Environmental Quality Technology Program

“Addressing Defense Requirements with Tomorrow’s Technology”

29th Environmental and Energy Symposium & Exhibition

Program Brief

April 9, 2003
Benefit of the EQT program -
Serves as a Total Army “Toolbox” by:
– Supporting programs to help reduce total ownership costs
– Making additional resources available for Readiness and Modernization through cost avoidances achieved by this program

Responsive to Defense Planning Guidance (DPG)
– Address Army’s High-Priority EQT Research, Development, Test, and Evaluation (RDT&E) Requirements
Defense Planning Goals (DPG) GOALS:
- EQT program must address all high-priority requirements
- Program must yield high return-on-investment (ROI) with payback period not greater than to 5 years from completion of demonstration/validation

February (1999) SECARMY policy memo:
- Promulgates “Corporate Approach” of the EQT program to the safety and occupational health programs, and
- Coordination by PMs for their systems’ ESOH impacts

May (1999) memo co-authored by the VCSA and Army Acquisition Executive (AAE) identifies PM consideration for/and investments in EQT as an Army high-priority effort
Environmental Quality Technology Program

EQT Tiered Oversight

Environmental Technology Technical Council

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Economic Analysis

Program Coord & Integration

R&D Reqmnt Resolution

Technology Transfer

ETIPT

Policy Develop & Compliance

Technology Maturity

Technology Teams

P2
Conservation
Restoration
Compliance
MEMORANDUM FOR SEE DISTRIBUTION

SECRETARY OF THE ARMY
WASHINGTON
February 9, 1999

SUBJECT: Environmental Technology Program Management and Oversight

The offices of the ASA(I&ES) and the ASA(R&DA) established an innovative approach to program management and oversight with the inception of the Environmental Technology Technical Council (ETTC) and the issuance of the Environmental Quality Technology (EQT) Investment Strategy. Through these efforts, the ETTC has corporately developed and is implementing environmental quality research and development (R&D) programs for the "Total Army" in the FY99-05 POM.

The process employs a team of senior Army leadership the ability to prioritize needs, focus resources and ensure cost-efficient investments for technologies that will sustain the "Total Army" as it deals with the nation's pressing defense challenges. The ETTC places a virtual "Tool Box" of innovative technologies in our hands to address high priority R&D needs while reducing total ownership costs, enhancing mission capabilities, and environmental stewardship.

In light of these benefits, I wish to exploit this success by including the consideration of EQT in Army safety and health programs. Consequently, the ETTC's role should be expanded to ensure that EQT is considered in all Environment, Safety and Health (ESH) programs where appropriate. All EQT initiatives realigned with research, development, test, and evaluation funds related to ESH shall be coordinated, planned, and programmed as necessary through the ETTC. Additionally, all environmental quality related engineering and manufacturing development programs should also be coordinated with the ETTC.

I am pleased with the efforts of the Army team that has brought this to fruition. To that end, I also encourage all of you to take an active role in the ETTC by addressing today's needs with tomorrow's technology.

Louis Caldera
Secretary of the Army

Foreword

On behalf of the Department of the Army, it is my pleasure to present the first annual report on the progress and accomplishments of the Army's Environmental Quality Technology Program for Fiscal Year 1999. In this report, we articulate and convey the most important environmental technology needs for the Army. We identify the Army process and technology solutions to meet these environmental requirements. Finally, we recommend a priority and funding structure within DOD's budget formulation process to implement these solutions.

Over the past two years the Army has developed and implemented an innovative approach to program management and oversight with the establishment of the Environmental Technology Technical Council and the promulgation of the Army's Environmental Quality Technology Investment Strategy. This program has been a significant success and is an example of the kind of innovative thinking and creative management that will support the Army for the 21st century. The process is structured to sustain the Army's science and engineering base for Environmental Quality Technology Research Development Test & Evaluation by focusing a fixed amount of resources toward basic and applied research every year as it develops technologies to resolve the Army's emerging high priority requirements. The net result provides Army leaders a virtual "Technology Tool Box" to address the Army's high priority research and development needs like Unexploded Ordnance Detection and Discrimination, Hazard/Risk Assessment for Human and Ecological Health, Hazardous Air Pollutant Mitigation and Lead Abatement. These innovative technologies are specifically targeted to reduce total ownership costs related to sustaining the environment and the Army mission.

I encourage each of you to take an active role in the Environmental Quality Technology Program in order to address critical Army needs with tomorrow's technology.

Louis Caldera
Secretary of the Army
## FY 04-09 High Priority EQT RDT&E Requirements

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<td>Hazard Assesment Models for UXO Sites</td>
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EQT Significant Accomplishments

- Newly authorized RDT&E demonstration/validation program element established in FY00 with OASA(I&E) oversight.
- Conducting UXO DoD technology validation at NDCEE.
- Secretary of the Army endorsed Annual Report to Congress to satisfy new Congressional requirement to report on DOD EQT programs.
- Army has five fully funded EQT programs:
  - Potential Cost Avoidance - $3.8 B
  - Lead Paint Removal Technologies (Compliance) 00-05
  - Hazardous Air Pollutants Control (Compliance) 00-05
  - UXO Identification and Discrimination (Restoration) 02-07
  - Hazardous/Risk Assessment of Military Unique Compounds (Restoration) 02-07
  - Sustainable Army Live-Fire Range Design & Maintenance (Compliance) 03-07
Environmental Quality Technology Program

Removal, Treatment and Disposal Technologies for Lead-Based Paint (LBP) Contamination

**Objectives:**
Demonstrate innovative technologies to provide Army installations environmentally safe and cost effective removal of lead based paint hazards. Conduct demonstrations to mature technology to assist Army installations in becoming environmentally compliant in a cost-effective manner and without compromising mission readiness.

**Approach:**
Improve environmental compliance through:
- Thermal spray vitrification.
- Microwave assisted removal.
- Self-healing overcoatings.
- Lead based paint hazard management system.
- Electrokinetic extraction for soils.

**Justification:**
Overcoatings and encapsulants reduce the lead dust and health risk. Thermal spray removal and microwave-assisted removal render the waste non-hazardous and reduce the lead dust during lead hazard abatement and disposal (AERTA requirement 2.3.k).

**Accomplishments:**
- Demonstrated feasibility of removing lead originating from lead based paint from soil using electromigration to reduce lead level below EPA’s level of concern of 400 ppm at Fort Drum.
- Demonstrated environmentally acceptable chemical strippers and thermal spray for removal of LBP and decision tree for optimal selection of technologies for control and abatement of LBP Hazards on steel structures.
- In FY03, demonstrate lead hazard removal technologies for buildings that result in non-hazardous waste that leaches less than 5ppm lead and produces no hazardous pollutants. Develop a decision tree based on field demonstrations for optimum selection of cost effective technologies.

**Program Schedule**

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<td>Demonstrate Lead Abatement Technologies for Family Housing &amp; Child Occupied Facilities</td>
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<td>Develop and Demonstrate Treatments for Lead in Soil</td>
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Accomplishments:
- Completed developmental testing of Zero Emission Cr Electroplating System at Anniston Army Depot.
- Demonstration of continuous emission monitor (XCEM) at Tooele Army Depot, meeting EPA Performance Specification for 5 metals.
- Demonstrated Improved Mobile Zone Spray Booth Recirculation exceeding the 81% VOC removal efficiency requirement for control devices at Fort Hood. Recent user interest: Army Reserves, UT; and Ft. Eustis.
- In FY03, demonstrate hazardous organic solvent emissions technologies to remove 95% of HAPs and 20% cost reduction (baseline -10,000 cfm unit at $65/cfm).
- By FY05, demonstrate combustion source HAP control from hazardous waste incinerators (chemical and conventional demilitarization) and non-natural gas boilers to meet NESHAP requirements.

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RDT&E BA2 (0602720A 896) RDT&E BA3 (0603728A 002)
Environmental Quality Technology Program

Unexploded Ordnance (UXO) Identification and Discrimination

Objective:
Develop technologies that are non-intrusive and can accurately identify UXO from scrap and shrapnel, and that identify the configuration and type of ordnance.

Approach:
• Develop models of electromagnetic, magnetic, Ground Penetrating Radar (GPR) and Chemical signatures of UXOs in representative environmental / geophysical conditions.
• Develop and evaluate enhanced sensors for buried UXO detection / discrimination.
• Develop advanced multi-sensor technologies for false alarm reduction.
• Validate technologies at standard UXO test sites.

Justification:
Multi-sensor approach addresses UXO discrimination focus on AERTA 1.6.a. Decreased false alarm rate reduces number of items to be excavated, thereby reducing removal costs and safety risks.

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Accomplishments:
• Developed validated UXO signature models of emerging sensors to support multi-sensor systems development and improved analysis techniques.
• In FY03, provide technical and performance specifications for an optimized UXO detection/discrimination systems.
• By FY04, transition handheld sensor technologies and advanced discrimination algorithms to users.
• By FY05, demonstrate a 90%-95% probable UXO detection/discrimination system to reduce false alarm rates by 90% (10 false alarm rate decrease from current capabilities) at or above currently achievable Pd (90%-95%).

Geonics EM-63 with GPS positioning, Fort Ord, CA, 2002
Objective: Develop an Army Risk Assessment Modeling System (ARAMS) to provide consistent and verifiable procedures to assess human and ecological health risks of Military Unique Compounds (MUC) at Army environmental restoration sites.

Approach:
- Screening-level models and spatially-explicit, comprehensive models of contaminant fate and transport.
- Multi-media exposure pathway assessment with uptake and transfer to environmental endpoints.
- Linked effects databases and options for higher-order effects models.
- Integrated modeling platform reducing time/cost to conduct risk assessments at Army sites.

Justification: Development of ARAMS (a knowledge model integration tool) provides consistent use of the existing 200 plus risk assessment models described in AERTA requirement 1.1.a and 1.5.g.

Accomplishments:
- Developed final program for Hazard/Risk advanced development and technology demonstration.
- Released version 1.0 of the ARAMS with process descriptors for explosives fate and transport, aquatic explosives uptake, and in vitro bioavailability data for humans.
- In FY03, release version 1.1 of the ARAMS with process descriptors for range compounds (propellants, smokes, illuminants) fate and transport, terrestrial explosives uptake, and expand fate/transport and toxicology databases.
- By FY04, complete ARAMS 2.0 with higher order assessment methods, i.e., Geographic Information System based spatially explicit wildlife exposure model and contaminant fate and transport models.
- By FY05, complete ARAMS 2.1 with tutorials and case studies of cost effectiveness for enhanced tech transfer.
Environmental Quality Technology Program

Sustainable Army Live-Fire Range Design and Maintenance

**Objective:**
Provide range risk assessment and management techniques integrating explosive safety, environmental compliance, and natural resources management with the objective of ensuring operational capability of the live-fire training environment. Technologies to be targeted toward range planning, design and maintenance activities.

**Approach:**
- Identify environmental compliance risk to ranges and develop a functional planning and management protocol for assessment of risk.
- Review doctrinal range designs, military construction, and Objective Force (OF) requirements to evaluate and develop range design components to be implemented to address environmental requirements.
- Develop long-term planning, construction, carrying capacity and operational protocols that will reduce environmental constraints, compliance and maintenance requirements.

**Justification:**
- Addresses AERTA requirement 2.5.e and will support sustainment of live training capabilities and facilities in the future

**Program Schedule**

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**Accomplishments:**
- Developed range risk and design assessment methodology.
- By FY04, complete development of a range design risk assessment model.
- By FY05, identify range design specification requirements and best management practices, incorporating environmental compliance.
- By FY05, complete development of a munitions carrying capacity model for range sustainment.
- By FY06, complete demonstration/validation of range design and retrofit packages.
- By FY07, technology transfer of risk, design, and capacity packages into standard range program.
National Defense Center for Environmental Excellence

“Addressing Defense Requirements with Tomorrow’s Technology”

Environmental Technology Facility

Technology Thrust Areas
- Organic Finishing
- Inorganic Finishing
- Advanced Cleaning
- Coatings Removal
- Recycle/Recovery/Reuse
- Fuel Cell Test & Evaluation Center
- Laboratories

NDCEE

- Congressionally chartered to facilitate research, development, test and evaluation (RDT&E) from basic research through demonstration, validation and technology transfer of innovative environmental quality technologies aimed at reducing total ownership costs in support of national defense.

- The OASA(I&E) is designated the DoD Executive Agent (EA) for the NDCEE

- EA provides DoD oversight of budget, policy, and execution IAW DOD Approved NDCE Operating Principles

- UXO technology mission added to NDCEE charter by the National Defense Authorization Act for Fiscal Year 2001, Army UXO technology program funded in FY02 and FY03 for $8 Million
Objectives:
- Explore new methods and improve existing technologies and processes for the reuse, recycle, or disposition of End-of-Life electronic equipment used by the Department of Defense and Federal Agencies at the DEER2- Demanufacturing Technology Center (DTC).

Justification:
Recovery of electronic equipment/parts and materials will:
- Reduce hazardous material and waste in DoD facilities (presently discards greater than 30 million pounds/yr of electronics).
- Reduce future procurement costs and landfill disposal costs for electronic equipment (anticipate $1M/yr in recycling fees returned to government and $300K/yr in HW disposal costs avoided).
- Comply with regulatory requirements; (i.e., Executive Order 13101).

Approach:
- Address additional demanufacturing subtasks identified by the Mission Need Statement and make improvements to existing technologies demonstrated and validated by Task N.228.
- Transition results and technologies to DoD and industry sites.

Accomplishments:
- Developed project management plan (FY02).
- Revise and update mission need statement (FY02/03).
- Deliver Information Reports (FY03).
- Deliver Module TDP/O&M Manuals updates (FY03).
- Transfer System Modules (FY03).
- Train Lone Star Army Ammunition Plant personnel on use of the equipment (FY03).
- Transition the system to Lone Star Army Ammunition Plant (FY03).
Managing Army Technologies for Environmental Enhancements (MANATEE)

Objective:
• Further develop and enhance the module-based environmental management system implemented at Radford Army Ammunition Plant (RFAAP) under Tasks N.125 and N.225 RFAAP Environmental Development and Management Program (REDMAP).

Justification:
• The results of this task will improve the environmental posture at RFAAP as well as improve the efficiency of the production process by increasing the recovery and reuse of process chemicals, which will lower production costs.

Approach:
• Designed to reduce the risk sometimes associated with implementing new technologies. It consists of six key elements that form the backbone of virtually all NDCEE tasks. These elements are: Baseline Analysis, Identify Alternatives, Technology Demonstration, Technology Justification, Technology Implementation, and Follow-up.
• The MANATEE Team includes: Office of the Deputy Assistant Secretary of the Army - Environmental Safety and Occupational Health - Executive Agent Team, Radford Army Ammunition Plant, and the NDCEE.

Accomplishments:
• Complete the Project Management Plan (FY03).
• Prepared a systems design paper (FY03).
• Upgrade the control systems (FY03).
• Complete the ethanol mass balance and distillation upgrade study (FY03).
• Develop a pictorial record (FY03).
• Implement the MANATEE Technologies (FY03).

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Environmental Quality Technology Program
National Defense Center for Environmental Excellence

Non-Hazardous Solid Waste

Objective:
Identify, develop and demonstrate technologies capable of rapid, on-site volume reduction, conversion, decomposition and/or transformation of waste materials into useful products; achieving a diversion rate (from landfill and incineration) of greater than 40%.

Justification:
The Army has identified Nonhazardous Solid Waste (NHSW) as its top pollution prevention mission need, prompted by Executive Order E.O. 13101, which requires a 40% reduction of landfilled solid waste by 2005; 50% by 2010.

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<td>6 Technology Transfer</td>
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Approach:

Construction and Demolition (C&D) Debris:
- Categorize Department of Defense (DoD) waste streams, management practices, regulatory barriers and disposal costs.
- Evaluate material recovery technologies for lead-based paint (LBP).
- Develop waste material diversion models through resale, conversion and/or reuse in new construction.

Municipal Solid Waste (MSW):
- Demonstrate and validate the Bouldin & Lawson (B&L) proprietary waste conversion process performance.

Accomplishments:
- MSW conversion gross feasibility (FY03).
- Mechanical processing of LBP-coated siding (FY03).
- Landfill evaluation for LBP-coated siding (FY03).
- Identification/evaluation of new conversion technologies (FY03).
- Interactive-Technology Transfer products (FY03).

Typical deconstruction at Ft. Ord
EITM Program
Information Systems Transition Strategy

FY02 | 1/02 | 4/02 | 7/02 | FY03
--- | --- | --- | --- | ---
Hazardous Substances Management System (HSMS) | Continuing enhancements | Continuing enhancements | Beta Test & Fielding of Application | Operations Sustainment
Integrated Pest Management Information System (IPMIS) | Develop & Fielding of Version 2.4.1 | Finalize Data Model Clean-up | Expand data model to encompass other Environmental Thrust areas | Operations Sustainment
Knowledge Based Corporate Reporting System (KBCRS) | Finalize Web-Based version | | | Operations Sustainment
Solid Waste Annual Reporting (SWAR) | | | | Operations Sustainment
Explosives Safety Siting (ESS) | Complete enhancements | | | Operations Sustainment
Explosives Safety and Resource Protection Module (ESRPM) | | Complete enhancements | | Operations Sustainment

Operations Sustainment

Continuing enhancements

Develop & Fielding of Version 2.4.1

Beta Test & Fielding of Application

Finalize Data Model Clean-up

Expand data model to encompass other Environmental Thrust areas

Finalize Web-Based version

Complete enhancements

Operations Sustainment

Operations Sustainment

Operations Sustainment

Operations Sustainment

Operations Sustainment

Operations Sustainment

Operations Sustainment
Overview of Corporate Data

- **What is corporate data?**
  - Information that is passed upward from the various services and agencies through command managers and headquarters managers to the Department of Defense (and beyond).
  - Information that represents the DoD as a whole.
KBCRS Features

- Standardized corporate-level information.
- Streamlined data collection/ no data manipulation
- Powerful tools for information access
- Secure, but accessible from anywhere via web

Knowledge-Based Corporate Reporting System

EITM
Corporate Systems

Access thru DENIX

Navy | Army | Air Force | DLA | Others

Component Dependent Data Collection

KBCRS

Filter

KBCRS DB

KBCRS Analysis and Reporting

Data Flow Schematic

Congress
OSD
Components
Public

Organization Schematic

Congress
OSD
Components
Public

Knowledge-Based Corporate Reporting System

EOOH Information Technology Management Program

Knowledge-Based Corporate Reporting System
ESOH Information Technology Management Program

DENIX

Welcome to the Defense Environmental Network & Information Exchange (DENIX), a comprehensive resource for Defense Installations & Environmental Communities.

DENIX serves as a central platform for the dissemination of environment, safety and occupational health (ESOH) news, policy, and guidance within Department of Defense (DoD) activities worldwide, in support of the national defense mission. DENIX informs ESOH professionals of salient issues and provides them with tools to sustain their readiness and compliance efforts with Congressional and DoD requirements.

DENIX is under new leadership as it enters its tenth year of serving the DoD ESOH community. In October 2001, the Office of the Assistant Secretary of the Army (ASA I&E) was designated as the Executive Agent for the Environmental Information Technology Management (EITM) program office by the Office of the Under Secretary of Defense for Installations & Environment (DUSD/I&E). EITM is responsible for the ongoing development, operations, and management of the DENIX system.