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ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)							DATE February 2000		
BUDGET ACTIVITY 2 - Applied Research				PE NUMBER AND TITLE 0602720A Environmental Quality Technology					
<i>COST (In Thousands)</i>	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	62208	78905	13994	14238	14787	16236	17096	Continuing	Continuing
D048 Industrial Operations Pollution Control Technology	2339	2177	2382	2533	2681	3216	3395	Continuing	Continuing
A822 Facility Environmental Management and Monitoring System	1926	0	0	0	0	0	0	0	1926
A823 Hawaii Small Business Development Center	3852	0	0	0	0	0	0	0	3852
A829 National Defense Center for Environmental Excellence (NDCEE) Technology	14447	1962	0	0	0	0	0	0	16409
A835 Military Medical Environmental Criteria	2971	2408	2848	2907	3074	3345	3743	Continuing	Continuing
A876 Plasma Energy Pyrolysis System	2890	7847	0	0	0	0	0	0	10737
A877 Western Environmental Technology Office Environmental Support	3853	0	0	0	0	0	0	0	3853
A895 Pollution Prevention Technology	1	0	0	0	0	0	0	0	1
A896 Base Facility Environmental Quality	4611	4662	5190	5128	5252	5633	5723	Continuing	Continuing
A908 Commercialization of Technology to Reduce Defense Costs Initiative	5781	6866	0	0	0	0	0	0	12647
A917 Computer Based Land Management	2408	1962	0	0	0	0	0	0	4370
A946 Electronic Equipment Demanufacturing	5778	15695	0	0	0	0	0	0	21473
A947 Sustainable Green Manufacturing	2890	5395	0	0	0	0	0	0	8285
A959 Corrosion Prevention and Control	0	8828	0	0	0	0	0	0	8828
A960 Watervliet Arsenal Pollution Projects	0	3924	0	0	0	0	0	0	3924

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COST (In Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
A961 Vessel Plating Technology	0	981	0	0	0	0	0	0	1000
AF25 Military Environmental Restoration Technology	3163	3446	3574	3670	3780	4042	4235	Continuing	Continuing
AF26 Agricultural-Based Bioremediation	3853	0	0	0	0	0	0	0	3853
AF27 ARO Chemical/Hazardous Material Disposal	1445	0	0	0	0	0	0	0	1445
AF28 Range Safe Technology Initiative	0	9809	0	0	0	0	0	0	0
AF29 Phyto-Remediation in Arid Lands	0	2943	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification: This Program Element (PE) provides technology that allows the Army to comply with regulations mandated by all Federal, State and local environmental/health laws and to reduce the cost of this compliance. Examples of key laws include the Superfund Amendments and Reauthorization Act of 1986 and the Defense Environmental Restoration Act (the DoD equivalent of this law), in addition to the Resource Conservation and Recovery Act of 1984, as amended. This PE provides the Army with a capability to decontaminate or neutralize Army-unique hazardous and toxic wastes at sites containing waste ammunition, explosives, heavy metals, propellants, smokes, chemical munitions, and other organic contaminants. The current DoD estimate for the total Army cost of completing this cleanup program is eight to ten billion dollars. This PE also provides technology to avoid the potential for future hazardous waste problems, by reducing hazardous waste generation through process modification and control, materials recycling and substitution. This PE develops pollution control technology, which assists installations in complying with environmental regulations at less cost. The PE also provides technology to mitigate noise impacts and maneuver area damage resulting from Army training activities. The work in this program element is consistent with the Army Science and Technology Master Plan (ASTMP), the Army Modernization Plan, and adheres to Defense Reliance Agreements on civil engineering and environmental quality with oversight provided by the Joint Engineers and Armed Services Biomedical Research Evaluation and Management.

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B. Program Change Summary	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>
Previous President's Budget (FY 2000/2001 PB)	64386	12758	14041
Appropriated Value	64842	80258	
Adjustments to Appropriated Value			
a. Congressional General Reductions	-456		
b. SBIR / STTR	-1531		
c. Omnibus or Other Above Threshold Reductions		-311	
d. Below Threshold Reprogramming	-389		
e. Rescissions	-258	-1042	
Adjustments to Budget Years Since FY 2000/2001 PB			-47
Current Budget Submit (FY 2001 PB)	62208	78905	13994

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ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE February 2000					
BUDGET ACTIVITY 2 - Applied Research				PE NUMBER AND TITLE 0602720A Environmental Quality Technology				PROJECT D048				
COST (In Thousands)				FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
D048 Industrial Operations Pollution Control Technology				2339	2177	2382	2533	2681	3216	3395	Continuing	Continuing
<p>Mission Description and Justification: This project provides compliance & pollution control technologies required to reduce the cost of treating hazardous and non-hazardous emissions from the operation of Army installations, and to satisfy increasingly stringent environmental standards and state regulations. Federal facilities are now subject to fines and facility shutdowns for violation of federal, state, and local regulations. This new technology is essential to control and reduce generation of hazardous and non-hazardous waste, to satisfy Army waste reduction goals, and to avoid future costs and liabilities to the Army. This project will provide compliance & pollution control tools for toxic and non-toxic regulated pollutants. Technologies will be addressing water and wastewater issues, as well as noise and environmental management issues impacting industrial and troop installations. Efforts will include a focus on new materials which will enter the Army inventory within the next decade to assure that Army installations will remain compliant. Changes in solid, liquid, and gaseous emissions resulting from pollution prevention efforts will require technology changes to existing treatment systems to compensate. The primary developing agency is the U.S. Army Engineer Research and Development Center.</p> <p>FY 1999 Accomplishments:</p> <ul style="list-style-type: none"> • 2339 - Designed technology for minimizing headloss using electrochemical reduction of energetic compounds in water. <li style="padding-left: 20px;">- Investigated biological treatment technology for munitions production. <li style="padding-left: 20px;">- Completed thermal plasma techniques for the pyrolytic destruction of organic energetic wastes and the vitrification of heavy metal-bearing wastes. <p>Total 2339</p> <p>FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • 2153 - Identify propagation cases for assessment of long-term average noise exposure for small arms range noise model. <li style="padding-left: 20px;">- Adapt technology for electrochemical reduction of energetic compounds in water. <li style="padding-left: 20px;">24 - Small Business Innovative Research/Small Business Technology Transfer Programs (SBIR/STTR) <p>Total 2177</p> <p>FY 2001 Planned Program:</p> <ul style="list-style-type: none"> • 2382 - Evaluate algorithms for single event noise prediction tools. <li style="padding-left: 20px;">- Investigate modified absorbent/biosorbent technology for treating Army waste streams containing heavy and toxic metals and explosives. <li style="padding-left: 20px;">- Establish guidelines for fluidized-bed granular activated carbon bioreactor to replace carbon absorption for water contaminated with explosives. <p>Total 2382</p>												
Project D048				Page 4 of 30 Pages				Exhibit R-2A (PE 0602720A)				

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ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE February 2000		
BUDGET ACTIVITY 2 - Applied Research				PE NUMBER AND TITLE 0602720A Environmental Quality Technology				PROJECT A822	
COST (In Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
A822 Facility Environmental Management and Monitoring System	1926	0	0	0	0	0	0	0	1926
<p>Mission Description and Justification: This was a one-year Congressionally funded project. Based on technology demonstrated at Tobyhanna Army Depot (TYAD) under the Facility Environment Management and Monitoring System (FEMMS), the technology was transferred to the Radford Army Ammunition Plant (RFAAP) as the basis for REDMAP. This Congressionally mandated pollution prevention project was managed by the Army to institute the Radford Environmental Development and Management Program (REDMAP) at the Radford Army Ammunition Plant, Virginia for the development of an integrated environmental and pollution prevention (P2) management and control system. In addition, since all DoD facilities are required to implement Executive Order (E.O.) 12856 by 1999 (so that Federal facilities comply with the mandated Pollution Prevention Act (PPA) of 1990 and Executive Order 12856 of August 3, 1993), these funds focused on issues related to implementation of E.O. 12856 at RFAAP.</p> <p>FY 1999 Accomplishments:</p> <ul style="list-style-type: none"> • 1926 - Completed the remaining FEMMS Modules: Electrostatic Precipitator (ESP), Propellant Explosive Pyrotechnic (PEP) Tracking System, Virginia Pollutant Discharge Elimination System (VPDES, i.e., Wet Wells and Outfalls), and integrated modules into the Environmental Information System (EIS). - Completed high priority environmental management projects which had high implementation savings potential (e.g., reduction of sulfates). Also, completed requirements and alternatives analysis on a new set of environmental projects and implement highest priority, highest payback options - (e.g., recycle/reuse of energetic manufacturing process fluids, aqueous-based and acidic-based streams). <p>Total 1926</p> <p>FY 2000 Planned Program: Project not funded in FY 2000.</p> <p>FY 2001 Planned Program: Project not funded in FY 2001.</p>									

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BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602720A Environmental Quality Technology	PROJECT A823
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COST <i>(In Thousands)</i>	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
A823 Hawaii Small Business Development Center	3852	0	0	0	0	0	0	0	3852

Mission Description and Justification: This was a one-year Congressionally funded project. The project had technology policy goals favoring activities that meet dual-use and employment-creating criteria. The former refers to commercializing products that are used by Armed Services personnel as well as the civilian population. The latter is offered as a contribution to U.S. economic revitalization. The approach involved private-public partnerships to carry out activities leading to the commercialization of these products. These include but are not limited to pharmaceuticals, industrial products, and food products derived from the agricultural resources of transitioning sugar plantations in Hawaii. Advisory personnel from federal agencies (primarily the Departments of Defense and Agriculture) and state agencies participated at the work group and oversight committee levels.

FY 1999 Accomplishments:

- 3852 - Completed the development of agricultural industrial products having potential for dual-use and commercialization, focusing on native Hawaiian agricultural crops with potential for medicine/food/bioremediation use in the military.
- Total 3852

FY 2000 Planned Program: Project not funded in FY 2000.

FY 2001 Planned Program: Project not funded in FY 2001.

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BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602720A Environmental Quality Technology	PROJECT A829
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COST (<i>In Thousands</i>)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
A829 National Defense Center for Environmental Excellence (NDCEE) Technology	14447	1962	0	0	0	0	0	0	16409

A. Mission Description and Justification: This is a one-year Congressionally funded project. The Materials and Processes Partnership for Pollution Prevention (MP4) project develops, demonstrates and validates pollution prevention technologies for the DoD acquisition community and the defense industrial base. These new technologies will assist DoD in reducing hazardous material usage, reducing regulatory pressure, and lowering the cost of weapon systems throughout their life cycle.

FY 1999 Accomplishments:

- 14447 - Awarded contract to the NDCEE, February 1999.
 - Conducted call for proposals within DoD for tasks to be executed within MP4 project which address DoD needs.
 - Received Phase I approval by the NDCEE DoD Working Group for twenty three proposals.
 - Developed specific task plans for Phase I approved projects.

Total 14447

FY 2000 Planned Program:

- 1909 Continue execution of Congressionally-directed “Material and Processes Partnership for Pollution Prevention (MP4)” program as follows:
 - Identify pollution prevention technologies and management solutions to address DoD needs.
 - Establish goals and requirements for new technology or management solutions.
 - Develop, test, and demonstrate technology and management solutions including cost and health risk impacts.
 - Transition new technologies and processes to the Army industrial base and other DoD and commercial sites.
- 53 - Small Business Innovative Research/Small Business Technology Transfer Programs (SBIR/STTR)

Total 1962

FY 2001 Planned Program: Project not funded in FY 2001.

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BUDGET ACTIVITY 2 - Applied Research				PE NUMBER AND TITLE 0602720A Environmental Quality Technology				PROJECT A835	
COST (In Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
A835 Military Medical Environmental Criteria	2971	2408	2848	2907	3074	3345	3743	Continuing	Continuing
<p>Mission Description and Justification: This project evaluates human health and environmental effects resulting from exposure to explosives, propellants, and smokes produced in Army industrial and field operations or disposed of through past activities. The end results of this research are determinations of acceptable residual concentration levels that will protect human health and the environment from adverse effects. The products of this research are US Environmental Protection Agency approved health advisories and criteria documents to be used in risk assessment procedures. These criteria are used by the Army during negotiations with regulatory officials to set scientifically and economically rational safe cleanup and discharge levels at Army installations. The primary developing laboratories are the US Army Center for Environmental Health Research (CEHR), Ft. Detrick, MD, the Center for Health Promotion and Preventive Medicine (CHPPM), Edgewood, MD, and the U. S. Army Engineer Research and Development Center (ERDC).</p> <p>FY 1999 Accomplishments:</p> <ul style="list-style-type: none"> • 2971 - Identified munitions biomarkers and bioeffects and conducted toxicological evaluation of munitions and degradation products. (CHPPM) - Established toxicity predictions using structure activity relationships. (CHPPM) - Performed cross-species extrapolation of mammalian and non-mammalian bioassays (CEHR/CHPPM), apply sentinel biomonitoring systems (CEHR), and apply methods for integrated environmental assessment of contaminated sites at Army installations (CEHR). - Constructed fate and transport of military-unique compounds. (ERDC) - Identified biomarkers to monitor bioattenuation and effects of military-unique compounds. (ERDC) - Constructed exposure and effects models and decision-making framework for ecological risk assessment. (ERDC) <p>Total 2971</p> <p>FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • 1170 - Identify toxicity values for use in a Army Risk Assessment Modeling System. (ARAMS). (CHPPM) - Identify biomarkers to assess various toxic endpoints as well as bioaccumulation. (ERDC/CHPPM) - Perform inter-laboratory and field validation of specific sentinel environmental toxicity hazard assessment methods. (CEHR) - Apply specific sentinel environmental toxicity hazard assessment methods as part of integrated hazard assessment of sites at Army installations. (CEHR) • 1173 - Construct a comprehensive exposure model and integrate with RAMS. (ERDC) - Construct a screening level model for Unexploded Ordinance (UXO). (ERDC) - Identify parameters for bioaccumulation of explosives in specific endpoints. (ERDC) 65 - Small Business Innovative Research/Small Business Technology Transfer Programs (SBIR/STTR). <p>Total 2408</p>									
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BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602720A Environmental Quality Technology	PROJECT A835
<p>FY 2001 Planned Program:</p> <ul style="list-style-type: none"> • 1423 - Conduct comprehensive risk assessment linkages for ARAMS. (ERDC/CHPPM) <ul style="list-style-type: none"> - Establish information to input into comprehensive ARAMS. (CHPPM) - Perform inter-laboratory and field validation of specific sentinel environmental toxicity hazard assessment methods (CEHR) - Apply specific sentinel environmental toxicity hazard assessment methods as part of integrated hazard assessment of sites at Army installations. (CEHR) • 1425 - Determine effects of environmental parameters on UXO chemical signatures. (ERDC) <ul style="list-style-type: none"> - Construct population model for assessment of environmental effects. (ERDC) - Link contaminant fate and transport with effects databases for multiple endpoints. (ERDC) - Complete development of a comprehensive link between contaminant fate and transport with effects databases for multiple environmental endpoints for incorporation into ARAMS. (ERDC/CHPPM) <p>Total 2848</p>		
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ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE February 2000			
BUDGET ACTIVITY 2 - Applied Research				PE NUMBER AND TITLE 0602720A Environmental Quality Technology				PROJECT A876		
COST (In Thousands)		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
A876 Plasma Energy Pyrolysis System		2890	7847	0	0	0	0	0	0	10737
<p>Mission Description and Justification: This is a one-year Congressionally funded project. It provides a compliance and pollution control technology required reducing the cost of treatment and disposal of hazardous and toxic site waste streams resulting from production or deactivation of military items or components. Plasma arc technology application enables the military to reduce the need for landfills and their future liability-related issues in a one step, safe, and economic process. The project will deliver an effective compliance technology to control and dispose of recalcitrant hazardous and toxic wastes regulated under Resource Conservation and Recovery Act amendments, in addition to satisfying the increasingly stringent emission standards of the Clean Air Act relevant to open burning/open detonation practices within the military. A plasma arc processing unit can reduce the significant costs associated with the many steps involved in other conventional hazardous waste treatment technologies, such as: sample characterization lead time, health and safety exposure risks to workers, and increased risks to the general public from accidents involving the excavated and transported wastes. The development and field demonstration of plasma arc technology will provide the user community with a much-needed tool for military hazardous waste processing and disposal on a flexible basis. In particular, developing a mobile unit's specifications, design, and blueprints will enable the Army, working with the Air Force, to converge on a mobile unit configuration and cut the time for field implementation.</p> <p>FY 1999 Accomplishments:</p> <ul style="list-style-type: none"> • 2890 - Completed procurement of mobile unit components and system integration. <li style="padding-left: 20px;">- Completed shake-down and mobility testing. <li style="padding-left: 20px;">- Obtained National Environmental Protection Act and other operating permits. <p>Total 2890</p> <p>FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • 7636 - Confirm mobile Plasma Energy Pyrolysis System (PEPS) ability to destroy and dispose of hazardous waste. <li style="padding-left: 20px;">211 - Small Business Innovative Research/Small Business Technology Transfer Programs (SBIR/STTR). <p>Total 7847</p> <p>FY 2001 Planned Program: Project not funded in FY 2001.</p>										
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ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE February 2000			
BUDGET ACTIVITY 2 - Applied Research				PE NUMBER AND TITLE 0602720A Environmental Quality Technology				PROJECT A877		
COST (In Thousands)		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
A877 Western Environmental Technology Office Environmental Support		3853	0	0	0	0	0	0	0	3853
<p>Mission Description and Justification: This was a one-year Congressionally funded effort with the Western Environmental Technology Office (WETO) to provide for the transfer of environmental compliance technologies required to reduce the cost for treating hazardous and toxic pollutants from Army industrial operations which include Army ammunition plants, depots, and arsenals, and to help satisfy increasingly stringent environmental regulations on DoD and the Department of Energy (DOE). Those environmental requirements include wastewater discharge standards under the Clean Water Act and relevant State regulations, hazardous air pollutant emission standards under the Clean Air Act Amendments (CAAA), requirements under Federal Facilities Compliance Act and Resource Conservation and Recovery Act and other regulations. The U.S. Army Construction Engineering Research Laboratories (CERL) works closely with the Industrial Operations Command (IOC) to transfer environmental compliance and pollution prevention technologies to IOC installations. This project will support the transfer of environmental technologies to IOC installations. This enables the Army to reduce environmental compliance costs and future environmental liability costs. The technology transfer projects under this project should result in model industrial operations with environmental compliance, which will help accelerate technology transfer to similar industrial operations within DoD. The primary technology transfer agency was the U.S. Army Construction Engineering Research Laboratories, Champaign, IL. WETO is a privatized former component of DOE (as of September 1996). WETO evaluated and demonstrated technologies to help DOE meet a requirement to clean up its sites.</p> <p>FY 1999 Accomplishments:</p> <ul style="list-style-type: none"> • 3853 - Completed design services and cost-benefit analyses in support of environmental compliance at Army industrial installations. <p>Total 3853</p> <p>FY 2000 Planned Program: Project not funded in FY 2000.</p> <p>FY 2001 Planned Program: Project not funded in FY 2001.</p>										
Project A877		Page 11 of 30 Pages				Exhibit R-2A (PE 0602720A)				

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ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE February 2000			
BUDGET ACTIVITY 2 - Applied Research				PE NUMBER AND TITLE 0602720A Environmental Quality Technology				PROJECT A896		
COST (In Thousands)		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
A896 Base Facility Environmental Quality		4611	4662	5190	5128	5252	5633	5723	Continuing	Continuing
<p>Mission Description and Justification: This project supports three of the four areas of the Army's Environmental Quality (EQ) program as follows: (1) Conservation: Efforts will provide the Army with the technical capability to protect and improve the biological and physical characteristics of training and testing areas needed to sustain readiness while also conserving protected natural and cultural resources, including threatened and endangered species. Technology developed within this project will enable training and testing land users to match usage events and schedules for training heavy, medium, and light forces to the capabilities of specific land areas, and will also provide advanced methods to restore lands damaged in training and testing activities. (2) Compliance & Pollution Prevention: Efforts under this project will also enable the Army to prevent pollution and to comply with the myriad of Federal, state, and host country environmental regulations. Technologies will address the requirements in the Clean Air Act Amendment including hazardous air pollutants and particulate matter emission. Technology must also address Army Installations requirements in solid waste. Efforts target the development of environmental monitoring and modeling capabilities to support risk-based analysis of changes in training doctrine and testing activities and environmentally sustainable lands and facilities in all three EQ areas. The primary developing agency is the U.S. Army Engineer Research and Development Center (ERDC).</p> <p>FY 1999 Accomplishments:</p> <ul style="list-style-type: none"> • 4611 - Incorporated a risk assessment capability into vegetation models to predict the effects of Army training and testing activities on the long-term growth and composition of plant communities. <ul style="list-style-type: none"> - Identified, for selected ecoregions, modeling tools and techniques that use both historic and predicted data on training, vegetation, and soils to match potential training throughput with the ability of soils and vegetation to withstand impacts of military use. - Developed a process to assess the impacts of maneuver training on threatened and endangered species and reduce restrictions on training while at the same time protect these species. - Completed greenhouse gas emission estimation model for the Army's mobile sources of greenhouse gases. <p>Total 4611</p> <p>FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • 3988 - Identify the information and modeling requirements to determine the risk of Army activities on threatened and endangered species. <ul style="list-style-type: none"> - Develop process-based soil erosion and deposition models that will assist in selecting sites and methods to more effectively reduce the effects of erosion and sedimentation from military activities on training lands. - Integrate training distribution, plant species composition, and sedimentation factors that affect land carrying capacity into the Army Training and Testing Area Carrying Capacity (ATTACC) model. - Validate pollution prevention simulation tool for smokes and obscurant emissions to minimize regulatory effects of smokes and obscurants on training. 										
Project A896			Page 12 of 30 Pages				Exhibit R-2A (PE 0602720A)			

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PE NUMBER AND TITLE 0602720A Environmental Quality Technology		PROJECT A896
FY 2000 Planned Program: (continued)		
•	625 - Develop activated carbon fiber cloth absorption technologies to control Hazardous Air Pollutants (HAPs) from hazardous organic solvents used in Army painting, cleaning, and degreasing operations.	
	49 - Small Business Innovative Research/Small Business Technology Transfer Programs (SBIR/STTR).	
Total	4662	
FY 2001 Planned Program:		
•	4465 - Validate the use of remote monitoring instrumentation and methods to evaluate changes in animal activity that may be caused from military activities.	
	- Incorporate information on the potential of land (soils and vegetation) to be effectively rehabilitated to reduce erosion and sustain land resources into decision support processes for land rehabilitation and maintenance.	
	- Develop predictive model to determine raw quantities of construction/demolition material and identify potential recycle/reuse technologies for solid waste streams.	
•	725 - Develop HAP control technologies for toxic combustion sources.	
Total	5190	

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BUDGET ACTIVITY 2 - Applied Research				PE NUMBER AND TITLE 0602720A Environmental Quality Technology				PROJECT A908		
COST (In Thousands)		FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
A908	Commercialization of Technology to Reduce Defense Costs Initiative	5781	6866	0	0	0	0	0	0	12647
<p>Mission Description and Justification: This is a one-year Congressionally funded project. The objective of this technology commercialization program is to lower Department of Defense procurement costs through integration of the technology commercialization process from the laboratory workbench to end product users. The approach involved matching of supply and demand technology requirements (utilizing Defense Technology Area Plan (DTAP), TriService Environmental Technology Requirements Strategies, Army 2010 and Beyond, and other DOD requirements documents); preliminary assessments of technology; testing, verification and demonstration; comprehensive technology and market assessments; and assistance in structuring, financing and closing of commercial transactions. An Interagency Agreement is in place with the Federal Laboratory Consortium (FLC) to assist in implementation of this program. This partnership supports DoD by identifying, developing, testing, evaluating, and transitioning state-of-the-art methods and technologies to improve quality, efficiency, and compliance and promote reduction of defense procurement costs.</p> <p>FY 1999 Accomplishments:</p> <ul style="list-style-type: none"> • 5571 - Completed requirements and technology matching (using DTAP and Army/DOD environmental requirements) to develop a database of available DoD/Federal Laboratory technologies, points of contacts. Vendor/commercial technologies matrixed against manufacturing, sustainment, and environmental needs. Overarching DoD Integrated Process Team provide linkage to DOD Technology Transfer and Environmental communities. <ul style="list-style-type: none"> - Commercialization underway for Antifreeze Admixtures for Cold Weather Concreting to eliminated heating, High Solids Anaerobic Digester for waste disposal, Micro-Channel Heat Exchangers (MCHX) for more efficient engines, Advanced Sensors to improve chemical and biological agent detection, On-board intelligent lubrication prognostication to reduce oil use, Pulsed Laser and Remote Acoustic Doppler for Non-Destructive Testing to eliminate repainting, Terrestrial Magnetic Surveyor to assist in Underground Storage Tank and other detection, Piezoelectric Ceramic Fiber Composite Transducers and Actuators for improved sensors and Mobile Sensate Robot for operation in hazardous environments. - Market assessments and matching underway for technologies such as Autotherm to increase engine efficiency, Low-wattage Plasma Cleaning and Decontamination, Location Monitoring Technologies for tracking personnel in hazardous areas, Pulsed Ultraviolet Light for water treatment and disaffection, and Low NOx burner technology to reduce nitrogen oxide emissions. - Metrics include over 31 active technologies under active commercialization investigation, 31 Industry Transaction Agreements in place, 6 Cooperative R&D Agreements under negotiation and over 160 technologies investigated. - Expanded role of DoD Integrated Process Team in technology matching. - Prioritized DoD needs and complete qualitative and quantitative scoring for selection of DoD/Federal Laboratory technologies. 210 - Established Laboratory Reimbursement fund to assist DoD/Federal Laboratories to provide for testing, demonstration, analysis and enhancement of Federal technologies to validate commercial applicability. <p>Total 5781</p>										
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BUDGET ACTIVITY 2 - Applied Research				PE NUMBER AND TITLE 0602720A Environmental Quality Technology				PROJECT A917	
COST (In Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
A917 Computer Based Land Management	2408	1962	0	0	0	0	0	0	4370
<p>Mission Description and Justification: This is a one-year Congressionally funded project to develop, test, and refine accurate, effective, and predictive methodologies and models, which have not been pursued by industry, for land condition assessment. These methodologies and models are needed to correlate and predict the relationship between military use and the patterns and nature of impacts associated with each type of military use under varying climatic and landscape conditions. This effort will utilize and exploit remote sensing geographic information systems and field survey and monitoring technologies. The results of this effort will improve DoD land managers' ability to characterize and monitor broad-scale changes occurring across training and testing lands through: (1) improvements in data acquisition, data display and visualization, and (2) integration of these data into dynamic landscape models. This program is managed primarily by the US Army Engineer Research and Development Center (ERDC). The primary performer for this effort is the Texas Regional Institute for Environmental Studies (TRIES).</p> <p>FY 1999 Accomplishments:</p> <ul style="list-style-type: none"> • 2408 - Verified wind-erosion modeling options for integration into the Army's land capability model at sites with extensive wind erosion problems (such as Ft. Bliss, TX and Mojave Desert installations). <ul style="list-style-type: none"> - Tested computer-based learning modules as elements of the decision support capabilities of the Land Management System (LMS). - Demonstrated and revised vegetation mapping protocols for Army installations through multi-tiered vegetation mapping efforts at Ft. Hood, TX. - Installed and tested real-time weather and soil moisture data recorders and integrated with training usage plans and training distribution model for near term damage and safety assessments. - Held workshops (Feb & Mar 99) for the Land Management System (LMS) at Ft. Hood, TX & Palm Springs, CA with participants from across the Army & DOD. - Developed and tested, at Ft. Hood, a protocol for field comparisons of watershed models. <p>Total 2408</p> <p>FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • 1909 - Complete integration and testing of a suite of Web-enabled models for military land management, use, analysis, and simulation. <ul style="list-style-type: none"> - Extend modeling capabilities to link ecological, wind erosion, noise, and watershed models. - Complete testing of prototype modeling suites at three test locations (Ft. Hood, TX; Ft. Benning, GA; and Marine Corps Air Guard Combat Center, 29 Palms, CA). - Design, develop, and test a Web-enabled data repository for three test locations (Ft. Hood, TX; Ft. Benning, GA; and Marine Corps Air Guard Combat Center, 29 Palms, CA). - Design, develop, and complete testing of Web-based linkages between data repositories and modeling suites. - Develop technology transfer package for Web-based modeling tools, mapping tools, instruction tools, and data repository developed over three-year effort. 									
Project A917	Page 16 of 30 Pages					Exhibit R-2A (PE 0602720A)			

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BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602720A Environmental Quality Technology	PROJECT A917
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FY 2000 Planned Program: (continued)

53 - Small Business Innovative Research/Small Business Technology Transfer Programs (SBIR/STTR).
Total 1962

FY 2001 Planned Program: Project not funded in FY 2001.

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ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE February 2000		
BUDGET ACTIVITY 2 - Applied Research				PE NUMBER AND TITLE 0602720A Environmental Quality Technology				PROJECT A946	
<i>COST (In Thousands)</i>	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
A946 Electronic Equipment Demanufacturing	5778	15695	0	0	0	0	0	0	21473
<p>Mission Description and Justification: This is a one-year Congressionally funded project. The objective of Electronics Equipment Demanufacturing program is to develop and demonstrate technologies and processes for the reuse, recycle, or disposal of manufactured electronic equipment used by the Department of Defense and its suppliers. Shortened electronics equipment product life cycles have led to early obsolescence and the 20-year accumulation of hundreds of millions of tons of scrap or surplus commercial and Government electronic equipment. Some of this equipment is classified. Although there are several commercial electronic demanufacturers, much end of life electronic equipment is sent to landfills. The managed reuse of electronic equipment may reduce future procurement costs and will reduce landfill and disposal costs through the separation of hazardous materials. Additionally, a further objective of this effort is to establish a demanufacturing recycling pilot site at Johnstown, PA to develop a cost-effective operational site that will integrate and apply the demanufacturing technology enhancements including state-of-the-art products and materials from the Demanufacturing of Electronic Equipment for Reuse and Recycling (DEER2) tasking and develop the material distribution system, education and training programs.</p> <p>FY 1999 Accomplishments:</p> <ul style="list-style-type: none"> • 5778 - Awarded task awarded on 11 Feb 99 and initiated program development. <ul style="list-style-type: none"> - Established Demanufacturing of Electronic Equipment for Reuse and Recycling (DEER2) Web Site Program Repository (approved May 1999) - Established a DoD and Stakeholders group to identify demanufacturing needs and technology gaps. - Completed Program Management Plan (PMP) (approved June 1999) - Held first Stakeholder Meeting at NJIT as part of the Multi-Lifecycle Engineering Research Center (July 1999) - Completed Mission Need Statement (MNS) (approved October 1999) - Held a DEER2 Information Exchange 26-27 October 99. - Presented an overview of the DEER2 program to stakeholder groups on multiple occasions. - Conducted approximately 50 site visits. - Began task of analyzing the Defense Reutilization and Marketing Service (DRMS) contracts with DM Electronics Corporation (DMC) and Handy & Harmon for recycling of material/components from DoD electrical equipment/systems. <p>Total 5778</p> <p>FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • 15272 - Complete review and approval of system concept papers. <ul style="list-style-type: none"> - Procure state-of-the-art demanufacturing demonstration/validation equipment . - Complete installation of equipment at Largo, Florida, demonstration factory. - Report progress at stakeholder meeting to be held in Largo, Florida in February 2000. - Complete stakeholder meeting at SUMMIT 2000 in California in May 2000. 									
Project A946			Page 18 of 30 Pages			Exhibit R-2A (PE 0602720A)			

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BUDGET ACTIVITY 2 - Applied Research		February 2000
PE NUMBER AND TITLE 0602720A Environmental Quality Technology		PROJECT A946
<p>FY 2000 Planned Program: (continued)</p> <ul style="list-style-type: none"> - Complete establishment of a demanufacturing demonstration facility in Largo, Florida; open in summer of 2000. - Initiate the establishment of the recycling pilot site at Johnstown, PA - Develop, demonstrate, evaluate and deploy advanced, environmentally acceptable demanufacturing processes/technologies. - Complete plan for Information Exchange to be held in Florida in October 2000. - Complete provision of technology updates to DoD agencies and private industry through Information Exchanges, Stakeholder meetings, conference presentation and technical papers. - Small Business Innovative Research/Small Business Technology Transfer Programs (SBIR/STTR). <p>Total 423</p> <p> 15695</p> <p>FY 2001 Planned Program: Program not funded in FY 2001.</p>		
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BUDGET ACTIVITY 2 - Applied Research				PE NUMBER AND TITLE 0602720A Environmental Quality Technology				PROJECT A947	
COST (In Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
A947 Sustainable Green Manufacturing	2890	5395	0	0	0	0	0	0	8285
<p>Mission Description and Justification: This is a one-year Congressionally funded project. The objective is to help the Army reduce pollution in its key manufacturing processes by introducing clean technologies and techniques onto weapon system and related production lines. This is a Congressionally mandated program managed by the Army and consisting of team members that include the National Defense Center for Environmental Excellence, New Mexico State University, and the New Jersey Institute of Technology. New Mexico State University will leverage experiences with predictive modeling and micro-sensor technologies. This program augments efforts to comply with Executive Orders 12856 Greening the Government through Waste Prevention and 13101 Recycling and Federal Acquisition which mandate use of environmentally preferable products and services in all Federal acquisition programs.</p> <p>FY 1999 Accomplishments:</p> <ul style="list-style-type: none"> • 2890 These efforts will be completed with FY 99 funds: <ul style="list-style-type: none"> - Develop a fate and transport model for hazardous metals liberated during testing at Proving Grounds. The model will use depleted uranium (DU) as the test species. - Implement corrosion/wear protection technologies to include High velocity oxygen fuel (HVOF) and ion beam deposition processing. - Develop techniques for mixing and measuring the quality of mixedness of meta-stable intermolecular composite (MIC) materials. - Develop an environmentally friendly process for the synthesis of trinitroazetidine (TNAZ). - Generate a handbook for a systematic approach to developing environmentally friendly processes for chemical synthesis. - Assist Benet labs in developing process parameter for the pilot plant CMS through the use of the bench scale cylindrical magnetron sputtering (CMS) unit and X-ray sorbing/scattering techniques. - Develop a computer-based tool for design engineers such that consideration of Demil/disassembly can be addressed in the design process. - Implement a powder coating process at Corpus Christi Army Depot. <p>Total 2890</p> <p>FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • 4010 - Complete efforts in detection, prevention and control of corrosion in DoD systems. This will include modeling and sensor technology development to make life predictions and better assessments of the effects of use and exposure on the life of material. - Complete efforts in the development of environmentally friendly techniques for the synthesis and mixing of energetic and pyrotechnic materials. - Complete training development efforts that address the needs of the DoD and industry to raise awareness, interest, and competence in managing environmental technologies and concerns. - Complete efforts in the implementation and training of reduced volatile organic compounds (VOC) painting technologies and corrosion protection processes in Army's maintenance facilities. 									
Project A947	Page 20 of 30 Pages					Exhibit R-2A (PE 0602720A)			

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)		DATE February 2000
BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602720A Environmental Quality Technology	PROJECT A947
FY 2000 Planned Program: (continued)		
280	- Compete development of powder coat application for 20mm/25mm objective individual combat weapon (OICW)/ objective combat squad weapon (OCSW) ammunition projectile bodies.	
280	- Replace hazardous materials in propellants for the M865E3 and M831A1 cartridges.	
280	- Complete initial evaluation of Ion Beam processing for corrosion prevention and control.	
200	- Complete provision of target design support for the cylindrical magnetron sputtering program.	
200	- Complete characterization of low VOC polymeric coatings corrosion resistance.	
145	- Small Business Innovative Research/Small Business Technology Transfer Programs (SBIR/STTR).	
Total	5395	
FY 2001 Planned Program: Project not funded in FY 2001.		

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ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE February 2000		
BUDGET ACTIVITY 2 - Applied Research				PE NUMBER AND TITLE 0602720A Environmental Quality Technology				PROJECT A959	
COST (In Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
A959 Corrosion Prevention and Control	0	8828	0	0	0	0	0	0	8828
<p><u>Mission Description and Justification:</u> This is a one-year Congressionally funded project. The objective is to assist the DOD in addressing corrosion related issues by conducting research on techniques for detecting, inhibiting and reporting corrosion on weapon systems. This is a Congressionally mandated program managed by the Army. The program will perform several functions. Research will be conducted on materials and coatings, techniques for measuring corrosion and predictive model development to aid design and maintenance engineers. Test protocols and surveillance methodologies for assessing and reporting corrosion of fielded systems and new systems will be developed. Standardized test protocols will be developed and tests will be conducted to determine suitability of materials, corrosion inhibitors and coatings for DOD applications. Technology transfer will be conducted through training and a web based data exchange. The stated mission will be completed by a team consisting of Government, Industry and Academia.</p> <p>FY 1999 Planned Program: Project not funded in FY 1999.</p> <p>FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • 8591 - Complete research on materials and techniques for inhibiting and detecting corrosion. Information will aid design engineers in the selection of materials and coatings for weapon systems. In addition, techniques for predictive modeling of components and systems with regard to their corrosion resistance will be generated. <ul style="list-style-type: none"> - Demonstrate the “producibility” and or “manufacturability” of the technologies researched. In addition, develop methodologies for testing and surveillance of fielded items and items under development. Correlation between corrosion testing and actual field conditions will be established. - Create and periodically update, DOD joint test protocols (JTPs) for classes of items/products. These JTPs would outline test requirements, including specific tests, test procedures, acceptance criteria, and reference industry/government specifications/standards, that must be met in order for any candidate material/process to be deemed acceptable as an alternative to what is currently called for in the technical data package (TDP), depot maintenance work request (DMWR), maintenance procedures, SOP, and/or is currently being used. These classes of items/products would be mostly generic in nature (i.e. lubricants, paints, coatings, etc.) and would have subcategories to classify the types of systems on which they are intended to be used (i.e. armaments, ground vehicles, air vehicles, etc.). - Develop a dual purpose training center for technology transfer. One aspect of the training will be to inform design engineers of the developed technologies. The second will be to demonstrate coating and surveillance techniques to maintenance and surveillance personnel: A web-based information exchange system will be developed and maintained to keep design personnel abreast of emerging technologies. • 237 - Small Business Innovative Research/Small Business Technology Transfer Programs (SBIR/STTR). <p>Total 8828</p> <p>FY 2001 Planned Program: Project not funded in FY2001.</p>									
Project A959	Page 22 of 30 Pages					Exhibit R-2A (PE 0602720A)			

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ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE February 2000			
BUDGET ACTIVITY 2 - Applied Research				PE NUMBER AND TITLE 0602720A Environmental Quality Technology				PROJECT A960		
COST (In Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost	
A960 Watervliet Arsenal Pollution Projects	0	3924	0	0	0	0	0	0	3924	
<p>Mission Description and Justification: This is a one-year Congressionally funded project. The objective is to provide for the transfer of environmental pollution prevention/compliance technologies through the Western Environmental Technology Office (WETO) for testing and demonstration at Watervliet Arsenal. These technologies are required to reduce the cost for treating hazardous and toxic pollutants from Army operations and to help satisfy increasingly stringent environmental regulations on DoD and the Department of Energy (DOE). Those environmental requirements include wastewater discharge standards under the Clean Water Act and relevant State regulations, hazardous air pollutant emission standards under the Clean Air Act Amendments (CAAA), requirements under Federal Facilities Compliance Act and Resource Conservation and Recovery Act and other regulations. The U.S. Army Engineer Research and Development Center (ERDC) works closely with Watervliet Arsenal and Army Installation representatives to transfer environmental compliance and pollution prevention technologies that are successful at Watervliet Arsenal. This project will support the transfer of environmental technologies to Army installations. This enables the Army to reduce environmental compliance costs and future environmental liability costs. The technology transfer projects under this project should result in model Army operations with environmental compliance, which will help accelerate technology transfer to similar operations within DoD. The primary technology transfer agency is the U.S. Army Engineer Research and Development Center (ERDC). WETO is a privatized former component of DOE (as of September 1996). WETO will evaluate and demonstrate technologies to help DOE meet a requirement to clean up its sites.</p> <p>FY 1999 Planned Program: Project not funded in FY 1999.</p> <p>FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • 3818 - Complete transfer of specific compliance/pollution prevention technologies to Army industrial installations. 106 - Small Business Innovative Research/Small Business Technology Transfer Programs (SBIR/STTR). <p>Total 3924</p> <p>FY 2001 Planned Program: Project not funded in FY 2001.</p>										
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BUDGET ACTIVITY 2 - Applied Research				PE NUMBER AND TITLE 0602720A Environmental Quality Technology				PROJECT A961	
COST (In Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
A961 Vessel Plating Technology	0	981	0	0	0	0	0	0	1000
<p>Mission Description and Justification: This is a one-year Congressionally funded project. Chrome plating of gun tubes provides substrate protection from harmful effects experienced during firing. This protection increases the life of the gun barrel, and ultimately improves the performance, durability and operational readiness of the weapons platform on which it is deployed. Using traditional technology, the chrome plating process is performed in large, open tanks containing carcinogenic compounds and highly concentrated acids. During processing, gun tubes are immersed into a series of these tanks. The length of some gun tubes requires tanks up to four stories tall containing thousands of gallons. This project funds vessel plating technology which reduces both environmental hazards and worker safety hazards, and provides enhanced chromium surfaces to be used in future advanced weapons systems. Vessel plating technology essentially utilizes the gun tube itself as the plating tank, without exposing the workers or the environment to the toxic compounds. Throughout the processing cycle, the gun tube is sealed from the outside environment. Additionally, the volume of chemicals used is reduced by 85% over the traditional process. This new vessel plating technology represents a significant advance in chrome plating and is now ready to be moved into military production.</p> <p>FY 1999 Accomplishments: Project not funded in FY 1999.</p> <p>FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • 955 - Identify hazardous waste contamination at the proposed site and complete a remediation plan to remove all chemical hazards. <ul style="list-style-type: none"> - Complete an environmental assessment to determine the impact of a new process on the environment at this site. - Establish air emission, waste water discharge and solid waste and environmental monitoring requirements for a new process/facility at this site. preliminary design of new facility. - Complete mechanical, chemical, structural and safety system design criteria for a full scale vessel plating facility. 26 - Small Business Innovative Research/Small Business Technology Transfer Programs (SBIR/STTR). <p>Total 981</p> <p>FY 2001 Planned Program: Project not funded in FY 2001.</p>									
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ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE February 2000					
BUDGET ACTIVITY 2 - Applied Research				PE NUMBER AND TITLE 0602720A Environmental Quality Technology				PROJECT AF25				
COST (In Thousands)				FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
AF25 Military Environmental Restoration Technology				3163	3446	3574	3670	3780	4042	4235	Continuing	Continuing
<p>Mission Description and Justification: This project provides cost effective technologies required to clean up DoD hazardous waste sites, including active installations under the Installation Restoration Program, those indicated for closure under the DoD Base Realignment and Closure Program and the Formerly Used Defense Sites Program. The thrust of this effort is to expedite site cleanup, reduce the cost of cleanup of contaminated soil, groundwater, and structures, and ensure that human health and the environment are protected. Research is conducted in several major areas: innovative and cost-effective site identification, characterization, and monitoring technologies; groundwater systems; treatment technologies to remediate soil and groundwater contaminated with military-unique contaminants such as explosives/energetics, chemical agents, heavy metals, and other organics. Emphasis is placed on the development of in-situ remediation technologies and real or near real-time sensing technologies. Development of existing technologies provides near-term solutions while adding to the knowledge base applicable to successful development of more complex in-situ technologies. The primary developing agency is the U.S. Army Engineer Research And Development Center (ERDC).</p> <p>FY 1999 Accomplishments:</p> <ul style="list-style-type: none"> • 3163 - Developed an enhanced instrumentation package for the SCAPS and continue development of UXO detection technologies and of on-site data visualization and analysis capabilities. • - Incorporated in-situ bioremediation and electrokinetics design modules into the GMS version 2 model. • - Developed advanced biological ex-situ (bioreactors) and in-situ treatment of contaminated soils and physical/chemical methods for groundwater. <p>Total 3163</p> <p>FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • 3354 Complete multi-sensor UXO data collection and demonstrate 50% reduction of false alarms at well characterized UXO test sites. - Develop engineering approach for delivery of amendments for in situ treatment or for hydrological modifications to groundwater systems to affect enhanced biodegradation and complete bench scale parameter optimization for reactive barrier enhancement. - Complete vapor-phase biological activity enhancing amendment delivery (proof-of-concept) in soil columns, develop engineering approach for delivery of amendments to the vadose zone, and complete correlation of soil/sediment characteristics with contaminant bioavailability. - Demonstrate first generation electro-kinetic treatment technologies for lead and Develop prototype instrumentation for on line detection of metal contaminated soils. 92 - Small Business Innovative Research/Small Business Technology Transfer Programs (SBIR/STTR). <p>Total 3446</p>												
Project AF25				Page 25 of 30 Pages				Exhibit R-2A (PE 0602720A)				

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BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602720A Environmental Quality Technology	February 2000
PROJECT AF25		
FY 2001 Planned Program:		
•	3574 - Develop predictive models for advanced UXO detection sensors (multi- frequency electromagnetic, GPR, vector magnetic, seismic/acoustic, and microgravimetry) and complete advanced UXO sensor data collection effort at a well documented site. - Complete pilot-scale demonstration in-situ biodegradation for TNT and demonstrate in-situ reactive barriers and/or reactive barriers coupled with biodegradation for explosives in groundwater. - Complete pilot-scale demonstration of in-situ biodegradation for explosives in soils and sediment. - Develop aggressive chemical metal treatment for small arms training ranges demonstrate the recycle of metal contaminated extracts for soils treatment systems.	
Total	3574	
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BUDGET ACTIVITY 2 - Applied Research				PE NUMBER AND TITLE 0602720A Environmental Quality Technology				PROJECT AF26	
COST (In Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
AF26 Agricultural-Based Bioremediation	3853	0	0	0	0	0	0	0	3853
<p>Mission Description and Justification: This was a one-year Congressionally funded project. The Agriculture-Based Bioremediation project, worked jointly by the U.S. Army Environmental Center (AEC) and the U.S. Army Engineer Waterways Experiment Station (WES), demonstrated technologies to restore contaminated military and civilian sites, especially those located in fragile Pacific island ecosystems. AEC provided user input and assistance. Demonstration of bioremediation technologies that are agriculturally-based will enhance the Army's ability to restore contaminated sites with fewer dollars and in a way that is widely accepted by the stakeholder community. Using fewer dollars for restoration purposes will allow those dollars to be directed to the readiness stance of the overall military. Stakeholder acceptance, both regulatory and public, is enhanced by employing "green technology." These green technologies, by being efficient and less costly, meet an ever growing requirement to produce clean sites with fewer dollars. Focusing on fragile Pacific island ecosystems could enable the Army to gain regulatory acceptance by the Environmental Protection Agency's Region IX, a major force behind gaining acceptance throughout the remaining regions.</p> <p>FY 1999 Accomplishments:</p> <ul style="list-style-type: none"> • 3853 - Extended the BAA to solicit additional and complimentary projects. Completed DoD projects that emphasize agricultural remediation of petroleum contaminated soils and remediation of contaminated sediments using manufactured soil technology. <p>Total 3853</p> <p>FY 2000 Planned Program: Project not funded in FY 2000.</p> <p>FY 2001 Planned Program: Project not funded in FY 2001.</p>									
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ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE February 2000		
BUDGET ACTIVITY 2 - Applied Research				PE NUMBER AND TITLE 0602720A Environmental Quality Technology				PROJECT AF27	
COST <i>(In Thousands)</i>	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
AF27 ARO Chemical/Hazardous Material Disposal	1445	0	0	0	0	0	0	0	1445
<p><u>Mission Description and Justification:</u> This Congressionally-funded project provided resources to the Army Research Laboratory (ARL) to investigate and integrate technologies to conduct on-site chemical and hazardous materials remediation and disposal in an environmentally acceptable manner. ARL identified projects that had promise for on-site disposal (i.e. restoration/remediation) that could be evaluated with a one-time investment. The project emphasized collaboration with Army scientists and engineers and addressed technology transfer strategies for implementation at the end of the project.</p> <p>FY 1999 Accomplishments:</p> <ul style="list-style-type: none"> • 1445 - Identified requirements and prepared Scope of Work (SOW) for a Self-Contained Chemical Remediation capability for the treatment and disposal of chemical munitions. <li style="padding-left: 20px;">- Evaluated technical and budget proposal from ICRC Energy, Inc. and awarded 18 month contract. <p>Total 1445</p> <p>FY 2000 Planned Program: Program not funded in FY 2000.</p> <p>FY 2001 Planned Program: Program not funded in FY 2001.</p>									
Project AF27			<i>Page 28 of 30 Pages</i>			Exhibit R-2A (PE 0602720A)			

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BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602720A Environmental Quality Technology	PROJECT AF28
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COST (<i>In Thousands</i>)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
AF28 Range Safe Technology Initiative	0	9809	0	0	0	0	0	0	0

Mission Description and Justification: This project, being executed by the U.S. Army Engineer Research and Development Center and the U.S. Army Environmental Center, has been established based upon Congressional interest in the demonstration of site cleanup technologies for the remediation of military firing ranges containing lead and low level radioactive materials. The objective of the work is to investigate emerging and current heavy metals remediation processes such as soil washing can lower the levels of toxic and/or hazardous heavy metals on military firing ranges to acceptable regulatory limits. This would be followed by the use of a continuous remediation process such as phyto-remediation (plants) to aid in maintaining acceptable heavy metals concentrations on range floors. Technology investigations are intended to be conducted at five separate military sites.

FY 1999 Accomplishments: Project not funded in FY 1999.

FY 2000 Planned Program:

- 4772 Investigate remediation of lead at Fort Dix, NJ.
 - Investigate remediation of low level radioactive materials such as depleted uranium at Aberdeen Proving Grounds, MD.
 - Investigate remediation of thorium at Kirkland AFB, NM.
 - 1909 Investigate remediation of a new, low cost process for cesium-strontium at Fort Greely, AK.
 - 2864 Investigate remediation for small arms firing ranges for lead and other heavy metals at Fort Irwin, CA.
 - 264 - Small Business Innovative Research/Small Business Technology Transfer Programs (SBIR/STTR)
- Total 9809

FY 2001 Planned Program: Project not funded in FY 2001.

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ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)							DATE February 2000		
BUDGET ACTIVITY 2 - Applied Research				PE NUMBER AND TITLE 0602720A Environmental Quality Technology				PROJECT AF29	
COST (In Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
AF29 Phyto-Remediation in Arid Lands	0	2943	0	0	0	0	0	0	0
<p>Mission Description and Justification: It was not specified in Congressional language the exact nature of this project. The overall objective of this program, being executed by the U.S. Army Engineer Research and Development Center and the U.S. Army Environmental Center, is to develop and evaluate new technologies specific to remediation of hazardous and toxic contaminants in arid environments by the use of plants (phyto-remediation). To reduce the burgeoning costs of restoration of contaminated sites at Army installations, the Army is investing RDT&E resources for the development of advanced treatment technologies with primary focus on in-place treatment processes. Phyto-remediation, specifically for inorganics, is a major contributor to the development of this technology development effort. Research, development, test and evaluation is being conducted to cover a wide range of site environmental conditions, including arid environments. Education provided in the area of phyto-remediation can make a positive contribution in the development, technology transition, use, and regulatory acceptance of this area of contaminant remediation.</p> <p>FY 1999 Accomplishments: New start in FY 2000.</p> <p>FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • 2864 Investigate the fundamental phenomena of phyto-remediation and demonstrate innovative technologies in an arid region in the U.S. 79 Small Business Innovative Research/Small Business Technology Transfer Programs (SBIR/STTR) <p>Total 2943</p> <p>FY 2001 Planned Program: Project not funded in FY 2001.</p>									