Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Army

R-1 Program Element (Number/Name)

2040: Research, Development, Test & Evaluation, Army I BA 3: Advanced

PE 0603728A I Environmental Quality Technology Demonstrations

Date: February 2015

Technology Development (ATD)

Appropriation/Budget Activity

COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	11.540	11.445	10.727	-	10.727	11.137	10.382	10.570	10.773	-	-
002: Environmental Compliance Technology	-	1.920	3.171	3.278	-	3.278	3.262	2.190	2.336	2.431	-	-
025: Pollution Prevention Technology	-	2.920	-	1.489	-	1.489	1.489	1.488	1.489	1.489	-	-
03E: Environmental Restoration Technology	-	6.700	6.024	5.960	-	5.960	6.386	6.704	6.745	6.853	-	-
03F: Environmental Quality Tech Demonstrations (CA)	-	-	2.250	-	-	-	-	-	-	-	-	-

Note

FY16 increase for pollution prevention efforts.

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.

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xhibit R-2, RDT&E Budget Item Justification: PB 2016 A	: February 20	15							
ppropriation/Budget Activity 040: Research, Development, Test & Evaluation, Army I BA echnology Development (ATD)	∖ 3: Advanced	R-1 Program Element (Number/Name) PE 0603728A I Environmental Quality Technology Demonstrations							
. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2010	6 Total			
Previous President's Budget	11.739	9.197	8.690	-		8.690			
Current President's Budget	11.540	11.445	10.727	-		10.727			
Total Adjustments	-0.199	2.248	2.037	-		2.037			
 Congressional General Reductions 	-	-0.002							
 Congressional Directed Reductions 	-	-							
 Congressional Rescissions 	-	-							
 Congressional Adds 	-	2.250							
 Congressional Directed Transfers 	-	-							
 Reprogrammings 	-	-							
 SBIR/STTR Transfer 	-0.199	-							
 Adjustments to Budget Years 	-	-	2.037	-		2.037			
Congressional Add Details (\$ in Millions, and Incl	udes General Rec	ductions)			FY 2014	FY 2015			
Project: 03F: Environmental Quality Tech Demonstra	ations (CA)								
Congressional Add: Program Increase					-	2.25			
			Congressional Add Subto	otals for Project: 03F	-	2.25			
			Congressional Add 1	Totals for all Projects	-	2.25			

Exhibit R-2A, RDT&E Project Justification: PB 2016 Army										Date: February 2015		
Appropriation/Budget Activity 2040 / 3					R-1 Program Element (Number/Name) PE 0603728A I Environmental Quality Technology Demonstrations				Project (Number/Name) 002 I Environmental Compliance Technology			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
002: Environmental Compliance Technology	-	1.920	3.171	3.278	-	3.278	3.262	2.190	2.336	2.431	-	-

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 and operations 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. Current and planned efforts enable the Army to efficiently characterize, evaluate, assess, and sustain training and testing capacity; power and water management in contingency operations and on installations; and noise mitigation and management. Technologies demonstrated aim to reduce the cost of resolving 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 2014	FY 2015	FY 2016
Title: Sustainable Ranges and Lands	1.920	3.171	0.303
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 2014 Accomplishments: Evaluated emerging biofiltration technologies applicable to gray water treatment at contingency bases based on technology performance, efficiency, and robustness; developed full scale design specifications for a robust gray water pretreatment component technology based on biofiltration evaluation; developed detailed technology test plan in coordination with Army Test			

Exhibit R-2A, RDT&E Project Justification: PB 2016 Army		Date: F	ebruary 2015	
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603728A I Environmental Quality Technology Demonstrations	Project (Number/I 002 / Environment Technology)
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
and Evaluation Command, US Army Public Health Command, and Engineering Center; matured a dynamic simulation model which int the dynamic operating systems of a contingency base.		iting		
FY 2015 Plans: Develop and evaluate gray water treatment and reuse system (G-W sustainment cost at 600-3000 personnel contingency operating bas baseline flow, water quality, energy consumption, and maintenance pilot scale testing for maximal performance and energy efficiency; from mature an intuitive integrated planning, design, and analysis model design and resource requirements for contingency bases ranging in power, water, waste (solid, sanitary, and hazardous) and protection multi-scale ecological response to compliance mandated altered fire and realistic military training lands.	tes; perform pilot scale testing of G-WTRS prototype; concertesting; optimize G-WTRS design and operation based of acilitate Army Evaluation Center certification of G-WTRS; that addresses power, water, waste and protection related is size from 50-2000 population; validate standalone modes; mature characterization and forecasting capabilities to a	n d ls for ssess		
FY 2016 Plans: Will mature and validate the design for a robust, operationally-efficiency Contingency Operating Bases (COBs) of 600-3000 Pax capacity the Test and Evaluation Command safety and performance approval for bases.	at will result in US Army Public Health Command and US	Army		
Title: Adaptive & Resilient Installations		-	-	2.97
Description: This effort demonstrates sustainable, cost efficient and for achieving resilient and sustainable installation and base operation adaptive construction techniques to impact manpower and material development of a prototype additive constructive system utilizing constructive system utilizing constructive.	ons. Investigates the applicability of utilizing automotive s necessary for contingency construction through the	ques		
FY 2016 Plans: Will integrate contingency base planning, design, operations and m Management System (JCMS) to provide a single system for all Service. Will assess the cementitious material requirements and charbe assessed utilizing a rudimentary pre development prototype system.	vices to plan and execute construction in support of the Joracteristics required for automated additive construction the	oint		
	Accomplishments/Planned Programs Sub	totals 1.920	3.171	3.27

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Army		Date: February 2015
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603728A I Environmental Quality Technology Demonstrations	Project (Number/Name) 002 I Environmental Compliance Technology
C. Other Program Funding Summary (\$ in Millions) N/A		
Remarks		
<u>D. Acquisition Strategy</u> N/A		
E. Performance Metrics N/A		

PE 0603728A: *Environmental Quality Technology Demonst...* Army

Exhibit R-2A, RDT&E Project Ju	stification	: PB 2016 A	rmy							Date: February 2015			
Appropriation/Budget Activity 2040 / 3				, ,				Project (Number/Name) 025 I Pollution Prevention Technology					
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost	
025: Pollution Prevention Technology	-	2.920	-	1.489	-	1.489	1.489	1.488	1.489	1.489	-	-	

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 2014	FY 2015	FY 2016
Title: Pollution Prevention Technology	2.920	-	1.489
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.			
FY 2014 Accomplishments:			

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Army			Date: February 2015
1	,	, ,	umber/Name) tion Prevention Technology

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016
Conventional Ammunition: Conducted large-scale performance and insensitive munitions testing on environmentally benign formulation in relevant end item; Pyrotechnics: Integrated chromate-free delay composition into relevant end item; Toxic Metal Reduction: Demonstrated alternatives to chromic acid anodizing for common aircraft substrates; Zero Footprint Camp: Selected and matured high-payoff approaches for reducing fresh water demand and wastewater generation in contingency bases.			
FY 2016 Plans: Conventional Ammunition: will qualify lead-free primary explosive from full-scale production lot; Pyrotechnics: will conduct prototype testing for chromate- and lead-free gasless delay formulations in a relevant end item; Toxic Metal Reduction: will conduct firing tests for large caliber gun barrel with hexavalent chromium-free liner.			
Accomplishments/Planned Programs Subtotals	2.920	-	1.489

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 Ju	stification	: PB 2016 A	Army						Date: February 2015			
Appropriation/Budget Activity 2040 / 3				, ,				Project (Number/Name) 03E I Environmental Restoration Technology				
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
03E: Environmental Restoration Technology	-	6.700	6.024	5.960	-	5.960	6.386	6.704	6.745	6.853	-	-

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 2014	FY 2015	FY 2016	
Title: Sustainable Ordnance Mitigation and Management	1.450	1.335	1.300	
Description: This effort develops real time detection and discrimination methodologies for unique unexploded ordinance (UXO).	ue and emerging non-metallic			
FY 2014 Accomplishments:				

Exhibit R-2A, RDT&E Project Justification: PB 2016 Army			Date: Fe	ebruary 2015	
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603728A I Environmental Quality Technology Demonstrations	03E / E/	oject (Number/Name) E I Environmental Restoration chnology		
B. Accomplishments/Planned Programs (\$ in Millions)			FY 2014	FY 2015	FY 2016
Developed a networked semi- to-fully-autonomous mobile platform military ranges.	with the operational capability to mitigate hazardous UXO	s on			
FY 2015 Plans: Develop electromagnetic induction algorithms for detection and disconductive materials- based munitions, and models and algorithms		ally			
FY 2016 Plans: Will validate algorithms for the detection and discrimination of interwill conduct field evaluations of electromagnetic induction (EMI) se metallic IECM munitions.					
Title: Hazard Assessment for Military Materials			0.863	0.722	1.100
Description: This effort demonstrates tools to assess hazard and for rapid environmental baseline survey reporting and screening as and allow for improved predictive risk assessment and provide environmental baseline survey reporting and screening as and allow for improved predictive risk assessment and provide environmental screening as a screeni	sessments of existing and future militarily relevant compo				
FY 2014 Accomplishments: Demonstrated a toolkit with optimized sensor technologies for rapid contamination within an operational environment.	d and reliable data collection providing real time analysis fo	or			
FY 2015 Plans: Integrate a suite of environmental-quality sensors with analytical cavisualization associated with environmental monitoring in Army open Army compounds.		or new			
FY 2016 Plans: Will mature sensor technologies (e.g. biological sensors, geochem data collection providing real time screening for contamination with		able			
Title: Technologies for Sustainable and Green Operations and Acc	quisition		2.262	2.043	2.089
Description: This effort investigates and matures technologies to clands and mission spaces as well as assesses and demonstrates rexisting and emerging contaminants.					

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PE 0603728A: Environmental Quality Technology Demonst... Page 9 of 12 R-1 Line #50 Army

Exhibit R-2A, RDT&E Project Justification: PB 2016 Army		Date: F	ebruary 2015	5		
Appropriation/Budget Activity 2040 / 3			ject (Number/Name) I Environmental Restoration			
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016		
Provided an integrated approach to contamination management in cost effective and environmentally protective management and/or r metallic Depleted Uranium and residues from affected soils and sa munitions production water and investigate new technologies for imby development and use of new munitions.	removal of small (size of the granular media or smaller) nds; developed a virtual model for wastewater treatment of					
FY 2015 Plans: Develop cost-effective, efficient, and integrative tools for remediation production. Tools are planned for rapid transition under technology for next generation Army ammunition Industrial Base Insensitive M	transition agreement with the Project Director Joint Service	es				
FY 2016 Plans: Will validate computational tools to predict the physical and chemic hazard potentials and health effects of insensitive munitions. Will m surface water characterization and contaminate potential in austere	nature predictive models and computational tools to assess					
Title: Risk Prediction and Decision Technologies		2.125	1.924	1.47		
Description: The goal of this effort is to develop and provide integral challenges with a focus on acquisition lifecycle models to predict enthat will proactively minimize impacts to the mission and to the Solo	nvironmental attributes of emerging chemicals and materia					
FY 2014 Accomplishments: Applied climate models, under site level simulation frameworks, to for assessing multi-stressor impacts due to predictive climatic chan parameterizing environmental risk data and parameterization for m	nges; demonstrated appropriate protocols for generating/					
FY 2015 Plans: Develop and demonstrate appropriate data, scenarios, and process antimony (Sb) containing small arms formulations, and for new inselife cycle assessments provide scientifically defensible approaches anticipating product impact with respect to environmental regulators.	ensitive munitions formulations, IMX 101 and 104. Econom for determining environment risk, and increase confidence					
FY 2016 Plans:						

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Army	Date: F	ebruary 201	5			
Appropriation/Budget Activity 2040 / 3	• `	Project (Number/Name) 3SE I Environmental Restoration Technology				
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016		
Will mature experimental protocols and characterization factors in determination; will mature and demonstrate software for interpretin support tools.		on				

Accomplishments/Planned Programs Subtotals

6.700

6.024

5.960

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 2016 Army							Date: February 2015					
1				R-1 Program Element (Number/Name) PE 0603728A I Environmental Quality Technology Demonstrations			Project (Number/Name) 03F I Environmental Quality Tech Demonstrations (CA)					
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
03F: Environmental Quality Tech Demonstrations (CA)	-	-	2.250	-	-	-	-	-	-	-	-	-

Note

Not applicable for this item

A. Mission Description and Budget Item Justification

This is a Congressional Interest Item

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015
Congressional Add: Program Increase	-	2.250
FY 2015 Plans: Program increase		
Congressional Adds Subtotals	-	2.250

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A