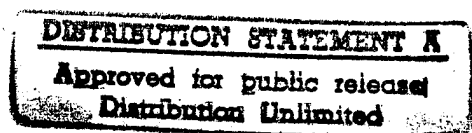
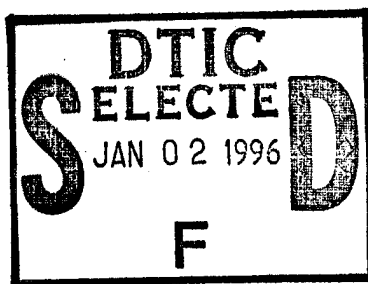

Logistics Management Institute

Army Pollution Prevention Program

Proposal for a Pollution Prevention Investment Fund

AR427RD1



Christopher P. Werle

DTIC QUALITY INSPECTED

19951227 029

LMI

May 1995

Army Pollution Prevention Program

Proposal for a Pollution Prevention Investment Fund

AR427RD1

Accession For		1
NTIS	CRA&I	☒
DTIC	TAB	☐
Unannounced		☐
Justification		
By		
Distribution /		
Availability Codes		
Dist	Avail and/or Special	
A-1		

Christopher P. Werle

Prepared pursuant to Department of Defense Contract MDA903-90-C-0006. The views expressed here are those of the Logistics Management Institute at the time of issue but not necessarily those of the Department of Defense. Permission to quote or reproduce any part except for government purposes must be obtained from the Logistics Management Institute.

Logistics Management Institute
2000 Corporate Ridge
McLean, Virginia 22102-7805

Contents

Army Pollution Prevention Program: Proposal for a Pollution Prevention Investment Fund	1
Background	1
Potential Cumulative Benefits of Pollution Prevention Investment	2
Recognizing Prevention as a Strategic Investment	4
The Funding Dilemma	5
Funding Impediments	5
Overcoming Current Funding Impediments	6
Use of Innovation Funds Within the Army	7
Pollution Prevention Investment Fund Operation	8
Funding Criteria	9
Project Prioritization	10
 Appendix A. Methodology Used to Develop Return on Investment and Potential Compliance Savings Assumptions	
 Appendix B. Pollution Prevention Program Requirements Sources, Program Areas, Funding Approach, and Cost Accounting	
 Appendix C. List of Pollution Prevention Program Requirements	

Army Pollution Prevention Program

Proposal for a Pollution Prevention Investment Fund

BACKGROUND

In FY95, the Army will spend approximately \$600 million on environmental compliance and nearly a *billion* dollars on cleanup. Annual costs in these areas will likely continue to escalate, diverting critically short funding from the Army's primary national defense mission.

While this expenditure of funds is necessary to protect the environment and comply with environmental statutory and regulatory requirements, it represents a tremendous diversion of resources that must be reversed. Consider the fact that for every \$1.00 the Army spends to purchase a hazardous material, we will spend another \$8.00 to handle, treat, store, protect, and dispose of it.

Clearly, it would make better sense to develop systems that do not incorporate or require the use of hazardous materials. Or in the alternative, we could potentially save a great deal of money simply by finding nonhazardous substitutes that were more environmentally "friendly." In other words, not generating hazardous waste in the first place (i.e., prevention) is the most logical solution.

The potential for pollution prevention to reduce environmental compliance and cleanup costs is still evolving. Although it has been discontinued, the Army's Hazardous Waste Minimization (HAZMIN) program achieved substantial technical success in the prevention area. It was largely responsible for the Army's 56 percent reduction in hazardous waste disposal between 1985 and 1992. Equipment purchased with Defense Environmental Restoration Account (DERA) HAZMIN funds has shown a 3:1 return on investment (ROI). While DERA no longer funds pollution prevention projects, numerous other examples exist to illustrate prevention's power as the ultimate weapon of choice. Consider the following:

- ◆ Corpus Christi Army Depot develops an aluminum ion vapor deposition process to replace conventional cadmium plating for light armored vehicles. The elimination of hazardous stripping agents and associated paint sludge disposal costs results in a ROI of 2.44.

- ◆ Redstone Arsenal uses no-clean flux on Hellfire missile circuit boards, eliminating the need for the annual purchase and disposal of 65,000 pounds of highly toxic trichloroethylene (TCE).
- ◆ Lima Army Tank Plant alters its dye-penetrant weld inspection method by replacing TCE with a magnetic particle process. As a result, TCE use is reduced by 90 percent, saving more than \$100,000 annually while simultaneously lowering the chemical pollution level by 44,000 pounds. In addition, the plant realizes a substantial reduction in the amount of time required to inspect each completed weld.

Potential Cumulative Benefits of Pollution Prevention Investment

Results similar to the ones described above have been documented at Army (and other DoD Components) installations and facilities around the world. While more precise data would be needed to determine the exact savings potential of media-specific pollution prevention investments, it is possible to develop a realistic, broad-based approximation. Table 1 illustrates the savings that could be realized across the Army if additional investment is made beyond the \$59 million that is currently programmed. The top two rows of the table reflect the FY95 funding levels for compliance and prevention by category. The third row reflects the total recommended amount of funding for pollution prevention, while the last row shows the total additional compliance funds that could be saved as a result.

Table 1.
Potential for Pollution Prevention Investment to Save Pollution Control (i.e., Compliance) Costs — Millions of Dollars

	Air pollution control	Water pollution control	Hazardous waste manage- ment	Assess- ments and planning	Other pollution control	Total \$ millions FY95 budget
FY95 compliance costs	72.3	138.7	170.0	48.4	178.9	607.9
FY95 programmed pollution prevention investment	32.3	2.0	22.1	0.0	2.9	59.3
FY95 Recommended pollution prevention investment	33.9	16.8	31.6	6.6	12.4	101.4
Potential additional compliance funds to be saved	5.1	94.4	47.5	19.8	28.6	145.4

The recommended amount of pollution prevention investment (row 3 in Table 1) was back-calculated from estimated additional compliance savings and return on investment (ROI) achievable according to the following assumptions¹ :

- ◆ For air pollution control: compliance savings = 7 percent,
ROI = 3:1.
- ◆ For water pollution control: compliance savings = 32 percent,
ROI = 3:1.
- ◆ For hazardous waste management: compliance savings = 28 percent,
ROI = 5:1.
- ◆ For assessments and planning: compliance savings = 41 percent,
ROI = 3:1.
- ◆ For other pollution control: compliance savings = 16 percent,
ROI = 3:1.

To understand the process used to develop these figures, consider the entry of \$33.9 million recommended for air pollution control pollution prevention investment funding for FY95. This figure was derived as follows:

- ◆ Current air pollution control cost = \$72.3 million
- ◆ Current pollution prevention investment = \$32.3 million
- ◆ Estimated achievable compliance savings = 7 percent
- ◆ Estimated ROI = 3:1

$$\begin{aligned}
 \text{Recommended Funding} &= (\text{air compliance costs})(\% \text{ savings achievable})/\text{ROI} \\
 &+ \text{Current pollution prevention investment} \\
 &= (\$72.3 \text{ million})(0.07)/3 + \$32.2 \text{ million} \\
 &= \$33.9 \text{ million.}
 \end{aligned}$$

As Table 1 projects, an additional \$42.1 million investment (\$101.4 million recommended amount vs. \$59.3 million programmed amount) in pollution prevention could save an additional \$145.4 million in compliance costs. This represents a favorable ROI of 3.45:1.

¹See Appendix A for a detailed discussion of how the ROIs and compliance savings percentages were derived.

Recognizing Prevention as a Strategic Investment

Clearly, prevention is the best long-term solution for reducing risks to human health and the environment from pollution. Congress recognized this when it enacted the Pollution Prevention Act of 1990, and the President reaffirmed its national importance through issuance of a series of Executive orders that mandate implementation of numerous pollution prevention policies and procedures. Additionally, DoD's Pollution Prevention Strategy charges that DoD will "effectively promote the national policy of pollution prevention through education, training and awareness, acquisition practices, facilities management, energy conservation, and the use of innovative *pollution prevention technologies*."

The *Army Environmental Strategy Into the 21st Century* supports this new national direction by incorporating pollution prevention as one of its "four pillars." The prevention pillar focuses on eliminating pollution to the greatest extent possible. The general goal is to adopt and implement integrated management approaches, procedures, and operations in all Army mission areas to minimize all environmental contamination and pollution. The focus of the prevention program's objectives is as follows:

- ◆ Use a holistic approach to pollution prevention that looks at all environmental media collectively.
- ◆ Systematically eliminate hazardous materials use and operations or processes that produce hazardous/solid waste and other emissions.
- ◆ Minimize environmental risks to operating personnel and visitors at Army civil works facilities.
- ◆ Instill the pollution prevention ethic throughout the entire Army community and all mission areas.

Prevention then, in concert with the conservation of natural and cultural resources, is the Army's preferred approach to environmental management and maintaining compliance with environmental laws and regulations. In this regard, pollution prevention will be used to initially complement, and eventually replace (where practical), the traditional pollution control and clean up practices that currently predominate. In so doing, the Army will achieve the following underlying goals:

- ◆ Reduce or eliminate future operating costs and liability associated with environmental cleanup and compliance, as well as from the unnecessary generation of waste.
- ◆ Minimize disruption of mission operations and activities resulting from regulatory compliance problems.
- ◆ Focus available resources on difficult to control sources of pollution that do not lend themselves readily to a regulatory control approach.

- ◆ Further national environmental policy.
- ◆ Demonstrate environmental leadership by eliminating the root cause of environmental degradation rather than treating the symptoms of environmentally damaging activities.
- ◆ Foster development of an environmental ethic through voluntary partnerships at all organizational levels with industry, communities, regulators, and private environmental advocacy organizations.
- ◆ Reduce the cost of base operations through improved process efficiencies and materials/energy utilization.
- ◆ Reduce the research, development, test, and evaluation (RDT&E), procurement, operations, and disposal costs of weapon systems.
- ◆ Educate the total Army community — commanders, managers, members of the civilian/military workforce, and the families — about the environmental consequences of their actions and decisions.

THE FUNDING DILEMMA

Funding Impediments

Despite the increased emphasis on pollution prevention, Army installations are not funding their pollution prevention programs at effective levels. Ironically, this situation has resulted in part from the current Army environmental "must fund" policy and its associated RCS 1383 reporting system. By the time all must fund environmental projects and other mission-essential requirements have been funded, the typical installation has few resources left to apply toward the heretofore lower priority prevention projects that "go beyond compliance." This is particularly acute at installations operating under the Defense Business Operating Fund, which must include capital and operating costs for such projects in the rates it charges its customers for services. Capital investments in pollution prevention equipment and process changes tend to inflate these rates, which may make them less competitive over the short term. This, in turn, may reduce the incentive for large investments in process improvement.

In addition to the problems described above, there is little help available from other likely funding sources, such as RDT&E or acquisition. The Army essentially has no techbase (6.2/6.3) funding in pollution prevention, and obvious disincentives exist in systems acquisition to fund pollution prevention research and development. Program Managers are concerned with developing and fielding new weapons systems, which is, after all, their primary mission. Given the limited resources available to them to accomplish that mission, realistically, they cannot address pollution prevention issues much beyond their application to the specific systems under development. They are simply not in a position to look at

prevention from a Total Army perspective. The situation as described is not consistent with Army and national policy to increase emphasis on pollution prevention while reducing emphasis on pollution control.

Given current and outyear budget realities, it is unlikely that significant new appropriations will be made to existing environmental accounts. This means that there will be little new impetus for commanders and program managers to develop and implement pollution prevention activities or projects. The only feasible way to resolve this dilemma is to find an alternative funding source.

Overcoming Current Funding Impediments

In the past, situations such as this have been addressed by Federal agencies and private industry through the development and use of "innovation funds." The following examples (which are taken from a report, *Improving Financial Management*, accompanying the *National Performance Review*) illustrate variations of the innovation fund concept:

- ◆ The Air Force Tactical Air Command created a \$10 million innovation fund during one year to finance reinvention ideas through grants. The funds were an appropriation set-aside.
- ◆ In the Department of Commerce's Pioneer Fund, employees apply for cash grants up to \$50,000 to finance innovative quality and productivity improvement projects. Funds can be used for project supplies, equipment, and expert services. The source of funding is an annual appropriation set-aside.
- ◆ Both the Departments of the Treasury and Transportation currently operate working capital funds. These funds require separate legislation and have a specific charter, which focuses on such purposes as information technology modernization.
- ◆ In the Justice Department's FY92 appropriations bill, permanent language was added to take the unobligated balances from the past five years and transfer them into a department-level working capital fund as start-up funding for investments in capital equipment and other nonsalary purposes.
- ◆ Florida cut government budgets 5 percent across the board and returned half to those agencies with approved plans that increased productivity or effectiveness.
- ◆ The city of Philadelphia uses an innovation fund that issues loans to government organizations that must be repaid after five years at double the amount borrowed.
- ◆ American Express Corporation uses a matching fund approach for its technology research group with 40 percent from the corporate technology (innovation) fund, 40 percent from the interested business unit, and 20 percent

from another business unit that has a vested interest in the outcome of the proposed application.

These types of working capital funds have proven successful and could be emulated to support the Army pollution prevention program. Success, however, is dependent on satisfying several basic principles:

- ◆ Users of the fund should have a choice of whether to use the fund and have alternatives for the service.
- ◆ The fund should have flexibility to adjust its operational cost structure and pricing strategies to adapt to changes in demands for services.
- ◆ Financial reporting safeguards must be built-in.
- ◆ A minimum initial investment for start-up costs and one-time seed money that is sufficiently large for significant investments is essential.
- ◆ The level of fees and interest charged and repayment schedules must generate sufficient profits for the fund to become self-sustaining within a few years.
- ◆ Shielding the fund from diversion and allocation of the accumulated savings is crucial. If too much is siphoned off for other priorities, the potential positive influence on organizational behavior will be minimized.
- ◆ Agencies must develop a formula for rewarding those who originate the savings.

Use of Innovation Funds Within the Army

Innovation funds are not new to the Army. The OSD Productivity Investment Funding (PIF) program, Quick Return on Investment Program (QRIP), and Productivity Enhancement Capital Investment Program (PECIP), have been used (they are currently inactive) as authorized by AR 5-4, *Productivity Capital Investment Program*, August 1982. Additionally, various "fenced" funds (e.g., DERA) are being used with success to provide needed focus on critical program areas.

When implemented, these investment funding vehicles are not intended to provide substitute funding for capital investments, but to supplement the regular budget when funds are inadequate to support worthwhile productivity improvements. Capital investment programs also serve as a pillar in the Army's Economies, Efficiencies, and Management Improvement Program in its quest for more effective use of capital and human resources. Given these facts, innovation funds are a viable alternative for solving the funding dilemma.

While each program varies somewhat, they all prescribe funding requirements for productivity improvements that amortize in a specified period. There

are constraints; however, which make some better than others. For example, QRIP programs require amortization in two years or less, and funding is restricted to use of the procurement appropriation. The OSD PIF specifies a four-year amortization period. While it permits funding from multiple appropriations, its use is restricted to projects costing \$100,000 or more. The most appropriate solution for the pollution prevention funding problem is the PECIP. This initiative is designed to fund projects costing \$3,000 or more and amortizing in four years or less. Multiple appropriations can also be used for funding PECIP projects, including procurement, operations and maintenance (Army), Family Housing Management Account, Military Construction (Army), and RDT&E.

Given that no other viable alternative currently exists, the Army should move forward with establishment of an innovation fund patterned after the PECIP. The general concept for operating the fund, which would be called the Pollution Prevention Investment Fund (PPIF), is outlined in the next section.

POLLUTION PREVENTION INVESTMENT FUND OPERATION

The Assistant Secretary of the Army (ASA) for Installations, Logistics, and Environment, in conjunction with the ASA for Financial Management, will establish and monitor operation of the PPIF. The PPIF will provide installations, organizations, and activities the opportunity to compete for funds to finance investments in pollution prevention equipment, facilities, and/or process improvements. The PPIF will be initiated in FY97, with start-up funding provided through a one-time \$84 million appropriation set-aside (see last section of PPIF operation for a discussion of start-up funding alternatives). Thereafter, the fund will be sustained through user payback.² A program manager (preferably in the resource management/comptroller functional area) will be designated at the Army Staff level to manage day-to-day operations of the fund.

Projects funded through the PPIF will not be subjected to limits (i.e., minimum/maximum cost ceilings/caps) that might preclude a valid project from being funded. PPIF funding will be made available to submitting organizations through normal budget channels. Once funds are received, submitting organizations must take immediate steps to obligate the funds. Funds not promptly obligated at the installation level will be subject to withdrawal at either the major command (MACOM) or Headquarters, Army (HQDA) level for return to the PPIF.

²See the section entitled: "Fund Sustainment Alternatives" for a detailed discussion of PPIF sustainment alternatives.

Funding Criteria

Funding criteria are described below.

- ◆ Any installation, organization, function, activity, or unit may submit as many qualified pollution prevention projects as desired throughout the operating fiscal year. However, to be considered for competition, each project submitted must meet the following standards.
- ◆ The project must fall within pollution prevention program requirements Categories B or C (all activity numbers). (See Appendix B for a discussion of requirements categories, program areas/activities, general funding approach, and cost accounting.)
- ◆ The project must require a capital investment for which funds are not available from any other account or appropriation. Investment costs, not recurring costs, are the only costs that may be funded through the PPIF. The benefiting organization must fund any recurring operating and maintenance costs. Projects need not be limited to a single activity or location. Related items for the same functional area may be grouped for a single submission to take advantage of quantity discounts.
- ◆ The project must generate sufficient savings, directly or indirectly, to return all investment costs within three years from the facility/equipment/process operational date. Investment costs include acquisition, transportation, installation, and other one-time incidental costs. Savings will be measured in program fiscal year dollars (current fiscal year plus two).
- ◆ The project must meet the submitting organization's long-range planning and programming objectives.

The PPIF cannot be used to

- ◆ address must fund requirements that are normally programmed through the RCS 1383 reporting process;
- ◆ fund RDT&E;
- ◆ purchase equipment or facilities already funded through the normal budget process;
- ◆ purchase equipment currently leased from the private sector or government organizations (unless the leased equipment's remaining economic life is at least 80 percent of a similar new item's economic life);
- ◆ purchase equipment specifically denied by Congress in prior years' budget requests;

- ◆ set up an in-house capability for operations readily and more economically available through a commercial contract; or
- ◆ invest at government-owned, contractor-operated facilities (unless the savings to the government will amortize the investment and the contractor concurs with the cost-reduction being proposed).

Project Prioritization

The Office of the Director of Environmental Programs will prioritize projects according to both economic factors and categories (degree) of benefit as follows:

For economic factors projects are prioritized on the basis of:

- ◆ return on investment;³
- ◆ manpower spaces saved per dollar invested (investment dollars needed to save the equivalent of one manpower space); and
- ◆ internal rate of return (IRR).⁴

Economic analysis will be accomplished in accordance with AR 11-28, *Economic Analysis and Program Evaluation for Resource Management*, and will incorporate the Concepts Analysis Agency-developed ROI forecasting model⁵, as appropriate.

For categories of benefit (not necessarily in order of relative priority), projects are prioritized on the basis of:

- ◆ reducing demand for the Army's targeted chemicals and compounds,
- ◆ reducing demand for other hazardous materials,
- ◆ recycling hazardous materials,
- ◆ recycling nonhazardous materials,
- ◆ reducing hazardous waste disposal volume,
- ◆ reducing hazardous waste disposal toxicity,
- ◆ reducing harmful air emissions,

³The ROI is defined as the ratio of documented savings to capital investment cost.

⁴The IRR is defined as the discount rate that equates the present value of the future cash inflows (e.g., savings and cost avoidances) with the present value costs of an investment.

⁵Officially known as the Pollution Abatement and Prevention Analysis (PAPA) model.

- ◆ reducing harmful water emissions,
- ◆ reducing municipal solid waste volume,
- ◆ reducing energy consumption,
- ◆ increasing cost savings, and
- ◆ intangible benefits (e.g., improved Army image, easier compliance, and reduced potential cleanup liability).

IDENTIFICATION OF SAVINGS

Savings used to amortize a project's investment cost must be trackable reductions (i.e., hard savings) in manpower or operations and maintenance (O&M) costs generated by the investment. Manpower savings must be in whole manpower authorizations or historically documented civilian overtime expenditures. Partial manpower savings and dollar or manpower cost avoidances may also be used to justify the investment.

Unobligated balances resulting from pollution prevention measures will be carried over to the following fiscal year without additional authorization or appropriation. The Office of the Comptroller will provide supplemental budget instructions for the treatment of pollution prevention savings and subsequent carryovers.

DISPOSITION OF SAVINGS

The entire amount of net dollar savings may be used for programs or activities at the discretion of the commander of the installation or facility at which the savings are realized, provided that the original intent of the investment fund (i.e., positive influence on organizational behavior) is not compromised. Typical programs or activities may include

- ◆ readiness and training;
- ◆ industrial or nonindustrial process improvements;
- ◆ industrial fund overhead rate offsets;
- ◆ environmental projects;
- ◆ any morale, welfare, or recreation facility or service;
- ◆ improvements to existing military family housing units; and

- ◆ any unspecified minor construction project that enhances the quality of life of personnel.

Net savings due to pollution prevention investment will be any funds realized after the PPIF has been reimbursed the original amount that was borrowed to finance the investment project.

PPIF START-UP FUNDING

As suggested by the initial discussion of the potential benefits of pollution prevention investment, the recommended start-up funding level for the PPIF is \$42 million. As outlined in the following section, however, the anticipated three-year payback period for pollution prevention projects will require initial funding of \$84 million in order to ensure that \$42 million is available during each of the first three years of PPIF operation.⁶ This level of investment will enable the Army to realize the maximum additional theoretical environmental compliance cost savings of approximately \$145 million (based on the FY95 compliance budget). Three potential alternative sources for this funding are briefly described below.

Alternative 1: Obtain Separate Funding Through the POM Process

This option reflects funding guidance provided in AR 5-4. The Program Analysis Resource Review (PARR) received from MACOMs in January 1996 would contain a display reflecting pollution prevention capital investment resource requirements. The data display would be used by HQDA to develop a consolidated Program Development Increment Package (PDIP) requesting total Pollution Prevention Capital Investment Program resources for the Army. Additionally, a special display reflecting potential cost savings/avoidances in the PARR years would be included in accordance with instructions in the Army guidance.

Based on PARR displays, the Army staff-developed PDIP for Pollution Prevention Capital Investments would compete with other Army requirements. If successful, the resources requested would then be included in the program objective memorandum and ultimately be used to activate the PPIF.

Alternative 2: Obtain an Appropriation Set-Aside

This option essentially amounts to "fencing" a portion of the Army budget for the exclusive purpose of financing PPIF expenditures. Given the total amount of resources currently allocated to Army environmental programs, and the projected savings/avoidances from investment in prevention, resource

⁶The \$42 million invested during year one will be repaid over three years at \$14 million per year. This will result in a fund shortfall of \$28 million the second year, and \$14 million the third year. Hence, the initial requirement for \$84 million.

managers might attempt to draw these funds from existing environmental compliance and restoration accounts. This should not be permitted, however, since the benefits of pollution prevention investment ultimately extend well beyond the environmental arena. For example, pollution prevention programs have been shown to

- ◆ minimize disruption of mission operations due to regulatory compliance problems;
- ◆ reduce the cost of base operations through improved process efficiencies;
- ◆ reduce the cost of weapon system RDT&E, procurement, operation, and disposal;
- ◆ reduce risks of criminal and civil liability;
- ◆ reduce worker's compensation costs and liability;
- ◆ reduce supply and materials costs;
- ◆ reduce general installation waste management and disposal costs;
- ◆ reduce industrial production costs to include scheduling, material handling, inventory control, and equipment maintenance;
- ◆ reduce installation energy costs;
- ◆ reduce facility clean-up costs;
- ◆ improve the Army's image in local communities;
- ◆ positively influence employee attitudes and productivity; and
- ◆ improve public health and realize environmental benefits.

Since these potential benefits cut across all Army program areas, it is only fitting that the cost of pollution prevention capital investment be apportioned accordingly. The set-aside should therefore be drawn from the entire Army budget, rather than just the environmental account. Given an FY97 Army budget projection of approximately \$60 billion, the \$84 million capital investment requirement to establish the PPIF would amount to only 0.14 percent of the budget.

Alternative 3: Seek Third-Party Financing

Under this alternative, the Army would not have to invest any capital up front to establish the PPIF. Instead, a private contractor would set up and operate the fund and provide the design, installation or construction, financing, and O&M of the capital investment projects. The contractor would be compensated

by sharing a predetermined percentage of the net savings realized from the capital investment program. If there are no savings, the contractor receives no payment. The only cost to be borne by the Army (at least initially) would be for management oversight of the contractor administering the PPIF.

While this approach appears very appealing on the surface, many questions would have to be resolved before it could be practically considered. Common barriers to implementing this type of arrangement include problems in establishing a baseline upon which to determine the savings realized from each investment. Another important consideration is the financial strength of the contractor and the probability that the company will remain solvent throughout the contract term. This type of program requires a solid company with sound financial management to support the financing of capital investments until the government begins to make repayments. For pollution prevention projects, this can take up to five years (or longer). Would the Army be able to step in and take over operation of the fund if the contractor were to default? These and other critical concerns probably make this alternative the least plausible of the three.

RECOMMENDED FUNDING SOURCE

Considering current and future budget realities (which make a separate or supplemental appropriation unlikely) and the acknowledged difficulties with third-party financing, the Army should seek a one-time appropriation set-aside on the basis of the entire FY97 Army budget.

FUND SUSTAINMENT ALTERNATIVES

The PPIF must become self-sustaining as soon as possible. To achieve this, four alternative courses of action are possible. Each alternative (with discussion where needed) and related pros and cons is outlined below.

Alternative 1: Require User Repayment From Retained Savings

Consider an installation commander who spends \$25,000 per year on virgin antifreeze purchases and waste antifreeze disposal. In this case, the commander borrows \$75,000 from the PPIF to install an antifreeze distillation unit, which will enable total recycling of waste antifreeze. This eliminates both the requirement to purchase virgin antifreeze and to dispose of the waste, saving \$25,000 per year. Therefore, the payback period for the investment is three years. Since the commander is now saving \$25,000 per year that would have otherwise been spent as described, the PPIF is reimbursed \$25,000 per year for three consecutive years in order to pay back the loan. Payback begins the first year the distillation unit is operational (this is accomplished at the HQDA level through an automatic debit to the MACOM fund authorization document). Unless the commander was not truthful about the savings to be realized from the investment, there should be no problem in making the repayments. After the three year payback

period ends, the commander retains the future savings for installation use as described earlier.

- ◆ The pros of this alternative are that:
 - ▶ single source for needed funds if full repayment is mandated,
 - ▶ supports basic premise for self-sustainment of fund,
 - ▶ minimizes administrative recordkeeping requirements, and
 - ▶ installations keep savings generated after repayment period (as a reward).
- ◆ The cons of this alternative are that:
 - ▶ repayment requirement may discourage fund use,
 - ▶ perception that future year O&M budgets will be reduced, and
 - ▶ initial seed money requirement would increase based on three year pay-back period for pollution prevention projects.

This alternative would require PPIF start-up funding of \$84 million (\$42 million x 2) since only one-third of funds loaned would be returned each year. After the third year of operation, \$42 million per year would be repaid to the fund by users.

Alternative 2: Obtain a Separate Recurring Annual Appropriation

- ◆ The pros of this alternative are that:
 - ▶ single source for needed funds and
 - ▶ no decrements to other key program areas.
- ◆ The cons of this alternative are that:
 - ▶ violates basic premise that fund be self-sustaining,
 - ▶ will likely require extensive historical performance data to support re-authorizations,
 - ▶ changes in Administrations and/or funding priorities could affect fund longevity,
 - ▶ no guarantee of continued funding to required levels,

- ▶ fuels the perception that environmental programs receive too much funding, and
- ▶ Congress will be reluctant to fund beyond initial start-up.

Alternative 3: Secure Available Prior Fiscal Year Unobligated Balances.

- ◆ The pros for this alternative are that:
 - ▶ the Comptroller could implement it without further authorization, and
 - ▶ it could conceivably meet a substantial portion of the annual requirement.
- ◆ The cons for this alternative are that:
 - ▶ no guarantee any funds will be available (unobligated),
 - ▶ unlikely that full funding requirement could be met through this alone, and
 - ▶ strong competition comes from other critical program area unfinanced requirements.

Alternative 4: Levy a Pollution Prevention Surcharge

A pollution prevention "surcharge" would be assessed against all forms of waste disposal and waste-generating (or potentially waste-generating) operations, services, products, or activities. The amount of the surcharge would be adjusted annually and would be based upon the total estimated annual cost of environmentally degrading products, services, operations, or activities, and the estimated amount of funding needed to satisfy projected PPIF demand. Areas to which the surcharge would be applied include, but are not limited to, the following:

1. Treatment and/or disposal services for wastes generated by installations involved in daily routine recurring operations and activities and, as a consequence, of processes, procedures, and types of materials and supplies used (normally O&M funded). This specifically includes solid and hazardous waste disposal services provided by Defense Reutilization and Marketing Service and the installation Directorate of Public Works.
2. Treatment and/or disposal of wastes generated by industrially-funded depots/plants that perform specific operations inherent to providing services. The basic cost of such waste treatment/disposal (to which the surcharge will be applied) will normally be included in the rate charged for the service.

3. Hazardous material (or products containing hazardous material) procurement, shipment, handling, and storage.
 - ◆ The pros for this alternative are that it:
 - ▶ could act as a potential major source for required funding, and⁷
 - ▶ provides a strong incentive to reduce hazardous material use and hazardous waste generation.
 - ◆ The cons for this alternative are that it:
 - ▶ generates substantial administrative requirements,
 - ▶ difficult to identify targeted products and services,
 - ▶ potential legal issues with "taxing" certain appropriations,
 - ▶ surcharge payment may reduce available O&M funds,
 - ▶ Defense Logistics Agency/General Service Administration may be less competitive versus local purchase, and
 - ▶ ban on local purchase of targeted products and services may be required to ensure that program is effective.

Recommended Alternative: Require User Repayment From Retained Savings.

The justification for selecting this alternative is based on the following benefits:

- ◆ It provides a single source for needed funds.
- ◆ No decrements to other key program areas are experienced.
- ◆ It supports the premise that the fund be self-sustaining.
- ◆ It minimizes administrative requirements.
- ◆ It provides a degree of incentive to installations to use the fund.
- ◆ It offers the greatest likelihood of continuing congressional support.

⁷In FY94, Army hazardous materials purchases made through GSA totaled \$22.5 million, while purchases through the Defense General Supply Center exceeded \$37 million. Local purchase amounts are unknown, but likely exceeded all others combined.

APPENDIX A

Methodology Used to Develop
Return on Investment and Potential
Compliance Savings Assumptions

Methodology Used to Develop Return on Investment and Potential Compliance Savings Assumptions

RETURN ON INVESTMENT

The return on investment (ROI) achievable from pollution prevention funding of engineering projects and other media program operations/activities is estimated to be as follows:

<i>Media Program Area</i>	<i>Estimated ROI</i>
Air Pollution Control	3:1
Water Pollution Control	3:1
Hazardous Waste Management	5:1
Assessment and Planning	3:1
Other	3:1

The ROI values listed above were extrapolated from Army, Environmental Protection Agency (EPA), and private industry experience documented in technical reports and articles in published journals. The Army Materiel Command (AMC), for example, embarked on a series of Hazardous Waste Minimization (HAZMIN) initiatives during the late 1980s and early 1990s, documented in over 20 HAZMIN audits, and summarized in a HAZMIN Progress Report in July, 1991. In addition, the U.S. Army Construction Engineering Research Laboratory (CERL) undertook a number of HAZMIN assessments at Forces Command installations during the late 1980s.

The EPA also has issued the *Facility Pollution Prevention Guide* containing a detailed methodology for economic evaluation of pollution prevention projects, and it has innumerable reports of case studies for industrial pollution prevention projects (included in, and available from, their electronic on-line Pollution Prevention Information Center). Additionally, a new technical journal called the *Pollution Prevention Review (PPR)*, began publication in 1990; each quarterly issue includes one or more case studies of successful pollution prevention initiatives and associated economic analyses.

Unfortunately, no document exists that comprehensively identifies, collects, analyzes, and outlines detailed cost-benefit data on every pollution prevention project undertaken to date. However, it is possible to illustrate by examples that the assumed ROIs are *reasonable* and, in fact, relatively *conservative* in light of past experience. The following are several such examples tied to the media program areas listed above.

Examples of pollution prevention projects impacting air pollution control are as follows:

- ◆ More efficient industrial spray painting of parts by improving paint spray gun technology: initial capital investment cost \$19,000; annual cost savings \$8,900; ROI estimated to be 4.7:1; payback period (PP) estimated to be 2.1 years [AMC].
- ◆ Elimination of methyl ethyl ketone (MEK) and trichloroethane (TCA) from hand cleaning (wiping) operations in aeronautical parts maintenance activities: initial research and development (R&D) cost \$350,000 (no capital investment cost); annual cost savings \$250,000; ROI estimated to be 7.1:1; PP estimated to be 1.4 years [PPR].
- ◆ Implementation of on-site distillation of paint thinning wastes at hobby/craft paint shops: savings to investment ratio (SIR ratio, essentially equal to ROI) estimated to be 5.8:1; PP estimated to be 2.65 years [CERL].
- ◆ Recycling hospital laboratory solvent (xylene) through distillation: SIR estimated to be 1.14:1; PP estimated to be 10 years [CERL].

Examples of pollution prevention projects impacting water pollution control are as follows:

- ◆ In-process purification of water-soluble cutting fluids during industrial machine shop operations: initial capital investment cost \$18,740; annual cost savings \$45,000; ROI estimated to be 24:1; PP estimated to be five months [AMC].
- ◆ Reduction of metal plating rinsewater volume through process change: initial investment cost \$10.00; annual cost savings \$1,039; ROI estimated to be more than 100:1; PP estimated to be immediate [PPR].
- ◆ Reuse of industrial wastewater during metal parts cleaning and plating operations: initial capital investment cost \$1.5 million; annual cost savings \$911,000; ROI estimated to be 6.1:1; PP estimated to be 1.6 years [PPR].

Examples of pollution prevention projects impacting hazardous waste management are as follows:

- ◆ Recycling of solvents through distillation during industrial parts painting operations: initial capital investment \$17,900; annual cost savings \$20,000; ROI estimated to be 11:1; PP estimated to be 11 months [AMC].
- ◆ Recovery of nonhalogenated solvents by distillation: initial capital investment cost \$15,000; annual cost savings \$14,500; ROI estimated to be 9.3:1; PP estimated to be 1.1 years [AMC].

- ◆ Recovery of halogenated solvents by distillation: initial capital investment cost \$120,000; annual cost savings \$11,813; ROI estimated to be 0.98:1; PP estimated to be 10.1 years [AMC].
- ◆ Recovery of alkaline cleaner from electrocoat painting operations: initial capital investment cost \$6,000; annual cost savings \$17,700; ROI estimated to be 29.5:1; PP estimated to be five months [PPR].
- ◆ Replacement of industrial shop parts cleaning solvents with aqueous cleaner: initial capital investment cost \$7,000; annual cost savings \$6,500; ROI estimated to be 9.3:1; PP estimated to be 1.1 years [PPR].

Examples of pollution prevention projects impacting assessment and planning are as follows:

- ◆ Modifying management procedures for used oil in automotive maintenance shops, including centralized storage facilities: SIR estimated to be 4.4:1; PP estimated to be 3.31 years [CERL].
- ◆ Providing training to improve painting techniques to reduce consumption of primer and solvent: initial capital investment cost \$3,500; annual cost savings \$4,820; ROI (over 5 years) estimated to be 6.88:1; PP estimated to be 0.7 years [EPA].
- ◆ Modifying plant procedures by reducing the amount of old coating removed during paint stripping operations: initial capital investment cost \$13,500; annual cost savings \$24,980; ROI (over 5 years) estimated to be 9.25:1; PP estimated to be 0.5 years [EPA].

Examples of other pollution prevention projects are as follows:

- ◆ Installation of cardboard recycling equipment: initial capital investment cost range of \$3,000 to \$16,500; annual cost savings range of \$3,950 to \$9,850; ROI estimated to range from 2.6:1 to 6:1; PP estimated to range from 6 months to 3.8 years [PPR].
- ◆ Installation of antifreeze recycling equipment in automotive maintenance shops; SIR estimated to be 15.7:1; PP estimated to be 1.59 years [CERL].
- ◆ Implementation of pharmacy concept for hazardous materials management at Corpus Christi Army Depot: capital investment cost over 6 years of \$1.31M; net cost savings of \$10.73 million over same period; ROI estimated to be 8.19:1; PP estimated to be 0.7 years (Joint Logistics Support Center).

PROJECTED COMPLIANCE SAVINGS

The projected compliance savings achievable are estimated based upon the aforementioned ROIs and historical Army environmental program expenditures under the compliance and prevention program pillars from FY90 to FY93. These expenditures (total outlays for four years, inclusive) are shown in Table A-1.¹

Table A-1.

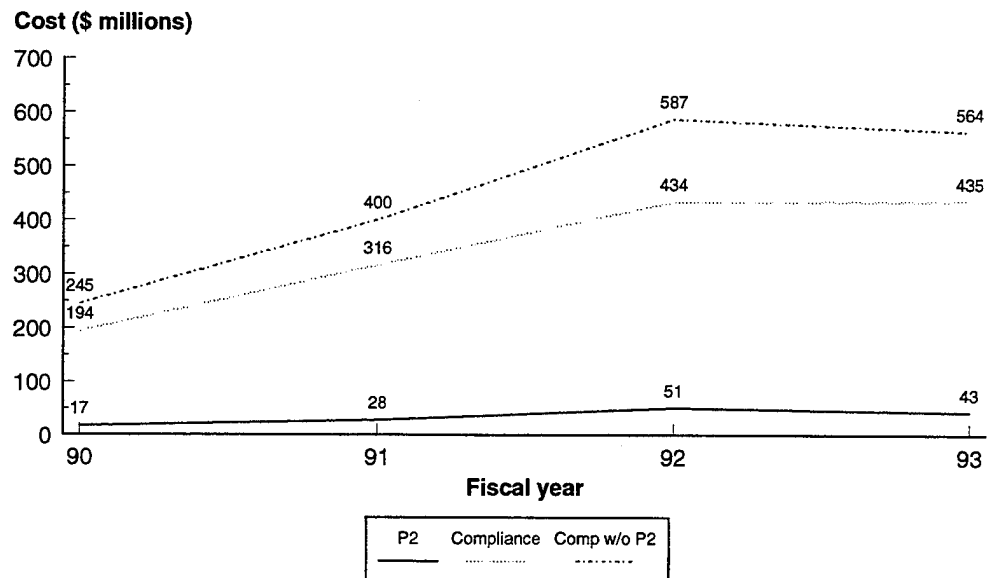
Computation of Projected Compliance Savings — Millions of Dollars

Expenditures	Air (3:1)	Water (3:1)	Assess/plan (3:1)	Hazardous waste (5:1)	Other (3:1)
Compliance	229.9	336.0	129.1	560.7	123.3
Prevention	6.1	52.1	30.0	43.0	7.7
Compliance without pollution prevention	248.2	492.3	219.1	775.7	146.4
Compliance savings (percent)	7	32	41	28	16

Using the Air data column as an example, an expenditure of \$6.1 million on prevention would equate to a compliance expenditure of \$6.1 million $\times$ 3 or \$18.3 million if prevention was not undertaken at all (assuming an ROI of 3:1). Adding this \$18.3 million to the compliance figure of \$229.9 million yields the result of \$248.2 million [compliance without pollution prevention (P2)]. The net reduction (i.e., savings) in compliance costs resulting from prevention is therefore $18.3/248.2 = 7$ percent.

To better visualize this effect, consider the graph in Figure A-1 below. This graph uses the same historical RCS 1383 expenditure data and assumes an average 3:1 ROI for prevention across all media program areas. What the graph shows is that for an expenditure equal to the area under the P2 curve, the Army would save compliance dollars in an amount equal to the area between the compliance and compliance without pollution prevention curves.

¹Figures taken from RCS 1383 data base, Fall 1993 update.



Note: P2 = pollution prevention. Compliance without pollution prevention is based on 3:1 ROI for pollution prevention investments.

Figure A-1.
Effect of Pollution Prevention Expenditures on Overall Compliance

APPENDIX B

Pollution Prevention Program
Requirements Sources, Program Areas,
Funding Approach, and
Cost Accounting

Pollution Prevention Program Requirements Sources, Program Areas, Funding Approach, and Cost Accounting

POLLUTION PREVENTION PROGRAM REQUIREMENTS SOURCES

Identified pollution prevention program requirements are derived from several sources as follows:

- ◆ The Pollution Prevention Act of 1990 (PPA1990).
- ◆ Clean Water Act (CWA), 33 U.S.C. 1251 et seq.
- ◆ Resource Conservation and Recovery Act (RCRA), Public Law 94-580.
- ◆ Superfund Amendments and Reauthorization Act (SARA) Title III, Public Law 99-499.
- ◆ Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law 96-510.
- ◆ Executive Order 12843, "Procurement Requirements and Policies for Federal Agencies for Ozone Depleting Substances," 21 April 93 (EO12843).
- ◆ Executive Order 12844, "Federal Use of Alternative Fuel Vehicles," 21 April 93 (EO12844).
- ◆ Executive Order 12845, "Requiring Agencies to Purchase Energy Efficient Computer Equipment," 21 April 93 (EO12845).
- ◆ Executive Order 12856, "Federal Compliance With Right-to-Know Laws and Pollution Prevention Requirements," 3 August 93 (EO12856).
- ◆ Executive Order 12873, "Federal Acquisition, Recycling, and Waste Prevention," 20 October 93 (EO12873).
- ◆ Executive Order 12902, "Energy Efficiency and Water Conservation at Federal Facilities," 8 March 94 (EO12902).

- ◆ HQDA Letter 200-94-1, "Army Pollution Prevention Program," Office of the Director of Environmental Programs (ODEP), Assistant Chief of Staff for Installation Management, 19 January 94.
- ◆ DoD Directive 4210.15, *Hazardous Material Pollution Prevention*, 27 July 89 (D4210.15).
- ◆ DoD Directive 5000.1, *Defense Acquisition Systems*, January 90 (D5000.1).
- ◆ DoD Directive 5000.2, Part 6, Section I: *System Safety, Health Hazards, and Environmental Impact, Defense Acquisition Systems Procedures*, June 91 (D5000.2).
- ◆ DoD Directive 6050.9, *Chloroflourocarbons and Halons*, 13 February 89 (D6050.9).
- ◆ DoD Instruction 6055.1, *DoD Occupational Safety and Health Program*, 26 October 84 (I6055.1).
- ◆ *DoD Pollution Prevention Strategy*, Office of the Deputy Undersecretary of Defense for Environmental Security (DoDPPS), 11 August 92.
- ◆ RCS 1383 Report, "Policy and Guidance for Identifying U.S. Army Environmental Program Requirements," July 1993 (1383).
- ◆ "DoD Environmental Technology Requirements Strategy" (DoDETRS), 1 June 94 .

Pollution prevention program requirements have been compiled and are provided at Appendix C. Each of the requirements shown is matched to one of the sources above as indicated under "basis for requirement." (Some requirements are found in several sources, in which case only the primary source is shown.) "Action agency" refers to the organization or activity having primary responsibility for addressing the requirement. The "environmental account" column indicates whether environmental funds should be used to address the requirement. "Category" and "program area" columns are further defined in the section that follows.

POLLUTION PREVENTION INVESTMENT FUND PROGRAM AREAS

The Pollution Prevention Investment Fund (PPIF) program areas (PAs) are established and defined below to facilitate PPIF development and to provide a mechanism for detailed cost accounting of pollution prevention program expenditures. PAs essentially categorize the requirements addressed above and detailed in Appendix C. PAs are designated by combining broad requirements categories (A to C) with more specific activities (numbered 1 through 9). For

example, a pollution prevention program management action required by an Executive order would be assigned PA A1.

Categories

Category A is pollution prevention reports, projects, or requirements that must be completed in order to comply with mandates/directives prescribed by Federal laws, statutes, regulations, executive orders, or other environmental legislation (including state and local requirements as appropriate).

Category B is pollution prevention initiatives, projects, or requirements that clearly go beyond compliance by demonstrating innovation, leadership, and/or positive investment potential/cost saving.

Category C is Headquarters, Army (HQDA)/OSD-directed pollution prevention projects or requirements that emphasize special strategic areas of concern.

Activities

1. *General* involves projects, programs, or activities needed to provide general pollution prevention program management, execution assistance, and technical support.
2. *Acquisition and Procurement* involves projects, programs, or activities needed to effectively integrate pollution prevention principles and practices into Army acquisition, procurement, and contracting operations.
3. *Logistics* involves projects, programs, or activities needed to effectively integrate pollution prevention principles and practices into Army materiel receipt, storage, handling, and transportation operations.
4. *Research, Development, Test, and Evaluation (RDT&E)* involves research and development projects or requirements related to innovative pollution prevention technologies.
5. *Information Transfer* involves projects, programs, or activities needed to disseminate Army pollution prevention success stories, exchange relevant information and/or technology, and foster support for continued investment in pollution prevention.
6. *Incentives and Recognition* involves projects, programs, or activities needed to provide incentive and foster initiative in implementing pollution prevention solutions in lieu of pollution control and cleanup.
7. *Performance Measurement* involves requirements or activities needed to assess and monitor the effectiveness of the Army pollution prevention program,

identify systemic and emerging pollution prevention problems or trends, and to develop strategies for achieving increased economies and efficiencies.

8. *Programming and Budgeting* involves activities or requirements needed to acquire requisite resources and track pollution prevention budgeting and execution (i.e., cost accounting) across all appropriations and funds [e.g., operation and maintenance (OMA) (Army), RDT&E, procurement, and Defense Business Operations Fund (DBOF)].
9. *Training* involves programs or activities needed to identify requisite pollution prevention training requirements (general awareness and technical) for the Total Army and to design, develop, and implement appropriate training programs.

GENERAL POLLUTION PREVENTION FUNDING APPROACH

Funding appropriations for pollution prevention include OMA, operation and maintenance (Army Reserve), operations and maintenance (National Guard), Army family housing, procurement appropriation (Army), weapons and tracked combat vehicle, RDT&E, military construction (Army), and DBOF. The general approach to funding each of the three broad categories of pollution prevention requirements is outlined below. Funding categories do not include projects that are not must fund, but are the responsibility of program executive officers/program managers, item managers, etc. These projects include routine modernization of the Army's industrial base, aggressive management of shelf-life hazardous materials, etc. The primary reasons for doing these projects are improving quality, enhancing readiness, and saving money. Pollution prevention is a potentially large side benefit.

Category A requirements will be addressed as must fund (i.e., Class I) requirements through established RCS 1383 reporting procedures. Designated action agencies are responsible for developing detailed action plans (where necessary) and for identifying the specific funding account and appropriation. Note, however, that pollution prevention projects generally falling outside the purview of the installation environmental coordinator (e.g., amend existing contracts to require the use of safe alternatives to ozone depleting substances) will not be funded from environmental accounts. Funding for these projects will come from RDT&E, acquisition, logistics or other appropriate accounts. The last column of the requirements list reflects which requirements qualify for funding from environmental accounts.

Category B requirements will be funded on a competitive basis from the PPIF that will be established and operated independently from other existing environmental compliance program accounts. As with Category A, action agencies are responsible for developing detailed action plans if needed. As stated earlier, initial start-up funding of \$84 million will be requested for FY97 as a one-time appropriation set-aside. Thereafter, the fund will be self-sustaining.

Category C requirements will be centrally funded at HQDA, Assistant Chief of Staff for Installation Management, by either Office of the Director of Environmental Programs or the U.S. Army Environmental Center, who are responsible for developing action plans and for identifying the specific funding account and appropriation. This may include the PPIF where appropriate.

POLLUTION PREVENTION COST ACCOUNTING

The Management Decision Package VEPP will be used to track pollution prevention program budgeting, funding, and execution across all appropriations and funds. Currently, program element 117056.FO captures all base operations (BASOPS) pollution prevention costs. Additional Army management structure codes will be developed (27 total — coinciding with the pollution prevention PAs previously described) to enable more detailed tracking of program expenditures, to include non-BASOPS pollution prevention costs related to weapon systems acquisition and inventory management.

APPENDIX C

List of Pollution Prevention
Program Requirements

List of Pollution Prevention Program Requirements

Category	Basis for Requirement	Requirement	Action Agency	Program Area (PA)	Environmental Account (Y/N)
A	CERCLA	Ensure that HW generators evaluate and document procedures for controlling the environmental impacts of their operations.	Installation	A1	Y
A	CWA	Obtain a stormwater discharge permit and develop stormwater pollution prevention plans (SWPPP) for all regulated industrial and construction activities.	Installation	A1	Y
A	CWA	Prepare SPCC plans IAW guidelines in 40 CFR 112.7 for all facilities that could reasonably be expected to discharge oil in harmful quantities into U.S. waters.	Installation	A1	Y
A	DoDPPS	Ensure that installation pollution prevention plans and investment strategies consider environmental justice concerns IAW E012898.	Installation	A1	N
A	DoDPPS	Ensure that significant environmental costs are included in the life-cycle cost estimates of MDAPs.	ARMYACQUEXEC	A2	N
A	DoDPPS	Focus pollution prevention RDT&E on developing and validating critical technologies needed for material and process modification.	ASARDA	A4	N
A	DoDPPS	Identify, quantify, integrate, and prioritize Army environmental security technology user requirements.	ASARDA	A4	N
A	DoDPPS	Implement integrated pest management Army-wide to reduce pesticide risk; reduce the amount of pesticide applied annually by 50% from the FY93 baseline.	Installation	A1	N
A	DoDPPS	Implement revised Military Standard 499B, Systems Engineering, by January 1995.	ARMYACQUEXEC	A2	N
A	DoDPPS	Integrate pollution prevention and other environmental concerns into the entire life cycle of acquisition programs from concept development to final disposal; identify and/or develop environmental life-cycle cost estimating tools.	ARMYACQUEXEC	A2	N

Category	Basis for Requirement	Requirement	Action Agency	Program Area (PA)	Environmental Account (Y/N)
A	DoDPPS	Leverage and integrate Army pollution prevention RDT&E programs with those of other government agencies, academia, and private industry.	ASARDA	A4	N
A	DoDPPS	Minimize the use of hazardous materials in all activities.	Installation	A1	N
A	DoDPPS	Promote pollution prevention awareness through multimedia outreach/awareness programs and partnerships; strengthen working relationships with environmental regulators at all levels.	ACSIM/ODEP	A5	Y
A	E012843	Alter existing equipment and/or procedures to make use of safe alternatives to ODSs.	Installation	A2	N
A	E012843	Amend existing contracts, as permitted by law, to require the use of safe alternatives to ODSs.	Installation	A2	N
A	E012843	Minimize procurement of of Class I ozone depleting substances.	DCSLOG	A2	N
A	E012843	Specify use of safe alternative goods and services that do not require use of Class I ODSs in new procurements and limit use of Class II ODSs consistent with section 612 of the CAA Amendments.	Installation	A2	N
A	E012844	If practical and appropriate (per SECDEF decision), acquire alternative fueled vehicles in numbers that exceed by 50 % the requirements for 1993 through 1995 set forth in the Energy Policy Act of 1992.	ASARDA	A2	N
A	E012845	Ensure that all acquisitions of microcomputers, including personal computers, monitors, and printers, meet EPA Energy Star requirements for energy efficiency; i.e., they shall be equipped with low-power standby feature.	Installation	A2	N
A	E012856	Collect data and submit TRI reports.	Installation	A1	Y
A	E012856	Comply with EPCRA release notification requirements.	Installation	A1	Y
A	E012856	Conduct internal reviews and audits, and take such other steps as needed to monitor compliance with EPCRA.	DAIG/AAA	A7	N
A	E012856	Develop a written Army pollution prevention strategy.	ACSIM/ODEP	A1	Y
A	E012856	Develop guidance for contractors to ensure they provide information needed to comply with EPCRA reporting requirements.	ACSIM/USAEC	A2	Y

Category	Basis for Requirement	Requirement	Action Agency	Program Area (PA)	Environmental Account (Y/N)
A	E012856	Develop pollution prevention plans for individual Army facilities that include baselines, PPOAs, and investment strategies.	Installation	A1	Y
A	E012856	Identify all Army facilities that must comply with EPCRA reporting requirements.	ACSIM/USAEC	A1	Y
A	E012856	Review specifications and standards to identify opportunities to eliminate or reduce the use of hazardous/toxic chemicals. Revise as appropriate.	ARMYACQUEXEC	A2	N
A	E012856	Submit annual progress reports on meeting EPCRA requirements to EPA.	ACSIM/ODEP	A1	Y
A	E012856	Submit information to LEPCs/SERCs IAW EPCRA.	Installation	A1	Y
A	E012873	Designate an Army Environmental Executive who serves at no lower than Deputy Assistant Secretary level to coordinate all environmental programs.	ASA(IL&E)	A1	
A	E012873	Develop and implement affirmative procurement programs in accordance with RCRA section 6002.	ASARDA	A2	N
A	E012873	Develop and implement an affirmative procurement program for all EPA designated items, i.e., concrete/cement containing fly ash; recycled paper products; re-refined lubricating oil; retread tires; and insulation containing recovered materials.	ASARDA	A2	N
A	E012873	Ensure that 100% of purchases of products meet or exceed EPA guideline standards for affirmative procurements.	DCSLOG	A3	N
A	E012873	Ensure that contract provisions for contractor operated facilities obligate the contractor to comply with the provisions of E012873.	Installation	A2	N
A	E012873	Identify, evaluate, and revise or eliminate any standards or specs unrelated to performance that present barriers to the purchase of paper or paper products made by production processes that minimize emissions of harmful byproducts.	ARMYACQUEXEC	A2	N
A	E012873	Implement EPA procurement guidelines for re-refined lubricating oil and retread tires.	DCSLOG	A3	N
A	E012873	Meet or exceed the minimum materials content standards when purchasing or causing the purchase of printing and writing paper.	Installation	A3	N

Category	Basis for Requirement	Requirement	Action Agency	Program Area (PA)	Environmental Account (Y/N)
A	E012902	Conduct energy and water surveys and audits for each facility.	Installation	A1	Y
A	E012902	Design and construct new facilities to minimize life cycle costs by utilizing energy efficiency, water conservation, or solar or other renewable energy technologies.	Installation	A1	N
A	E012902	Develop and apply incentive programs such as gain sharing, shared energy performance contracting, and utility demand side management programs.	Installation	A6	N
A	E012902	Develop and implement a program for industrial facilities to increase energy efficiency by 20% by 2005 (1990 baseline).	ACSIM/ODEP	A1	Y
A	E012902	Develop and implement a program to reduce energy consumption for buildings in use by 20% by 2000 (1985 baseline).	Installation	A1	Y
A	E012902	Develop and implement a program to reduce energy consumption for buildings in use by 30% by 2005 (1985 baseline).	ACSIM/ODEP	A1	Y
A	E012902	Establish and promote efficient material/energy-use practices through conservation, reutilization, materials substitution, recycling, affirmative procurement, and by creating markets for recycled materials.	Installation	A1	N
A	E012902	Identify and accomplish all energy and water conservation actions which pay back in 10 years or less by 2005.	Installation	A1	Y
A	E012902	Implement a comprehensive program to accomplish cost effective conservation in all existing installations and energy systems.	Installation	A1	Y
A	E012902	Incorporate into facility leases provisions that minimize the cost of energy and water under a life cycle analysis.	Installation	A1	N
A	E012902	Maximize use of environmentally friendly materials in the planning, programming, construction, and maintenance of facilities and installations.	Installation	A1	N
A	E012902	Minimize petroleum-based fuel use in buildings and facilities.	Installation	A1	N
A	E012902	Procure energy-efficient products IAW OMB guidelines under Section 161 of the Energy Policy Act of 1992.	DCSLOG	A3	N

Category	Basis for Requirement	Requirement	Action Agency	Program Area (PA)	Environmental Account (Y/N)
A	E012902	When more than 5 buildings are constructed in one year, designate at least one as a showcase highlighting advanced technologies and practices for energy efficiency, water conservation, or use of solar or other renewable energy.	ACSIM/ODEP	A1	N
A	E012902	Where feasible, increase use of solar and other renewable energy sources.	Installation	A1	N
A	PPA1990	File a toxic chemical source reduction and recycling report for the preceeding calendar year. The report will cover each toxic chemical required to be reported in the annual TRI form.	Installation	A1	Y
A	RCRA	Institute a hazardous waste minimization (HAZMIN) program to the extent that it is economically practicable.	Installation	A1	Y
A	RCRA	Prepare HW contingency plans to provide installation personnel with procedures and responsibilities to respond to emergencies.	Installation	A1	Y
A	SARAI111	Assign emergency coordinators to prepare for emergency releases of hazardous substances.	Installation	A1	N
B	E012856	Achieve a 50% reduction in total toxic chemical/pollutant releases to the environment and off-site transfers for treatment and disposal by end of 1999. Source reduction is preferred method. Base year is first year of TRI reporting.	ACSIM/ODEP	B1	Y
B	E012856	Develop and test innovative pollution prevention technologies at facilities in order to encourage development of strong markets for same. Utilize partnerships with industry, government agencies, academia, and others to assess and deploy them.	ASARDA	B4	Y
B	E012856	Establish plans and goals for eliminating or reducing unnecessary acquisition of products or systems containing hazardous materials or toxic chemicals. Also reduce Army manufacturing, processing, and use of same.	ASARDA	B2	N
B	E012856	Place high priority on obtaining funding and resources needed for implementing all aspects of E012856. Primary vehicle is A-106/1383. Apply life cycle analysis and total cost accounting principles to all identified projects.	Installation	B8	Y
B	E012873	Develop an internal awards program, as appropriate, to reward the most innovative environmental programs.	ACSIM/ODEP	B6	Y

Category	Basis for Requirement	Requirement	Action Agency	Program Area (PA)	Environmental Account (Y/N)
B	E012873	Ensure compliance with the provisions of E012873 in the acquisition and management of federally owned and leased space.	ACSIM/ODEP	B2	Y
B	E012873	Establish goals for solid waste prevention and recycling to be achieved by the year 1995.	DASA(ESOH)	B1	Y
B	E012873	Establish model facility demonstration programs that include waste prevention and recycling programs and emphasize the procurement of recycled and environmentally preferable products and services using an EDI system.	ACSIM/ODEP	B2	Y
B	E012873	In plans, drawings, SOWs, or other product descriptions consider: eliminating virgin materials; using recovered materials; reusing products; life cycle cost; recyclability; environmentally preferable products; waste prevention; and ultimate disposal.	Installation	B2	N
B	E012873	Increase the procurement of products that are environmentally preferable or that are made with recovered materials and set annual goals to maximize the number of recycled products purchased, relative to non-recycled alternatives.	DCSLOG	B3	N
B	E012873	Initiate a program to promote cost effective waste prevention and recycling of reusable materials at all facilities.	ACSIM/ODEP	B1	Y
C	ODEP	Address the PR R&D issue -- funding level, specific pillars to address, how to get biggest bang for \$, ROI methodology, algorithms to use, etc.	ASARDA	C4	N
C	ODEP	Determine how can Army move toward P2 as primary means for achieving compliance.	ACSIM/ODEP	C1	Y
C	ODEP	Establish a system to track pollution prevention budgeting and execution (i.e., cost accounting) across all appropriations and funds.	ASAFM	C8	N
C	ODEP	Establish and manage an Army-wide Pollution Prevention Opportunity Assessment (PPOA) program.	ACSIM/ODEP	C1	Y
C	ODEP	Identify P2 success stories to document the ROI of P2 across the Army.	ACSIM/USAEC	C5	Y
C	ODEP	Identify incentives the Army should provide to foster initiative in implementing P2 projects and activities.	ACSIM/ODEP	C6	Y

REPORT DOCUMENTATION PAGE

Form Approved
OPM No.0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources gathering, and maintaining the data needed, and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

1. AGENCY USE ONLY (Leave Blank)		2. REPORT DATE May 1995	3. REPORT TYPE AND DATES COVERED Final
4. TITLE AND SUBTITLE Army Pollution Prevention Program: Proposal for a Pollution Prevention Investment Fund			5. FUNDING NUMBERS C MDA903-90-C-0006 PE 0902198D
6. AUTHOR(S) Christopher P. Werle			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Logistics Management Institute 2000 Corporate Ridge McLean, VA 22102-7805			8. PERFORMING ORGANIZATION REPORT NUMBER LMI- AR427RD1
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Mr. David C. Guzewich Chief, Environmental Compliance Division U.S. Army Environmental Center (SFIM-AEC-EC) Aberdeen Proving Ground, MD 21010-5401			10. SPONSORING/MONITORING AGENCY REPORT NUMBER
11. SUPPLEMENTARY NOTES			
12a. DISTRIBUTION/AVAILABILITY STATEMENT A: Approved for public release; distribution unlimited			12b. DISTRIBUTION CODE
13. ABSTRACT (Maximum 200 words) Despite increased emphasis on pollution prevention, Army installations are not funding their pollution prevention programs at effective levels. This situation has resulted in part from the current Army environmental "must fund" policy and its associated reporting system. By the time all must fund projects and other mission-essential requirements have been funded, the typical installation has few resources left to apply toward the heretofore lower priority prevention projects that "go beyond compliance." This research document outlines a proposal for establishing and operating a pollution prevention investment fund, which would provide an alternative source of funding for prevention projects (to be administered separately from existing environmental compliance accounts). Specific areas addressed by the proposal include project prioritization and funding criteria, procedures for identification and disposition of savings, alternative fund start-up and sustainment sources, as well as a suggested approach for pollution prevention cost accounting.			
14. SUBJECT TERMS Pollution prevention; investment funds; innovation funds			15. NUMBER OF PAGES 46
			16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL