ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

February 2005

BUDGET ACTIVITY	PE NUMBER AND TITLE
3 - Advanced technology development	**0603728A - Environmental Quality Technology Demonstrations**

	COST (In Thousands)	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
	Total Program Element (PE) Cost	19942	17933	12606	13659	14898	16255	16439	16608
002	ENVIRONMENTAL COMPLIANCE TECHNOLOGY	1359	630	1310	1916	2014	2043	2061	2077
025	POLLUTION PREVENTION TECHNOLOGY	2266	2671	3212	3426	3513	3603	3675	3748
03E	ENVIRONMENTAL RESTORATION TECHNOLOGY	11500	10749	8084	8317	9371	10609	10703	10783
03F	ENVIRONMENTAL QUALITY TECH DEMONSTRATIONS (CA)	2384	3883	0	0	0	0	0	0
EM3	PROTON EXCHANGE MEMBRANE FUEL CELL DEMO	2433	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification: The objective of this program element is to mature and demonstrate technologies that will assist Army installations in becoming environmentally compatible without compromising the readiness or training critical to the success of the Future Force. Technologies demonstrated within this program element are transitioned from PE 0602720A (Environmental Quality Technology). This program includes technology demonstrations for: restoration of sites contaminated with toxic and/or hazardous materials (such as unexploded ordnance [UXO]) resulting from Army operations; pollution prevention to minimize the Army's use and generation of toxic chemicals and hazardous wastes; compliance with environmental laws by control, treatment, and disposal of hazardous waste products; and conservation of natural and cultural resources while providing a realistic environment for mission activities. This program demonstrates technological feasibility, assesses the technology and its producibility, and transitions mature technologies from the laboratory to installations. Technologies developed by this program element will improve the Army's ability to achieve environmental restoration and compliance at its installations, at active and inactive ranges and other training lands, and at its rework and production facilities. Technologies demonstrated will focus on reducing the cost of treating hazardous effluents and remediating Army sites contaminated by hazardous/toxic materiel. The cited work is consistent with Strategic Planning Guidance, the Army Science and Technology Master Plan (ASTMP), the Army Modernization Plan, and the Defense Technology Area Plan (DTAP). Work in this program element is performed by the U.S. Army Engineer Research and Development Center, headquartered at Vicksburg, Mississippi, and the U.S. Army Research, Development and Engineering Command, headquartered at Fort Belvoir, Virginia.

B. Program Change Summary	FY 2005	FY 2006	FY 2007
Previous President's Budget (FY 2005)	14666	12906	13826
Current Budget (FY 2006/2007 PB)	17933	12606	13659
Total Adjustments	3267	-300	-167
Net of Program/Database Changes			
Congressional Program Reductions	-267		
Congressional Rescissions			
Congressional Increases	4050		
Reprogrammings			
SBIR/STTR Transfer	-516		
Adjustments to Budget Years		-300	-167

Change Summary Explanation:

Two FY05 Congressional adds totaling $4050 were added to this PE.

FY05 Congressional adds with no R-2A:
($1007) Commercialization of Technologies to Lower Defense Costs, Project 03F
($2877) Fort Ord Lead Based Paint and Wood Recycling Initiative, Project 03F

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

February 2005

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced technology development	**0603728A - Environmental Quality Technology Demonstrations**	**002**

COST (In Thousands)		FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
002	ENVIRONMENTAL COMPLIANCE TECHNOLOGY	1359	630	1310	1916	2014	2043	2061	2077

A. Mission Description and Budget Item Justification: This project will mature and demonstrate technologies transitioned from PE 0602720A (Environmental Quality Technology), Projects 048 and 896 that will assist Army installations in achieving environmental compliance. These technologies will reduce the cost of treating hazardous effluents from Army installations, including ammunition plants, depots and arsenals, to satisfy increasingly stringent wastewater and air pollutant discharge standards. Army facilities are now subject to fines and facility shutdowns for violation of federal, state, and local air and wastewater discharge regulations. This technology is essential to control and reduce the generation of wastes to satisfy hazardous waste reduction goals, and to avoid future hazardous waste disposal costs and liabilities to the Army. Technology demonstrated will also reduce the cost of resolving training noise compliance issues for the Army, avoid reductions in availability of training facilities, and sustain the viability of testing and training ranges. Efforts under this project will enable the Army to reduce pollution at installations while complying with the myriad of federal, state, and host country regulations dealing with hazardous wastewater, air emissions, and solid wastes. The cited work is consistent with Strategic Planning Guidance, the Army Science and Technology Master Plan (ASTMP), the Army Modernization Plan, and the Defense Technology Area Plan (DTAP). Work in this project is performed by the U.S. Army Engineer Research and Development Center, headquartered at Vicksburg, Mississippi.

Accomplishments/Planned Program	FY 2004	FY 2005	FY 2006	FY 2007
Installation Operations – Demonstrate environmentally safe and cost-effective technologies for removing lead-based paint and reducing Hazardous Air Pollutants (HAP) emissions from Army sources to meet National Emission Standards for HAP. In FY04, matured and demonstrated zero emission control system for control of HAP emissions from chromium plating operations. In FY05, mature and demonstrate complete emission control system for demil furnaces. Reconfigurable and Joint Training Ranges - In FY06, will mature acoustic emission data acquisition techniques and models for various weapon systems. In FY07, will integrate noise tools into Army range design protocols.	1359	630	1310	1916
Totals	1359	630	1310	1916

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

February 2005

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced technology development	**0603728A - Environmental Quality Technology Demonstrations**	**025**

COST (In Thousands)		FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
025	POLLUTION PREVENTION TECHNOLOGY	2266	2671	3212	3426	3513	3603	3675	3748

A. Mission Description and Budget Item Justification: The objective of this project is to mature and demonstrate pollution prevention advanced technologies required to comply with regulations mandated by federal, state and local environmental and health laws. Technology thrusts under this project include: (1) demonstration of new coating materials, systems and processes to comply with existing and new national laws and local regulations, (2) demonstration of advanced nanocomposite packaging systems and advanced technologies for the reuse/recycling of solid waste resulting from packaging during deployed operations required to meet the operational needs of the Future Force, and (3) demonstration of advanced technologies to eliminate or significantly reduce the environmental impacts that threaten the sustainment of rocket and missile propellant production and maintenance facilities, and training ranges. These propellant technologies are transitioned from PE 0602720A, Project 895, and will ensure that advanced energetic materials required for Future Combat System (FCS) high performance munitions are developed that meet weapons lethality and survivability stretch goals. The cited work is consistent with Strategic Planning Guidance, the Army Science and Technology Master Plan (ASTMP), the Army Modernization Plan, and the Defense Technology Area Plan (DTAP). Work in this project is performed by the Army Research Laboratory (ARL) located at Aberdeen, Maryland, the U.S. Army Natick Soldier Center (NSC) located at Natick, MA, the Armaments Research, Development and Engineering Center (ARDEC) located at Picatinny Arsenal, NJ, and the Aviation and Missile Research, Development and Engineering Center (AMRDEC) located at Huntsville, Alabama.

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

February 2005

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced technology development	**0603728A - Environmental Quality Technology Demonstrations**	**025**

Accomplishments/Planned Program	FY 2004	FY 2005	FY 2006	FY 2007
Sustainable Painting Operations – In FY04, demonstrated hazardous air pollutant (HAP) free general and high performance munitions coating materials. In FY05, demonstrate HAP free solvents for depainting. In FY06, will reformulate HAP free solvents, cleaners and thinners used in coating operations and processes. In FY07, will reformulate HAP free sealants and adhesives used in weapon system maintenance, production and industrial processes. Solid Waste Diversion - In FY04, matured demolition debris reduction technologies that enable materials' reuse and recycling. In FY05, demonstrate advanced technologies for the reuse and recycling of solid waste resulting from barracks and motor pool modernization programs. In FY06, will demonstrate solid waste minimization technologies for use in deployed base camp operations. In FY07, will demonstrate advanced nanocomposite packaging technologies to reduce the amount of packaging debris generated during deployed operations. Ordnance Manufacture, Maintenance, Use, and Surveillance - In FY05, identify potential benign propellant alternatives that eliminate or significantly reduce the environmental impacts associated with the manufacture, maintenance, use and surveillance of rocket and missile propellants. In FY06, will down select and demonstrate most promising benign propellant alternative that eliminates or significantly reduces the environmental impacts associated with the manufacture, maintenance, use and surveillance of rocket and missile propellants. In FY07, will demonstrate alternatives to hydrazine fuels.	2266	2671	3212	3426
Totals	2266	2671	3212	3426

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

February 2005

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced technology development	**0603728A - Environmental Quality Technology Demonstrations**	**03E**

COST (In Thousands)		FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
03E	ENVIRONMENTAL RESTORATION TECHNOLOGY	11500	10749	8084	8317	9371	10609	10703	10783

A. Mission Description and Budget Item Justification: This project will mature and demonstrate technologies transitioned from PE 0602720A (Environmental Quality Technology), projects F25 and 835 that improve the Army's ability to achieve cost-effective environmental restoration of contaminated (UXO, military unique compounds, and energetics) sites at its installations, active and inactive ranges, its rework and production facilities, and the battlefield. Technologies demonstrated within this project focus on reducing the cost of management and remediation of Army sites contaminated by hazardous/toxic material. Efforts under this project will enable the Army to prevent pollution of the air, soil, and groundwater at installations, ranges, facilities, and battlefield operations, and to comply with the myriad of federal, state, and host country regulations dealing with contaminated soil and groundwater. This program includes demonstrations to establish technological feasibility and assessments of performance and productivity, and includes technology transition from the laboratory to demonstration/validation funded under PE 0603779A (Environmental Quality Technology - Dem/Val), Project 04E. The cited work is consistent with Strategic Planning Guidance, the Army Science and Technology Master Plan (ASTMP), the Army Modernization Plan, and the Defense Technology Area Plan (DTAP). The U.S. Army Engineer Research and Development Center, headquartered at Vicksburg, Mississippi, performs this work.

Accomplishments/Planned Program	FY 2004	FY 2005	FY 2006	FY 2007
Unexploded Ordnance (UXO) – In FY04, demonstrated an integrated suite of UXO detection multi-sensing and processing modes optimized for site-specific environmental characteristics; fabricated an optimized multi-sensor and data fusion analysis UXO detection/discrimination system; transitioned UXO detection/discrimination sensors and multi-sensing processes to the Army Environmental Center for demonstration/validation. In FY05, evaluate new innovative analysis algorithms and models for next generation multi-axis/multi-sensor UXO detection systems. In FY06, will develop UXO discrimination models for wide-area transmitter sensor systems and for multi-axis sensor systems. In FY07, will develop a model for active range real-time UXO discrimination, and the Management Aid for UXO Detection Efforts (MAUDE) software application for active range remediation.`	936	750	1461	1963
Hazard/Risk Assessment Tools for Military Unique Compounds – In FY04, completed the Army Risk Assessment Modeling System (ARAMS) version 2.0 containing higher order assessment methods (i.e., Geographic Information System based spatially explicit wildlife exposure model and contaminant fate and transport models); demonstrated and validated a rigorous ARAMS that seamlessly links models of exposure/effects with toxicological data for multiple species. In FY05, complete ARAMS version 2.1 with tutorials and case studies of cost effectiveness capable of assessing contaminant transport through multiple media types such as different soil types and predicting contaminant exposure and toxicity levels in humans and other organisms of concern; evaluate current practices of the Intelligence Preparation of the Battlefield (IPB) process to include threats, vulnerabilities, and after-action cleanup operations of toxic industrial chemicals and toxic industrial materials. In FY06, will inventory current IPB practices and conduct gap analysis. In FY07, will complete inventory of current IPB practices.	5400	3445	1460	1790

Accomplishments/Planned Program (continued)	FY 2004	FY 2005	FY 2006	FY 2007
In Situ Remediation Technologies for Contaminated Groundwater and Soils – In FY04, completed evaluation of in situ physical and biological cleanup processes (in place without pumping or excavation) of explosive materials in groundwater, developed aggressive chemical metal treatment alternatives for small arms training ranges and recycling metal contaminated extracts for soils treatment systems. In FY05, continue development of in situ reactive barriers and/or reactive barriers coupled with biodegradation for treating explosive materials in groundwater, will complete cost-effective ex-situ lead electro-kinetic extraction, physical separation, and stabilization remediation technologies for inorganics with applicable evaluation tools for a wide variety of contaminated soils. Will evaluate advanced in situ inorganics treatment methods at small arms training ranges. In FY06, will complete development of in situ physical and biological cleanup processes for explosives in groundwater, will develop in situ chemical and phyto (plant uptake) treatment methods to immobilize inorganics at small arms training ranges. In FY07, will finalize in situ physical and biological cleanup processes for explosives in groundwater with process guidance, specifications, and protocols, and will continue development of in situ chemical and phyto (plant uptake) treatment methods to immobilize inorganics on berms at small arms training ranges.	2747	2575	1703	1521
Characterization, Evaluation and Remediation of Distributed Source Contamination on Army Ranges – In FY04, investigated geostatistical methods to predict distribution patterns of distributed contaminants across range landscapes; began development of topical treatment methods for in situ treatment of explosives contaminants on active ranges. In FY05, develop predictive model for distributed source contamination impacts on inactive and live fire training ranges; evaluate base hydrolysis technologies for topical site restoration on distributed contamination sources. In FY06, will develop a real-time detection capability for high concentration source zones for explosives and propellants, will develop topical treatment methods for blow-in-place and other high concentration source zones. In FY07, will complete a real-time detection capability for high concentration source zones for explosives and propellants and continue development of geostatistical methods to predict the distribution pattern of distributed contaminants; will develop advanced in situ explosives treatment processes for distributed source explosives contamination on active ranges.	1802	2709	2317	1865

Accomplishments/Planned Program (continued)	FY 2004	FY 2005	FY 2006	FY 2007
Long Term Monitoring Applications - In FY04, began advanced development of on-site sensors and quantitative chemical analysis of military relevant contaminants for in situ, near real-time monitoring of environmental cleanup actions, and evaluated commercial-off-the-shelf technologies for monitoring and analyzing military unique compounds on site. In FY05, continue development of cost-effective, long term monitoring systems that will greatly reduce the frequency of manual sampling and off-site laboratory analysis, and complete development of standardized analytical methods for nitrocellulose and perchlorate. In FY06, will develop adaptations of commercially available direct-push wells for long term monitoring applications, and evaluate field portable sensors, sampling, and analysis methods. In FY07, will integrate advanced development of direct-push wells coupled to in situ real time sensing and analysis technologies, and evaluate integrated long term monitoring system designs for near real-time sampling, measurement, analysis, and information transmission.	615	1270	1143	1178
Totals	11500	10749	8084	8317