RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									DATE JUNE 2001	
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3							R-1 ITEM NOMENCLATURE Strategic Environmental Research and Development Program **PE 0603716D8Z**			
COST *(In Millions)*	FY2000	FY2001	FY2002						Cost to Complete	Total Cost
Total Program Element (PE) Cost	56.945	59.007	69.376						Continuing	Continuing
SERDP/P470	56.945	59.007	69.376						Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U)The Strategic Environmental Research and Development Program (SERDP) was established by Congress 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, 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, 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.

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(U) Project Number and Title: P470 SERDP

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2000 Accomplishments:

(U) General:

Solicited proposals from industry, academia, and Federal R&D organizations. Commenced 31 new technology development projects; continued 56 projects; and completed 21 development projects

(U) By Thrust:

(U) Pollution Prevention (25 projects): The focus of pollution prevention is to attain compliance through elimination of pollution at its source. High priority issues include the replacement of Ozone Depleting Chemicals for firefighting; elimination or reduction of regulated air emissions from military operations; the development of environmentally benign explosives and propellants; elimination of Chromium and other heavy metals through both process modifications and development of alternative coatings; and elimination and reduction of hazardous materials associated with weapons systems and depot-level repair facilities.
Specific Accomplishments include:

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Searching for non-structural adhesives containing no VOCs; unrefined microbial extracts derived from microorganisms isolated from extreme environments such as natural hot springs have shown adhesive strength that exceeds that of currently used high VOC content adhesives. Using the trapped vortex combustor for turbine engines; estimates based on sector tests data have demonstrated 50 percent reduction in VOC emissions, and a 55 percent reduction in NOx emissions. This new combustor design is applicable to aircraft, ship and tank engines. A project using a physical vapor deposition technology for the application of environmentally safe coatings for gun barrel bore protection; completed the design, fabricated, and assembled bench-level cylindrical magnetron sputtering demonstrator for 25mm diameter and 6" long gun barrel specimens. Using the materials by design approach, in less than eight months of effort one project has designed and prototyped a corrosion resistant structural stainless steel alloy that meets the primary design objectives of strength for aircraft landing gear applications (equivalent to today's 300M steel) and is likely to eliminate the need for cadmium and chromium coatings.
($ 17.982 million)

(U) Unexploded Ordnance (UXO) (8 projects): Efforts focus on improvement of UXO detection capability, including: innovative methods to identify UXO using acoustic and electromagnetic sensors; and data interpretation/ integration research.

The primary contributor to the high cost and time associated with remediating a UXO contaminated site is the high false-alarm rate. Researchers have made advances in the development of algorithms that substantially reduce false alarm rates associated with individual detection sensors. Advances also have been made to optimally combine information across detection sensors to further reduce UXO false alarm rates.
($ 2.988 million)

(U)Conservation (20 projects): The Conservation Thrust Area supports land managers and natural/cultural resource managers to effectively support military training and testing operations through research in assessment and mitigation of military impacts; ecological modeling and simulation to assess error and uncertainty; and ecosystems management to permit sustainable use of these lands.

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During FY00 SERDP researchers made significant advancements in the assessment and prediction of the effects of military noise on marine mammals, including the completion of the first-ever predicted audiogram for the humpback whale. To enable installation managers and planners to avoid the potential future impacts on training and testing activities on local communities, SERDP has developed computer models that assess the probability and characteristics of future urban development within the vicinity of military installations. Significant advances were made in the development of models to predict habitat probabilities as well as the effects of ecosystem fragmentation on animal populations at military testing and training ranges. When complete, these models will be used to manage threatened and endangered species and their habitats on military installations while minimizing any disruptions to testing and training activities.
($ 11.414 million)

(U)Cleanup (43 projects): Cleanup is focused on the remediation and restoration of past actions. The detection and remediation of DNAPLs remains a ubiquitous and technically challenging problem. The development of risk assessment tools and standards to help determine `how clean is clean` is vital to reducing cleanup costs. Efforts to develop field implementable, cost-effective, in-situ biotreatment processes for remediation of predominant DoD contaminants continue to show promise. The National Environmental Technology Test Sites (NETTS) that facilitate the demonstration and validation of technologies prior to commercialization continue to play a vital role in transitioning technologies to the field.

In FY00 SERDP researchers demonstrated that many organic contaminants (PAH’s) can be bound or sequestered on sediments, rendering them immobile in the environment. To address the growing issue of groundwater contaminated with energetic materials at DoD facilities, researchers have made significant advances in the development of innovative methods to remediate compounds such as TNT, RDX and HMX. SERDP is attacking the widespread problem of determining the extent of and treating dense non-aqueous phase liquids (DNAPLs) in groundwater. SERDP researchers have developed methods for the integrated geophysical detection of sources of DNAPL contamination and are pursuing a variety of in situ treatment technologies.
($ 16.447 million)

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(U)Compliance (22 projects): The Compliance Thrust Area supports waste treatment and disposal, environmental monitoring and environmental management that is not directly related to site restoration but is meeting current and future environmental compliance requirements of DoD and DOE. The reduction of air emissions continues to be a significant driver as many DoD facilities are in air quality non-attainment areas. The development of technologies for the detection and treatment of regulated air pollutants is a key focus. Emerging issues that are addressed include the fate and impact of energetics on DoD training and testing ranges as well as heavy metal contamination in harbors.

During FY00, significant progress has been made in the development of emissions control technologies. An innovative alternative technology was developed to replace Open Burning/Open Detonation of energetics by reacting a bulk energetic material with a chemical that neutralizes the energetic materials in a controlled manner. Another project is using a biofiltration system to control hazardous air pollutant (HAPs) and volatile organic chemical (VOCs)air emissions from DoD painting facilities. Progress has also been made in the development of field-portable environmental monitoring technologies, including two continuous emissions monitors (CEMs), one for gas-phase pollutants and another for metals emissions monitoring. Additionally, developments have been made with respect to advanced methods for the measurement of the size distribution and the chemical composition of fine particulate matter emitted from mobile and stationary DoD sources.
($ 8.114 million)

(U) FY 2001 Plans:

(U)General:

Continue development of environmental technologies that respond to the DoD`s highest priority environmental needs. Commence 42 new R&D projects; continue 42 research and technology development projects; and complete 36 projects.

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(U) By Thrust:

Pollution Prevention (29 projects): Continue efforts on the development of non-ozone depleting chemicals for firefighting; elimination and reduction of hazardous air emissions; development of "Green" energetics; elimination of heavy metals including chromium and cadmium; and elimination or reduction of hazardous materials from DoD weapons systems and platforms.
($ 18.797 million)

(U)Cleanup (36 projects): Technology development efforts will continue to address the remediation high priority pollutants includi ng energetics, chlorinated solvents and ammonium perchlorate. These will include advances in site characterization focusing on optimization of long-term groundwater monitoring systems; Risk Assessment and Standards; Bioremediation; and Physio-chemical Remediation.
($ 14.723 million)

(U)Compliance (27 projects): The Compliance Thrust Area will continue efforts to support waste treatment and disposal, environmental monitoring and environmental management that is not directly related to site restoration but is meeting current and future environmental compliance requirements of DoD and DOE. Focus will be on and work on reduction of hazardous air emissions, fate and impact of contaminants, and characterization and treatment of contaminated waters and sludges.
($12.304 million)

(U)Conservation (17 projects): Work will continue in the assessment and mitigation of military impacts on DoD lands with an emphasis on range sustainability. Efforts will continue in addressing issues associated with threatened and endangered species and Ecosystem Management to develop the scientific understanding of ecosystem processes on military lands that will permit the continued use of these lands.
($10.488 million)

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(U) Unexploded Ordnance (UXO) Detection (11 projects): Continuing efforts to improve UXO detection capability, including the development of sensor technologies that exploit all of the physical characteristics of UXO. Equally important is the continued development of methods and techniques for accurately discriminating UXO from scrap in order to significantly reduce the cost of clearance.
($ 2.695 million)

(U) FY 2002 Plans:

(U)General: SERDP will continue research and technology efforts to address the high priority requirements in Pollution Prevention ; Cleanup; Compliance; Conservation; and unexploded ordnance (UXO). Particular attention is being directed to UXO and other issues which impact the sustainability of the Department's training and testing ranges. The increase in the FY 02 request will be directed towards the detection and discrimination of UXO as well as the multitude of issues concerned with the contamination of soil and groundwater due to energetic materials expended during live fire operations. In the Pollution Prevention thrust area: Five projects will come to completion. In addition to the ongoing projects, the new start focus areas for FY 2002 include: environmental fate, transport and effects of the new energetic material CL-20; environmentally benign polymer matrix composites; tagging technologies to permit the remote localization and identification of UXO; environmentally benign, low-temperature, powder coatings; environmentally benign packaging for military rations; environmentally acceptable pyrotechnics; technologies to prevent or limit marine fouling of ship hulls and heat exchangers; and environmentally acceptable replacements of fluorescent dyes for non-destructive testing of weapons systems. In addition, a major effort to develop "green" medium caliber ammunition will be begin. For the Compliance thrust area: In addition to the ongoing projects, five projects in compliance will complete. The areas of interest for new start projects include: determination of the emissions from live fire activities; source and ambient air toxic monitoring technologies; technologies to control aquatic non-indigenous species in Navy ships; and observation and prediction technologies for hazardous emissions from DoD operations. Within the Conservation thrust area: The new starts will focus on: techniques to cost effectively

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detect and evaluate cultural resources on DoD ranges; evaluation of the impact of fog oil "smoke generators" on the plants and animals on DoD ranges; techniques to assess the impact of land use changes (urbanization, encroachment) outside DoD installations on the installations' ecosystems; techniques to determine the impact of noise on animals; and the development of micro- and nano-scale sensors for ecosystem parameters. In addition, 4 projects will be completed. The Cleanup thrust area will have 11 projects completing. The focus of the new starts will include: technologies for remediation of soil and groundwater contaminated with energetic materials; developing a more complete understanding of the basic chemistry and physics of in-situ oxidation remediation methods; development of techniques to assess and predict the impact of source zone removal on the time and cost of total remediation; developing alternatives to expensive microcosm protocols for bioremediation; and development of technologies for cost effective long term monitoring. In the Unexploded Ordnance (UXO) area, there are 8 completing projects. The new start areas of interest include: developing technologies for the characterization and remediation of high density areas such aerial targets; new sensors, platforms or processing techniques for UXO detection in rugged or heavily vegetated terrain; new geolocation techniques and new render-safe or removal technologies. ($ 69.376 million)

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(U) B. Program Change Summary	**FY2000**	**FY2001**	**FY2002**	**Total Cost**
Previous President's Budget Submit	57.207	51.357	53.346	Continuing
Appropriated Value		59.557		Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	-0.417	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.262	-0.133	0.000	
c. Other	0.000	0.000	16.030	
Current President's Budget	56.945	59.007	69.376	Continuing

Change Summary Explanation

(U) Funding: FY 2000 funding reductions are the result of below threshold reprogramming actions. FY 2001 reductions reflected Section 8086 adjustments and recissions. Increases in FY 2002 reflect amended budget changes for UXO efforts.

(U) Schedule: N/A

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(U) Technical:

(U) C. Other Program Funding Summary Cost N/A

(U) D. Acquisition Strategy: N/A

(U) E. Schedule Profile: N/A