environmental advocates, and Federal, state, local governments, and the general public.

Employ technically and fiscally sound approaches to cleanup.

3. Modus operandi

Clean Sites strives to find a middle-ground consensus in environmental cleanups and to function as a neutral party. Representatives from private industry, government and environmental watchdog groups serve on the board of directors.

Clean Sites facilitates the cleanup effort by organizing potentially responsible parties (PRPs) into groups to plan cleanup proposals, by obtaining EPA approval for cleanups, and by providing technical assistance and compliance reviews to assure the public that cleanups are adequately performed. Clean Sites also makes policy recommendations designed to improve the nation's programs for the cleanup of hazardous waste. For example, Clean Sites suggested specific improvements to Congress during the Superfund reauthorization of 1994. Clean Sites also reviews technical cleanup plans, manages removal projects, conducts RI/FSs on behalf of PRPs, mediates settlements between regulators and PRPs, assists states in designing effective state hazardous waste cleanup programs, and facilitates discussions among government, industry, environmentalists, and citizens on hazardous waste cleanup issues. Clean Sites evaluates the effectiveness of existing Federal programs, policies, regulations and guidance designed to exchange scientific and technological information and encourage the use of innovative technologies. Finally, Clean Sites publishes books and pamphlets to share technical experience and to inform and involve the public.

Clean Sites promotes innovative technologies through a Cooperative Assistance Agreement with the EPA Technology Innovation Office (EPA-TIO). Through this agreement, Clean Sites facilitates new partnerships between government and industry aimed at identifying, evaluating, and promoting less costly, yet environmentally sound cleanup technologies. Clean Sites identifies Federal Facilities conducive to innovative IR technology and brings together private and public parties to conduct full-scale evaluations of innovative technologies at those Facilities. The first innovative technology partnership facilitated by Clean Sites is being conducted on McClellan Air Force Base in Sacramento, CA. This public-private technology partnership brings together the U.S. and California EPAs, the U.S. Air Force, and several private companies: AT&T, Beazer East, Dow, DuPont, Monsanto, Southern California Edison, and Xerox. The private companies contribute funds; they benefit when the demonstration results in a technology that the private party needs at their private properties.

Clean Sites also provides direct support to organizations such as McClellan AFB to maximize the effectiveness of technology development initiatives.

The Western Governors' Association contracted Clean Sites to support the DOIT (Develop On-site Innovative Technology) Committee. DOIT will demonstrate and commercialize cost-effective cleanup methods at federal sites. DOIT Committee members are: the Western Governors' Association, the EPA, DOE, DoD, and the Department of the Interior. DOIT is built on workgroups that feature extensive stakeholder involvement from citizens, tribal representatives, state

and federal representatives, and technology vendors. In 1993, Clean Sites began facilitating the workgroups' efforts to identify potential innovative technologies and demonstration sites; develop criteria for technology demonstrations; and pinpoint barriers to more widespread use at munitions and mining waste sites. Several demonstrations sites will be selected in 1994.

4. Funding

Initial funds were donated by corporations and nonprofit foundations. Today Clean Sites receives a mix of funding from "for fee" projects, donations (corporate, foundation and individual), and government grants.

Clean Sites' annual budget is about $6 million. In addition Clean Sites manages the financial accounts of several cleanup projects; e.g. the total monies managed in 1993 was $23 million.

5. Program initiator

The nonprofit Clean Sites was formed by top officials from EPA, Monsanto Co., the Conservation Foundation, and the National Wildlife Federation in 1984.

6. Interaction with DoD, DoE, EPA and other gov't agencies

Yes, extensive. One of Clean Sites primary functions is to increase interaction between DoD, EPA, private industry, and the public.

7. Time period of program

1984-present, ongoing with no expected termination

8. Contact Names

Clean Sites main switchboard 703-683-8522
John D. Johns, Alexandria, VA 703-739-1299
Clean Sites staff numbers 60 personnel.

N. PUBLIC/PRIVATE PARTNERSHIP

1. Mission/purpose statement

This Clean Sites, Inc. initiative, funded through a cooperative agreement with the EPA-TIO seeks to pair government cleanup sites with private companies for in the field demonstrations of innovative technologies. These partnerships will result in greater acceptance and increased use of innovative technologies and result in more efficient, more cost effective cleanups.

2. Goals/objectives

Gain acceptance of innovative remediation approaches by market clients and providers, regulators, and the public.

Reduce overall costs of cleanup with more efficient technologies.

Remove the liability barrier from cleanup projects by allowing private parties to participate in the demonstration of innovative cleanup technologies on federal property.

Conduct demonstrations at six or seven different facilities.

3. Modus operandi

The EPA Technology Innovation Office sponsors this initiative and implements it through a cooperative agreement with Clean Sites, Inc. to arrange demonstration partnerships. Private/Public Partnerships "match" cleanup problems of industrial partners with government sites for cooperative technology demonstrations. This meets Clean Sites mission of improving the Superfund process.

The participant company benefits because it can develop innovative technologies at minimum cost and risk (government retains primary or all liability). The federal facility receives assistance in design, performance evaluation, and technology dissemination. The industry also enjoys improved credibility of innovative technologies with regulators.

The pilot project is the McClellan Air Force Base cleanup facilitated by Clean Sites, Inc. using SVE off-gas treatment (photolytic destruction) and two-phase vacuum extraction. Other projects include: 1) the DOE Innovative Remediation Technology Demonstration Project, Pinellas, Plant, FL, 2) the application of the "lasagna process" at the DOE Paducah Gaseous Diffusion Plant, 3) Joliet Army Arsenal, and 4) the Massachusetts Military Reservation test center which is under consideration. Navy sites being considered are Mare Island Naval Shipyard and Naval Air Station North Island.

Criteria to identify potential project sites:

-contaminant problems common to many sites, public as well as private

-sites in advanced characterization stages (want to fit into existing cleanup schedules)

-good relations between regulators, public, and responsible agency

-willingness to innovate (region and facility management)

-adequate resources for cleanup effort (funding and staffing)

-openness to input from private partners.

4. Funding

EPA pays the overhead of the program from EPA-TIO and EPA SITE (Superfund Innovative Technology Evaluation Program) monies, and from the CRADA funds. DoD/DOE contribute to the actual cleanup costs of the property.

5. Program initiator (Congress, Navy, etc.)

Lead Federal Agency is the EPA.

Clean Sites, Inc. suggested using federal properties as sites for private company technology demonstrations.

6. Interaction with DoD, DoE, EPA and other gov't agencies

Extensive; aim of the project is to partner federal facilities with private remediation consultants. Goal is to have at least one site from each major military branch.

7. Time period of program

The Public/Private Partnership CRADA currently extends to FY95 and a proposal to amend it to continue to FY97 has been submitted. EPA-TIO expects to continue partnerships indefinitely. The initial cooperative agreement with Clean Sites was awarded in July 1991.

8. Contact Names

Daniel Powell, EPA-TIO Wash DC	703-308-8827
Ellen Fitzpatrick, Clean Sites, Inc.	703-739-1262
Bud Hoda, McClellan AFB, CA	916-643-0830, ext 377

O. SUPERFUND INNOVATIVE TECHNOLOGY EVALUATION (SITE)

1. Mission/purpose statement

Evaluate new and promising treatment technologies for cleanup at hazardous waste sites. Encourage the development and routine use of innovative treatment technologies and/or monitoring and measurement technologies at hazardous waste sites.

2. Goals/objectives

Provide environmental decision-makers with data on new, viable treatment technologies that may have performance or cost advantages compared to traditional treatment technologies. Strive to bring innovative technologies to the commercial market.

3. Modus operandi

The EPA Office of Research and Development, Risk Reduction Engineering Laboratory (RREL) administers the SITE program from Cincinnati, OH.

EPA enters cooperative agreements with technology developers. The developers refine their innovative technologies at bench- or pilot-scale and may demonstrate them at hazardous waste sites with support from EPA. EPA collects and publishes engineering, performance, and cost data to aid in future decision-making for hazardous waste site remediation.

SITE program staff work closely with EPA's regional offices, the states, technology developers, the Environmental Monitoring Systems Laboratory (EMSL), the Superfund Technology Assistance Response Team (START), and the Office of Solid Waste and Emergency Response (OSWER) to provide technology demonstrations and to disseminate information. START provides site-specific technical support to EPA Remedial Project Managers (RPMs) for especially complex sites. The SITE program also uses EPA research facilities, such as the Test and Evaluation (T&E) Facility and the Center Hill Facility in Cincinnati, to evaluate innovative technologies.

SITE staff publish "Technology Profiles," updated annually, which profiles demonstration or emerging monitoring and measurement technologies being evaluated under the SITE program. The Sixth Edition published in November 1993 described 170 technologies and their applicability to various wastes, gave the state of development, and provided contact information for each. These technologies form the projects of the Demonstration, Emerging Technology, and Monitoring and Measurement Technologies Programs.

Four components comprise the SITE program:

1) Emerging Technology Program - Provides funding (up to $150k/yr for two years) to developers to continue research efforts at the bench- and pilot-scale levels to promote the development of innovative technologies. Continues funding to technologies that may be applicable to Superfund site waste characteristics; promising projects move from Emerging Technology to the Demonstration Program.

2) Demonstration Program - Conducts and evaluates demonstrations of promising innovative technologies to provide reliable performance, cost, and applicability information for site cleanup decision-making; developers conduct field tests on hazardous waste materials. The EPA selects technologies for demonstration through annual requests for proposals. Here, the EPA funds the evaluations and the developer funds the actual demonstration.

3) Monitoring and Measurement Technologies Program - Develops technologies that detect, monitor, and measure hazardous and toxic substances to provide better, faster, and more cost-effective methods for producing real-time data during site characterization and remediation.

4) Technology Transfer Activity - Disseminates technical information on innovative technologies from the other SITE programs by publishing reports, brochures, and videotapes, and networking at conferences and associations. Gives technical assistance to regions, States, and remediation cleanup contractors.

Emerging Technology Program = 64 projects to date.

Demonstration Program = 98 current demonstrations.
Monitoring and Measurement Technologies Program = 30 projects to date.

4. Funding

Projects operate under cooperative agreements and joint funding. Developers are responsible for operating their innovative systems at a selected site, pay costs to transport equipment to the site, operate on-site, and remove the equipment from the site. EPA is responsible for project planning, waste collection and pretreatment, sampling and analysis, quality assurance and quality control, preparing reports, and disseminating information.

Annual budget comes from Congress and totals around $20 million, with $12 million going for demonstration programs.

5. Program initiator (Congress, Navy, etc.)

Lead Federal Agency: EPA

The EPA Office of Solid Waste and Emergency Response (OSWER) and the EPA Office of Research and Development (ORD) established the SITE program in response to the 1986 SARA section 311 mandate; SARA recognized a need for an "alternative or innovative treatment technology research and demonstration program."

6. Interaction with DoD, DoE, EPA and other gov't agencies

Moderate.

7. Time period of program

Began in 1985; continuation depends on Superfund reauthorization.

8. Contact Names

To receive SITE technical reports: 513-569-7562
SITE program, EPA-CERI (Center for Environmental Research Information)
Demonstration program: Bob Olexsey, Cincinnati 513-569-7696
Emerging Technology: Norma Lewis, Cincinnati 513-569-7665
Monitoring/Measurement: J. Lary Jack, Las Vegas 702-798-2373
SITE budget info: Richard Nalesnik, OEETD (Office of Environmental and Emerging Technology Demonstration) Wash DC 202-260-2583

ATTIC (Alternative Treatment Technology Information Center)
General system information 703-908-2137
Project office 908-321-6677
On-line access (no password needed) 703-908-2138

VISITT (Vendor Information System for Innovative Treatment Technologies)
Information hotline 800-245-4505
To download VISITT files from CLU-IN, a cleanup information bulletin board, access by modem @ 301-589-8366

P. DoD/NATIONAL ENVIRONMENTAL TECHNOLOGY DEMONSTRATION PROGRAM (DNETDP); NATIONAL TEST SITE (NTS) PROGRAM

1. Mission/purpose statement

To develop national demonstration sites to accelerate the orderly development, evaluation, and use of innovative environmental cleanup and pollution prevention technologies. Provide locations for demonstration, comparative evaluation, and transfer of innovative remediation technologies from research through full-scale use. The National Test Site (NTS) program overall mission is to achieve: regulatory and institutional acceptance; an understanding of the fate and transport processes of DoD contaminants as they relate to cleanup technology mechanisms; technology certification; and transfer and application of innovative water, sediments, and soil cleanup methods technologies to DoD and DOE sites.

2. Goals/objectives

The overall goal of this program is to demonstrate, evaluate, and transfer innovative technologies from research and development to full-scale use. The DoD National Environmental Technology Test Site Program can reduce cleanup costs, quicken the pace of cleanup, and facilitate compliance with various Federal and State regulations by quicker application of innovative technologies. Achieving this goal includes the accomplishment of the following objectives: 1) standardizing data collection and analysis among the three Services and participating DOE and EPA organizations, 2) ascertaining the information needed by users and regulators for effective technology transfer, 3) inviting users and regulators to comment on technology demonstrations, 4) testing technologies for the same contamination/media combination under comparable conditions, 5) publishing user guides and engineering design specifications, and 6) providing test beds for supporting environmental research.

3. Modus operandi

The DoD/National Environmental Technology Demonstration Program (DNETDP), initiated in 1993 and supported under SERDP (Strategic Environmental Research & Development Program), is designed to aid DoD and DOE environmental obligations. DNETDP is a coordinated Tri-service, DOE and EPA effort which manages applied research and technology evaluations for contaminated groundwater, sediments, and soil remediation. The National Test Site (NTS) program, a subset of DNETDP, will demonstrate Installation Restoration (IR) technologies at actual field sites and transfer those technologies throughout the public sector and private industry. The Air Force, Army, Navy, DOE, EPA, University of Michigan, and the AATDF (Rice University) have joined together for this program.

The Navy will conduct research and demonstration of fuel hydrocarbon cleanup technologies. The Army is focusing on heavy metal wastes, and contamination generated by the production, storage, and disposal of explosive materials. The Air Force is focusing on cleanup of dense nonaqueous phase liquids (DNAPLs), e.g. chlorinated solvents in groundwater, gas, and soils. EPA is focusing on remediation of diverse organic contaminates. EPA will also establish standard guidelines for IR technology evaluations and field demonstrations.

As an example, the NTS at CBC Port Hueneme, CA will support demonstrations of ex-situ bioremediation of diesel contaminated soil and in-situ bioremediation utilizing recirculating well technology. The California Regional Water Quality Control Board is in the process of issuing site permits. The Advance Fuel Hydrocarbon Remediation NTS at CBC Port Hueneme is also a candidate DOIT (Western Governors Association DOIT Committee, see section L) site for developing stakeholder outreach and participation procedures. NFESC (Naval Facilities Engineering Service Center) and the CBC Environmental Office are developing and verifying a public relations model with local area modification capability which may be the standard for all NTSs and DOIT demonstrations.

At the completion of each project, a technology transfer package will be prepared that includes a Technology Evaluation and Design Guideline report to be disseminated throughout DoD, DOE, and EPA organizations which are making remedial action decisions. The DNETDP Test Site Organization will use the following media for technology transfer: technical short courses/seminars; on-site visitor's workshops; field assistance; conference exhibits; professional journal articles; DoD periodicals; videotapes and brochures.

Technology contributors to the NTS include: DoD Environmental Quality Strategic Plan; Academia; private sector; Foreign Governments; EPA SITE Demonstrations; Other Federal laboratories; EPA Emerging Technologies Program; NELP (Navy Environmental Leadership Program) projects.

National Test Sites/Managers: NFESC Port Hueneme, CA; McClellan AFB, CA; Armstrong Laboratory Tyndall AFB, FL; Wurtsmith AFB, University of Michigan; Army Environmental Center Aberdeen, MD; Volunteer Munitions Plant, TN; EPA Environmental Monitoring Systems Laboratory, Las Vegas, NV.

4. Funding

Funding for DNETDP comes from SERDP Cleanup Thrust area (6.3).

Funding level projected as of FY93 in $1000:

	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	TOTAL
Air Force	4100	850	850	850	850	850	850	850	10050
Army	2870	2120	2120	2120	1900	1500	1000	1000	14630
Navy	650	900	900	900	800	600	600	400	6300
TOTAL	7620	3870	3870	3870	3550	2950	2450	2250	30980

5. Program initiator (Congress, Navy, etc.)

The Deputy Under Secretary of Defense for Environmental Security initiated the NTS Program under the SERDP Cleanup/Installation Restoration technology thrust area. The lead agency for the NTS rotates among the Air Force (Armstrong Laboratory), Army (Environmental Center), and Navy (NFESC).

6. Interaction with DoD, DoE, EPA and other gov't agencies

Extensive, including AATDP, WGA, Clean Sites, Federal Remediation Technologies Roundtable, American Petroleum Institute, Environmental Performance Cooperative, Inc., Michigan Department of Natural Resources, and others.

7. Time period of program

Began 1993, budget currently projected through 2001 with expectations to continue beyond 2001.

8. Contact Names

The lead organizations and contacts are:

Naval Facilities Engineering Service Center (NFESC), Port Hueneme, CA
Mr. Ernest Lory 805-982-1299
Ms. Leslie Karr 805-982-1618

Army Environmental Center, Aberdeen Proving Ground (USAEC-APG), MD
Mr. Theodore Ruff 410-671-1560

Air Force, Armstrong Laboratory, Tyndall AFB, FI
Major Mark H. Smith, PhD 904-283-6291

Air Force, McClellan AFB, CA
Mr. Bud Hoda 916-643-0830, ext 355

EPA HQTRs, Wash, DC, in cooperation with the University of Michigan
Mr. Alfred Galli 202-260-2583
Dr. Michael Barcelona 313-763-9666

EPA, Environmental Monitoring Systems Laboratory, Las Vegas, NV
Mr. Eric Koglin 702-798-2432

Q. NAVY ENVIRONMENTAL LEADERSHIP PROGRAM (NELP)

1. Mission/purpose statement

NELP will demonstrate the Navy's ability to do effective cleanup, and do it better, faster and cheaper. NELP will showcase cleanup, compliance, conservation, and pollution prevention efforts at two Navy sites, NAS North Island, CA and Mayport NAVSTA, FL.

2. Goals/objectives

Demonstrate and implement new and innovative methods and technologies to achieve and maintain environmental compliance, conduct restoration and pollution prevention, and preserve natural resources. Identify technologies and management techniques that expedite compliance and cleanup actions at reduced costs. Export NELP experience to other Navy and DoD activities. Coordinate with the Tri-service Reliance program and SERDP to avoid duplication.

3. Modus operandi

NAS North Island and NAVSTA Mayport were designated as NELP demonstration bases. These two sites will be used to develop, test, and refine IR methods for transfer into the Navy-wide environmental program. NFESC will provide technical support to NELP players.

After assembling a team of experts to guide NELP, the two sites were investigated to identify and document the environmental problems to be addressed. The team reviewed available Navy technologies, and also conducted a New Technologies Solicitation for outside technology. As of July 1994, NELP leaders were evaluating and choosing appropriate technologies. Innovative technologies will get preference in the selection process. Contracts will be awarded to do technology demonstrations leading to full-scale implementation. Successful technologies will be transferred Navy-wide.

NELP will operate several initiatives. In addition to the New Technologies Solicitation, NELP will also partner with the EPA SITE Program to demonstrate innovative technology. The Management Action Plan is an innovative management tool to plan and summarize NAS North Island environmental programs status and strategy. The CNO-sponsored Pollution Prevention Plan Prototype will examine and then reduce waste and pollution at NAS North Island and NAVSTA Mayport. The Restoration Advisory Board (RAB) will increase public involvement by providing fact sheets to the public and by having several members of the public participate on the Board, including a role as co-chairperson. The Bioremediation Treatment Unit will serve as a permanent site for soil remediation.

NELP will undertake DoD Cooperation/Partnering with the Air Force Center for Environmental Excellence (AFCEE) and other existing programs to learn and share knowledge and experience. The New Technologies Demonstrations and Development initiative will showcase several technologies: 1) supercritical oxidation, 2) seismic groundwater modeling, 3) the cone penetrometer, 4) hydrothermal destruction of toxic and hazardous waste, and others as identified by the NELP team for implementation.

4. Funding

NELP funding comes from existing accounts (e.g. DERA, O&M) and from special requests to CNO for justified requirements. Additional funds come from EPA cooperative agreements and grants from DoD and DOE. NELP funding is not a separate budget item but estimated funds for FY94 are as follows:

Navy Procurement (OPN)	$1.8 million
Defense Environmental Restoration Account (DERA)	$4.0 million
Operations & Maintenance (O&M)	$1.3 million.

For example, the new Technologies Solicitation for proposals for new technologies has a $15M total contract value, maximum $5M per contract.

5. Program initiator (Congress, Navy, etc.)

Initiated within the Navy by the CNO (Chief of Naval Operations)

Environmental Quality Management Board.

6. Interaction with DoD, DoE, EPA and other gov't agencies

NELP will draw on the SITE program, AFCEE, and other existing technology programs. NELP will also work together with the Western Governor's Association DOIT Committee to get regulatory approval for technologies and reciprocity of the approval in western states.

7. Time period of program

NELP implementation commenced May 1993, and formal direction was given March 1994. NELP is an ongoing program with no completion or ending date.

8. Contact Names

Morgan Rogers, SWDIV, San Diego 619-522-3866; DSN 522-3866; fax x1242
Arnold Bernardo, NAS North Island, San Diego 619-545-1125
Elaine Morrison, SouthDiv, Charleston, SC 803-743-6057
Mike Davenport, NAVSTA Mayport, Jacksonville, FL 904-270-6730

R. ADVANCED APPLIED TECHNOLOGY DEMONSTRATIONS FACILITY (AATDF); RICE UNIVERSITY CONSORTIUM

1. Mission/purpose statement

Established to guide selection, development, demonstration, and commercialization of advanced applied environmental restoration technologies for DoD.

2. Goals/objectives

Implement use of new environmental cleanup (IR) technologies by demonstration of their technical and economic viability on a scale large enough to show commercial viability.

Enable technology transfer and commercialization.

Focus on technologies for the remediation of soil, the unsaturated zone, and groundwater because these problems are most prevalent on DoD hazardous waste sites.

3. Modus operandi

Congress directed the formation of AATDF to solicit proposals, select technologies, design demonstrations, conduct demonstrations, and prepare viable technologies for commercialization. AATDF is a consortium of University environmental research centers led by Rice University. The US Army Corps of Engineers Waterways Experiment Station manages AATDF for the DoD and contracted AATDF to Rice University's Energy and Environmental Systems Institute, directed by Dr. C. Herb Ward.

Directors of the university-based environmental research centers comprise the Technology Selection Board (TSB) of the AATDF program. The TSB is supported by four technical advisory committees: 1) Engineering Advisory Committee, chaired by David Miller, CEO of Geraghty & Miller, 2) Industrial Advisory Committee, chaired by Richard Conway, Senior Corporate Fellow, Union Carbide, 3) Commercialization and Technology Transfer Committee, chaired by Benjamin Bailar, Dean of the Jones Graduate School of Administration at Rice University, and 4) DoD Advisory Committee, co-chaired by John Keeley and James Arnold, representing the Army Corps of Engineers Waterways Experiment Station and the Army Environmental Center.

Consortium of University Environmental Research Centers:

- National Center for Ground Water Research, Rice University
- Hazardous Substance Research Center, Louisiana State University
- Waterloo Centre for Groundwater Research, University of Waterloo
- Western Region Hazardous Substance Research Center, Stanford
- Gulf Coast Hazardous Substance Research Center, Lamar University
- Environmental Solutions Program, U-T Austin

Consulting Engineering Partners:

- Battelle Memorial Institute
- GeoTrans, Inc.
- Geraghty & Miller, Inc.
- Groundwater Services, Inc.
- Remediation Technologies, Inc. (ReTeC)

AATDF includes an experimental controlled release site (ECRS) where emerging concepts can be tested under known conditions; i.e. a controlled release of small quantities of contaminants will be performed. For more mature technologies, the AATDF will permit technology developers to perform pilot tests and demonstrations with detailed evaluation of performance, cost, and practicability.

AATDF solicited technology proposals (received 171) and from these chose technology for demonstrations (took 40). Proposals came from consulting firms, industry, research labs, universities, federal researchers, and other groups. AATDF will match a site to the technology (favor DoD sites but may be off-DoD property). Proposers must provide cost sharing equivalent to 50% of

the administrative (indirect) cost associated with the demonstration.

Successful proposers will work with consortium members to design the field test or pilot demonstration, develop the performance monitoring system, install the field equipment, and then implement the test program in the field. Depending on the capabilities of the proposers, the consortium will either assist in the operation of the test or take a lead role in conducting the test. In either case, consortium members will provide oversight of the entire test process, participate in the collection of performance monitoring data, and help evaluate the test results. To ensure that the results of the tests are transferred to the environmental cleanup community, the consortium will work with the proposers to develop performance data, life-cycle cost information, engineering design manuals, and commercialization summaries.

4. Funding

DoD gave $19.3 million (Congress mandated $20 million) as a one-time grant to establish the AATDF. AATDF should not require DoD funding after first three years of operation of the facility. (PL 102-190) AATDF may also seek SERDP funding. Funding for individual projects ranges from $50k to $400k.

5. Program initiator (Congress, Navy, etc.)

Lead Federal Agency: managed by the US Army Corps of Engineers Waterways Experiment Station for the DoD; contracted to Rice University under a grant in May 1993.

Congress established the Advanced Applied Technology Demonstration Facility for Environmental Technology (AATDF) by specific name in PL 102-190 Section 254 of the National Defense Authorization Act. The statute directed the DoD to grant $20M to a nonprofit or university to establish an AATDF.

6. Interaction with DoD, DoE, EPA and other gov't agencies

Extensive. The DoD advisory committee represents all three services on the AATDF advisory committee. Also close connections with EPA; Dr. Kovalick of the EPA-TIO serves on the AATDF Commercialization and Technology Transfer Committee. Strong industry connections and participation by CEOs from manufacturing and engineering companies.

7. Time period of program

DoD original grant for 3 years (5/93 to 5/96). Plan for program to be stand alone after the first 3 years.

8. Contact Names

Dr. C.H. Ward, program director, Rice Univ.	713-527-4086
Dr. Stephanie Fiornza, asst program manager	713-527-4700, ext 3338
Rice University operator	713-527-8101

S. ENVIRONMENTAL SECURITY TECHNOLOGY CERTIFICATION PROGRAM

1. Mission/purpose statement

Demonstrate and validate promising innovative environmental technologies that target DoD's most urgent environmental needs. These technologies must be projected to pay back the investment in five years through cost savings and improved efficiency.

2. Goals/objectives

Respond to Congressional concern about the slow pace of remediation of environmentally polluted sites on military installations. Follow Congressional direction to conduct demonstrations specifically focused on emerging new technologies. Improve defense readiness by reducing the drain on DoD's operation and maintenance dollars caused by real world commitments such as environmental restoration and waste management.

3. Modus operandi

The Office of the Assistant Deputy Under Secretary of Defense (Environmental Technology), located in Washington, D.C. heads this program. The Environmental Security Technology Program funds demonstration and evaluation of innovative remediation technologies at military installations. Preference will be given to technologies that respond to Environmental Security program objectives and have successfully completed all necessary research and development objectives. Chosen technologies will be dual use, i.e. technologies which meet both government needs and spur growth in the economy.

The executing installations (demonstration sites) let contracts for the technology demonstrations. Test and evaluation oversight is provided by the Defense Evaluation Support Activity.

The following steps describe a typical, successful remediation demonstration. This project life cycle will average about three years in duration. Select demonstration site. Complete site preparation and regulatory permitting. Conduct testing and evaluation. Obtain user, regulator, and other stakeholder approval. Develop and distribute user data packages.

4. Funding

Congressional approval of the DoD and the President's budget request was pending but nearly final at the time of this publication. Projected budget for FY95 is $20 million; program will continue at a similar level of funding.

5. Program initiator

President Clinton initiated this program. Executive Order 12856 requires Federal agencies to place a high priority on obtaining funding and resources needed for the development of innovative pollution prevention programs and technologies for installations and in acquisition. The Environmental Security Technology Certification Program also responds to Congressional concerns about environmental cleanup costs and completion schedules.

6. Interaction with DoD, DoE, EPA and other gov't agencies

This is a DoD-wide program.

7. Time period of program

Began 1994, planned as on ongoing program.

8. Contact Names

Ed Dyckman, Washington, DC 703-697-9107

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T. ENVIRONMENTAL TECHNOLOGY INITIATIVE

PLEASE NOTE: the information in this section was compiled from a June 1994 draft version of the FY95 Solicitation Package for the Environmental Technology Iniative. All information must be confirmed by the user.

1. Mission/purpose statement

Accelerate environmental protection, strengthen America's industrial base, and increase exports of U.S. technologies and expertise.

2. Goals/objectives

Adapt EPA's policy, regulatory, and compliance framework to promote innovation. Strengthen the capacity of technology developers and users to succeed in environmental technology innovation. Strategically invest EPA funds in the development and commercialization of promising new technologies. Accelerate the diffusion of innovative technologies at home and abroad.

3. Modus operandi

The Environmental Technology Initiative, led by the U.S. Environmental Protection Agency (EPA), seeks to stimulate and accelerate the development of innovative environmental technologies. The ETI encourages maximum consultation with stakeholders; continuing dialogue is intended to improve EPA's strategy, programs, and their implementation. ETI desires coordination with federal, state, and local agencies; government partners will offer their respective talents, expertise, adn perspectives. ETI seeks partnership and collaboration with the private sector and academia; convening public-private partnerships to target research and development, testing and demonstration, and the need for government policy change. ETI wants cleaner technology and not just control technology because the best environmental solutions involve changes in production processes, feedstocks, and product design. Finally, ETI will measure progress along the way to through development and use of indicators and tools to benchmark EPA's progress.

Roughly 50% of the appropriated monies fund innovative technology projects conducted by Federal agencies, States, Tribes, and private sector businesses. Proposals are solicited (published in the Commerce Business Daily) and selected projects receive grants that may be passed on to partners, grantees, or contractors. Projects must address the specific objectives in the following topic areas: 1) policy framework, 2) innovation capacity, 3) environmental technologies, 4) pollution prevention technologies, 5) domestic diffusion, and 6) international diffusion. Grants will be awarded by committees composed of EPA staff from all parts of the Agency and representatives of the Departments of Defense, Commerce, Energy, Interior, Agriculture, the National Science Foundation, the Agency for International Development, and the Small Business Administration.

4. Funding

Congress appropriated $36 million for ETI in FY94 and as of July 1994 was considering a request for $80 million in FY95. The EPA must pass through up to 50% of the funds to other Federal agencies.

5. Program initiator

President Clinton initiated the Environmental Technology Initiative in his State of the Union address of 1993. The EPA Innovative Technology Council designed the solicitation program.

6. Interaction with DoD, DoE, EPA and other gov't agencies

Extensive.

7. Time period of program

Began in FY94.

8. Contact Names

Jeff Heimerman, EPA-TIO 703-308-8806

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U. REMEDIATION TECHNOLOGIES SCREENING MATRIX; COMPREHENSIVE GUIDE TO IR SITE REMEDIATION TECHNOLOGIES

1. Mission/purpose statement

Encourage further development and use of innovative technologies that offer efficient and cost-effective alternatives for site remediation.

2. Goals/objectives

Summarize innovative and conventional technologies used for site remediation and environmental cleanup. Provide information to assist site project managers responsible for screening technologies for potential use at their sites. Present the reviewed technologies in a large table format that can be posted for quick and easy reference.

3. Modus operandi

The "Matrix" is a 24" X 30" poster presentation of a table listing 48 remediation technologies described by 13 factors. The "Reference Guide" details the technologies and screening factors; it also lists contact names and a bibliography of printed materials on remediation technologies.

The Air Force hosted a two-day workshop where remediation technology experts identified and evaluated the technologies. The experts came from diverse backgrounds in academia, regulatory agencies, and private industry, and represented both technology users and developers. The participants chose thirteen screening factors including cost, commercial availability, long-term effectiveness, reliability, regulatory acceptability, and community acceptability. Forty-eight technologies were selected and rated with these criteria. The experts reviewed in situ and ex situ biological, chemical/physical, and thermal technologies for treating groundwater, soils and sediments, and air emissions.

When they compiled the Matrix, the Air Force and EPA planned periodic updates of the Matrix and Reference Guide to keep pace with the ever changing range of technology. The updated compilation, the "Comprehensive Guide to IR Site Remediation Technologies," features input from the seven member agencies of the DoD Environmental Technology Transfer Committee (ETTC), i.e. the EPA, DOE, DOI, DoD, Navy, Army, and Air Force. The Guide strives to reduce individual efforts among the services by combining results from their different programs.

4. Funding

The Air Force and EPA funded the original Matrix. For the updated Guide, each service and contributing agency has provided personnel to write, edit, and proofread the manuscript. Each service will be responsible for printing and distributing copies

5. Program initiator

Originally a joint Air Force/EPA project, initiated by the Air Force.

6. Interaction with DoD, DoE, EPA and other gov't agencies

Originally a EPA/Air Force joint project. The Matrix may be used by all agencies. The updated Matrix/Guide ("Comprehensive Guide to IR Site Remediation Technologies") is an ETTC (Environmental Technology Transfer Committee) initiative.

7. Time period of program

This was essentially a one-time project which produced a specific project. The Remediation Technologies Screening Matrix workshop was conducted in March 1993, and the Matrix was printed July 1993. Updates will be incorporated into the "Comprehensive Guide to IR Site Technologies" being coordinated by the Army Environmental Center in Aberdeen, MD; expect the updated guide to be available in fall of 1994.

8. Contact Names

Jai Jeffery, NFESC, Port Hueneme, CA	805-982-3020
LTC Robert LaPoe, AL/EQW, Tyndall AFB	904-283-6244
John Kingscott, TIO-EPA, Washington DC	703-308-8749
Edward Engbert, Army Environmental Center, MD	410-671-1575

V. SMALL BUSINESS INNOVATION RESEARCH (SBIR)

1. Mission/purpose statement

Fund small businesses to do research and development of innovative concepts to solve specific defense-related scientific or engineering problems, especially those concepts that also have high potential for commercialization in the private sector.

2. Goals/objectives

Stimulate technological innovation.

Strengthen the role of small business in meeting DoD research and development needs.

Foster and encourage participation by minority and disadvantaged businesses in technological innovation.

Increase the commercial application of DoD-supported research.

3. Modus operandi

The SBIR is a three phase program. Phase I determines the scientific or technical merit and feasibility of ideas and typically funds an effort of one half-person year effort over a period not to exceed six months. Success in Phase I is a prerequisite to further DoD support in Phase II. The measure of Phase I success includes evaluations of the extent to which Phase II results would have the potential to yield a product or process of continuing importance to DoD and the private sector. Subsequent Phase II awards are made to firms on the basis of results from the Phase I effort and the scientific and technical merit of t.he Phase II proposal. Phase II awards will typically cover 2 to 5 person-years of effort over a period generally not to exceed 24 months, with a maximum award of $675,000. Phase II is the principal research or research and development effort and is expected to produce a well-defined deliverable product or process. Under Phase III, the small business is expected to use non-federal capital to pursue private sector applications of the research or development. Also under Phase III, federal agencies may award non-SBIR funded follow-on contracts for products or processes which meet the mission needs of those agencies.

The SBIR outreach program features three National SBIR Conferences per year and participates in many state-organized conferences for small business. The DoD makes a special outreach effort to socially and economically disadvantaged firms and to small companies that are negatively affected by the Defense down-sizing.

4. Funding

SBIR is a tax on the research and development program; FY95 the tax will be 2%. The FY93 SBIR budget totalled $375 million throughout DoD.

5. Program initiator

Congress mandated the Federal SBIR Program by the Small Business Innovation Development Act of 1982, PL 97-219, PL 99-443, and PL 102-564.

6. Interaction with DoD, DoE, EPA and other gov't agencies

Participating DoD components: Navy, Air Force, Advanced Research Projects Agency, Defense Nuclear Agency, Ballistic Missile Defense Organization, U.S. Special Operations Command.

7. Time period of program

SBIR began in 1982. The program is currently authorized through 2000 and Congress will likely reauthorized beyond 2000; funds are increasing the program size is growing.

8. Contact Names

Bob Wrenn, SBIR coordinator	703-697-1481
Benson Schaper, ONR	703-696-4286
SBIR hotline	800-225-3842

Defense Technical Info Center	703-274-6260
Jerry Dummer, NFESC	805-982-1599

W. LEGACY PROGRAM

NOTE: Legacy is not a technology transfer program nor is it an IR (environmental cleanup) program. However, it is possible to get Legacy funds to demonstrate an innovative IR technology if it also meets one of the Legacy legislative purposes and current FY Legacy themes.

1. Mission/purpose statement

Promote, manage, research, conserve, and restore the priceless biological, geophysical, and historical resources which exist on public lands, facilities or property held by the Department of Defense. Natural and cultural resources form the legacy of nature and those who have gone before us; Legacy seeks to study and preserve these national treasures, the legacy of each generation to those who follow.

2. Goals/objectives

Create a program of management, conservation, and restoration that encourages proactive stewardship of resources at the installation level. Coordinate these efforts across the military services, scientific disciplines, and geographic regions.

The legislative act that created Legacy lists 9 purposes:

1) To establish a strategy, plan, and priority list for identifying and managing significant biological, geophysical, cultural, and historical resources existing on, or involving, all Secretary of Defense lands, facilities, and property, and including lands, facilities, and property owned and/or managed by the National Guard in each of the fifty states and territories.

2) To provide for the stewardship of all Department of Defense controlled or managed air, land, and water resources.

3) To protect significant biological systems and species including, but not limited to, those contained on the Federal endangered list and those which are candidates for that list.

4) To establish a standard Department of Defense methodology for the collection, storage, and retrieval of all biological, geophysical, cultural, and historical resource information which, in the case of biological information, should be compatible with that used by state Natural Heritage Programs.

5) To establish programs to protect, inventory, and conserve the artifacts of Native American civilization, settler communities, and others deemed to have historical, cultural, or spiritual significance.

6) To establish inventories of all scientifically significant biological, geophysical, cultural, and historical assets of Department of Defense lands. In addition to the specific attributes of the asset, these inventories are to catalog their scientific and/or cultural significance as well as their interrelationship to the surrounding environment, including the military mission carried out on the land upon which they reside.

7) To establish programs for the restoration and rehabilitation of altered or degraded habitats.

8) To establish educational, public access, and recreation programs designed to increase public appreciation, awareness and support for these national environmental initiatives.

9) To establish and coordinate by Fiscal Year 1993 with other federal departments, agencies and entities a project to inventory, protect, and conserve the physical and literary property and relics of the Department of Defense, in the United States and overseas, connected with the origins and the development of the Cold War, which are not already being carried out by other capable institutions or programs.

3. Modus operandi

Legacy solicits grant proposals from the Army, Navy, and Air Force. All proposals prepared by outside agencies must be endorsed by military or DoD proponent.

Legacy focuses on two main areas of activity: demonstration projects,

and program development. The demonstration projects serve to address resource management needs specified in the Legacy legislation and to add data and knowledge to form the basis of the Legacy program. Demonstration projects may focus on natural resources and/or cultural resources. Program development is being conducted in the following areas: Biological Resource Management; Earth Resource Management; Cultural Resource Management; Public Awareness and Education; Data Management; Decision Framework; and Survey of Current Programs.

Legacy funds natural resources projects centered on public awareness, restoration, and data collection. EX: FY93 project in Sugar Grove, WV to protect the Rockshell Cress, an endangered specie; erosion control, habitat restoration.

4. Funding

Congress appropriates Legacy funds on an annual basis. Legacy began in 1991 with a total annual budget of $10 million, current budget is $50 million total. Future budgets may remain at the $50 million level but that is uncertain.

5. Program initiator

Began in 1991 by Congressional enactment of the Legacy Resource Management Program. Lead agency is the DoD, Office of the Deputy Under Secretary of Defense for Environmental Security.

6. Interaction with DoD, DoE, EPA and other gov't agencies

Although mainly a DoD project, the Legacy program partners with other Federal and State agencies, private organizations, and volunteers.

7. Time period of program

Began in 1991; dependant on annual Congressional reapproval.

8. Contact Names

Lorri Swartz 703-325-8525; DSN 221-8525, fax x2839

X. CALIFORNIA BASE CLOSURE ENVIRONMENTAL COMMITTEE (CBCEC)

NOTE: The CBCEC does not focus on IR technology transfer but this committee could help NFESC gain approval for using innovative IR technologies on Navy properties.

1. Mission/purpose statement

Facilitate base closure and reuse in the State of California. Identify methods and technologies that promote accelerated restoration and expedited transfer of BRAC properties.

2. Goals/objectives

Lessen the socioeconomic impacts of military base closures in the State of California (estimated direct dollar loss $7 billion). Expedite the environmental restoration and reuse of closing military bases. Protect environmentally sensitive areas affected by BRAC like coastal zones, non-attainment areas under the Clean Air Act, endangered species, wetlands, and groundwater. Coordinate the many regulatory agencies involved in oversight during BRAC; build interagency communication and teamwork. Share lessons learned with other States.

3. Modus operandi

The CBCEC is comprised of two representatives from each of the agency members: Cal-EPA (State Water Resources Control Board, and Department of Toxic Substances Control), CA Governor's Office, US-EPA, Army, Navy Air Force, DoD. The CBCEC has formed seven Process Action Teams (PATs) which function like subcommittees: Site Characterization; Technology Matching; Air Emissions Credits; Radioactive and Mixed Waste; Decision Documents; Training and Outreach; and Fast Track Cleanup. The CBCEC holds quarterly meetings and the PATs meet as needed. CBCEC publishes a quarterly newsletter describing the committee's activities.

The CBCEC puts together consensus documents to guide and expedite environmental issues during base closure in the state of California. For example, the Technology Matching Process Action Team developed a "Treatment Technologies Applications Matrix for Base Closure Activities" to assist remedial project managers in identifying and evaluating treatment technologies during the feasibility study. This Matrix does not list innovative technologies but focuses on developed technologies that should be considered for immediate implementation. A 1994 addendum surveys Innovative/Emerging Treatment Technologies. The Matrix and Addendum were prepared as a collaborative effort by representatives of the Air Force (AFCEE), Army, Corp of Engineers, Navy, WESTDIV, DOE, EPA Region IX, Cal-EPA, Governor's office, California State Water Resources Control Board, and Department of Toxic Substances Control. Other CBCEC technical products include a "Guidance Document for Hydrogeologic Investigations", and a "Guidance to Evaluate 'Uncontaminated' Parcels."

The CBCEC has established shared commitment and responsibility, fostered partnerships, developed regional focus and accountability, encouraged open communication, and shared lessons learned.

4. Funding

The Committee itself has no monies. Each member agency provides personnel to serve on the committee and complete committee business. The state of California funds the cost of the meetings from state and DSMOA funds. Mostly DoD BRAC funds. DoD and California state have a DSMOA (DoD/State Memorandum of Agreement) for grant monies; periodic renewal on funding.

5. Program initiator (Congress, Navy, etc.)

Initiated by California Governor Wilson in 1991 by executive order.

6. Interaction with DoD, DoE, EPA and other gov't agencies

Extensive.

7. Time period of program

Began 1991, ongoing.

8. Contact Names

Mark Berscheid, CA EPA	916-322-3294
Stacey Lupton, PRC	415-222-8245
Dana Sakamoto, Navy SWDiv	619-532-3964
Peter Wood, Cal Toxic Control Bd, tech transfer	916-255-2012
Mark Walsh, PRC	619-225-1883

Y. ENVIRONMENTAL PERFORMANCE COOPERATIVE, INC.

1. Mission/purpose statement

Support industry in attaining the most cost-effective environmental performance in the areas of remediation, waste reduction, and pollution prevention. Bring together researchers and technology users to develop needed technologies for site characterization of soils contaminated with explosives; coordinate efforts to reduce cost and increase technology innovations.

2. Goals/objectives

Identify representatives of concerned organizations dealing with common environmental issues.

Link organizations having common problems toward development of common solutions.

Facilitate rapid delivery of best available environmental performance and solutions.

3. Modus operandi

The Environmental Performance Cooperative has two major thrust areas: hold workshops to discuss and disseminate information on environmental problems and solutions; and form/foster partnerships and testbeds for technology demonstrations to develop cost-effective solutions. For example, in July 1994 EPC held a workshop on "Site Characterization and Remediation of Nitroglycerine" at the Naval Surface Warfare Center, Indian Head MD. EPC has organized three large workshops and several small workshops since its inception. Partnership demonstrations have included detection technology for nitroglycerine contamination in soil, and the "smart pipe" program with the Air Force to improve wastewater treatment technologies.

4. Funding

ICI-Americas contributes two personnel, each on a part-time basis, to administer the Environmental Performance Cooperative. Registration fees cover the costs of workshops which are generally held on government property with no or low rental fees. EPC has no budget or funding source per se.

5. Program initiator (Congress, Navy, etc.)

Non-profit company formed by ICI-Americas, a chemical and explosives manufacturer.

6. Interaction with DoD, DoE, EPA and other gov't agencies

Work with DoD agencies and facilities, especially those that employ explosives or have soils contaminated with explosives.

7. Time period of program

Began 1992; ongoing.

8. Contact Names

Sid Saunders 215-666-8786; 610-701-0247

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Z. MISCELLANEOUS

1. Navy Domestic Technology Transfer Program

Objective is to transfer Navy technology to the U.S. civilian sector to promote national technical growth and economic development. Largely accomplished by CRADA's (Cooperative Research and Development Agreements), i.e. joint programs with private sector. Also accomplished by membership in the Federal Laboratory Consortium. Funding comes from Navy R&D budgets.

Note: CRADA's stimulate creative research between industry and government laboratories by offering private firms special incentives. These agreements undergo a streamlined government approval process and provide the private sector with first patent rights to intellectual property of the joint research and trade-secret protection for up to five years.

2. Federal Laboratory Consortium (FLC) for Technology Transfer

An organization of Federal research and development laboratories and centers established pursuant to 15 U.S.C. § 3710(e), and formed to identify and mobilize the necessary resources to provide the environment, organization, and necessary technology transfer mechanisms required to facilitate the fullest possible utilization of Federally sponsored research and development results by both public and private sector potential users. Also formed to provide a National referral network to allow potential users to gain access to any Federal technology, by contacting any activity of which they become aware.

Formerly the Department of Defense Technology Transfer Consortium begun in 1971. Administered by the National Institute of Standards and Technology, the FLC is located in Washington DC (202-331-4220). Initiated by Congress as PL 96-480, "Stevenson-Wydler Technology Innovation Act of 1980," as amended by PL 99-502, "Federal Technology Transfer Act of 1986."

3. Army Domestic Technology Transfer Program (ADTTP)

Implements 15 USC 3701, Executive Order 12591, and DoD 3200.12-R-4. Purpose is to transfer Army-developed technology to the civilian sector. Implementation: Contribute 0.008% of Army R&D funds to the FLC; Enter into CRDAs; Cooperate with the SBIR (Small Business Innovateion Research) program.

4. U.S. Army Corps of Engineers HTRW Innovative Technology Transfer Workshops

This workshop has been held annually since 1991 to promote exchange of information on innovative HTRW (hazardous, toxic, and radioactive wastes) technologies among program managers, environmental engineers, designers and users. Presentations are given by Corps personnel as well as representatives from the EPA, Air Force, DOE, and the Army Environmental Center. The Corps is responsible for cleaning up former DOE and DoD sites which have a wide range of contaminants (explosives, solvents, metals, etc.) in the soil and water. Funding for the project depends on the agency/location of the job. The Corps essentially acts like a consultant to other federal agencies. The majority of their work is for the Air Force.

The HTRW group of the Corps has four innovative technology advocates, one at headquarters and one each in the Omaha, Kansas City, and Tulsa district offices. The Corps plans to create additional positions to increase technology transfer. For more information on the Corps' HTRW technology transfer efforts, contact David Nusz in Omaha at 402-221-7381.

5. Databases

WMTADS: Waste Management and Technologies Analytical Database System

available on Internet
developed in 1992 by DOE, Los Alamos
more info available thru the Waste Policy Institute @ 703-231-3324

ATTIC (Alternative Treatment Technology Information Center)

ATTIC is a comprehensive automated information retrieval system that integrates existing hazardous waste data into a unified, searchable resource.

This system provides access to a variety of technical information sources at one location, including information on alternative treatment technologies, such as SITE data reports, bench and pilot scale data, and industrial applications. Oil spill information and UST databases will be added in the near future. The Center itself provides searches of ATTIC resident data bases, comprehensive searches of other on-line data bases, and technical evaluations of collected data. An on-line system provides an electronic link to the ATTIC system data bases and document ordering and is accessible by any IBM-type or Macintosh computer equipped with communications software and a modem. ATTIC has three components: the RCRA/CERCLA Hotline; the Clean-Up Information (CLU-IN) Bulletin Board; and a reference library that consists of the EPA Library's Hazardous Waste Superfund Collection. Services are provided for EPA personnel and others involved in Superfund cleanup activities.
ATTIC information hotline: 703-908-2137; fax x2412
ATTIC online system number, no password needed: 703-908-2138

DROLS (Defense RDT&E ON-line System)

DROLS was developed by the Defense Technical Information Center (DTIC) to provide on-line access to its collection of reports and documents. DROLS provides access to extensive databases and report collections. The DTIC can be reached at 703-274-7709 or autovon 284-7790.

HWCD (Hazardous Waste Collection Database)

HWCD is a special EPA Headquarters Library Collection on hazardous waste related topics. HWCD contains books and journals, legislation and regulations, reports from Federal agencies, OSWER policy and guidance directives, and EPA reports from selected program offices. 202-382-5922

VISITT (Vendor Information System for Innovative Treatment Technologies)

VISITT lists innovative technologies (especially bioremediation) offered by various private companies. This compilation is distributed on diskettes or from an electronic bulletin board called CLU-IN (modem access # 301-589-8366). The EPA compiled VISITT version 1 in 1992; version 3 is due out in summer 1994. Neither vendors nor users pay a fee, EPA funds all production and distribution costs in an effort to promote innovative technology. VISITT boasts 11,000 users in 60 countries; the 141 vendors in version 2 generated 2500 contacts between users and technology providers.
VISITT information hotline: 800-245-4505

AFCEE maintains an on-line environmental information hotline called PRO-ACT, available on an electronic bulletin board called DENIX (Defense Environmental Network and Information Exchange). A DENIX login is available from the DENIX data manager (1-800-642-3332) and the access numbers are 1-800-233-HELO (233-4356) or DSN 240-4214.

EPA National Response Center, hotline for reporting spills: 800-424-8802

6. NASA's Technology Transfer Centers

NASA supports six, nonprofit, regional technology transfer centers (listed below). Each of these regional centers maintains affiliations with universities in the area. The Centers serve as information clearinghouses, do database searches, match businesses with federal agencies to conduct technology demonstrations, and help write SBIR proposals and business plans for businesses. The Centers sponsor some environmental remediation projects but they do not emphasize this area.

Technology Transfer Center
University of Southern California
Los Angeles, CA
800-872-7477 outside CA
213-743-6132

Midcontinent Technology Transfer Center
Texas A&M University
College Station, TX
409-845-8762

Center for Technology Commercialization
Massachusetts Technology Park
Westborough, MA
508-870-0042

Great Lakes Technology Transfer Center, Battelle
Cleveland, OH
216-734-0094

Mid-Atlantic Technology Applications Center
University of Pittsburgh
800-257-2725
412-648-7000

Southern Technology Application Center
University of Florida, Alachua
800-225-0308 (outside FL)
904-462-3913

7. Center for Innovative Technology (CIT)

This State of Virginia nonprofit organization advances Virginia's economic growth and technology leadership by providing Virginia businesses with access to new technologies and technical/educational resources. CIT helps Virginia companies reinvest their defense expertise in civilian business or non-military government work. CIT also helps private/public partnerships' with military installations located in Virginia. For example, CIT enabled a CRADA for the Naval Surface Warfare Center to develop a process to use waste materials in nose cones. Contact Dr. Jack Heinemann, director of Envirotechnology Development and Commercialization at 703-689-3006.

8. Environmental Technologies Exports: Strategic Framework for U.S. Leadership

On Earth Day 1993, President Clinton asked the Department of Commerce, DOE, and EPA to develop a national export strategy for environmental technologies. In response, the Interagency Environmental Technologies Exports Working Group produced this document. It discusses export opportunities and the significance of government policy on the exports of environmental technologies. It also suggests a framework for effective action.

This document may be ordered from Ms. Millie Mack Syberg at 202-482-0617. It is also available on internet: telnet to ebb.stat-usa.gov; filename is ENVRTECH.TXT.

9. National Research Council Evaluation Protocols for Commercializing Innovative Remediation Technologies

The Water Science and Technology Board of the Commission on Geosciences, Environment and Resources proposed this study to test and transfer innovative technologies for cleaning up hazardous waste sites. The study was in a draft stage as of July 1994 with a proposed total budget of $400,000. Contact Jackie MacDonald, National Research Council, at 202-334-3422.

10. California Department of Toxic Substances Control Evaluation of New Environmental Technologies

The Department of Toxic Substances Control (DTSC), and Environmental Health and Safety, U-C Davis formed a partnership to evaluate and demonstrate innovative hazardous waste reduction technologies developed by California companies. The 1994 solicitation was open to California companies and closed on July 14, 1994. Contact Lynda Dyane, DTSC, 916-322-3670.

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PRC INC / WALSH, SAN DIEGO, CA
PWC GUAM / EBEL, SANTA RITA,
PWC/EFA GREAT LAKES / CODE 930, GREAT LAKES, IL
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