ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

February 2006

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

	COST (In Thousands)	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	16919	15777	14089	15098	16479	16666	16838
002	ENVIRONMENTAL COMPLIANCE TECHNOLOGY	629	1291	1989	2042	2072	2091	2106
025	POLLUTION PREVENTION TECHNOLOGY	2670	3166	3471	3559	3652	3725	3799
03E	ENVIRONMENTAL RESTORATION TECHNOLOGY	10745	7969	8629	9497	10755	10850	10933
03F	Environmental Quality Tech Demonstrations (CA)	2875	3351	0	0	0	0	0

A. Mission Description and Budget Item Justification: The objective of this advanced technology development program element is to mature and demonstrate technologies that 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 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 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). 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, execute the project work.

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B. Program Change Summary	FY 2005	FY 2006	FY 2007
Previous President's Budget (FY 2006)	17933	12606	13659
Current BES/President's Budget (FY 2007)	16919	15777	14089
Total Adjustments	-1014	3171	430
Congressional Program Reductions		-70	
Congressional Rescissions		-159	
Congressional Increases		3400	
Reprogrammings	-1014		
SBIR/STTR Transfer			
Adjustments to Budget Years			430

One FY06 Congressional add totaling $3400 was added to this PE.

FY06 Congressional add with no R-2A (appropriated amount is shown):
($3400) Alternate Power Fuel Cell Demonstration at Ft. Irwin

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

February 2006

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

COST (In Thousands)		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	629	1291	1989	2042	2072	2091	2106

A. Mission Description and Budget Item Justification: The objective of this advanced technology development project is to mature and demonstrate technologies transitioned from PE 0602720A (Environmental Quality Technology), Projects 048 and 896 that assist Army installations in achieving environmental compliance. These technologies 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. Efforts under this project 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. Technologies demonstrated 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. 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, executes the project work.

Accomplishments/Planned Program	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 which will continue under project 025 and to manage and reduce the increase in noise concerns associated with training ranges. In FY05, matured and demonstrated complete emission control system for demil furnaces. Reconfigurable and Joint Training Ranges - In FY06, mature acoustic emission data acquisition techniques and models for various weapon systems. In FY07, will integrate noise prediction and management tools into Army range design protocols.	629	1291	1989
Total	629	1291	1989

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2a Exhibit)

February 2006

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

COST (In Thousands)	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	2670	3166	3471	3559	3652	3725	3799

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 enable sustainment of rocket and missile propellant production and maintenance facilities and training ranges through elimination or significant reduction of environmental impacts. These technologies are transitioned from PE 0602720A, Project 895, and will ensure that advanced energetic materials required for Future Combat Systems (FCS) high performance munitions are developed that are compliant with environmental and health laws and 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)and supports the Army Strategy for the Environment. Work in this project is performed by the Research, Development & Engineering Command's (RDECOM) 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.

Accomplishments/Planned Program	FY 2005	FY 2006	FY 2007
Sustainable Painting Operations - In FY05, demonstrated hazardous air pollutant (HAP)-free solvents for de-painting. In FY06, mature and evaluate 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 FY05, characterized and tested multilayered nanocomposite films to be used in Meals Ready to Eat packaging. In FY06, demonstrate solid waste minimization techniques for base camp operations. In FY07, will mature and evaluate advanced nanocomposite packaging technologies to reduce the amount of packaging debris generated during deployed operations. Compliant Ordnance Lifecycle - In FY05, identified potential benign propellant and engine alternatives that eliminate or significantly reduce the environmental impacts associated with the manufacture, maintenance, use and surveillance of rocket and missile propellants. In FY06, select and demonstrate most promising benign propellant alternative that eliminates or significantly reduces their environmental impacts. In FY07, will demonstrate alternatives to perchlorate and hydrazine propellants and non-toxic pyrotechnic compositions.	2670	3166	3471
Total	2670	3166	3471

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February 2006

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

COST (In Thousands)		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	10745	7969	8629	9497	10755	10850	10933

A. Mission Description and Budget Item Justification: The objective of this advanced technology development project is to mature and demonstrate technologies transitioned from PE 0602720A (Environmental Quality Technology), project 835 that improve the Army's ability to achieve cost-effective environmental restoration of contaminated (unexploded ordnance, military unique compounds, and energetics) sites at its installations, active and inactive ranges, its rework and production facilities, and the battlefield. Technologies matured within this project enable the Army to cost effectively address current environmental liabilities resulting from soil and groundwater contamination. Current and planned efforts enable the Army to efficiently characterize, evaluate, assess, and remediate soil and groundwater at installations, ranges, facilities, and during battlefield operations. Efforts also identify ways to economically comply with the myriad of federal, state, and host country regulations dealing with contaminated soil and groundwater. A key aspect of this work is the enhancement of risk assessment techniques that can more accurately display the environmental risks associated with munitions residues. This program includes pilot scale field studies to establish technological feasibility and assess performance and productivity of the risk assessment techniques, 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, executes the project work.

Accomplishments/Planned Program	FY 2005	FY 2006	FY 2007
Unexploded Ordnance (UXO) - In FY05, evaluated innovative analysis algorithms and models for next generation multi-axis/multi-sensor unexploded ordnance (UXO) detection systems. In FY06, 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.	750	1440	2035
Hazard/Risk Assessment Tools for Military Unique Compounds - In FY05, completed Army Risk Assessment Modeling System (ARAMS) version 2.1, adding tutorials and case studies capable of assessing contaminant transport through multiple soil types and predicting contaminant exposure and toxicity levels; evaluated 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, assess non-intrusive methods for identification and risk assessment of toxic industrial chemicals and materials and develop conceptual techniques and procedures for incorporation into IPB practices and conduct gap analysis. In FY07, will complete migration of ARAMS to the higher order modeling technique, will initiate adapting ARAMS to live fire range assessment, and continue preparation of geospatial environmental risk visualization techniques for incorporation into the IPB process.	3445	1439	1856
In Situ Remediation Technologies for Contaminated Groundwater and Soils - In FY05, continued to mature capability for in situ reactive barriers and/or reactive barriers coupled with biodegradation for treating explosive materials in groundwater, completed 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. Evaluated advanced in situ inorganics treatment methods at small arms training ranges. In FY06, mature in situ physical and biological cleanup processes for explosives in groundwater, and advance in situ chemical and plant uptake treatment methods to immobilize inorganics at small arms training ranges. In FY07, will finalize in situ	2575	1679	1579

physical and biological cleanup processes for explosives in groundwater with process guidance, specifications, and protocols; and will continue to mature in situ chemical and plant uptake treatment methods to immobilize inorganics on berms at small arms training ranges.			
Characterization, Evaluation and Remediation of Distributed Source Contamination on Army Ranges - In FY05, matured predictive model for distributed source contamination impacts on inactive and live fire training ranges; and evaluated base hydrolysis technologies for site restoration on distributed contamination sources. In FY06, mature and initiate early stage demonstration of a real-time detection capability and topical treatment methods for high concentration source zones of explosives and propellants. In FY07, will complete a real-time detection capability for high concentration source zones for explosives and propellants and evolve geo-statistical methods to predict contaminant distribution patterns; will mature in situ explosive treatment processes for distributed contamination on active ranges.	2705	2284	1933
Long Term Monitoring Applications - In FY05, continued development of cost-effective, long term monitoring systems that greatly reduces the frequency of manual sampling and off-site laboratory analysis, and completed standardized analytical methods for nitrocellulose and perchlorate. In FY06, mature 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 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.	1270	1127	1226
Total	10745	7969	8629