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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>							DATE February 1999			
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3				R-1 ITEM NOMENCLATURE Strategic Environmental Research and Development program PE 0603716D8Z						
COST ( <i>In Millions</i> )	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	Cost to Complete	Total Cost
Total Program Element (PE) Cost	56.716	58.771	53.506	51.729	53.764	53.423	54.468	55.569	Continuing	Continuing
SERDP/P470	56.716	58.771	53.506	51.729	53.764	53.423	54.468	55.569	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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Total Program Element (PE) Cost	56.716	58.771	53.506	51.729	53.764	53.423	54.468	55.569	Continuing	Continuing
SERDP	56.716	58.771	53.506	51.729	53.764	53.423	54.468	55.569	Continuing	Continuing

(U) **Project Number and Title: SERDP/P470**

(U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

(U) **FY1998 Accomplishments:**

(U) **Pollution Prevention:**

(U) **Next Generation Fire Suppression Technology Program (NGFSTP):** This umbrella project which began in FY 1997 is part of the NGFSTP for the replacement of Halon 1301 in DoD weapon systems, the production of which was banned by the Montreal Protocol. It is divided into the following six fully integrated technical focus areas each with sequential and synergistic research elements (a total of 32 research elements). Research and development activities began in the following sub-thrust areas: Mechanisms of Ultra-High Efficiency Chemical Suppressants, Suppression Dynamics of Fine Droplets and Particles, Stabilization of Flames, Suppression System Effectiveness Screening, and Advanced Propellants/Additive Development for Gas Generators. In FY 1998, data on fires in military platforms and the outcome of these fires were received from military safety centers and a draft report summarizing these was completed. A number of compounds containing such atoms as phosphorus, iron, nitrogen, and bromine have been demonstrated to be at least as effective as Halon 1301 with little potential environmental impact. Additionally, characterization of the particle behavior in flames as a function of the individual size groupings and position in the flames of various strain is underway and fabrication of wind tunnel for flame spread experiments is completed. A successful workshop on screening methods for agent compatibility with people, materials, and the environment was held. A detailed summary of the discussions and conclusions from the workshop is available online at <http://flame.cfr.nist.gov/ngp/>. Also, sixteen new research elements were initiated. (\$ 3.407 Million)

(U) **Elimination of Toxic Materials and Solvents from Solid Propellant Components:** Continuing project, to eliminate (minimize) the use of lead compounds as ballistic catalysts in reduced-smoke propellants, and eliminate HCl as a combustion product of tactical and strategic boosters. In FY 1998 lead-free formulations were developed and formulation downselection was completed. (\$ 1.420 Million)

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(U) **Elimination of Toxic Heavy Metals from Small Caliber Ammunitions:** Continuing project to eliminate hazardous materials in the bullet core and primer of small caliber ammunition while meeting U.S. and NATO performance requirements. The project evaluates tungsten as a possible replacement for lead-antimony. A draft report on environmental safety and health aspects of tungsten is being prepared. Preliminary recycle and bio-uptake studies for tungsten as replacement material for lead antimony are completed. A sensitivity study of Metastable Interstitial Composites primer to water was completed. Primers have been assembled into cartridges and tested. Long term storage tests and primer/propellant ignition interface tests are ongoing. (\$ 0.900 Million)

(U) **Eliminate Volatile Organic Compounds (VOCs) in CARC Paint Formulation, Applications, and Removal:** Continuing project to reduce the regulated VOC content of chemical agent resistant coating (CARC) system for use on military equipment by all services. Established basic low VOC formulation. Army Research Laboratory awarded patent (#5,691,410) for the water reducible low VOC CARC formulation. Validated all properties of Army Green camouflage color. (\$ 0.900 Million)

(U) **Trapped Vortex Combustor for Jet Engines:** Continuing project will develop design rules for and demonstrate the feasibility of a trapped vortex combustor for reducing the NOx (oxides of nitrogen) VOC, and CO (carbon oxide) emissions from aircraft, land and marine gas turbine engines by 60%. This combustor has been chosen for inclusion in the Integrated High Performance Turbine Engine Technology (IHPTET) engine. Fabrication of high pressure facility for testing trapped vortex combustor at up to 45 atm has been completed. (\$ 0.640 Million)

(U) Additional efforts in 17 other projects were undertaken in Pollution Prevention. (\$ 11.363 Million)

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**(U) Cleanup:**

**(U) Unexploded Ordnance (UXO) Detection:** Continuing umbrella effort to integrate and automate UXO detection, identification, and discrimination sensor technologies to include wide-area, rapid coverage over a variety of terrain of UXO-contaminated areas. In FY1998, completed in-depth analysis of UXO sensor data from Phase II studies. Developed GIS for incorporating sensor, ground truth, and environmental/geophysical data. Assembled database of magnetic and acoustic resonance signatures of UXO. Developed prototype multisensor fusion algorithm. Also, in a related parallel approach using enhanced harmonic radar for UXO detection, levels of UXO harmonic responses were measured and included narrowband (CW) and impulse waveforms. Also, system integration and field demonstration of the multi-sensor MUDSS (Mobile Underwater Debris Survey System) system for underwater UXO detection was completed. Use of MUDSS as compared to manual survey can reduce survey time by a factor of five and reduce costs by 50-70%, a savings of up to \$400K per square nautical mile. MUDSS was also successfully demonstrated in the search for the SWISSAIR plane off Nova Scotia in September 1998. (\$ 2.695 Million)

**(U) Integrated Biotreatment Research Program:** From Flask to Field: Continuing umbrella project to be completed in FY 2001. Project represents a collective research initiative by several key government and academic organizations supporting the development of bioremediation treatment technologies. The research objective is to develop and field several biotreatment processes for remediation of predominant DoD contaminants. Project is evaluating: (1) biocell reactor and cascading bioslurry reactors for PAHs (polycyclic aromatic hydrocarbons); (2) aerobic degradation of PCBs (polychlorinated biphenyls) with new strains; (3) engineering of reductive dechlorination of PCBs; and (4) combining solvent extraction with residual in situ biotreatment for PCE (perchloroethylene) and TCE (trichloroethylene). The fluidized-bed reactor study at Volunteer Army Ammunition Plant and the engineering and installation of an electrolytic degradation system for PCE were completed successfully. (\$ 2.600 Million)

**(U) Aquifer Restoration by Enhanced Source Removal:** Continuing project to demonstrate processes for enhancing removal of light and dense non-aqueous phase liquids (LNAPLs and DNAPLs) in a variety of geologic settings. In FY 1998 with leveraged funding from other DoD and EPA sources, completed 9 side by side tests at Hill Air Force Base for LNAPL removal using surfactants and co-solvents. Field tests for DNAPL removal from contaminated ground water using co-solvents, sparging, and surfactants began at Dover Air Force Base test cells. The results from these tests will be used to develop guidelines that will address the entire remediation effort, including site characterization and support to achieve maximum benefit. (\$ 2.180 Million)

**(U)** Additional efforts in 13 other projects were undertaken in Cleanup. (\$ 10.040 Million)

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(U) **Conservation:**

(U) **Marine Mammal Monitoring for DoD Compliance:** Two projects completed in FY 1998. These projects demonstrated a near real-time communication link for data distribution to automate detection and classification processes for marine mammals. Completed at-sea tests to assess the impacts of low-frequency sound sources on mammals and determined long-term monitoring capability. Monitoring databases have been developed for NAVFAC and will be transitioned to the Navy and the National Oceanic and Atmospheric Agency (NOAA) in FY 1999. Results will provide DoD with first order effects of the impact of Naval operations on marine mammals and the tools and analytical capability to comply with the Marine Mammals Act. (\$2.065 Million)

(U) **Emerging and Contemporary Technologies in Remote Sensing for Ecosystem Assessment and Change Detection on Military Reservations:** Continuing project will develop remotely sensed change detection protocols necessary to stimulate natural dynamics (temporal and spatial) of the military installation ecosystems. The project will also develop models and/or techniques for military trainers and land managers to assess training impact on land use. Initiated the retrospective analysis and developed classifications of ecological sites. Survey points for ecotone identification / analysis were established. (\$1.000 Million)

(U) Additional efforts in 13 other projects were undertaken in Conservation. (\$6.046 Million)

(U) **Compliance:**

(U) **Compact Shipboard Incinerator:** Project completed in FY 1998. Developed new concept for waste incinerator based on pulsed combustor actuator. Successfully developed and demonstrated pilot-scale actively controlled vortex combustion (afterburner) and transitioned to simplified design and realistic operational conditions. Evaluations are underway for full, real-time testing of this afterburner. (\$1.240 Million)

(U) **Lead-Based Paint Hazard Mitigation:** Project completed in FY 1998. Project has transitioned to demonstration/validation field tests of vitrification technologies for immobilizing heavy metals during lead removal activities are underway at DoD installations (Rock Island Arsenal, IL, Marine Corps Base Hawaii, and Puget Sound Naval Shipyard, WA). Other removal technologies including microwave assisted removal of paint from wood, were evaluated to minimize worker and public exposure. (\$ 0.750 Million)

(U) Additional efforts in 16 other projects in were undertaken Compliance. (\$ 9.470 Million)

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(U)     **FY1999 Plans:**

(U)     **Pollution Prevention:** There are five major focus areas within pollution prevention.

(U)     **(1) Next Generation Fire Suppression Technology Program:** This umbrella project seeks to replace Halon 1301 in DoD weapon systems. In FY 1999, this project will finalize data on in-flight ullage conditions and complete the development of test methodologies on the toxicity, environmental impact, materials compatibility, and principal degradation products. (\$ 4.146 Million)

(U)     **(2) Reduction of Air Emissions:** There are eight projects focused on reducing or eliminating hazardous air emissions in the form of Volatile Organic Compounds (VOC), oxides of nitrogen (NOx) and particulates. These projects range from reformulations of sealants, primers and coatings to improved, non-hazardous solvents to improved turbine engine design. (\$ 5.251 Million)

(U)     **(3) “Green Energetics”:** Five projects are designed to reduce the environmental impact of explosives and propellants. They span from the reformulation of bullets in small caliber ammunition to eliminate the lead in them, to elimination of hazardous material from propellants, to the “Green Gun Barrel” program. (\$ 3.953 Million)

(U)     **(4) Elimination of Chromium:** Chromium is used extensively in both coatings and sealants due to its corrosion protection and durability. However, hexavalent chromium is a carcinogen and creates an environmental hazard. There are four projects dedicated to the elimination of chromium in a variety of applications from hard chrome plating to sealants, adhesives and coatings. Research spans from elucidating basic mechanisms to reformulations of products to eliminate the chromium. (\$ 2.891 Million)

(U)     **(5) Elimination or Reduction of Hazardous Materials:** The handling and disposal of hazardous materials is a costly and time consuming process. These six projects are designed to eliminate or reduce the production of hazardous materials in the operation and maintenance of weapons systems. Technologies such as new repainting and stripping processes can radically reduce the volume of hazardous materials. Development of non-hazardous substitute materials which perform equal to or better than the original is another focus of these projects. (\$ 2.699 Million)

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(U) **Cleanup:** There are four high priority areas within cleanup that comprise the bulk of the cleanup effort. In addition, there are four National Environmental Technology Test Sites (NETTS) which are maintained in order to facilitate the demonstration and validation of technologies for more rapid transfer to the field.

(U) **(1) Unexploded Ordnance (UXO) Detection:** A total of 8 projects including 5 continuing efforts to improve UXO detection capability, which is the highest priority within the SERDP Cleanup Technology Thrust Area. Represents a collective research initiative for the development and integration of multi-sensors and data fusion software for the location, identification, discrimination, and delineation of UXOs. In FY 1999, three new efforts will be initiated to address innovative UXO discrimination techniques (\$ 4.024 Million)

(U) **(2) Dense Non-Aqueous Phase Liquid (DNAPL) Detection and Remediation:** DNAPLs are among the most difficult materials to detect in the subsurface and remediate. They are a common contaminant at almost every DoD site due to their widespread use as cleaning solvents. Twelve projects, including five new starts, are focused on all phases of the problem starting with detection of the contamination in the subsurface. Included within these projects are several technologies for remediating DNAPLs with an emphasis on in-situ technologies. (\$ 6.135 Million)

(U) **(3) Risk Assessment:** One of the most pressing issues in cleanup is “how clean is clean”. To determine this, five projects are focusing on the risks to humans, animals, plants and ecosystems associated with military compounds. Included in this is a \$2.7M earmark for environmental toxicological risk assessment. (\$ 5.921Million)

(U) **(4) Integrated Biotreatment Research Program: From Flask to Field:** Continuing umbrella project that represents a collective research initiative by several key government and academic organizations supporting the development of bioremediation treatment technologies. The research objective is to develop field implementable, cost effective biotreatment processes for remediation of predominant DoD contaminants. (\$ 2.635 Million)

(U) **(5) DoD National Environmental Technology Test Sites (NETTS) Program:** Continuing project facilitates transfer to field use of new, innovative, cost savings cleanup technologies. Four operational test sites (Dover AFB, McClellan AFB, NCB Port Hueneme, and former Wurtsmith AFB) plan to host 15-20 field tests and demonstrations of innovative remedial and site characterization technologies. (\$ 2.575 Million)

(U) **Compliance:** The Compliance Thrust Area develops “end-of-pipe” control technologies which treat waste streams to prevent the introduction of contaminants into the environment. There are three major foci within the Compliance thrust area. This thrust area includes an earmark for the National Environmental Education and Training Center (NEETC).

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(U)      **(1) Air Emissions:** This is the largest of the foci of the thrust area. There are eleven projects dealing with the control of the emission of Volatile Organic Compounds (VOC), the oxides of nitrogen (NOx) and particulate matter with an emphasis on applications to detect contaminants and control them in jet engine test cells and tactical vehicle paint booths. (\$ 6.345 Million)

(U)      **(2) Demilitarization of Conventional Weapons:** There are two continuing projects to develop environmentally benign processes for the destruction of explosives in conventional weapons. With the establishment of the DoD Demilitarization Program, these are the last projects for demilitarization that will be funded by SERDP. (\$ 0.926 Million)

(U)      **(3) Oil/Water Separator Sludge:** There are two new start projects to deal with the difficult problem of Oil/Water separator sludges. The goal is a small, compact unit for on-site or shipboard processing that can render these sludges environmentally benign. (\$ 1.417 Million)

(U)      **Conservation:** There are four central themes to the Conservation thrust area.

(U)      **(1) Impacts of Military Operations:** The seven projects in this sub-thrust examine the impacts of military operations on military lands, threatened and endangered species and marine mammals. Through sound scientific knowledge, we can sustain military training and testing operations while simultaneously protecting the environment. (\$ 4.427 Million)

(U)      **(2) Restoration:** These two projects develop techniques and technologies which are designed to restore degraded military lands. This is necessary not only to ensure the long term sustainability of the land, but also to provide a realistic training environment. These projects include new planting techniques as well as the development of new cultivars that can withstand a significant level of use and abuse. (\$ 1.071 Million)

(U)      **(3) Modeling and Simulation:** Modeling and simulation play a key role in the development of natural resources management plans. Three efforts in ecological modeling and simulation and an analysis of the errors inherent in the models are included in this segment. (\$ 1.254 Million)

(U)      **(4) Ecosystem Management:** This represents a major new initiative beginning in FY 1999 to develop the scientific understanding of ecosystem processes on military lands that will permit the sustainable use of these lands. Centered at Ft. Benning, GA, this initiative will first focus on the development of indicators of ecosystem health and thresholds of ecosystem damage. (\$ 3.101 Million)

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(U)     **FY2000 Plans:**

(U)     **Pollution Prevention:** There are five major focus areas within pollution prevention.

(U)     **(1) Next Generation Fire Suppression Technology Program:** This umbrella project seeks to replace Halon 1301 in DoD weapon systems. In FY 2000, this project will finalize data on the toxicity, environmental impact, materials compatibility, and principal degradation products of candidate replacements. (\$ 3.888 Million)

(U)     **(2) Reduction of Air Emissions:** There are six continuing projects focused on reducing or eliminating hazardous air emissions in the form of Volatile Organic Compounds (VOC), oxides of nitrogen (NOx) and particulates. These projects include reformulations of sealants and coatings to improved, non-hazardous solvents. The initial development of the improved combustor for turbine engines will be completed. (\$ 3.954 Million)

(U)     **(3) “Green Energetics”:** Three continuing projects are designed to render the manufacture of explosives and propellants environmentally benign. They span from the reformulation of propellants to elimination of solvents from the manufacturing process. Work on a solventless binder for energetic materials and recycling of propellants will be completed. (\$ 3.570 Million)

(U)     **(4) Elimination of Chromium:** There are four continuing projects dedicated to the elimination of chromium in a variety of applications. Research spans from elucidating basic mechanisms of chromium protection to development of new application processes. A new start for developing a replacement for the non-line-of-sight hard chrome plating process is projected. (\$ 3.592 Million)

(U)     **(5) Elimination or Reduction of Hazardous Materials:** Five continuing projects are designed to eliminate or reduce the production of hazardous materials. Development of technologies which permit inspection of aircraft structures without removing the coating will significantly reduce the volume of waste material. One new start is anticipated in reducing the hazardous materials associated with the application and stripping of specialty coatings. (\$ 3.064 Million)

(U)     **Cleanup:** There are four high priority areas within cleanup that comprise the bulk of the cleanup effort. In addition, there are four National Environmental Technology Test Sites (NETTS) which are maintained in order to facilitate the demonstration and validation of cleanup technologies for more rapid transfer the to field.

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(U) **(1) Unexploded Ordnance (UXO) Detection:** There are 6 continuing efforts to improve UXO detection capability. Efforts in exploiting third harmonic radars and data fusion will be completed. (\$ 2.431 Million)

(U) **(2) Dense Non-Aqueous Phase Liquid (DNAPL) Detection and Remediation:** DNAPLs are among the most difficult materials to detect in the subsurface and remediate. Ten continuing projects are focused on all phases of the problem starting with detection of the contamination in the subsurface. Included within these projects are several technologies for remediating DNAPLs with an emphasis on in-situ technologies. Work on In-well vapor stripping of TCE will be completed and one new start in anticipated. (\$ 5.363 Million)

(U) **(3) Risk Assessment:** One of the most pressing issues in cleanup is “how clean is clean”. To determine this, four continuing projects are focusing on the risks to humans, animals, plants and ecosystems associated with military compounds. (\$ 3.516 Million).

(U) **(4) Integrated Bio-treatment Research Program: From Flask to Field:** Continuing umbrella project that represents a collective research initiative by several key government and academic organizations supporting the development of bioremediation treatment technologies. The research objective is to develop field implementable, cost effective biotreatment processes for remediation of predominant DoD contaminants. The demonstration of a bioreactor to treat PAHs and the in situ biotreatment of PCE/TCE will be completed. (\$ 4.143 Million)

(U) **DoD National Environmental Technology Test Sites (NETTS) Program:** Continuing project facilitates transfer to field use of new, innovative, cost savings cleanup technologies. Four operational test sites (Dover AFB, McClellan AFB, NCB Port Hueneme, and former Wurtsmith AFB) plan to host 15-20 field tests and demonstrations of innovative remedial and site characterization technologies. (\$ 1.683 Million)

(U) **Compliance:** The Compliance Thrust Area develops “end-of-pipe” control technologies which treat waste streams to prevent the introduction of contaminants into the environment. There are three major foci within the Compliance thrust area. Two new starts in FY00 are planned in the areas of fate and impact of energetics on training and testing ranges and fate and impact of copper and zinc in harbors and estuaries. (\$ 1.000 Milion)

(U) **(1) Air Emissions:** There are eight continuing projects develop detection and control technologies for the emission of contaminants. Work on non-thermal plasma destruction and membrane mediated extraction of VOCs will be completed. (\$ 4.244 Million)

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- (U)      **(2) Demilitarization of Conventional Weapons:** There are two completing projects to develop environmentally benign processes for the destruction of explosives in conventional weapons. These are the last projects dealing with demilitarization that will be funded by SERDP. (\$ 1.421 Million)
  
- (U)      **(3) Oil/Water Separator Sludge:** There are two continuing projects to deal with the difficult problem of Oil/Water separator sludges and rendering them environmentally benign. Work continues towards developing a small, compact unit for on-site or shipboard processing. (\$ 2.187 Million)
  
- (U)      **Conservation:** There are four central themes to the Conservation thrust area.
  
- (U)      **(1) Impacts of Military Operations:** The six continuing projects in this sub-thrust examine the impacts of military operations on military lands, and threatened and endangered species. One new start in the impact of riparian zones is anticipated. (\$ 3.864 Million)
  
- (U)      **(2) Restoration:** The two continuing projects develop techniques and technologies which are designed to ensure the long term sustainability of the land, and to provide a realistic training environment. A new start in the control of invasive species is planned. (\$ 1.661 Million)
  
- (U)      **(3) Modeling and Simulation:** Modeling and simulation play a key role in the development of natural resources management plans. Three continuing efforts in ecological modeling and simulation and an analysis of the errors inherent in the models are included in this segment. (\$ 1.106 Million)
  
- (U)      **(4) Ecosystem Management:** This major initiative continues to develop the scientific understanding of ecosystem processes on military lands that will permit the sustainable use of these lands. Centered at Ft. Benning, GA, this initiative will first focus on the development of indicators of ecosystem health and thresholds of ecosystem damage. One new start to examine the role of disturbance is planned. (\$ 2.818 Million)
  
  
- (U)      **FY2001 Plans:**
  
- (U)      **Pollution Prevention:** There are five major focus areas within pollution prevention. Five new starts to address high priority DoD needs are planned.

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(\$ 3.001 Million)

(U) **(1) Next Generation Fire Suppression Technology Program:** This continuing umbrella project seeks to develop a replacement for Halon 1301.  
(\$ 4.182 Million)

(U) **(2) Reduction of Air Emissions:** There are six continuing projects, five of which will complete in FY 2001, focused on reducing or eliminating hazardous air emissions in the form of Volatile Organic Compounds (VOC), oxides of nitrogen (NOx) and particulates. (\$ 3.873 Million)

(U) **(3) "Green Energetics":** One continuing project, the "Green Gun Barrel" program will be completed in FY 2001. (\$ 1.092 Million)

(U) **(4) Elimination of Chromium:** There are four continuing projects dedicated to the elimination of chromium in FY 2001. The development of Sol-Gel technology to replace chromated sealant and primers will be completed. (\$ 3.716 Million)

(U) **(5) Elimination or Reduction of Hazardous Materials:** Three continuing projects are designed to eliminate or reduce the production of hazardous materials. Technologies to replace current toxic aircraft deicing fluids will be completed. (\$ 1.130 Million)

(U) **Cleanup:** There are four high priority areas within cleanup that comprise the bulk of the cleanup effort. Eight new starts, including an increased emphasis on UXO, are planned. (\$5.773 Million)

(U) **(1) Unexploded Ordnance (UXO) Detection:** There are 5 continuing efforts to improve UXO detection capability, all of which will be completed. A large portion of the new start funds cited above will be dedicated to UXO detection. (\$ 3.185 Million)

(U) **(2) Dense Non-Aqueous Phase Liquid (DNAPL) Detection and Remediation:** Six continuing projects are focused on all phases of the problem. Five of the six continuing projects will be completed. (\$ 3.185 Million)

(U) **(3) Risk Assessment:** One continuing project, which will be completed this year addresses the risk of DoD related environmental contaminants to individuals and populations. (\$ 1.131 Million)

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- (U)      **(4) Integrated Bio-treatment Research Program: From Flask to Field:** This continuing umbrella project will be completed this year. (\$ 0.331 Million)
  
- (U)      **DoD National Environmental Technology Test Sites (NETTS) Program:** Continuing project facilitates transfer to field use of new, innovative, cost savings cleanup technologies. (\$ 1.668 Million)
  
- (U)      **Compliance:** The work in Demilitarization has ended and work on fate and impact of contaminants started in FY 00 is continuing. Three new starts are planned for FY 01. (\$ 2.302 Million)
  
- (U)      **(1) Air Emissions:** There are four continuing projects dealing with the control of the emission of Volatile Organic Compounds (VOC) and particulate matter, all of which will be completed. (\$ 2.528 Million)
  
- (U)      **(2) Fate and Impact of Contaminants:** Continuing work on energetics on military ranges and zinc and copper in harbors and estuaries. (\$ 2.714 Million)
  
- (U)      **(3) Oil/Water Separator Sludge:** There are two completing projects to deal with the difficult problem of Oil/Water separator sludges. (\$ 2.166 Million)
  
  
- (U)      **Conservation:** There are four central themes to the Conservation thrust area. There are 5 new starts planned in FY 01. (\$2.606 Million)
  
- (U)      **(1) Impacts of Military Operations:** The three completing projects in this sub-thrust examine the impacts of military operations on military lands, and threatened and endangered species. (\$ 1.695 Million)
  
- (U)      **(2) Restoration:** The two continuing projects develop techniques and technologies which are designed to restore degraded military lands. (\$ 1.782 Million)
  
- (U)      **(3) Modeling and Simulation:** Three completing efforts in ecological modeling and simulation and an analysis of the errors inherent in the models are included in this segment. (\$ 1.172 Million)

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(U) **(4) Ecosystem Management:** This major long-term initiative continues to develop the scientific understanding of ecosystem processes on military lands that will permit the sustainable use of these lands. Centered at Ft. Benning, GA, this initiative will first focus on the development of indicators of ecosystem health and thresholds of ecosystem damage. (\$ 2.498 Million)

(U) <b>B. <u>Program Change Summary</u></b>	<b><u>FY1998</u></b>	<b><u>FY1999</u></b>	<b><u>FY2000</u></b>	<b><u>FY2001</u></b>	<b><u>Total Cost</u></b>
Previous President's Budget	57.115	0	54.429	52.664	Continuing
Appropriated Value	61.874	58.771			Continuing
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction	(5.158)				
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment					
c. Other					Continuing
Current President's Budget	56.716	58.771	53.506	51.729	Continuing

**Change Summary Explanation:**

- (U) **Funding:** Funding changes in outyears reflect below threshold program adjustments and revisions to inflation adjustments.
- (U) **Schedule:** Not Applicable
- (U) **Technical:** Not Applicable

(U) **C. Other Program Funding Summary Cost** Not Applicable

(U) **D. Acquisition Strategy:** Not Applicable.

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(U) **E. Schedule Profile** Not Applicable

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