Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2, RDT&E Budget Item Justification							Date: February 2004
Appropriation/Budget Activity RDT&E. Defense-Wide BA3				R-1 Item Nomenclature: **PE 0603716D8Z** Strategic Environmental Research and Development Program (SERDP)			
Cost ($ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	50.938	49.883	56.936	60.358	61.189	63.048	64.528
SERDP P470	50.938	49.883	56.936	60.358	61.189	63.048	64.528

A. Mission Description and Budget Item Justification:

(U) Brief Description of Element:

(U) Congress established the Strategic Environmental Research and Development Program (SERDP) in 1990 (10 U.S.C. Section 2901-2904) to address Department of Defense (DoD) and Department of Energy (DOE) environmental concerns. It is conducted as a DoD program, jointly planned and executed by the DoD, DOE, and the Environmental Protection Agency (EPA), with strong participation by other Federal agencies, industry, and academia. SERDP`s objective is to improve DoD mission readiness by providing new knowledge, cost-effective technologies, and demonstrations in the areas of environmental Cleanup, Unexploded Ordnance (UXO), Compliance, Conservation, and Pollution Prevention. SERDP does this by (1) addressing high priority, mission- relevant, defense environmental technology needs necessary to enhance military operations, improve military systems` effectiveness, enhance military training/readiness, sustain DoD's training and testing range infrastructure, and help ensure the safety and welfare of military personnel and their dependents; and (2) enhancing pollution prevention capabilities to reduce operational and life-cycle costs, as well as reducing the cost of necessary cleanup actions and compliance with laws and regulations. As a secondary benefit, SERDP helps solve significant national and international environmental problems. The keys to a growing list of SERDP technological successes are the ability to respond aggressively to these priority defense needs; the pursuit of universal, world-class technical excellence; emphasis on constant technology transfer to field use; and sound fiscal management. The apparent increase represents a return to historical levels in prior years' requests.

B. **Program Change Summary:** (Show total funding, schedule, and technical changes for the program element that have occurred since the previous President's Budget Submission)

	FY 2003	FY 2004	FY 2005
Previous President's Budget	52.543	47.068	60.012
Current FY 2005 President's Budget	50.938	49.883	56.936
Total Adjustments	1.605	-2.815	3.076
Congressional program reductions	1.605		
Congressional rescissions			
Congressional increases		-3.550	
Reprogrammings		0.735	3.076
SBIR/STTR Transfer			
Other			

C. Other Program Funding Summary: NA

Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification	Date: February 2004
Appropriation/Budget Activity RDT&E. Defense-wide BA 3	**PE 0603716D8Z** Strategic Environmental Research and Development Program (SERDP)

Cost ($ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
SERDP P470	50.938	49.883	56.936	60.358	61.189	63.048	64.528	

A. Mission Description and Budget Item Justification:

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B. Accomplishments/Planned Program

Pollution Prevention	FY 2003	FY 2004	FY 2005	
Accomplishment/ Effort/Subtotal Cost	10.514	10.813	12.434	

(U) FY 2003 Accomplishments: Pollution Prevention:
Efforts to eliminate or reduce the use and emissions of carcinogenic chromium were successful on several fronts; from a new corrosion resistant steel to novel polymers for corrosion protection to a chromate-free dry-coating technology. Efforts continued in tagging technologies to permit the remote localization and identification of UXO; environmentally acceptable oxidizers to replace perchlorate in pyrotechnic flares; the reduction of particulate emissions from gas turbine and diesel engines; the environmental fate, transport and effects of the new energetic material CL-20; environmentally benign polymer matrix composites; and environmentally benign packaging for military rations. Several new projects were successfully launched in FY 2003. They included: environmentally acceptable alternatives to chrome coating systems, and environmentally benign impact initiation devices and detonators for "green" medium caliber munitions.

(U) FY 2004 Plans: Pollution Prevention:
The development of "green" munitions and weapon systems that will not impact on the environment are core objectives of pollution prevention. Projects include elimination of hazardous materials from medium caliber munitions and pyrotechnics as well as novel,

environmentally preferable synthesis methods for energetic compounds that are found in both explosives and propellants. SERDP will also continue to pursue technologies that will permit the "greening" of our industrial complex. The elimination or reduction of toxic and hazardous materials from our weapons systems and platforms and the processes that we use to repair and maintain them remains a primary objective. These projects include developing environmentally acceptable alternatives to ammonium perchlorate in missile fuels. These technology needs are addressed by both continuing and new start projects.

(U) FY 2005 Plans: Pollution Prevention:
New starts include the elimination of hazardous "redwater" from explosives (TNT) manufacturing; cadmium plating on high-strength steels; and solvents containing Class II ozone depleting substances. Additional new initiatives that will be funded in FY 2005 include alternatives to perchlorate in incendiary mixes and pyrotechnic formulations; Hazardous Air Pollutant (HAP)-free solvents, and environmentally benign "green" gun barrels for medium caliber weapons.

Compliance	FY 2003	FY 2004	FY 2005
Accomplishment/ Effort/Subtotal Cost	8.902	8.111	9.817

(U) FY 2003 Accomplishments: Compliance:
An extensive ongoing program to determine the levels of explosives contamination on training and testing ranges and the determination of the fate and transport of these materials into the environmental continued to yield a new understanding of the impact of military operations on the soil and groundwater at training ranges. This new knowledge combined with technologies to measure air emissions from the firing of munitions will contribute to the sustainable management of our ranges. New technologies to measure and characterize fine particulate matter in the air from military systems were successfully concluded and will permit the Department to comply with emerging EPA regulations. Projects to develop technologies for estimating the impact of DoD activities on marine estuaries and technologies to control aquatic non-indigenous species in Navy ships successfully concluded. New projects to develop technologies to measure and model the emissions from off-road training ranges vehicles were initiated.

(U) FY 2004 Plans: Compliance:
The focus of Compliance projects continues to be the development of technologies needed to support the sustainability of DoD's training and testing ranges. Specific attention is focused on the emissions from munitions and the fate and effect of explosive materials on the ranges. Related efforts include technologies for the measurement and control of air emissions from military vehicles. The other major driving issue is the need to understand the level of explosives residues on the ranges; how they are transported off the range and what effect they have in the environment. Specifically, the development of methods to measure and control air emissions from both tactical vehicles and munitions is key as are methods to assess the impact of noise. New starts in FY 2004 specifically address military noise prediction on ranges.

(U) FY 2005 Plans: Compliance:
New starts include dust emissions factors on ranges, and air toxic emissions factors for military aircraft engines. SERDP will be funding efforts to understand naturally occurring sources of perchlorate and methods for the treatment of perchlorate in drinking water. Ammonium perchlorate is a constituent of sold rocket fuel which is being found in drinking water sources with increasing frequency. In 1997 SERDP identified perchlorate as problem contaminant for DoD and the nation, and recently, EPA has begun the process to regulate this compound. Additional new initiatives that will be funded in FY05 to ensure the continued use and sustainability of our training ranges include characterizing the source term of energetic compounds in aquatic environments; exposure assessments of energetics; and innovative monitoring systems for impulse noise.

Conservation	FY 2003	FY 2004	FY 2005	
Accomplishment/ Effort/Subtotal Cost	9.704	8.661	10.471	

(U) FY 2003 Accomplishments: Conservation:
The extensive efforts at Fort Benning, GA under the SERDP Ecosystem Management Project (SEMP) continued to develop land management techniques for installations and ranges. Work on an evaluation of the impact of military noise on marine mammals as well as protocols to control invasive plants on DoD installations that impair training activities continued to make progress. Methods to assess and predict the impact of urbanization and encroachment on our ranges are in their third year of effort. Continuing projects also focused on techniques to cost effectively detect and evaluate cultural resources on DoD ranges that fall under the Native America Graves Protection and Reparation Act; and the development of resilient wear-resistant plants for military training lands. New technologies to detect and control invasive aquatic species that are carried in Navy ships' ballast water are under development. Continuing projects are determining the impact of military operations on threatened and endangered species and develop methods and protocols for managing our natural resources in estuaries that are dominated by military activity.

(U) FY 2004 Plans: Conservation:
To ensure the sustained use of military ranges, SERDP in FY 2004 requested proposals for innovative technologies to conduct cost effective inventorying and monitoring of and quantification of impact of military operations on Threatened and Endangered Species, prediction of marine mammal distribution, and cost effective control of invasive species on ranges. Ecosystem management techniques for installations and ranges continues to dominate the Conservation thrust area as the SEMP project initiates the next round of projects on adaptive management. Work on technologies to detect and assess cultural resources also continues.

(U) FY 2005 Plans: Conservation:
New starts include understanding and managing invasive plant species that negatively affect training activities and the prediction of marine mammal population densities. Additional new initiatives that will be funded in FY 2005 to: characterize military activities that contribute to the transport of non-indigenous species; monitor migratory

bird species on military lands; and develop remote sensing technologies to identify threatened/endangered species habitats to meet requirements of the Endangered Species Act and Migratory Bird Treaty Act.

Cleanup	FY 2003	FY 2004	FY 2005	
Accomplishment/ Effort/Subtotal Cost	10.112	9.191	11.125	

(U) FY 2003 Accomplishments: Cleanup:
SERDP-funded advances in bioremediation have been successful for two other major sources of pollution: the munitions constituents (explosives, propellants & pyrotechnics) found on ranges; and the chlorinated solvents (TCE, PCE) found at over half of DoD sites. Significant efforts continued in FY2003 to develop technologies to reduce the effort and cost associated with the long-term monitoring of sites that are undergoing cleanup. Projects continue to develop both biological and abiotic technologies to address the remediation of munitions constituents in soil and groundwater. The development of in-situ alternatives to decades-long "pump and treat" solutions to chlorinated solvent remediation continued, including aggressive chemical treatment of source zones, bioremediation and monitored natural attenuation. Other continuing projects included source zone delineation, new diagnostic procedures for evaluating performance and new technologies for the sequestration of toxic heavy metals in soils, such as lead on small arms ranges.

(U) FY 2004 Plans: Cleanup:
Projects were initiated in FY 2004 to develop advanced technologies for the remediation of munitions constituents on ranges; abiotic remediation of chlorinated solvents; cost-effective, in-place remediation of sediments; and the remediation of heavy metals. Contamination of drinking water with chlorinated solvents remains a significant issue for many military bases.

(U) FY2005 Plans: Cleanup:

New start projects will address the improved scientific understanding and innovative cost effective methods for the bioremediation of munitions constituents, specifically energetics and nitroaromatic compounds. Additional initiatives will be funded in FY05 to develop new technologies to: 1) better understand the scientific principles behind the thermal treatment of contaminants; 2) cost-effectively remediate new emerging contaminants in soil and groundwater and explosives and propellant-contaminated surface runoff; and 3) to improve risk assessments at DoD sites with ecological soil screening levels and wildlife toxicity reference values and to with screening level risk assessments of energetics contaminated soil and groundwater.

Unexploded Ordnance (UXO)	FY 2003	FY 2004	FY 2005
Accomplishment/ Effort/Subtotal Cost	11.706	10.292	13.089

(U) FY 2003 Accomplishments: Unexploded Ordnance (UXO):
In FY 2003 the investment in UXO increased to address a broad range of aspects of the UXO issue. These efforts ranged from next generation sensors to multiple sensor platforms to improved, precise geolocation systems to underwater detection and discrimination phenomena and system design to advanced signal processing. Two standardized test sites for the demonstration and evaluation UXO technologies became fully functional. New starts focused on innovative, high risk, high payoff sensor designs.

(U) FY 2004 Plans: UXO: SERDP continued its commitment to advance the state of the art in UXO detection and discrimination technologies. Projects were funded in FY 2004 to develop advanced approaches for detecting and discriminating UXO, identifying filler material in recovered UXO, and characterizing and remediating underwater UXO sites.

(U) FY 2005 Plans: UXO: New starts include a project to develop methods for UXO discrimination using time and frequency domain Electromagnatic Induction. Additional new initiatives in FY 2005 will develop site characterization and remediation technologies for underwater UXO-contaminated sites; advanced navigation systems for portable platforms; magnetometers or electromagnetic induction sensors and processing; and to perform systems integration studies.

C. Other Program Funding Summary: NA

D. Acquisition Strategy. Not required for Budget Activity 3.

Major Performers: None