Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Army											Date: March 2014	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603728A *I Environmental Quality Technology Demonstrations*							
COST ($ in Millions)	**Prior Years**	**FY 2013**	**FY 2014**	**FY 2015 Base**	**FY 2015 OCO #**	**FY 2015 Total**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**Cost To Complete**	**Total Cost**
Total Program Element	-	12.398	11.739	9.197	-	9.197	8.690	8.696	7.931	7.989	-	-
002: *Environmental Compliance Technology*	-	2.124	1.922	3.172	-	3.172	2.697	2.679	1.797	1.807	-	-
025: *Pollution Prevention Technology*	-	3.309	3.020	-	-	-	-	-	-	-	-	-
03E: *Environmental Restoration Technology*	-	6.965	6.797	6.025	-	6.025	5.993	6.017	6.134	6.182	-	-

The FY 2015 OCO Request will be submitted at a later date.

Note

FY 13 decreases attributed to Congressional General reductions (-28 thousand); SBIR/STTR transfers (-207 thousand); and Sequestration reductions (-993 thousand) FY15 funding realigned to support higher Army priorities.

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates technologies that assist the Army in becoming environmentally compliant and limiting future liability without compromising readiness or training assets critical to the success of the future force. Project 002 demonstrates tools and methods for compliance with environmental laws relevant to conservation of natural and cultural resource laws while providing a flexible realistic training environment for mission activities. Project 025 demonstrates pollution prevention tools and methods to minimize the Army's use and generation of toxic chemicals and hazardous wastes. Project 03E focuses on maturation and demonstration of technologies for advanced life cycle analysis, advanced sensing, and advanced remediation of Army-unique toxic or hazardous materials. This program demonstrates technological feasibility and transitions mature technologies from the laboratory to the user. Technologies developed by this program element improve the ability of the Army to achieve environmental restoration and compliance at its installations, at active/ inactive ranges and other training lands, and in modernization programs. Technologies demonstrated focus on reducing current and future environmental liability costs.

The cited work is consistent with the Assistant Secretary of Defense, Research and Engineering Science and Technology priority focus areas and the Army Modernization Strategy and supports the Army Strategy for the Environment.

This program is fully coordinated and complementary to PE 0602720A (Environmental Quality Technology).

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Army					Date: March 2014
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 3: *Advanced Technology Development (ATD)*			R-1 Program Element (Number/Name) PE 0603728A / *Environmental Quality Technology Demonstrations*		
B. Program Change Summary ($ in Millions)	**FY 2013**	**FY 2014**	**FY 2015 Base**	**FY 2015 OCO**	**FY 2015 Total**
Previous President's Budget	13.626	11.745	12.537	-	12.537
Current President's Budget	12.398	11.739	9.197	-	9.197
Total Adjustments	-1.228	-0.006	-3.340	-	-3.340
• Congressional General Reductions	-0.028	-0.006			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.207	-			
• Adjustments to Budget Years	-	-	-3.340	-	-3.340
• Other Adjustments 1	-0.993	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army			Date: March 2014
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603728A / *Environmental Quality Technology Demonstrations*	Project (Number/Name) 002 / *Environmental Compliance Technology*	

COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
002: *Environmental Compliance Technology*	-	2.124	1.922	3.172	-	3.172	2.697	2.679	1.797	1.807	-	-

The FY 2015 OCO Request will be submitted at a later date.

Note

Not applicable for this item

A. Mission Description and Budget Item Justification

This project matures and demonstrates technologies transitioned from PE 0602720A (Environmental Quality Technology), Projects 048 and 896, that assist Army installations in achieving environmental compliance. Army facilities are subject to fines and facility shutdowns for violation of federal, state, and local environmental regulations. Efforts under this project enable the Army to reduce environmental constraints at installations while complying with the myriad of federal, state, and host country environmental regulations and policy. 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, i.e., land, air, and waters of the Army.

Work in this project supports the Army S&T Innovation Enablers (formerly Enduring Technologies) Portfolio.

The cited work is consistent with the Assistant Secretary of Defense, Research and Engineering Science and Technology priority focus areas and the Army Modernization Strategy, and supports the Army Strategy for the Environment.

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: Sustainable Ranges and Lands	2.124	1.922	3.172
Description: This effort provides ecosystem vulnerability assessment and ecosystem analysis, monitoring, modeling and mitigation technologies to support sustainable, unconstrained, realistic access and use of the Army's ranges and lands. This effort demonstrates environmentally safe and cost effective technologies to manage and reduce the increase in noise and pollution concerns associated with training ranges.			
FY 2013 Accomplishments: Developed, demonstrated, and validated a field portable sensor for detection of hazardous and toxic compounds in water including heavy metals, perclorate and general toxicity; developed, tested, and demonstrated smart cell sensors for intracellular			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army		Date: March 2014
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603728A / *Environmental Quality Technology Demonstrations*	**Project (Number/Name)** 002 / *Environmental Compliance Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
markers of toxicity and stress, interdigitated electrode arrays (IdEA) for measuring cell membrane integrity, and biomarker detection systems for sensing extracellular signs of damage; tested and validated results using real world field samples for incorporation into final portable sensor hardware component and system design specifications. ***FY 2014 Plans:*** Evaluate emerging biofiltration technologies applicable to gray water treatment at contingency bases based on technology performance, efficiency, and robustness; develop full scale design specifications for a robust gray water pretreatment component technology based on biofiltration evaluation; develop detailed technology test plan in coordination with Army Test and Evaluation Command, US Army Public Health Command, and US Army Tank Automotive Research, Development and Engineering Center; mature a dynamic simulation model which integrates the complex adaptive system algorithms representing the dynamic operating systems of a contingency base. ***FY 2015 Plans:*** Will develop and evaluate gray water treatment and reuse system (G-WTRS) that is designed to reduce water demand and sustainment cost at 600-3000 personnel contingency operating bases; will perform pilot scale testing of G-WTRS prototype; will conduct baseline flow, water quality, energy consumption, and maintenance testing; will optimize G-WTRS design and operation based on pilot scale testing for maximal performance and energy efficiency; will facilitate Army Evaluation Center's certification of G-WTRS; will mature an intuitive integrated planning, design, and analysis model that addresses power, water, waste and protection related design and resource requirements for contingency bases ranging in size from 50-2000 population; will validate standalone models for power, water, waste (solid, sanitary, and hazardous) and protection; will mature characterization and forecasting capabilities to assess multi-scale ecological response to compliance mandated altered fire regimes and the consequences for accessible, sustainable and realistic military training lands.			
Accomplishments/Planned Programs Subtotals	2.124	1.922	3.172

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army			Date: March 2014
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603728A / *Environmental Quality Technology Demonstrations*	Project (Number/Name) 025 / *Pollution Prevention Technology*	

COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
025: *Pollution Prevention Technology*	-	3.309	3.020	-	-	-	-	-	-	-	-	-

The FY 2015 OCO Request will be submitted at a later date.

Note

Not applicable for this item

A. Mission Description and Budget Item Justification

This project matures and demonstrates 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 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. Technology thrusts also include demonstration of technologies for reductions of waste streams at base camps and toxic metal reductions from surface finishing processes.

Work in this project supports the Army S&T Innovation Enablers (formerly Enduring Technologies) Portfolio.

The cited work is consistent with the Assistant Secretary of Defense for Research and Engineering science and technology priority focus areas and the Army Modernization Strategy and supports the Army Strategy for the Environment.

The project is fully coordinated and complementary to PE 0602720A, Project 895. This project transitions technologies developed under that PE.

Work in this project is performed by the Research, Development, and Engineering Command Army Research Laboratory, Aberdeen Proving Ground, MD, the Armaments Research, Development, and Engineering Center, Picatinny Arsenal, NJ, the Aviation and Missile Research, Development, and Engineering Center, Redstone Arsenal, AL , the Natick Soldier Research, Development and Engineering Center, Natick, MA (NSRDEC), and the Tank Automotive Research, Development and Engineering Center (TARDEC), Warren, MI in conjunction with the Army Public Health Command, Aberdeen Proving Ground, MD.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: Pollution Prevention Technology	3.309	3.020	-
Description: This effort demonstrates pollution prevention advanced technologies required to sustain operation of Army weapons systems to comply with state, federal, and local environmental and health laws and regulations.			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army		Date: March 2014
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603728A / *Environmental Quality Technology Demonstrations*	**Project (Number/Name)** 025 / *Pollution Prevention Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
FY 2013 Accomplishments: Rocket and Missile Propellants: qualified and tested lead-free propellant in 2.75-inch Hydra rocket system; Conventional Ammunition: initiated insensitive munitions testing on environmentally benign formulation in relevant end item; Pyrotechnics: integrated high nitrogen materials into pyrotechnic signal prototypes. ***FY 2014 Plans:*** Conventional Ammunition: Conduct large-scale performance and insensitive munitions testing on environmentally benign formulation in relevant end item; Pyrotechnics: Integrate chromate-free delay composition into relevant end item; Toxic Metal Reduction: Demonstrate alternatives to chromic acid anodizing for common aircraft substrates; Zero Footprint Camp: Select and mature high-payoff approaches for reducing fresh water demand and wastewater generation in contingency bases.			
Accomplishments/Planned Programs Subtotals	3.309	3.020	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army			Date: March 2014
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603728A / *Environmental Quality Technology Demonstrations*	Project (Number/Name) 03E / *Environmental Restoration Technology*	

COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
03E: *Environmental Restoration Technology*	-	6.965	6.797	6.025	-	6.025	5.993	6.017	6.134	6.182	-	-

The FY 2015 OCO Request will be submitted at a later date.

Note

Not applicable for this item

A. Mission Description and Budget Item Justification

This project matures and demonstrates technologies transitioned from PE 0602720A (Environmental Quality Technology), Projects 835 and 896 by addressing the management/mitigation of materials and chemicals released to the natural environment and residual environmental effects of military training and operations. The emphasis of this effort includes remediation of legacy materials, e.g., traditional explosives energetics, and unexploded ordinance; management of new materials, e.g., nanomaterials and emerging contaminants; and mitigation of residual impacts from implementation of sustainable technologies and processes. Technologies matured within this project enable the Army to cost effectively address current and future environmental liabilities resulting from the use of militarily relevant materials and chemicals in the environment. Current and planned efforts enable the Army to efficiently characterize, evaluate, assess, and remediate soil and water at installations, ranges, facilities, and during operations in the face of changing weather and climatic conditions. Efforts also identify ways to economically comply with the myriad of federal, state, and host country regulations dealing with contaminated soil and water. A key aspect of this work is the enhancement of risk assessment and life cycle analysis techniques that can more accurately predict and identify the environmental liabilities associated with fielding new systems and technologies. This program includes pilot scale field studies to establish technological feasibility and assess performance and productivity of the risk mitigation techniques.

Work in this project supports the Army S&T Innovation Enablers (formerly Enduring Technologies) Portfolio.

The cited work is consistent with the Assistant Secretary of Defense, Research and Engineering Science and Technology priority focus areas and the Army Modernization Strategy and supports the Army Strategy for the Environment.

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

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: Sustainable Ordnance Mitigation and Management	1.308	1.497	1.335
Description: This effort develops real time detection and discrimination methodologies for unique and emerging non-metallic UXO.			
FY 2013 Accomplishments:			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army		Date: March 2014
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603728A / *Environmental Quality Technology Demonstrations*	**Project (Number/Name)** 03E / *Environmental Restoration Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Matured emergent technology in smart sensors and real time assessment of UXO discrimination for enhanced range maintenance, sustainability and construction support. ***FY 2014 Plans:*** Develop a networked semi- to-fully-autonomous mobile platform with the operational capability to mitigate hazardous UXOs on military ranges. ***FY 2015 Plans:*** Will develop electromagnetic induction algorithms for detection and discrimination of emerging non-metallic intermediate electrically conductive materials- based munitions, and models and algorithms applicable to difficult sensing environments.			
Title: Hazard Assessment for Military Materials ***Description:*** This effort demonstrates tools to assess hazard and risk of Army-unique chemicals and material. The tools provide for rapid environmental baseline survey reporting and screening assessments of existing and future militarily relevant compounds and allow for improved predictive risk assessment and provide environmental life cycle assessment capability. ***FY 2013 Accomplishments:*** Provided novel screening assays for neurotoxicity and reproductive toxicity, and predictive models integrated with toxicology and genomic screening protocols; matured the computational tool for rapid and reliable forensic and predictive assessment of munitions constituents, providing risk evaluation capability designed to meet Army needs for proactive land management. ***FY 2014 Plans:*** Demonstrate a toolkit with optimized sensor technologies for rapid and reliable data collection providing real time analysis for contamination within an operational environment. ***FY 2015 Plans:*** Will integrate a suite of environmental-quality sensors with analytical capabilities to provide environmental guidance and data visualization associated with environmental monitoring in Army operations in theater; will develop rapid hazard screening tools for new Army compounds.	1.207	0.863	0.722
Title: Technologies for Sustainable and Green Operations and Acquisition ***Description:*** This effort investigates and matures technologies to control contaminant transport in environmental media on Army lands and mission spaces as well as assesses and demonstrates novel detection, remediation and mitigation capabilities for existing and emerging contaminants. ***FY 2013 Accomplishments:***	2.654	2.287	2.044

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army		Date: March 2014
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603728A / *Environmental Quality Technology Demonstrations*	**Project (Number/Name)** 03E / *Environmental Restoration Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Determined effectiveness of green remediation technologies on munitions constituents and selected appropriate field sites for validation; predicted the effects of landscape contouring and identified optimal placement of treatment systems to ensure the selection of efficient and cost-effective treatment designs; incorporated terrestrial animal uptake values, contaminant flow in food webs, as well as the effects of stabilization and removal activities on uptake and toxicity of depleted Uranium in ecological risk assessment models. ***FY 2014 Plans:*** Provide an integrated approach to contamination management in range and installation design; develop methods for the cost effective and environmentally protective management and/or removal of small (size of the granular media or smaller) metallic Depleted Uranium and residues from affected soils and sands; develop a virtual model for wastewater treatment of munitions production water and investigate new technologies for improved water quality of surface water and wetlands impacted by development and use of new munitions. ***FY 2015 Plans:*** Develop cost-effective, efficient, and integrative tools for remediation of contaminated wastewater from insensitive munitions production. Tools are planned for rapid transition under technology transition agreement with the Project Director Joint Services for next generation Army ammunition Industrial Base Insensitive Munitions (IM) Wastewater Treatment technologies.			
Title: Risk Prediction and Decision Technologies ***Description:*** The goal of this effort is to develop and provide integrated science and technology solutions to Army environmental challenges with a focus on acquisition lifecycle models to predict environmental attributes of emerging chemicals and materials that will proactively minimize impacts to the mission and to the Soldier. ***FY 2013 Accomplishments:*** Matured a decision framework and screening assessment tool to evaluate multi-stressor climatic change impacts to vulnerable Army installations based on mission critical criterion. ***FY 2014 Plans:*** Apply climate models, under site level simulation frameworks, to validate web-based visualization tools that provide a framework for assessing multi-stressor impacts due to predictive climatic changes; demonstrate appropriate protocols for generating/ parameterizing environmental risk data and parameterization for modifying existing life-cycle analysis of munitions constituents. ***FY 2015 Plans:*** Will develop and demonstrate appropriate data, scenarios, and processes necessary for conducting the life cycle analysis of the antimony (Sb) containing small arms formulations, and for new insensitive munitions formulations, IMX 101 and 104. Economic life	1.796	2.150	1.924

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army		Date: March 2014
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603728A / *Environmental Quality Technology Demonstrations*	**Project (Number/Name)** 03E / *Environmental Restoration Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
cycle assessments will provide scientifically defensible approaches for determining environment risk, and increase confidence in anticipating product impact with respect to environmental regulatory requirements when fielding.			
Accomplishments/Planned Programs Subtotals	6.965	6.797	6.025

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A