Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification									DATE: May 2009	
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)					R-1 ITEM NOMENCLATURE PE 0603728A Environmental Quality Technology Demonstrations					
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	14.611	15.468	15.706						Continuing	Continuing
002: ENVIRONMENTAL COMPLIANCE TECHNOLOGY	1.984	2.057	2.128						Continuing	Continuing
025: POLLUTION PREVENTION TECHNOLOGY	3.411	3.610	3.640						Continuing	Continuing
03E: ENVIRONMENTAL RESTORATION TECHNOLOGY	9.216	9.801	9.938						Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates technologies that assist Army installations in becoming environmentally compatible without compromising the readiness or training critical to the success of the future force. 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 material. Technologies demonstrated within this program element are transitioned from PE 0602720A (Environmental Quality Technology).

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, the Army Science and Technology Master Plan, and supports the Army Strategy for the Environment.

Work in this PE is performed by the US Army Engineer Research and Development Center (ERDC), Vicksburg, MI, and the US Army Research, Development, and Engineering Command (RDECOM), Aberdeen Proving Ground, MD.

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APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603728A Environmental Quality Technology Demonstrations

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	14.887	15.519	15.760	
Current BES/President's Budget	14.611	15.468	15.706	
Total Adjustments	-.276	-.051	-.054	
Congressional Program Reductions	.000	-.051		
Congressional Rescissions	.000	.000		
Total Congressional Increases	.000	.000		
Total Reprogrammings	.005	.000		
SBIR/STTR Transfer	-.281	.000		

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603728A Environmental Quality Technology Demonstrations					PROJECT NUMBER 002	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
002: ENVIRONMENTAL COMPLIANCE TECHNOLOGY	1.984	2.057	2.128						Continuing	Continuing

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 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 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 waste 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 as well as protect the critical resources of the Army.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, the Army Science and Technology Master Plan, and supports the Army Strategy for the Environment.

Work in this project is performed by the US Army Engineer Research and Development Center (ERDC), Vicksburg, MS.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Installation Operations: Demonstrate environmentally safe and cost-effective technologies to manage and reduce the increase in noise and pollution concerns associated with training ranges. In FY08, completed initial blast noise complaint risk study criteria and developed impulse noise prediction models. Developed a new User Interface, to take full advantage of Army geographical information systems (GIS) capability, for the BNOISE2 software package, which is the tool used by all of DoD for prediction and impact assessment of training blast noise. In FY09, complete complaint risk guidelines and a new noise modeling calculation engine for peak noise events based on statistical data and numerical analysis propagation algorithms. Develop new noise complaint criteria to provide defensible guidelines regarding appropriate installation action in response to noise complaints, to maintain both amicable community	1.984	2.029	2.128	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603728A Environmental Quality Technology Demonstrations	PROJECT NUMBER 002

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
relations and mission accomplishment. Complete a large-scale propagation demonstration to provide foundational weather and blast noise data that will enable improved understanding and prediction algorithms for blast noise from training and testing. In FY10, will utilize cell-based sensor for toxins with on-board reactive oxygen species electrode.				
Small Business Innovative Research/Small Business Technology Transfer Programs	.000	.028	.000	
Total	1.984	2.057	2.128	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603728A Environmental Quality Technology Demonstrations					PROJECT NUMBER 025	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
025: POLLUTION PREVENTION TECHNOLOGY	3.411	3.610	3.640						Continuing	Continuing

A. Mission Description and Budget Item Justification

The objective of this project is to mature and demonstrate pollution prevention advanced technologies required for sustainable operation of Army weapon systems, to include compliance 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 exceed all existing, new and projected national laws and local regulations; (2) demonstration of advanced nanocomposite packaging systems and advanced technologies for the reuse/recycling of supplied resources during deployed operations in order to reduce logistics, health and force protection impacts; (3) demonstration of advanced technologies to enable sustainment of propellant, explosive and pyrotechnic production and maintenance facilities and training ranges through elimination or significant reduction of environmental impacts. These technologies will ensure that advanced energetic materials required for future force's high performance munitions are developed that meet weapons lethality and survivability goals and that are compliant with environmental and health laws. The project transitions technologies from PE 0602720A, project 895.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, the Army Science and Technology Master Plan, and supports the Army Strategy for the Environment.

Work in this project is performed by the Research, Development, and Engineering Command's (RDECOM) Army Research Laboratory (ARL), Aberdeen, MD, Natick Soldier Research, Development and Engineering Center (NSRDEC), Natick, MA, Armaments Research, Development, and Engineering Center (ARDEC), Picatinny Arsenal, NJ, Aviation and Missile Research, Development, and Engineering Center (AMRDEC), Huntsville, AL, Tank-Automotive Research, Development, and Engineering Center (TARDEC), Warren, MI and Edgewood Chemical Biological Center (ECBC), Edgewood, MD.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Sustainable Painting Operations: In FY08, designed and evaluated touch-up kits containing hazardous air pollutant (HAP)-free paints for on-system field maintenance. In FY09, mature advanced HAP-free primer and topcoat formulations for all applications of the chemical agent resistant coating system. Zero Footprint Camp:	3.411	3.509	3.640	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603728A Environmental Quality Technology Demonstrations	PROJECT NUMBER 025

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY08, optimized nanocomposite packaging structures and evaluated prototype packages in a simulated operational environment. Compliant Ordnance Lifecycle: In FY08, evaluated environmental health of new propellants, pyrotechnics and explosives, refined alternative rocket propellants/motor combinations, and demonstrated improved colored smoke compositions. In FY09, scale-up synthesis of environmentally benign RDX replacement candidates for demonstration in munitions, demonstrate gelled hydrazine monopropellant replacement, and refine solventless processing techniques. In FY10, will assess performance of potential RDX replacements on the kilogram scale, will demonstrate hybrid propulsion system as potential alternative to ammonium perchlorate, and will evaluate low-toxicity colored smoke formulations in a relevant environment.				
Small Business Innovative Research/Small Business Technology Transfer Programs	.000	.101	.000	
Total	3.411	3.610	3.640	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603728A Environmental Quality Technology Demonstrations					PROJECT NUMBER 03E	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
03E: ENVIRONMENTAL RESTORATION TECHNOLOGY	9.216	9.801	9.938						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project will mature and demonstrate technologies transitioned from PE 0602720A (Environmental Quality Technology), project 835 that improves the Army's ability to achieve cost-effective environmental restoration of contaminated (unexploded ordnance, military unique compounds, and energetic materials) sites at its installations, active and inactive ranges, its rework and production facilities, and in 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.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, the Army Science and Technology Master Plan, and supports the Army Strategy for the Environment.

Work in this project is performed by the US Army Engineer Research and Development Center (ERDC), Vicksburg, MS.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Unexploded Ordnance (UXO): In FY08, completed development of rapid computational modeling for active range scenarios and conducted field evaluations of: rapid route survey and evaluation systems; target/berm/bunker survey and assessment systems; and a multi-sensor projectile impact assessment, positioning, and characterization system for range operations. In FY09, conduct field evaluations of specialized instrumentation for targets, berms, and bunkers for monitoring impacts and condition assessment. Investigate innovative technologies for range UXO maintenance and for mitigation of unique and emerging UXO.	2.260	1.728	2.118	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603728A Environmental Quality Technology Demonstrations	PROJECT NUMBER 03E

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY10, will identify range monitoring and maintenance systems for sustainable range operations. Will retain identification and characterization of unique and emerging UXO and will begin development of protocols for adaptive detection.				
Hazard/Risk Assessment Tools for Toxicity of Munitions Constituents (MCs): In FY08, initiated advanced toxicogenomic molecular tools to quantitatively assess MC exposure, mathematical models of toxicity and effects due to existing, well characterized MC, predicting multiple stressor impacts on toxicity, MC toxicity mechanisms in ecological species, and species developmental pathways affected by MCs. In FY09, conduct cross-species validation of MC effects. Will initiate advanced protocols for rapid screening and monitoring of ecological impact of MCs. Develop advanced computational chemistry predictions of chemical structures and physical properties of adsorbed explosives in soils. Conduct technology demonstration of exposure quantification metrics for select representative nanomaterials. In FY10, will devise mathematical models of effects and toxicity due to existing MCs. Will characterize multiple stressor impacts on toxicity. Will identify developmental pathways affected by MCs and toxicity mechanisms in alternate ecological species, and will complete a cross species validation of MC effects. Will devise computational chemistry predictive methods of chemical structures and physical properties of MC adsorbed soils, MC reactivity and decomposition, and chemical mechanisms of MC breakdown by soil microbes.	2.405	4.352	6.888	
Long Term Monitoring Applications: In FY08, completed advance development of prototype gene signature array microchip sensor for MCs. Evaluated field detection of MCs and emerging contaminants with negative ion miniature mass spectrometry. Conducted field evaluation of catalytic DNA and Surface Plasmon Resonance (SPR) affinity array sensors. In FY09, complete advanced development of in situ biosensor technologies implemented in direct push wells. Conduct final field evaluation of a novel analytical instrument (negative ion miniature mass spectrometer) for monitoring multiple contaminants under a wide range of site conditions. In FY10, will complete the development of a rapid, sensitive, near real time on-site assessment of Army-related contamination.	1.385	1.145	.351	
In Situ Remediation Technologies for Contaminated Groundwater and Soils: In FY08, matured near-surface biostabilization and phytostabilization technologies for inorganics on small arms firing ranges (SAFRs). Constructed integrated assessment models for inorganics on SAFRs.	.855	.149	.000	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603728A Environmental Quality Technology Demonstrations	PROJECT NUMBER 03E

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY09, finalize and validate remediation/management of inorganic residues on SAFRs with process guidance, specifications, and protocols.				
Characterization, Evaluation and Remediation of Distributed Source Contamination on Army Ranges: In FY08, completed field evaluation of statistically valid range characterization/sampling protocols for MC sources on active range soils and surface waters. Continued maturing on-site, topical alkaline hydrolysis of impact area explosives and quantifying the effects of wildfire control practices on active ranges. In FY09, conduct field evaluations of advanced spatial components for range risk assessment in range assessment modeling system (ARAMS). Continue to quantify the effects of wildfire control practices on active ranges. Perform field evaluation of on-site, topical alkaline hydrolysis of impact area explosives. In FY10, will provide the capability to rapidly and accurately quantify MC sources, distribution, and transport in soil and surface water and to cost-effectively manage residual MCs on active Army training ranges.	2.311	2.275	.581	
Small Business Innovative Research/Small Business Technology Transfer Programs	.000	.152	.000	
Total	9.216	9.801	9.938	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.