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U.S. ARMY FORCES COMMAND

POLLUTION PREVENTION PLAN

January 1998

This document covers pollution prevention programs for the Active Component only at the 11 installations that were part of FORCES COMMAND on 1 Oct 97. It does not cover the Reserve Component. Information on Third Army and Signal Command P2 activities will be included in the next update of this document.

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1.0 EXECUTIVE SUMMARY

- **COMMITMENT.** FORSCOM is committed to a team effort to prevent pollution and environmental damage.

- **COMMAND RESULTS 1996**
  - Hazardous waste disposal DOWN 29% from 92 to 96
  - Solid waste disposal DOWN 33% from 92 to 96
  - Toxic releases DOWN 10% from 94 to 96
  - Pesticide application DOWN 37% from 93 to 96
  - Energy use per square foot DOWN 6% from 85 to 96
  - 8% of solid waste RECYCLED in 96
  - 81% of stormwater P2 practices COMPLETE by 96
  - Water use DOWN 17% from 92 to 96
  - Wastewater discharge DOWN 6% from 92 to 96

- **COMMAND STATUS 1996**
  - FORSCOM generated 928 million pounds of pollutants.
  - Non-hazardous solid waste was 97% of the total pollution generated.
  - FORSCOM used 19 billion gallons of water, which resulted in 17 billion gallons of wastewater.
  - FORSCOM paid $87 million for the privilege of polluting and using natural resources.
  - FORSCOM used 18 million BTUs of energy at a cost of $148 million.

- **INVESTING FOR THE FUTURE**
  - **Over $7 million/year saved** by P2 projects costing $26 million from 96 - 98
  - **$12.5 million/year potential savings** by planned P2 projects of $46 million from 99 - 03 (energy projects not included)
  - **Savings are primarily in the logistics stream, *not* in environmental costs**
  - **A shortfall of $56 million from FY 99 - 03** (total requirement of $76 million; program budget guidance of $20 million) will be reduced through use of the FORSCOM environmental investment strategy

- **FORSCOM POLLUTION PREVENTION GOALS**
  - Sustain readiness by saving mission money
  - Sustain readiness by saving soldier time
  - Move from compliance-oriented environmental management to prevention-oriented
  - Reduce specific pollutants and conserve natural resources in accordance with installation-specific goals

2.0 FORSCOM POLLUTION PREVENTION PROGRAM STATUS

2.1 Definition of Pollution Prevention.

The Forces Command Pollution Prevention Plan outlines FORSCOM's status and past, current, and future initiatives to prevent pollution and reduce adverse environmental impacts. In FORSCOM, pollution prevention is not a stand-alone "program" that is separable from the total environmental management program. Rather, it is an integrated approach to conducting all installation business in a way that **prevents** significant environmental impacts. Preventive approaches to environmental compliance requirements are the first choice at FORSCOM installations, when they are cost-effective and technically feasible. As shown in the table below, FORSCOM has spent about 15% of all environmental dollars on prevention of pollution and environmental damage. This includes compliance and conservation-related requirements (such as stormwater pollution prevention, erosion control, spill prevention), as well as pollution prevention projects done to achieve a return on investment. FORSCOM anticipates doubling the percentage of the environmental budget spent on preventive approaches to 30% during the 99-03 POM cycle, as pollution prevention is further integrated into the environmental compliance program. Background data supporting these figures are in Appendices A through K which show individual installation's status and programs for FY 96 - 98; and in section 2.3.3 for 99-03 estimated requirements.)

FY	Environmental budget VENC+VEPP+VENN	Total spent on "preventive approaches" in all accounts	% spent on preventive approaches
96	$131 million	$19 million	14%
97	$124 million	$16 million	13%
98	$123 million	$21 million	17%
99-03	$629 million	$183 million	29%

Pollution prevention is the Army and DoD preferred approach to environmental management. AR 200-1, Chapter 10 (21 Feb 97) requires the major Army commands to "*establish a pollution prevention plan ...that identifies a systematic approach to reduce all adverse environmental impacts.*" DODI 4715.4, Pollution Prevention, 18 June 96, defines pollution prevention as "*source reduction as defined in the Pollution Prevention Act of 1990, and other practices that reduce or eliminate the creation of pollutants through: (a) increased efficiency in the use of raw materials, energy, water, or other resources; or (b) protection of natural resources by conservation.*

2.2 FORSCOM Environmental Impacts

Forces Command's mission is to train, mobilize, and deploy combat-ready forces to meet operational commitments. These forces, their families, and civilian support workforce are housed and trained at 11 major installations located throughout the US that have facilities and operations similar to small cities. These operations cause a wide variety of environmental impacts on air, land, and water.

a. **Land** and habitat disturbance, erosion, and soil contamination - caused by training exercises, construction, and maintenance of weapons systems and facilities.

b. **Air** emissions, caused by energy production, fuel use, maintenance of weapons systems and facilities, and dust from military training and prescribed burns.

c. **Water** pollution, caused by operating housing and administrative facilities, washing vehicles and equipment, and maintenance of weapons systems, facilities, and grounds.

Since FORSCOM installations are geographically located in various types of ecosystems, the nature of impacts or sensitivity of the environment to these impacts will vary from installation to installation. Some of the activities, such as military training, are mission related and unique to military installations. Other activities, such as solid waste generation or water and energy consumption are more common and reflect the fact that installations provide living and working space for military members, their families, and the civilian workforce. The types of activities, common environmental impacts, target media and contaminants of concern are identified in Appendix L.

2.3 FORSCOM Pollution Prevention Results

This section contains a "snapshot" of progress Command-wide and at each installation towards lessening environmental impacts, and highlights innovative technologies and practices at each installation.

2.3.1 Pollution Reduction

The status of the program at each installation is shown in Appendices A through K. Technologies and business practices used at each installation to attain these results are shown in Appendix M. FORSCOM-wide total reductions are as follows:

- Hazardous waste disposal DOWN 29% from 92 to 96
- Solid waste disposal DOWN 33% from 92 to 96
- Toxic releases DOWN 10% from 94 to 96
- Pesticide application DOWN 37% from 93 to 96

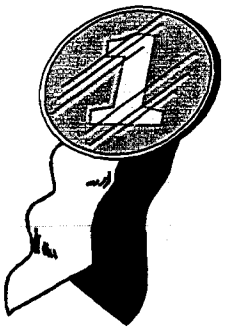
- Energy use per square foot DOWN 6% from 85 to 96
- 8% of solid waste RECYCLED in 96
- 81% of stormwater P2 practices COMPLETE by 96
- Water use DOWN 17% from 92 to 96
- Wastewater discharge DOWN 6% from 92 to 96

2.3.2 Awards

Forces Command is proud of the accomplishments of its installations. They have been recognized by both headquarters Army and DoD, as well as many of their state regulatory authorities, for their contributions to environmental stewardship. In FY 96 alone, FORSCOM installations earned 3 state, 1 DOD and 9 Army environmental awards, based solely or in part on prevention of pollution and environmental damage.

Award	**Installation**	**Army**	**DoD**
Pollution Prevention - non-industrial inst.	Ft. Lewis	**1st place**	**1st place**
Recycling	Ft. Hood	**1st place**	
Natural Resource Conservation	Ft. Carson	**1st place**	
Recycling	Ft Carson	2nd place	
Environmental quality - non-industrial inst.	Fort Hood	2nd place	
Pollution Prevention - Non-Industrial	Ft. Campbell	3rd place	
Environmental quality - individual	Dr. Hull, Ft. Polk	3rd place	
Natural Resource Conservation	Ft. Polk	3rd place	
Natural Resource Conservation - individual	Ms. Stevens, Ft. Polk	3rd place	

The initiatives at some of the winning installations are highlighted on the next page; Appendices A through K contain a synopsis of each installation's pollution prevention program.



Fort Lewis was selected as the 1st place winner of the 1996 DOD Pollution Prevention Award for Non-Industrial Installations in recognition of its on-going, comprehensive, innovative pollution prevention program. Fort Lewis is now preparing its second five year pollution prevention plan. The installation has achieved a 35% hazardous waste reduction since 1991, having implemented over 143 pollution prevention projects. Fort Lewis was selected as a major DOD field test site for seven candidate solvents used in vehicle maintenance and operations, and was chosen as one of three DOD representatives to spearhead a pilot project intended to provide a more flexible and cost effective approach to environmental management. Fort Lewis' long history of cooperative stewardship was instrumental in its being awarded the Washington Department of Ecology's Environmental Excellence Award.

Fort Hood earned 1st place in the 1996 Department of the Army Recycling Award for Non-Industrial Installations. The installation's Recycling Center processes more than 350 tons of material each month, and between 1.5 million and 2.5 million pounds of scrap metal are recycled each quarter. Fort Hood recycles 12,000 gallons of antifreeze every two weeks, reconditions and reuses latex paints, crushes and recycles oil filters, and retreads tires whenever possible. Battery life extension and recharging practices have allowed Fort Hood to reduce new lead/acid battery purchases by more than 35%. Currently, pollution prevention staff are aggressively pursuing solvent substitution and elimination efforts within the DOL.

Fort Campbell, winner of the 3rd place 1996 US Army Pollution Prevention Award, has achieved significant reductions in pollution through their Environmental Quality Officer Program. EQOs throughout the installation implement pollution prevention projects and provide source reduction, reuse, and recycling recommendations to the pollution prevention staff. Fort Campbell's Hazardous Materials Control Center avoided costs of more than $400,000 after 7 months of operation, increased operational readiness dramatically, reduced material consumption and waste generation rates, and passed both State and Federal compliance audits with no findings. Fort Campbell's Multi-Media Inspection Program provides a self-sustaining team which ensures continuous improvement, serves as a vehicle to transfer lessons learned, and eliminates the root causes of potential environmental violations.

2.3.3 Pollution Prevention Investment and Return on Investment

Pollution prevention dollars in program element VEPP are justified based on potential return on investment. Class 1 projects pay back in 0-2 years; Class 2 projects in 3-5 years; Class 3 projects in more than 5 years. Though specific project-level ROI is not available, FORSCOM estimates return on investment for the P2 program by "back calculating" from the payback period, using an average payback of 1 year for Class 1 funding, and 4 years for Class 2. The results of these calculations are shown in the table below for 96-98 programmed funds; and 99-03 estimated requirements. Investment of $26 million from 96 through 98 in Class 1 and 2 projects is currently saving the Command over $7 million/year. Planned investment of an additional $46 million in P2 projects funds from 99 through 03 could save an additional $12.5 million/year.

FY	VEPP Class 0** (no ROI)	VEPP Class 1	ROI at average 1 year payback	VEPP Class 2	ROI at average 4-year payback
96 program	0	210k	210 k/year	17,000k	4,250 k/year
97 program	6,900 k	700k	700 k/year	2,500k	625 k/year
98 program	8,000 k	50k	50 k/year	6,000k	1,500 k/year
99-03 requirement*	30,000 k	0k	0k/year	45,000k	11250 k/year
Total	$44900k	$961k	$961k/year	$70502k	$17625 k/year

** The total Class 0, 1, and 2 pollution prevention (VEPP) requirement for 99-03 is $76 million; Class 0 is an estimated $6M/year based on 97/98 programs. See section 4.5 for further explanation of the 99-03 requirement.*

*** Class 0 requirements are recurring requirements for program planning, reporting, and record-keeping. FORSCOM has not funded any Class 3 requirements with payback periods longer than 5 years; therefore they are not shown in this table or included in this plan.*

3.0 FORSCOM HEADQUARTERS P2 INITIATIVES

3.1 Roles and Responsibilities

HQ FORSCOM is responsible for management and oversight of the P2 program. The installations do the heavy lifting of program planning and execution. **It is FORSCOM policy that specific goals, priorities, and projects are determined at each installation, in accordance with local priorities established by the installation mission and environmental impacts, and concerns of the local regulators and community.**

FORSCOM's approach to environmental management includes these roles and responsibilities:

- FORSCOM - Set policy

- FORSCOM - Provide resources.
- Installations - Assess environmental impacts.
- Installations - Plan for preventing or lessening environmental impacts.
- Installations - Implement the plan.
- Installations - Check and assess progress.
- FORSCOM - Review results.

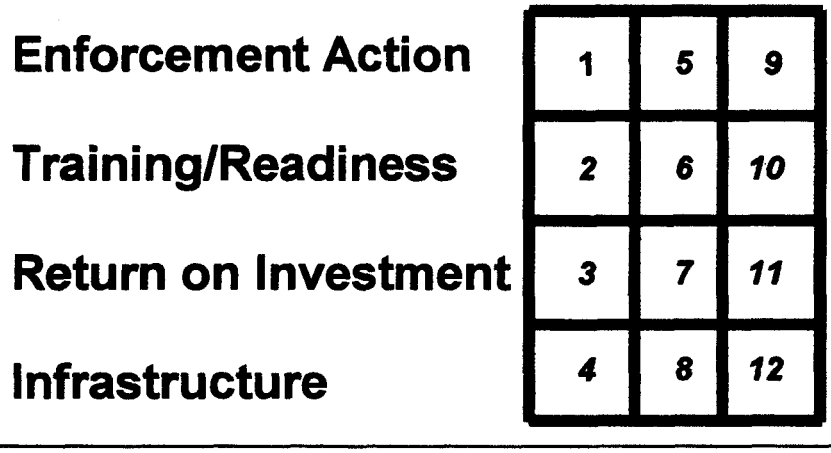
How FORSCOM meets the three headquarters' responsibilities is discussed in detail in the sections that follow: section 3.2 details FORSCOM's policy and section 3.3 discusses funding, manpower, and technical assistance provided by FORSCOM.

3.2 Set Policy

HQ FORSCOM is responsible for setting pollution prevention policy and encouraging adherence to the policy through program and budget guidance. HQ FORSCOM does this in two ways.

The HQ FORSCOM EQB, chaired by the FORSCOM Chief of Staff, and the **FORSCOM Pollution Prevention Work Group** act as an advocate for resources in support of pollution prevention initiatives. The P2 Work Group is made up by personnel from Environment, Engineer, Logistics, Budget, Operations, Public Affairs, and Staff Judge Advocate. The work group serves as a cross-functional integrated team to evaluate, prioritize, and recommend approval of pollution prevention initiatives. The group also investigates pollution prevention opportunities that may be relevant to FORSCOM installations, and provides a forum for sharing lessons learned between installations.

The HQ FORSCOM Environmental Investment Strategy, shown below, sets forth funding policy that enables installations to take a preventive approach to environmental management.



Through the use of this investment strategy, the FORSCOM Commander provides the installations with yearly budget guidance on how to prioritize limited environmental resources among all requirements with a good balance between compliance and prevention. The left side of the table lists FORSCOM priorities: enforcement action (compliance), readiness, return on investment, and infrastructure. The top axis of high, medium, low priority, ranks the requirements in terms of when adverse consequences would actually occur if the requirement was not funded: 1-2 years out, 3-5 years, and more than 5 years; or for when the savings would occur for ROI-related projects. Working with its installations, FORSCOM places each funding requirement in one of the 12 boxes according to its priority in terms of risk and return on investment.

This strategy allows good environmental stewardship AND good investment decisions by providing a balance of preventive and compliance approaches. In use since FY 96, this strategy has helped FORSCOM to allocate over $41 million dollars to the pollution prevention program. This total includes $26 million worth of investment projects that might not have been done under a strategy that gave first priority to all compliance projects, without assessing the management risk associated with them. The return on the 96-98 investment of $26 million is over $7 million/year. The table below shows the results of using the FORSCOM investment strategy vs relying solely on the existing "must fund" policy.

FY -total envir funding	"must fund" policy P2 investment	ROI	FORSCOM strategy P2 investment	ROI
96 - $131 million	$4.5 million VEPP	$1.3 million/year	$17 million VEPP	$4.5 million/year
97 - $124 million	$4.2 million VEPP	0*	$10 million VEPP	$1.3 million/year
98 - $123 million	$2.7 million VEPP	0	$14 million VEPP	$1.5 million/year
Totals	$11 million	$1.3 million/year	$41 million	$7.3 million/year

** The ROI is 0 because the P2 funding allocated under the "must fund" policy is not enough to finance the program planning and management requirements of EO 12856; it would not provide for projects with return on investment potential.*

3.3 Provide Resources

HQ FORSCOM provides three types of resources to assist installations in their pollution prevention efforts: funding, manpower, and technical assistance. Recently completed, on-going, and future initiatives in each of these areas are discussed in the sections below.

3.3.1 Funding

Programmed investments in pollution prevention from 96-98 are shown in Appendices A through K for each installation. Beginning in FY 96, FORSCOM specifically funded many P2 projects that were not compliance-driven, but focused on better business practices and return on investment. This high investment in prevention initiatives was made possible by using the investment strategy described in section 3.2 to increase the balance of P2-related projects in the overall environmental program. FORSCOM actually funds and executes P2 projects in many different budget lines: environmental compliance, pollution prevention, ITAM, energy conservation, minor construction, equipment purchases, and mission funds. However, in the formal pollution prevention line alone (VEPP), which is oriented primarily towards projects that provide a return on investment, FY 96 investment was $17 million; FY 97 investment was $10 million; planned investment in FY 98 is $14 million. Requirements of $76 million for FY 99 - 03 are broken out and discussed in section 4.5.

3.3.2 Manpower

FORSCOM provided all installations with funding to cover the cost of a full-time dedicated pollution prevention program manager in FY 96. In FY 97, 10 additional authorizations, or "slots," were distributed to the major FORSCOM installations for pollution prevention program management, as well as funding to cover those positions. The 97 Environmental Quality Report to Congress showed 41 federal employees (39 civilian, 2 military) dedicated to P2 at FORSCOM installations. **These individuals, along with their other colleagues at installation level, deserve the vast majority of the credit for the pollution reductions and return on investment described in section 2.3.** They are the best investment in P2 that FORSCOM has made.

In addition, FORSCOM has developed and signed Memoranda of Understanding (MOU) with the Department of Energy, the US Geological Survey, and the Natural Resource Conservation Service to provide on-site technical advice and regulatory expertise to FORSCOM installations. Agreements with The Nature Conservancy and the US Fish and Wildlife Service will be developed in 98. In addition, some FORSCOM installations have their own MOUs with these agencies. Twenty-five personnel are dedicated to FORSCOM P2 initiatives through these agreements and contractual arrangements.

3.3.3 Guidance and Technical Assistance

FORSCOM provides technical assistance to installations in a variety of ways.

The FORSCOM Environmental Operations Center (FEOC): The FEOC has provided technical assistance and direct on-site consulting to FORSCOM installations since FY90. The FEOC fields 30-50 phone calls each month on a wide variety of environmental topics, and follows up with 6-7 site visits a year for in-depth studies, plans, and data

collection. They publish *The Grapevine* quarterly, and coordinate the Recycling Subcommittee of the FORSCOM EQCC. In the pollution prevention area specifically, they write and update the installation spill plans upon request, and have done a number of solid waste characterization studies and waste stream analysis surveys.

Information: FORSCOM has a full-time staff member dedicated to pollution prevention, who acts as a clearinghouse of lessons learned between the installations. In addition, video teleconferences are held as needed with individual or groups of installations. A meeting of the installation environmental chiefs was held at FORSCOM in May 97 to exchange views on funding and investment strategy. A meeting of FORSCOM and installation pollution prevention staffs was held in August 97.

Staff assistance: FORSCOM environmental staff visit the installations on a continual basis to provide command emphasis, spread "lessons learned" throughout the command, participate in ECAS assessments, and offer general assistance to the installations. Fourteen installation visits took place in FY 97; eight are already scheduled for FY 98.

Studies, policy changes, and projects with Command-wide impact: Within the headquarters, FORSCOM performs specific studies and projects that are of interest to at least several installations. In addition, the headquarters staff implements policy changes from the FORSCOM level that remove institutional barriers and assist the installations in pollution prevention. Recent examples are listed below:

1. Fielding of HMCCs: One of FORSCOM's major initiatives is 100% fielding by the end of 01 of Hazardous Material Control Centers (HMCC). These are centers in which hazardous materials are centrally managed from cradle to grave. This is a joint effort between Environmental and Logistics staff. FORSCOM will provide "seed money" to the installations of up to $500k for the first three years of operation. After that, the HMCCs must pay for themselves, either through charge-backs to the using units or some other means.

As part of this initiative, the *FORSCOM Hazardous Substances Management Plan* was sent to installation Command, Logistics, and Environmental staffs in July 97 for comment. The Plan provides guidance on hazardous material inventory control, and is applicable to all organizations that use hazardous materials (e.g. tactical and base operations and tenant activities). The guidance recommends that installation commanders establish HMCCs. The Plan establishes FORSCOM funding policy, sets MACOM and installation level roles and responsibilities and contains a five year fielding plan. The tentative fielding schedule is as follows:

FY 97 - Forts Campbell, Carson
FY 98 - Forts Irwin, Lewis, Hood
FY 99 - Forts Drum, Bragg, Riley
FY 01 - Forts Stewart, McPherson, Polk

2. *Policy on local contracting for HW disposal.* In FY 92, FORSCOM established policy allowing the installations to contract locally for hazardous waste disposal, rather than being forced to use the Defense Reutilization and Marketing Service (DRMS). This allowed them to take advantage of small local recycling options, which DRMS is not well suited to pursue given its worldwide mission and responsibilities. The February 97 version of AR 200-1 mandates the use of DRMO for all hazardous waste disposal and recycling. FORSCOM is seeking a waiver through its reinvention lab, to reinstate the 92 policy for FORSCOM installations with appropriate safeguards.

3. *Policy on direct sales of recyclable materials.* In FY96, FORSCOM transmitted a reinvention waiver to allow installations to directly sell to local buyers many recyclable materials that had been purchased with appropriated funds, such as cardboard, paper, glass, metals, plastics, etc. This waiver was formalized in May 97 by a policy letter signed by the FORSCOM Commander. Benefits of direct sales include better prices for recyclable materials, making solid waste recycling more cost-effective and defensible.

4. *Policy Changes to Reduce Hazardous Materials Use* – In FY97, FORSCOM Environmental and Logistics staff started evaluating policy changes that will lead to reduced hazardous material usage in unit maintenance operations. The first policy change, now being evaluated by TACOM, will reduce the frequency of antifreeze changes in tactical vehicles, mandating that coolant changes be based on quality rather than elapsed time. The potential savings from this one change are $1-2 million/year and 30-50 man years/year across FORSCOM. The next policy change to be considered is putting more vehicles on the Army Oil Analysis Program (AOAP).

5. *Dust Study* – HQ FORSCOM is conducting a dust suppression study investigating non-aqueous methods of decreasing particulate matter in arid or semi-arid climates. Concerns about the proposed CAA particulate matter standards, safety issues and the single emission factor used to estimate all off road vehicle dust generation prompted the investigation. A working group comprised of all interested FORSCOM installations gives direct feedback to FORSCOM and Pacific Northwest National Laboratories (Department of Energy laboratory conducting study) and provides guidance on installation concerns to ensure the results of the study are both exportable to all locations and provide necessary information for use in fugitive dust negotiations with local regulators.

6. *Smoke Study* – Many natural resource managers are convinced that less total pollutants are put into the air from frequent, prescribed fires than from infrequent, catastrophic fires. The trouble is that no one has data to support this widely-held belief. In order to have this data, FORSCOM has funded a study at Fort Stewart by nationally recognized U.S. Forest Service experts to determine exactly what the components are and how much of each is present. Data from ground and aerial monitoring will be added to a regional smoke dispersion model to enable local foresters to manage the smoke from these prescribed burns better. Subject to funding availability, the same studies will be conducted at Fort Polk, because there is a significant "hole" in the USFS data set for that portion of the Southeast.

7. TRI Emissions Quantification Study – FORSCOM is partnering with USACERL to perform a study to determine the actual emissions of TRI chemicals from FORSCOM installations, including emissions from sources that are currently exempt from TRI reporting. Results from this study will indicate the actual toxic chemical pollution load released into the environment, as opposed to only the non-exempt load which is currently reported under the Toxic Release Inventory. The study will provide a more accurate picture of the toxic substances from FORSCOM installations and will be used by FORSCOM to set future project and funding priorities.

8. Army-unique solid waste study. FORSCOM has teamed with PNNL to examine Army-unique solid wastes at Ft. Polk and Ft. Irwin, and try to mesh up with local industries to reuse them. Examples of Army-unique solid wastes are unused Meals Ready to Eat (MRE) and concertina wire. The study's purpose is to use industrial ecology principles where local industries will reuse or recycle solid wastes generated at the FORSCOM installations and provide the "product" back to the installation or another local market.

9. Partnerships with local universities. FORSCOM has worked with the Georgia Institute of Technology many times, providing real-world applications for their students and professors on topics of mutual interest. Much of the time, these studies are done at no cost to the Army. This year, students from the City Planning Department are performing a Design For Environment study at Fort Stewart, investigating how to integrate pollution prevention approaches into selected industrial activities.

10. Solargizers. These devices use solar power to keep vehicle battery plates clean, thereby lengthening their lifetimes indefinitely. Many FORSCOM installations installed these in FY 95/96, including Forts Polk, Hood, Bragg, and Campbell. Approximately 18,000 solargizers were installed, mostly on vehicles. III Corps intends to install them on every piece of equipment by the end of FY 98.

11. Changing the length of service on Safety Kleen contracts has resulted in significant savings in both solvent disposal and costs. The standard frequency of Safety Kleen solvent change-out service for parts washers is 6-8 weeks. By extending the frequency of service, a significant reduction in solvent usage and reduced costs have been achieved. In some cases, the frequency has been extended to 12 weeks. Some installations have procured parts washers with filter systems, which significantly extend the life of the solvent even further.

12. Managing Forests Correctly – As DoD installations change their land management strategy from a commercial base to one that supports the assigned military mission and manages the overall ecosystem, we anticipate a subsequent reduction in the amount of pesticides used. This is because the southeastern installations were originally dominated by Longleaf Pine, rather than Loblolly or Slash Pines. Longleaf is more disease and insect-resistant

than either of the other two pine species. The reduction will be further enhanced by using less herbicides because we are controlling excessive vegetation with prescribed burning.

13. Elimination of hydrocarbon solvents that are RCRA or EPCRA regulated. The G4 is developing a potential FORSCOM-wide contract for use in FY 98 that has options for the installations/units to use the 6 TARDEC-approved solvents that are non-hazardous - and unregulated. Several FORSCOM installations are already procuring parts-washer systems and low-VOC, high flashpoint petroleum hydrocarbon solvents for use in vehicle and weapons maintenance shops. Use of these solvents in aviation maintenance units may be approved on a case-by-case basis. FORSCOM's previous central contract for parts cleaning switched to Chemfree, an aqueous, enzyme-based parts washer system in FY 97. Enzymes biodegrade oils; therefore little or no waste other than filters is generated. All FORSCOM and Reserve units in Regions I, IV, X used it during FY 97. Laboratory testing is on-going at the Army Testing Center, with results pending in FY 98, due to concerns about corrosion of aviation parts by the aqueous cleaner.

14. Application of universal waste rule. During staff assistance visits, FORSCOM personnel discuss the universal waste rule with installation hazardous waste managers. Through proper application of the universal waste rule (UWR), FORSCOM installations could reduce HW generation and disposal. Most installations can achieve hazardous waste reductions (and cost savings) by simply taking advantage of the UWR for the disposal of batteries, thermostats and pesticides. Under the UWR, nickel-cadmium, lead-acid, and even discharged lithium batteries, mercury-switch thermostats, and off-spec pesticides can be stored for up to one year, a commercial transporter can be used, and the shipment can be documented using a standard bill of lading. Required paperwork, transportation costs and disposal costs can be significantly reduced, since the wastes are not managed or disposed as hazardous waste.

15. Consolidation of OB/OD permits. The DA initiative to consolidate open burning/open detonation (OB/OD) permits at Army depots will decrease open burning and open detonation at FORSCOM installations. FORSCOM figures show that installations have spent between $500k and $1.7 million each over 8-10 years to get final Subpart X permits - and only two are final so far. In addition, the cost to maintain one Subpart X permit is approximately $250,000 per year. FORSCOM is encouraging the installations to transport their OB/OD wastes to the Depots and withdraw from interim status permits. FORSCOM is requiring justification for keeping the OB/OD permits, and is requiring the use of "operator" funds, instead of environmental funds, to obtain and maintain those permits the installations want to keep.

While this is primarily a cost savings initiative, the Depots may remanufacture or reuse the munitions, rather than destroy them, leading to a beneficial reuse/recycling. FORSCOM accounts for only about 5% of all OB/OD treated; therefore, the Depots are better suited for either destruction of OB/OD wastes, or reprocessing into usable products.

16. Used tires. FORSCOM staff are doing a feasibility study on reuse of used tires during FY 98. If it looks like potential savings are significant, a used tire business strategy will be developed in FY 98 or 99, depending on funding.

17. Withdrawal of Part B permits: Almost all of the RCRA Part B permits for storage resulted because DRMO was usually not able to dispose of HW within 90-days. The cost of a Part B permit can run as high as $250k/year. As a reinvention lab, FORSCOM is considering either encouraging DRMO to dispose of HW in a timely manner by getting rid of the Part B permits, or using commercial contractors to dispose of HW. AEC is evaluating the costs to close permitted units and withdraw the permits.

18. Rechargeable radio batteries were fielded Command-wide by CECOM and FORSCOM Log personnel during FY 97. These batteries can be recharged up to 225 times, and are expected to greatly reduce the use and disposal of the primary lithium batteries.

19. DLA vehicle battery consignment program - Nine FORSCOM installations have signed up for this consignment program, in which a contractor delivers wet, charged, lead-acid batteries to the installation battery shop, and removes unserviceable batteries from the installation for repair or recycle. This program gives the installation battery shop more time to concentrate on maintenance and repair of batteries, and is expected to decrease hazardous waste disposal and spills.

20. Energy conservation. The FORSCOM energy goal is to decrease energy consumption 30%/square foot from 1985-2005. About 15% of FORSCOM energy use is in mobility fuels; the rest is facility energy. This reduction in energy use will have many environmental benefits, particularly in reducing criteria air pollutants.

21. Integration of P2 into ECAS. FORSCOM staff are participating in the ODEP/AEC work group on integrating P2 into ECAS assessments.

22. Digital Printing technology. HQ FORSCOM staff are looking for ways to provide sufficient OPA funds to buy digital printing technology for all FORSCOM installations. This technology uses a special camera to take an electronic or digital image which is transferred to a computer where it is manipulated and than printed directly as a picture. The digital camera and photo processing technology replaces wet photo processing techniques that use hazardous chemicals to process the photographs and generate waste water, solid waste and air pollution. Fort Bragg, with assistance from Pope Air Force Base, is implementing the technology in FY 98, and expects to almost completely eliminate photo processing wastes. Fort McPherson has already switched to the digital technology.

23. The Integrated Training Area Management (ITAM) program applies sound natural resource conservation and land use management practices to training lands. ITAM is a DCSOPs initiative, coordinated with the environmental staff. The twin goals of the program are to conserve natural resources and provide realistic training areas. The ITAM program has

made great strides in reducing erosion and related water quality problems through proactive erosion control and mitigation efforts. Vegetative planting to stabilize erosion areas, establishing riparian buffer zones and other "soft" solutions are used to reduce or prevent soil erosion. Hard engineering projects are also used, for example paving a stream crossing and using rip rap to reduce shoreline erosion at vehicle crossing points. ITAM is implemented and on-going at the 10 major FORSCOM installations.

24. Coordination with AMC. FORSCOM interacts with AMC on changes and improvements to weapons systems through the FORSCOM Science Advisor and the Logistics Division. Many initiatives are underway to improve logistical speed and efficiency that also result in reduced environmental impact, such as the radio battery, vehicle battery, and hazardous material control programs described above. The MIL-SPEC review currently being done by AMC to reduce the number of hazardous materials required for use in maintaining weapons systems will reduce FORSCOM use and disposal of hazardous materials/wastes. AMC is supporting FORSCOM's current initiative to find non-hazardous parts washing solvents and cleaners, by developing the testing protocols, doing the testing, and approving the acceptable solvents/cleaners for use on weapons systems.

4.0 FORSCOM POLLUTION PREVENTION GOALS

Forces Command's pollution prevention goals are to:

- **Sustain readiness**
  - save mission money
  - save soldier time
- **Reduce pollution and conserve natural resources**
  - move from environmental compliance to prevention
  - steadily reduce pollution generation and resource use

Forces Command's initiatives to save mission money have been discussed in section 2.3, with details in section 4.5 below. Initiatives to save soldier time, primarily implementation of HMCCs and one-stop hazardous waste shops, are described in section 3.3. Efforts to move from compliance to prevention through the FORSCOM environmental investment strategy are described in sections 2.1 and 3.2. The final goal, to reduce pollution and resource use, is discussed in sections 4.1 through 4.4 below.

4.1 FORSCOM Pollution Reduction Goal-Setting Strategy

FORSCOM installations set their own specific goals in each program area, such as hazardous waste, solid waste, erosion, etc. Appendices A through K show the tough but realistic goals they have set for themselves in each P2 program area. The installations choose whether they intend to continue to reduce pollution, maintain at the current level, or are already at a level of minimal impact, based on their professional judgment about the relative priorities.

The sound professional judgment of the installation staffs is critical to success. Currently, FORSCOM environmental requirements are about 50% greater than the level of available funding. Installations set priorities for spreading limited funding among their identified requirements based on the FORSCOM Environmental Investment Strategy (see section 3.2) plus local priorities and constraints. The criteria weighed in setting priorities are compliance, readiness, return on investment, infrastructure, the concerns of the local regulators and public, significance of each specific environmental impact on local natural resources, and availability and reliability of control and prevention technology.

FORSCOM monitors and reviews the efforts of the installations towards their goals. Data reported in the ISR, EPR, and EQR reports, as well as input from the installations and the headquarters' staff knowledge of the installations' programs, is used. Appendices A-K show the source(s) of data used to evaluate progress in each program area. HQ FORSCOM looks at these management indicators annually, and provides increased command emphasis and assistance/resources to those installations that are not improving in accordance with their own goals.

4.2 Projected Future Performance

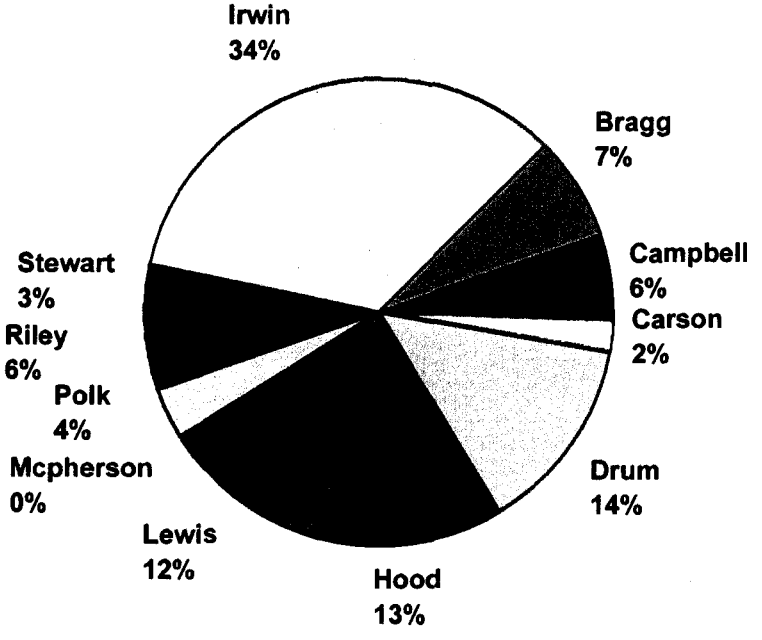
The following pages show current and predicted future performance in those program areas for which data are available.

4.2.1 Hazardous Waste - Estimated Future Reduction

GENERATION:

- FORSCOM generated 6 million pounds in 1996, and 8.4 million pounds in 1992
- 75% of hazardous waste is disposed by Ft. Irwin (36%), Ft. Drum (14%), Ft. Hood (13%) and Ft. Lewis (12%).

REDUCTION: 29% from 92 through 96

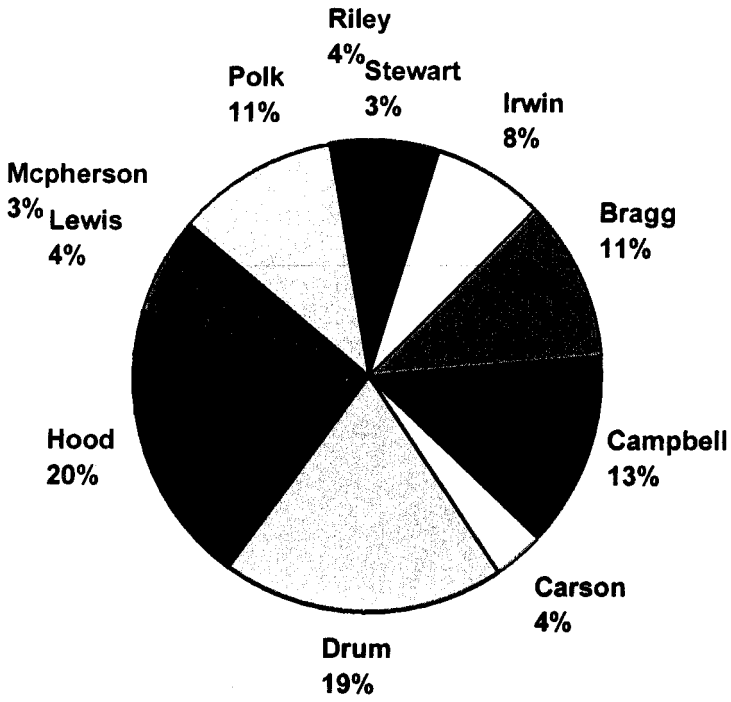


COSTS:

Cost of hazardous waste reduction projects obligated in environmental accounts was $4.1 million in FY 96.

Cost of hazardous waste program management obligated in environmental accounts was $3.5 million in FY 96.

Cost of hazardous waste disposal obligated in mission accounts was $3.2 million in FY 96, broken out by installation as follows:



ESTIMATED FUTURE REDUCTIONS: Further significant hazardous waste reduction depends on the performance of Forts Irwin, Drum, Hood, and Lewis, which indicate the following plans:

Ft. Irwin - further reductions, through innovative technologies that extend the life of ground equipment engines, which will significantly reduce the generation of waste antifreeze and waste oil
Ft. Drum - no response
Ft. Hood - further reductions, through implementing the use of less hazardous parts washers, non-abrasive depainting technology, and volume-reducing painting systems
Ft. Lewis - further reductions, through implementing a Hazardous Material Control Center, and more innovative pollution prevention technologies.

installation	planned performance	'96 generation	'96 status	98 funds programmed
Irwin	further reduce	2.1 million lbs	26% reduction	$500k
Drum	no response	843,000 lbs	95% increase	$200k
Hood	further reduce	788,000 lbs	47% reduction	$200k
Lewis	further reduce	735,000 lbs	9% reduction	$425k

Based on the installation plans, assuming the four installations listed above reduce 25% from their 96 levels:
Estimated 1996-1999 reduction: an additional 1.1 million pounds
Estimated 1999 disposal: 4.9 million pounds
Estimated 1999 vs 1992 reduction: 42%

FORSCOM HW reduction is complicated by over 100 small waste streams that cannot be economically reduced or recycled using currently available technology. It would take an average 45% reduction from the 96 levels at these installations to make the DoD 50% reduction goal. Given the low cost of HW management and disposal relative to other environmental costs, the planned level of investment in reduction technology and business practices is comparably low. Barring changes in available technology and/or regulatory requirements, FORSCOM will declare victory at the predicted level of 42% and focus available resources on higher priorities.

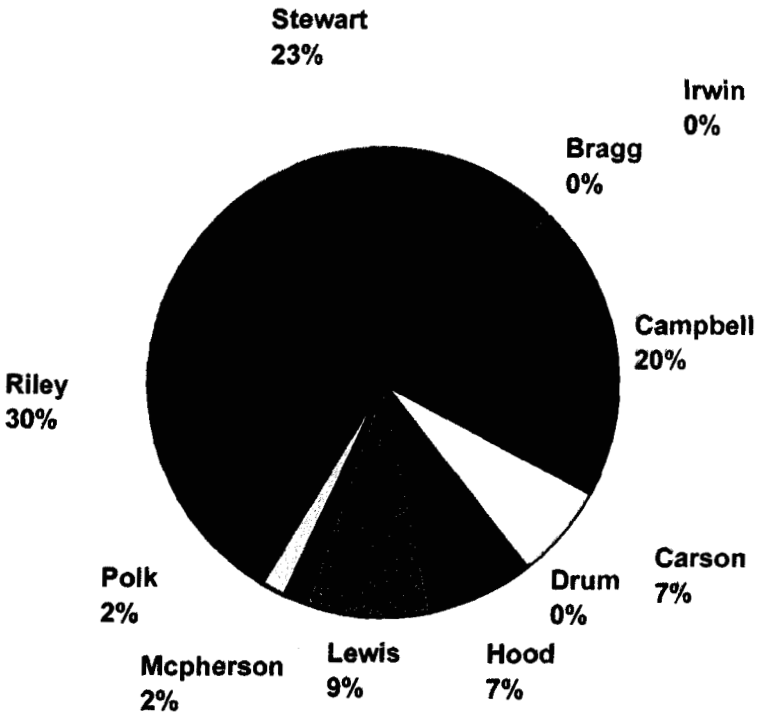
FORSCOM PRIORITIES: Continue to support hazardous material substitution, centralized hazardous material management, and other hazardous material/waste reduction and recycling efforts at above installations.

4.2.2 Pesticides - Estimated Future Reduction

USAGE:

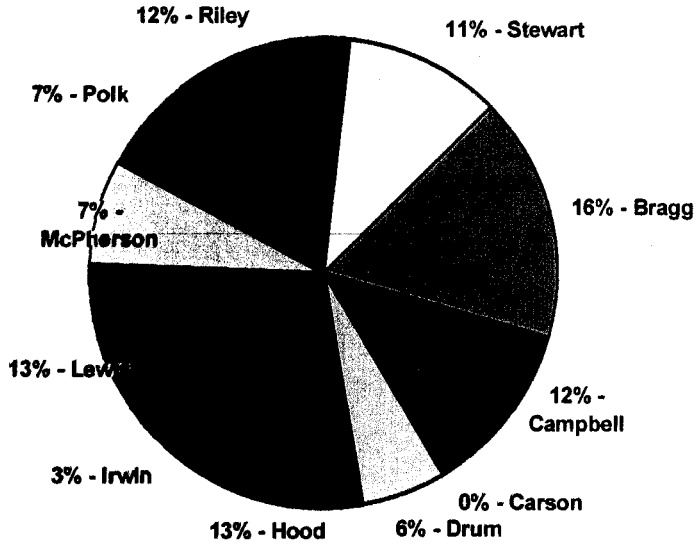
- FORSCOM used 35,315 lbs of active ingredient in 96; and 56,179 lbs in 93
- 96% of pesticide application occurs at Ft. Lewis (9%), Campbell (20%), and Riley (30%), Stewart (23%), Fort Hood (7%) and Fort Carson (7%)

REDUCTION: 37% from 93 to 96



COSTS:

- FORSCOM spent $2.2 million on pest control in 96.
- 77% of those dollars were spent at Forts Bragg, Campbell, Hood, Lewis, Riley, and Stewart.



ESTIMATED FUTURE REDUCTIONS: Further significant pesticide use reduction depends on the performance of Forts Campbell, Lewis, and Riley; reduction in pest control costs depends on the performance of Forts Bragg, Campbell, Hood, Lewis, Riley, and Stewart. These installations indicate the following plans:

installation	planned performance	'96 use	'96 status	98 funds programmed
Bragg	further reduce	no response	no response	0
Campbell	maintain	8120 lbs	50% reduction	0
Carson	further reduce	2735 lbs	1% reduction	0
Hood	further reduce	2792 lbs	54% reduction	50k
Lewis	further reduce	3480 lbs	43% reduction	5k
Riley	further reduce	12,103 lbs	28% reduction	50k
Stewart	maintain	1050 lbs	30% reduction	0

Based on these plans, assuming Ft. Lewis, Riley, Carson, and Hood reduce 25% from 96 levels:
Estimated 1996-1999 reduction: an additional 5300 pounds
Estimated 1999 application: 30,000 pounds
Estimated 1999 vs 1993 reduction: 47%

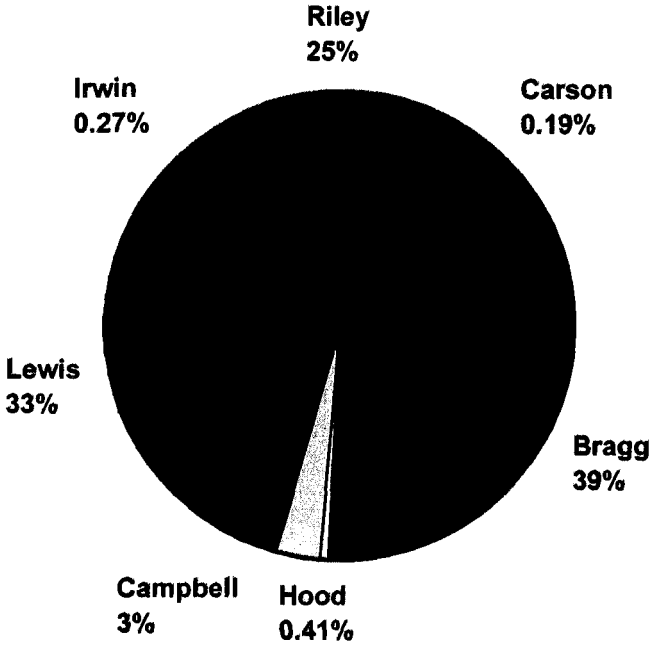
FORSCOM PRIORITIES: Continue to support pesticide reduction efforts at above installations.

4.2.3 TRI - Estimated Future Reduction

RELEASED/DISPOSED:

- FORSCOM released or disposed of 84, 448 lbs in 96, and 93,109 lbs in 94
- Approximately 99% TRI releases come from 4 installations: Lewis (33%), Bragg (39%), Campbell (3%), and Riley (25%)

REDUCTION: 10% from 94 through 96



Further significant TRI reduction depends on the performance of these four installations, which indicate the following plans:

Ft. Bragg - further reductions in paint and parts washer solvent air emissions;
Ft. Campbell - further reductions in waste antifreeze transferred offsite for treatment;
Ft. Riley - further reductions in waste antifreeze transferred offsite for treatment; and,
Ft. Lewis - further reductions in painting and waste antifreeze transferred offsite for treatment.

Estimated 1996-1999 reduction: an additional 24,000 pounds
Estimated 1999 disposal: 60,520 pounds
Estimated 1999 vs 1994 reduction: 35%

FORSCOM believes that significant reductions in air emissions will result by using aqueous-based parts washer systems wherever possible, and substituting P-D-680 solvent with low-VOC hydrotreated petroleum hydrocarbon solvents containing no ozone depleting chemicals and having very low vapor pressures. Furthermore, by reducing the incidence of waste antifreeze being contaminated with diesel fuel or other lubricants, offsite transfers for treatment will also be either reduced or eliminated. As a result of these changes in business practices, an additional 25% reduction is predicted by 31 Dec 99, yielding a total reduction of 35%.

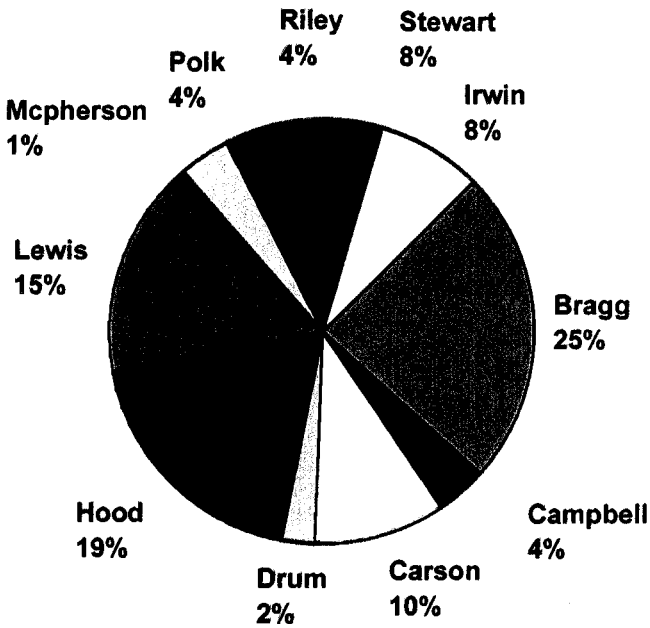
It is estimated that the cost of using P-D-680 parts washers which generate hazardous waste and air emissions is approximately $130 per month per unit. The cost of using parts washers with low-VOC, high flashpoint petroleum hydrocarbon solvent is about $82/month per unit. The cost of substituting the aqueous-based, enzyme activated parts washer system which generate little or no hazardous waste and no air emissions is approximately $70 per month per machine. It must be noted that the aqueous-based, enzyme activated parts washer has limited approved use at the current time. FORSCOM has funded AEC to conduct extensive testing of the system in an effort to identify approved applications, with the vision that usage will expand throughout the maintenance arena.

4.2.4 Solid Waste - Estimated Future Reduction

GENERATION:

- FORSCOM generated 909 million pounds of municipal solid waste (not including construction/demolition debris) in 96 and 1368 million pounds in 92
- 69% of solid waste generation occurs at Ft. Bragg (25%), Carson (10%), Hood (19%), and Lewis (15%)

REDUCTION: 33% from 92 through 96



COSTS:

- FORSCOM spent $20.3 million on municipal solid waste collection and disposal in 96.
- Unknown costs for construction/demolition and yard wastes
- 79% of those dollars were spent at Forts Bragg 8%, Campbell 8%, Hood 33%, Lewis 11%, Riley 8%, and Irwin 11%.

FORSCOM believes that significant reductions in air emissions will result by using aqueous-based parts washer systems wherever possible, and substituting P-D-680 solvent with low-VOC hydrotreated petroleum hydrocarbon solvents containing no ozone depleting chemicals and having very low vapor pressures. Furthermore, by reducing the incidence of waste antifreeze being contaminated with diesel fuel or other lubricants, offsite transfers for treatment will also be either reduced or eliminated. As a result of these changes in business practices, an additional 25% reduction is predicted by 31 Dec 99, yielding a total reduction of 35%.

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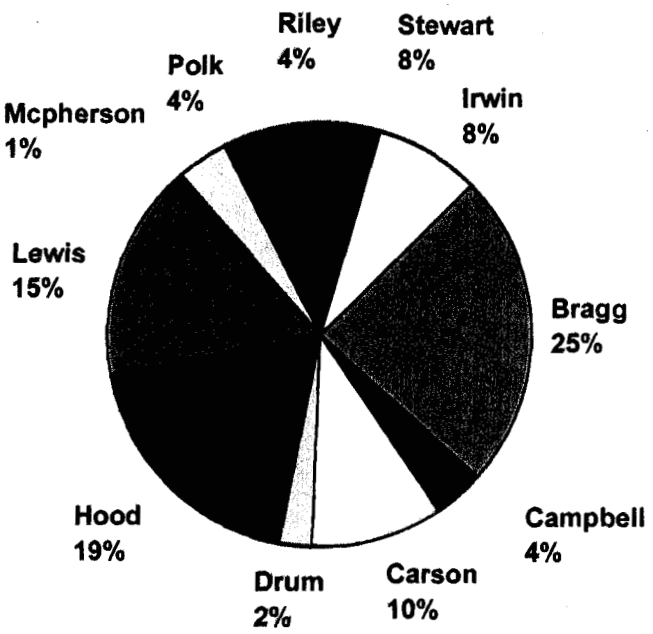
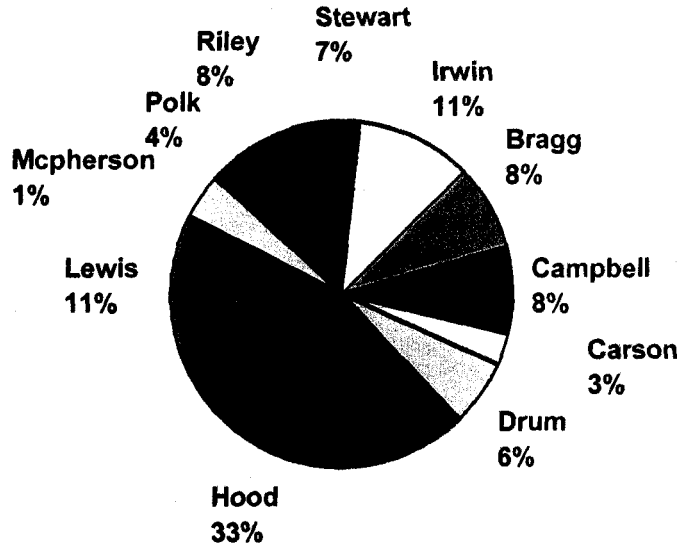
- 69% of solid waste generation occurs at Ft. Bragg (25%), Carson (10%), Hood (19%), and Lewis (15%)

REDUCTION: 33% from 92 through 96



COSTS:

- FORSCOM spent $20.3 million on municipal solid waste collection and disposal in 96.
- Unknown costs for construction/demolition and yard wastes
- 79% of those dollars were spent at Forts Bragg 8%, Campbell 8%, Hood 33%, Lewis 11%, Riley 8%, and Irwin 11%.



RECYCLING:

- FORSCOM recycled 8% or 72 million pounds, of all solid waste generated.
- Forts Campbell (35% diversion), Drum (34% diversion), Polk (39% diversion), and Riley (18% diversion) recycled over half of the total.

AFFIRMATIVE PROCUREMENT: Forts Carson, Hood, Irwin, Lewis, Polk, and Riley have formal affirmative procurement programs. These six installations plus Fort. Stewart are actively purchasing recycled materials.

ESTIMATED FUTURE REDUCTIONS: Further significant solid waste reduction depends on the performance of Forts Bragg, Carson, Hood, and Lewis. Reduction in solid waste disposal costs depends on the performance of Forts Bragg, Campbell, Hood, Lewis, Riley, and Irwin. These installations indicate the following plans:

installation	planned performance	'96 generation	'96 vs '92	98 funds programmed
Bragg	further reduce	220 million lbs	175% increase	150k
Carson	further reduce	92 million lbs	38% reduction	122k
Hood	further reduce	173 million lbs	42% reduction	400k
Lewis	further reduce	137 million lbs	18% reduction	130k

Based on these plans, assuming the four installations in the table above can reduce another 25% from their '96 levels:
Estimated 1996-1999 reduction: an additional 156 million lbs
Estimated 1999 generation: 753 million lbs

Estimated 1999 vs 1992 reduction: 45%

FORSCOM PRIORITIES: Continue to support solid waste reduction and recycling efforts at above installations.

BARRIER: There is currently no way to track affirmative procurements through the GSA supply system. Therefore, it is not possible to determine how much progress is being made in this area. The Air Force Materiel Command plans to work with GSA during FY 98 to see what can be done.

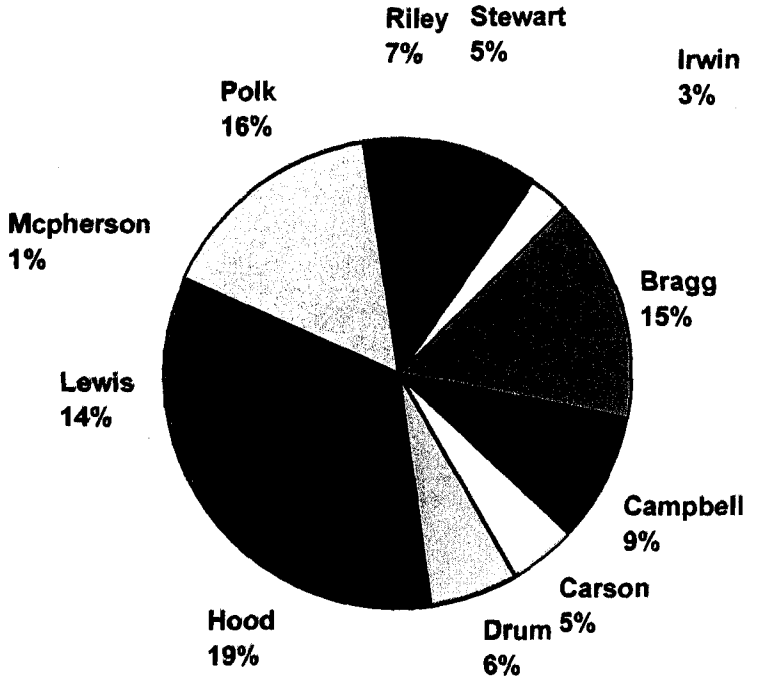
BARRIER: FORSCOM needs $2 million/year through the POM years in OPA funds to procure HW and SW recycling equipment. The whole Command gets about $500,000/year for all needs. As an alternative, an exception to policy to allow the use of OMA funds for pollution prevention equipment could be obtained from the Army Budget Office, with ACSIM support.

4.2.5 Water - Estimated Future Use/Reduction

USAGE:

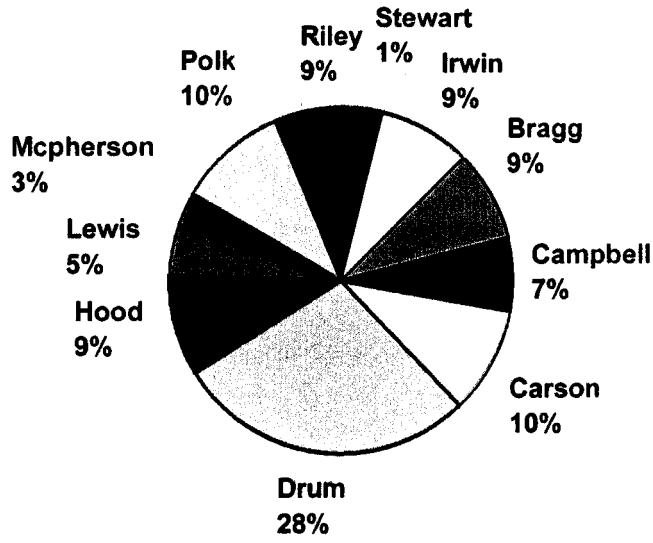
- FORSCOM used 18.8 million kgals of water in 96 and 23.1 million kgal in 91
- 73% of water use occurs at Ft. Bragg (15%), Campbell (9%), Hood (19%), Lewis 14%, Polk 16%

REDUCTION: 17% from 91 through 96



COSTS:

- FORSCOM spent $23 million on water purchase and treatment in 96.
- 84% of those dollars were spent at Forts Bragg, Carson, Drum, Hood, Polk, Riley, and Irwin.



ESTIMATED FUTURE REDUCTIONS: Further significant water conservation depends on the performance of Forts Bragg, Campbell, Hood, Lewis, and Polk. Forts Irwin, Carson, and Hood are located in water short regions where water conservation is or will be a local priority. Reduction in water costs depends on the performance of Forts Bragg, Carson, Drum, Hood, Polk, Riley, and Irwin. These installations indicate the following plans:

installation	planned performance	'96 use	'96 status	98 funds programmed
Bragg	maintain	2.9 million kgal	38% increase	0
Campbell	reduce	1.7 million kgal	6% increase	0
Carson	maintain	0.9 million kgal	36% reduction	0
Hood	reduce	3.5 million kgal	84% increase	0
Irwin	reduce	0.5 million kgal	37% reduction	0
Lewis	reduce	2.2 million kgal	24% reduction	10k
Polk	unknown	3.0 million kgal	67% increase	0k

Based on these plans, assuming the Forts Campbell, Hood, Irwin, and Lewis can reduce an additional 10% from their '96 usage:
Estimated 1996-1999 reduction: an additional 0.8 million kgal
Estimated 1999 use: 18 million kgal
Estimated 1999 vs 1991 reduction: 22%

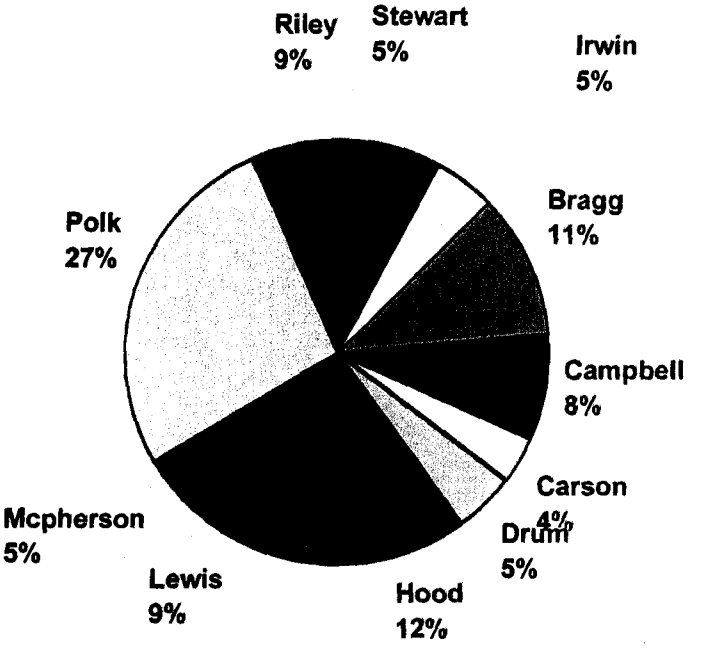
FORSCOM PRIORITIES: Continue to support water conservation efforts at above installations.

4.2.6 Wastewater - Estimated Future Reduction

GENERATION:

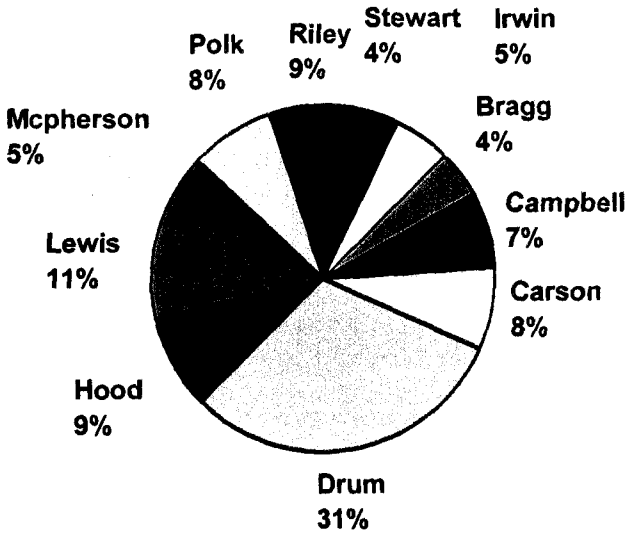
- FORSCOM generated 17 million kgals of wastewater in 96 and 18 million kgal in 92
- 73% of wastewater generation is at Ft. Bragg (11%), Campbell (8%), Hood (12%), Lewis 9%, Polk 27%, and Riley 9%

REDUCTION: 6% from 92 through 96



COSTS:

- FORSCOM spent $24 million on wastewater collection and treatment in 96.
- 83% of those dollars were spent at Forts Campbell 7%, Carson 8%, Drum 31%, Hood 9%, Lewis 11%, Polk 8%, and Riley 9%



ESTIMATED FUTURE REDUCTIONS: Further significant wastewater reduction depends on the performance of Forts Bragg, Campbell, Hood, Lewis, and Polk and Riley. These installations indicate the following plans:

installation	planned performance	'96 generation	98 funds programmed
Bragg	maintain	1.9 million kgal	0
Campbell	reduce	1.4 million kgal	0
Hood	maintain	2.1 million kgal	0
Lewis	reduce	1.6 million kgal	0
Polk	unknown	4.6 million kgal	0
Riley	maintain	1.6 million kgal	0

Based on these plans, assuming the Forts Campbell and Lewis can reduce an additional 10% from their '96 usage:
Estimated 1996-1999 reduction: an additional 0.3 million kgal
Estimated 1999 generation: 16.7 million kgal
Estimated 1999 vs 1991 reduction: 7%

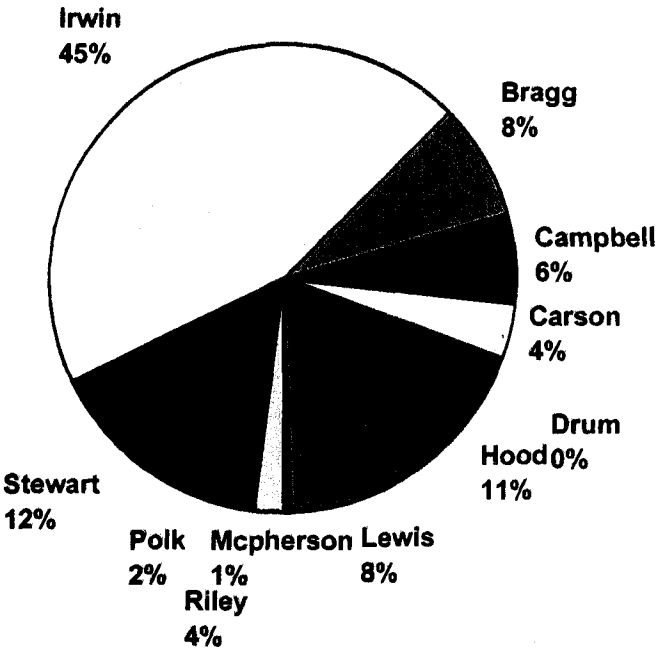
FORSCOM PRIORITIES: Continue to support wastewater reduction efforts at above installations.

4.2.7 Air Pollution - Estimated Future Reduction

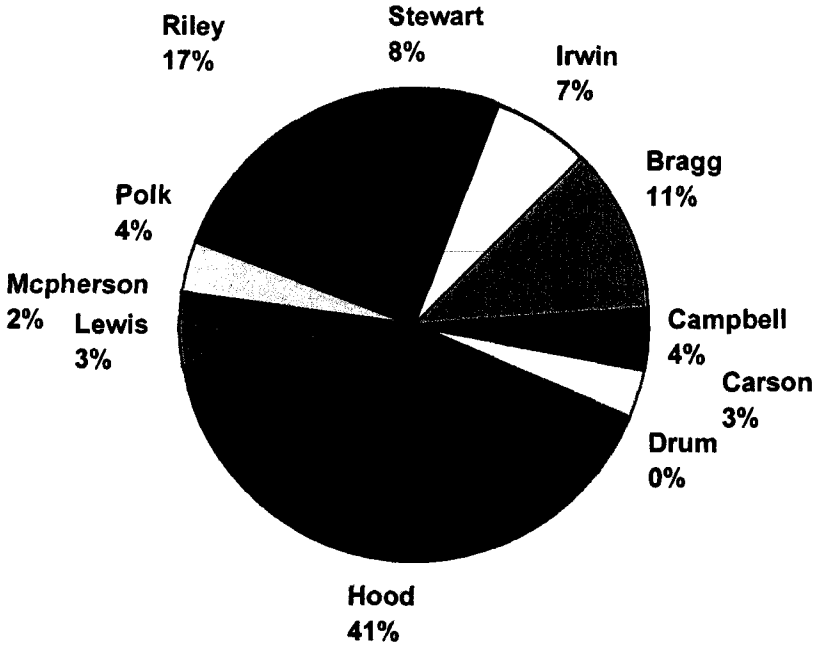
GENERATION:

- FORSCOM generated 6,127 tons of criteria air pollutants, 148 tons of hazardous air pollutants, and had 700 tons of Class I ozone depleting substances in '96
- 84% of criteria air pollution is generated by Forts Bragg 8%, Hood 11%, Lewis 8%, Stewart 12%, and Irwin 45%

REDUCTION: unknown



84% of hazardous air pollutants (HAPS) are generated by Bragg 11%, Hood 41%, Riley 17%, Stewart 8%, and Irwin 7%



COSTS: unknown

Ozone Depleting Substances (ODS): Eight FORSCOM installations are recycling ODS; four have complete ODS management plans, and another plan is currently under development.

ESTIMATED FUTURE REDUCTIONS: Reduction of criteria air pollution depends on the performance of Forts Bragg, Hood, Lewis, Stewart, and Irwin. Reduction of hazardous air pollutants depends upon Forts Bragg, Hood, Riley, Stewart, and Irwin. These installations indicate the following plans:

installation	planned performance (criteria/HAPS)	'96 criteria	'96 HAPS	98 funds programmed (criteria/HAPS)
Bragg	reduce/reduce	495 tons	27 tons	0/0 (150k req'd)
Hood	maintain/reduce	667 tons	98 tons	0/0
Lewis	reduce/reduce	482 tons	8 tons	20k/5k
Riley	reduce/reduce	220 tons	40 tons	0/0
Stewart	reduce/reduce	760 tons	20 tons	0/0
Irwin	reduce/reduce	2735 tons	16 tons	207k/450k

Based on the installation plans, assuming the installations listed above can reduce 10% from their 96 levels:
Estimated 1996-1999 reduction: 470 tons criteria pollutants, 21 tons HAPS
Estimated 1999 generation: 5657 tons criteria; 127 tons HAPS
Estimated 1999 vs 1996 reduction: 8% criteria; 14% HAPS

FORSCOM PRIORITIES: Continue to support air pollution reduction efforts at the above installations

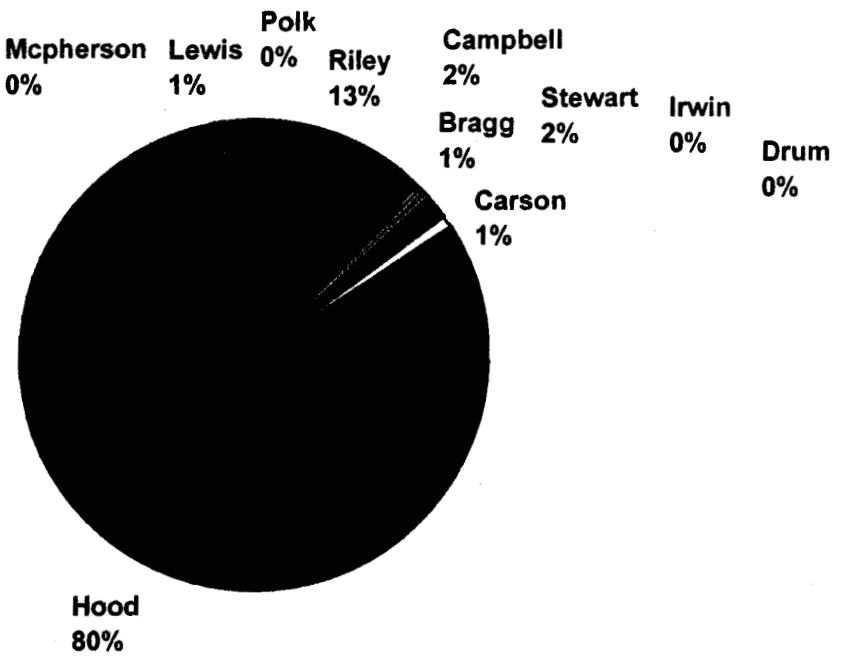
BARRIER: No staff element appears to be POM-ing funds for retrofit/replacement of ODS-containing facility systems. This is a potentially large bill that will come due within the next decade, as existing systems cannot be repaired or refilled without major modification or replacement.

4.2.8 Ozone Depleting Substances

USAGE:

- FORSCOM had 1.4 million pounds of Class I ozone depleting substances in use in '96
- 93% of ODS's are at Hood 80% and Riley 13%.

REDUCTION: unknown



COSTS: unknown

ESTIMATED FUTURE REDUCTIONS: Reduction of ODS depends on Hood and Riley. These installations indicate the following plans:

installation	planned performance	'96 use	98 funds programmed
Hood	reduce	180,000 lbs	410k
Riley	reduce	1,141,493 lbs	0

Based on the installation plans, assuming the installations listed above can reduce 10% from their 96 levels:
Estimated 1996-1999 reduction: 132,000 lbs
Estimated 1999 generation: 1,265,921 lbs
Estimated 1999 vs 1996 reduction: 9%

BARRIERS: Reduction of weapons systems ODS depends upon redesign of weapons system to use available substitutes. AMC has a plan for accomplishing this. Reduction of facility ODS depends upon funds being made available in the Maintenance and Repair BASOPs budget. To date, this has not occurred. These facility systems are aging, and cannot be refilled, because ODS are no longer manufactured. A large unidentified (and unfunded) requirement is likely to occur over the next decade as a result of this.

4.2.9 Alternative Fuel Vehicles

The table below shows the 1996 performance of FORSCOM installations with respect to buying and leasing alternative fuel vehicles (AFVs)in 1996. The DOD Measure of Merit is that 75% of new non-tactical vehicles be AFVs by the end of CY 99.

Installation	Number non-tactical vehicles bought or leased in **1996**	Number alternatively fueled	Percent	Regulatory Requirement
Bragg	no data	no data	no data	MOM
Campbell	0	0	n/a	MOM
Carson*	500	2	0.4%	Energy Policy Act
Drum	no data	no data	no data	MOM
Hood	15	14	93%	MOM
Irwin	16	0	0%	Energy Policy Act
Lewis	no data	no data	no data	Energy Policy Act
McPherson	0	0	n/a	Energy Policy Act Clean Air Act
Polk	no data	no data	no data	MOM
Riley	148	0	0%	MOM
Stewart	112	0	0%	MOM

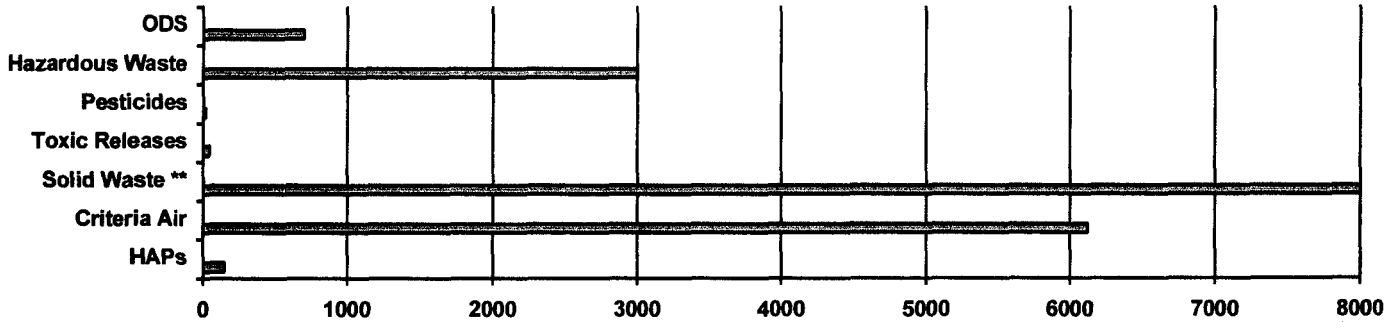
** Carson, Irwin, Lewis, and McPherson are currently exempt from the Energy Policy Act because no refueling stations are available within five miles. This could change in the future if commercial interests provide sources of alternative fuel in the local communities.*

BARRIERS: The lack of refueling stations on post or in the local community frustrates installations' attempts to use AFVs in significant numbers. Unless funding is identified and provided to build refueling points ($50-60k each), it is unlikely that most FORSCOM installations will be able to meet the goals of the DoD Measure of Merit.

4.3 FORSCOM Pollution Generation, Resource Use, and Costs

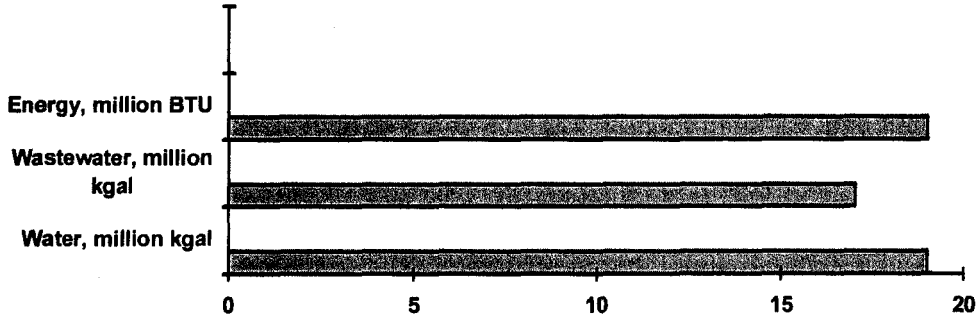
The data in section 4.2 has been pulled together in the charts below to show the total amounts of pollution generated in each program area, the resources used, and the costs associated with each area.

TONS OF POLLUTANTS GENERATED/USED IN 1996



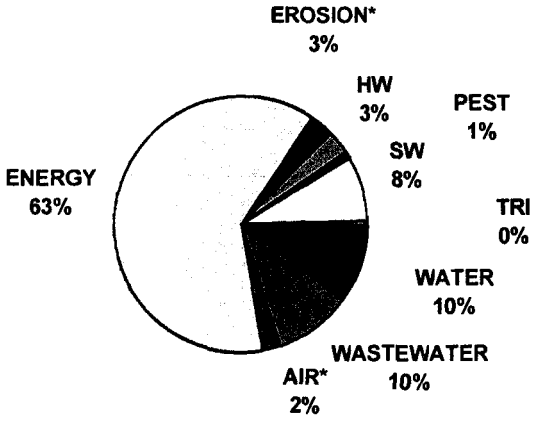
** Solid waste generation is actually 454,000 tons; it is truncated on this chart to facilitate display.

ENVIRONMENTAL RESOURCES USED IN 1996

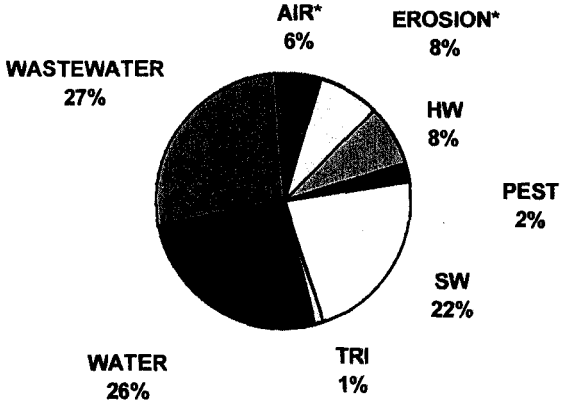


ANNUAL COSTS OF POLLUTION GENERATION AND RESOURCE USE

$235 MILLION/YEAR



ANNUAL COSTS OF POLLUTION GENERATION AND RESOURCE USE
ENERGY NOT INCLUDED
$87 MILLION/YEAR



** Air pollution abatement costs are not known; they have been estimated at $5 million/year, based on an estimate of $500,000/installation/year for the 10 major installations. The $7 million/year erosion control costs represent environmental funds only; a similar sum is spent out of ITAM funds each year.*

The following observations and conclusions can be drawn from the data above:

FORSCOM installations generate 464 thousand tons of pollutants (1996 data). Solid waste (454 thousand tons/year), criteria air pollutants (6 thousand tons/year), and hazardous waste (3 thousand tons/year), are the three largest pollution sources, representing 99% of the total annual tonnage. The total tonnage includes these three waste streams, plus pesticides, toxic releases, and hazardous air pollutants.

FORSCOM installations use large volumes of natural resources. Resources used include 703 tons of ozone-depleting substances, 19 million BTU's of energy and 19 billion gallons of water, resulting in 17 billion gallons of wastewater.

FORSCOM installations pay $235 million/year for the privilege of polluting and using natural resources. Energy use leads the way in terms of costs, at $148 million/year. Wastewater ($24 million/year), water ($23 million/year), and solid waste ($20 million/year) are the other high cost items. These four items represent 92% of total "environmentally related" costs of $235 million/year. (Accurate costs for air pollution control are not separately available. They have been conservatively estimated at $5 million/year.)

4.4 Future priorities

Future P2 investment of about $36 million/year, (which includes funds in all environmental accounts plus $10 million/year for energy conservation), is anticipated over the POM cycle. A complete breakout is shown in section 4.5. The following major priorities will be pursued.

- **Solid waste:** Solid waste represents 97% of the total pollution load, 9% of costs including energy, and 23% of the costs exclusive of energy. Reduction of solid waste will be a priority because both cost and volume is high. Standard household waste recycling is already a strong program at most installations, based on commercially available technology and markets. Army-unique solid wastes, such as MREs, tank track, and concertina wire, will be a bigger challenge. The on-going study of Army-unique wastes needs to be followed up with a waste characterization of the 909 million pounds that make up the current solid waste stream. Once the large and costly components of this waste stream are identified, a business plan for reusing and/or recycling them using currently available technology and markets will be prepared. Concurrently with these studies, FORSCOM staff will work with the Corps of Engineers to revise their standard design specs and contractual practices for construction/demolition debris, which makes up a large part of the solid waste stream. Continued significant investment in solid waste reduction of about $6 million/year is expected over the POM years (see section 4.5) and beyond.

- **Air pollution:** Air pollution is 1.3% of the pollution load, and an estimated 2% of all costs including energy, and 6% of costs not including energy. Air pollution at FORSCOM installations is caused primarily by energy production, prescribed burning, and vehicle travel over dirt roads and ranges. The regulatory requirements for air pollution are in a state of flux; they are expected to become more stringent. That fact, combined with the high volume

of air pollution, makes it a priority for preventive approaches. Potential preventive measures are currently being explored and designed. The FORSCOM dust study, and prescribed burning studies are the first step to characterizing the types and amounts of pollution from various activities, which will lead to design and implementation of pollution prevention opportunities. FORSCOM anticipates an investment of $4-6 million/year through the POM years in air pollution prevention, as shown in section 4.5.

- **Water/wastewater:** Water use and wastewater treatment account for 20% of all costs including energy; 53% of total costs not including energy. Erosion control adds another 3% and 8% respectively. In addition to these high yearly operational costs, the maintenance and repair costs of the treatment plants are a huge looming bill that will come due during the next two decades. In addition, water rights and the availability of potable water will be a major concern in the next decade, particularly at posts in arid (Irwin, Hood, Yakima, Carson) and coastal (Stewart) areas. For these reasons, water conservation will become an increasingly larger part of the FORSCOM P2 program. Characterization of water use, quality, and costs will be the first step in defining the P2 opportunities in the water/wastewater programs. Significant investment of over $1 million/year in water conservation studies and measures, and $7.5 million/year in water protection (erosion and spill prevention) is expected over the POM years and beyond.

- **Hazardous waste/materials:** Hazardous waste represents 0.6% of the total pollution load, and 3% of total costs including energy, 8% of total costs not including energy. On-going initiatives to reduce hazardous waste will come to fruition over the next five years. Hazardous material control centers will ensure that hazardous materials don't become wastes unnecessarily, which is currently a large component (25-50%) of the HW stream. In addition, AMC and DLA efforts to reduce the use of hazardous materials in the logistics stream (rechargeable batteries, vehicle battery consignment program), will also contribute to reductions in FORSCOM hazardous waste. Investment of about $3.5 million/year in hw and toxic substances reduction and hm management is anticipated over the POM cycles (see section 4.5). Barring changes in mission or waste recycling technology, significant investment in hw reduction past this POM cycle is not anticipated.

- **Energy:** Energy use accounts for 63% of total costs, and an unknown amount of the air pollution load. FORSCOM will continue to invest $19 million/year in energy conservation ($13 million FEMP, $6 million FORSCOM).

- **Program management:** The remaining $2-4 million/year will pay for the costs of having the program: salaries, travel, training of the whole installations workforce, data collection, reporting and recordkeeping, etc.

4.5 FY 99-03 Funding Requirements and Shortfall

The table on the following pages show estimated funding requirements for pollution prevention, broken out by environmental account (VEPP, VENC, VENN) from FY 99 - 03.

The last column in the table shows the basis for each requirement. These requirements are based on the installations' goals in each program area. The totals at the bottom of the table show requirements of $14-16 million/year in pollution prevention (VEPP) funds, for a total requirement of $76 million and an expected return on investment of $12.5 million/year. Section 2.3.3 contains a discussion of ROI calculations.

The Program Budget Guidance (PBG) for FY 99 - 03 contains $4 million/year in pollution prevention (VEPP) funds, for a total of $20 million. This results in a $56 million shortfall. By applying the environmental investment strategy described in section 3.2, FORSCOM intends to fund the total $76 million in pollution prevention requirements from FY 99 - 03.

FORSCOM Pollution Prevention Status and Estimated Requirements

Background Data

Impact	P2 status	Future Plans	FY99	FY00	FY01	FY02	FY03	Type	Basis of Requirement
HW generation and disposal (ISR data)	29% reduction in off-site disposal vs CY92 6 million lbs disposed in CY 96 at a disposal cost of $3.2 million.	maintain current level at Drum, McPherson, Stewart; further reduction at remaining 8 posts	400k 23k 6k	400k 23k 6k	400k 23k 6k	400k 23k 6k	 23k 6k	VEPP VEPP VEPP	4 digital cameras 45 parts washers @ $2600 30 HVLP guns @ $1000
Solid waste reduction (ISR and Redbook data)	33% reduction since CY92; 8% diversion of solid waste to recycling; 909 million lbs generated in CY 96; $20M to collect and dispose. 6 installations have a formal affirmative procurement program. 7 installation procure materials with recycled content.	maintain current level at Drum, McPherson, Polk; further reduction and increased recycling at the 8 remaining posts	1500k 1000k 150k 3200k 400k	2500k 1000k 150k 5200k 400k	1000k 1000k 150k 1700k 400k	1000k 1000k 150k 1700k 400k	1500k 1000k 150k 3200k 400k	VEPP VEPP VEPP VEPP VNC	soil recycling @ 10 instl @ $150k/yr C/D grinders @ 5 installations pump trucks @ 5 installations P2 eqp @ 8 instl @ $400k/year sw recycling eqp @ 8 instl @ $50k/year
Pesticide use (ISR and Redbook data)	37% reduction vice FY93; 35,315 lbs active ingred. applied in FY 96, at a total cost of $2.2 million.	maintain current level at Campbell, McPherson, Polk, Stewart; minimal impact at Drum, Irwin; further reduction at remaining 5 posts	75k	75k	75k	75k	75k	VEPP	reduction studies/processes @ 5 posts @ $15k/yr
Water conservation (Redbook data)	20/26 million kgallons used in FY 96/92; 23% reduction $23M in FY 96 to treat;	maintain current level at Bragg, Carson, Drum;, Polk, Riley; minimal impact at McPherson; further conservation at remaining 5 posts	500k	500k	500k	500k	500k	VEPP	water conservation studies/eqp/processes @ 5 posts @ $100k/year
Stormwater P3 (ISR data)		maintain current level at Carson, Drum, Stewart; further improvement at 8 posts	200k	200k	200k	200k	200k	VNC	8 posts @ $25k/year
Wastewater (Redbook data and ISR data; EPR and ACTS data on funds)	18 million kgal in 92; 17 million kgal in 96; 6% reduction $24M to collect, treat and dispose.	maintain current level at Bragg, Carson, Drum, Hood, Polk, Riley, Stewart; minimal impact at McPherson; continued improvement at remaining 3 posts	300k	300k	300k	300k	300k	VEPP	ww reuse/recycle studies/processes @ 3 posts @ $100k/year

Impact	P2 status	Future Plans	FY99	FY00	FY01	FY02	FY03	Type	Basis of Requirement
Wellhead protection (installations)	Wellhead protection plans	plan not needed at Bragg, Hood, McPherson; unknown at Drum; needed at remaining 7 installations	100k	100k	100k	50k		VNC	one time cost of $50k @ 7 installations
Energy conservation (ISR data)	6.5% energy efficiency improvement per square foot from FY 85 to FY 96; 18.7 million MBTU consumed FY 96; at a cost of $148 million	plans unknown at Campbell, Drum; continued improvement at remaining 9 posts.	1500k 8000k	1500k 8000k	1500k 8000k	1500k 8000k	1500k 8000k	FEMP OMA	continue at FY 98 investment levels
Dust (installation)	Dust suppression practices used?	minimal impact at McPherson, Riley, Stewart; unknown status at Bragg, Campbell, Drum, Polk; required at remaining 4 posts	200k	200k	200k	750k	750k	VNC	200k for continued study in 99; potentially large requirements at 4 posts due to CAA amendments
ODS (ISR data)	lbs of Class I ODS on post in 100 units; Recycling of ODSs at X installations; ODS management plan in draft at 1 installation.	maintain current levels at Bragg; Carson, Drum; further reductions at remaining 8 posts.	550k	550k	550k	550k	550k	VEPP	surveys/recycling eqp/training @ 11 posts @ $50k/year
Annual emissions of criteria air pollutants (installation)		maintain current level at Hood; unknown status at Drum; further improvement at remaining 9 posts	1800k	1800k	1800k	1800k	1800k	half VEPP half VNC	P2 eqp @ 9 posts @ $200k/yr
Hazardous air pollutants (installation)	148 tons HAPs/year	unknown status at Drum; further improvement at remaining 10 installations	2000k	2000k	2000k	2000k	2000k	half VEPP VNC	P2 eqp @ 10 posts @ $200k/yr
Hazardous air pollutants (installations)	Risk Management Plans	plans not required at Hood, Stewart; done at Irwin, Bragg; determining status at Carson; unknown at Drum; required at remaining 5 instl + 2 subs	262k	262k				VNC	7 plans @ $75k/plan one time cost
Prescribed burns (installation)	FORSCOM burns 254,200 acres each year.	no burns at Irwin , Yakima, and McPherson; unknown status at Drum							unknown requirement; potential CAA impact
Noise reduction (installation)	Noise contours go off post at 6 installations.	maintain current levels at Bragg, Carson, Hood, Polk, Stewart; minimal impact at Irwin, McPherson, Riley; unknown status at Drum; further improvement at Campbell, Lewis.	40k	40k	40k	40k	40k	VNN	noise reduction @ 2 posts @ $20k/yr

Impact	P2 status	Future Plans	FY99	FY00	FY01	FY02	FY03	Type	Basis of Requirement
Erosion and sedimentation (installation)	Soil loss is a significant impact at 5 installations Sedimentation is a significant impact at 4 installations	further improvement at Bragg; Campbell; Carson; Hood, Irwin, Lewis, Stewart; minimal impact at McPherson, Riley	6500k	6500k	6500k	6500k	6500k	VNN	FY 98 levels required indefinitely @ 7 posts
Spill planning and prevention (ISR data)	at least 90% secondary containment in place: 4 Spill response supplies are readily available: 8 Spill response team is trained and equipped: 9 SPCCP is current: 7 ISCP is current: 7 unknown status: Drum	maintain current level at Bragg, Carson, Hood, McPherson, Stewart; improvement at Campbell, Irwin, Polk, Riley; unknown plans at Drum, Lewis.	700k 275k 55k	700k 275k 55k	700k 275k 55k	700k 275k 55k	700k 275k 55k	VNC VNC VNC	sec. containment @ 7 posts @ $500k supplies/training @ 11 posts/year plans updates @ $15k/instl/3 years
Hazardous material management (ISR data)	HMCC status	100% fielding of HMCC to all installations by FY 03	2500k	3000k	3000k	2000k	1500k	VEPP	$500k seed money for 3 years at each installation (see fielding plan in text)
Toxic release reduction (ISR data)	10% decrease in TRI releases/disposals vs CY 94 84,448 lbs released/disposed in CY 96	further improvement at Bragg, Campbell, Hood, Lewis, Riley; minimal impact at Carson, Irwin, McPherson, Polk, Stewart	880k	880k	880k	880k	880k	VNC	EPCRA reporting @ 11 posts @ $80k/yr TRI reductions due to change in business practices (pharmacy) shown above at no additional cost
Program planning (installation)	Installation has a current P2 plan: 6	plan completed or updated in FY 98: Bragg, Campbell, Carson, Hood, Lewis, Polk	3000k 165k	3000k 165k	3000k 165k	3000k 165k	3000k 165k	VEPP VEPP	prog mgmt at FY 98 levels plan updates @ $15k/instl/yr
Environmental education and awareness (installation)	Environmental awareness/training programs at 10 installations	maintain current level at Bragg, Carson, Stewart; increase training at Campbell, Hood, Irwin, Lewis, McPherson, Polk, Riley; unknown plans at Drum	550k	550k	550k	550k	550k	half VEPP half VNC	$50k/inst/year
TOTALS			$36831	$40331	$35069	$34569	$35619	all	
VEPP only			$15544	$19044	$14044	$13044	$14144	VEPP	

Appendix A: Ft. Bragg Pollution Prevention Program

Fort Bragg

Fort Bragg, headquarters for XVIII Airborne Corps and home of the 82 Airborne Division and Special Operations Command, maintains a high operational and training tempo. This requires careful management of available maneuver space and installation assets in order to maintain compliance with environmental requirements.

Cultural Resources. Fort Bragg is located in the North Carolina Sandhills. This region is a transitional area between the piedmont and the coastal plain. It provides an important site for the study of the prehistoric and colonial era. In addition to approximately 2000 archeological sites, the post includes two historic wood frame churches, 22 church and family cemeteries, a Civil War battlefield at Monroe's Crossroads, a family estate of the Rockefeller family at Overhills, and a main post area eligible for the National Register of Historic Places.

Environmental Awareness Training. Since 1995, training of unit leaders has improved environmental compliance by commanders and their soldiers. The post provides three environmental awareness courses. These are a 20-hour unit environmental compliance officer course, an 8-hour command course for battalion/brigade commanders and command sergeants major, and a 3.5 hour pre-command course for company commanders and first sergeants. About 1,500 people are trained each year at an annual cost of $45,000. Endangered species incidents dropped 38% the first year the training program was instituted. The post has not received any fines for violations of the Resource Conservation Recovery Act (RCRA) since the program was instituted. Both of these accomplishments are attributed to the comprehensive environmental training provided to commanders, unit environmental coordinators, and soldiers. Significantly, these dramatic results were achieved without any loss of military readiness.

Installation Training Area Management (ITAM). **Fort Bragg has taken a proactive, multi media approach to the pollution prevention challenge, meeting compliance requirements while ensuring maximum freedom of action for military commanders and units. The installation's ITAM program provides a post wide system of erosion control and prevention. ITAM protects endangered species habitat while preserving training lands. Prevention and control of soil erosion has enabled Fort Bragg to make major improvements in compliance with the Clean Water Act.**

FORSCOM Recommended Language for the brochure: The Integrated Training Area Management (ITAM) program is central to Fort Bragg's pollution prevention strategy. ITAM's erosion prevention and control efforts target protection of surface waters and preservation of training lands, as well as the endangered Red Cockaded woodpeckers' habitat. By implementing the ITAM program, Fort Bragg has received no Clean Water Act violations and no fines since 1995.

Soil Conservation. The combination of piedmont topography with erodible coastal plain soil types makes the prevention and repair of soil erosion problems a major priority for the command.

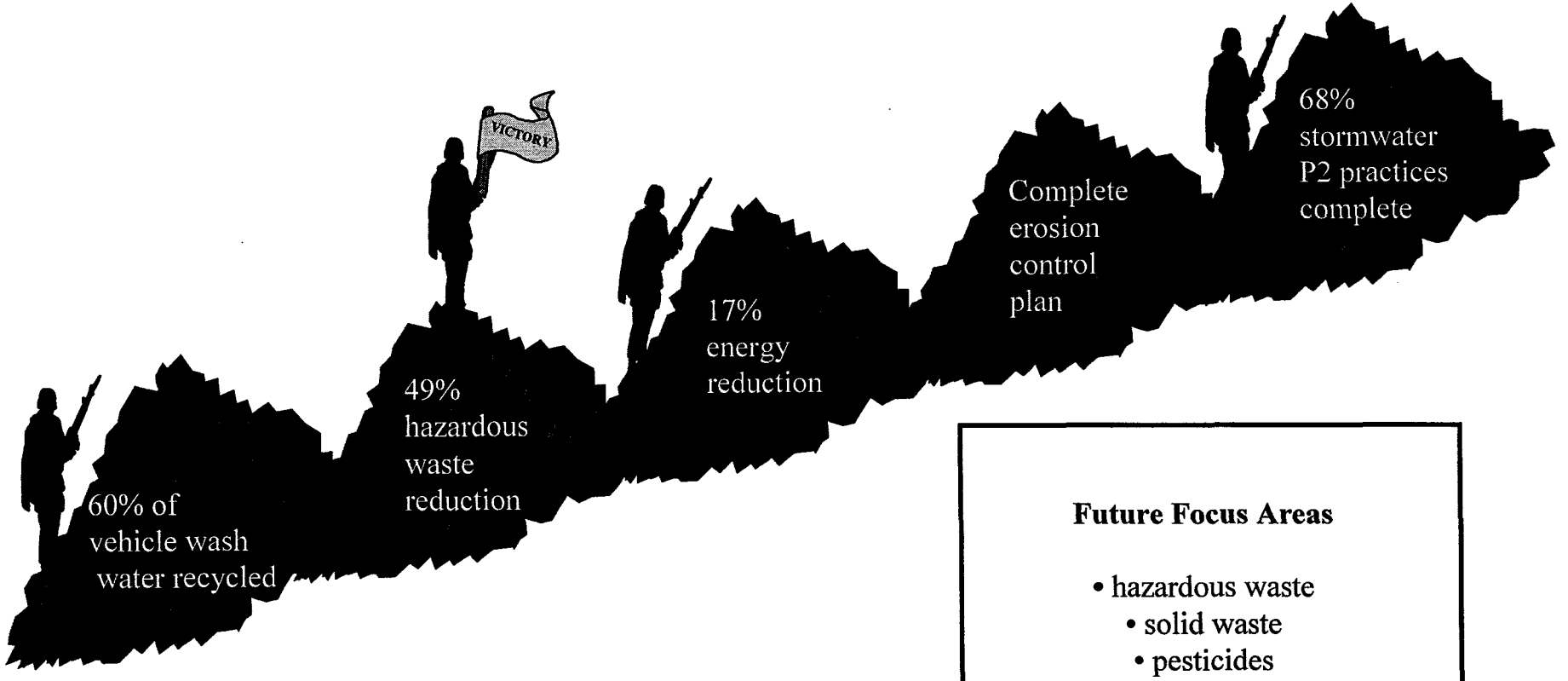
Threatened and Endangered Species. The Army's management of land on the installation has preserved a vast acreage of longleaf pine-wiregrass ecosystem. Once the most dominant ecosystem on the coastal plain of what is now the southeastern United States, it now covers but a fraction of its former range. Most areas are on public land. Within this ecosystem are found various rare and endangered plants and animals. Chief

among these is the Federally listed red-cockaded woodpecker. Preservation of such biological diversity on a military reservation with an intense training effort is a significant professional achievement.

Fort Bragg is a large quantity hazardous waste (HW) generator. In addition to Fort Bragg generated waste, DRMO-Bragg accepts waste from adjacent Pope Air Force Base, the North Carolina National Guard, and Sunny Point Ocean Marine Terminal. Fort Bragg's annual hazardous waste total was reduced by approximately 50% from CY 95 (804,000 lbs) to CY 96 (451,000 lbs). This reduction is attributed to smarter handling of photo waste (digital imaging equipment and silver recovery), new aqueous parts washers which generate less HW, and smarter management of hazardous substances by individual activities. Smarter management is a result of post-wide environmental education and awareness. Other large waste streams include batteries, paint, adhesives, sealants, and expired chemical defense kits. Fort Bragg is exploring lithium battery recycling to further reduce HW totals. Post-wide, spent fluorescent lamps are now managed for disposal because of mercury content, but are recycled off-site, not manifested as HW. Approximately 75% of the post's waste is cans and bottles of hazardous materials which are excess, have expired, or have deteriorated. Fort Bragg is pursuing the establishment of Hazardous Material Control Centers (HMCCs) to more effectively control the procurement of hazardous materials, to re-issue hazardous substances, and to prevent waste.

Approximately 500,000 gallons of used oil are recycled on post as energy for the post heating plant. Used antifreeze is recycled off-post at a very inexpensive rate, but on-site recycling is being evaluated as well. The consolidation of fuel issue sites is underway and will reduce potential pollution from spills.

Ft. Bragg Pollution Prevention Program



Innovative Technologies and Practices

- recycling of fluourescent lamps
- digital printing process to replace wet printing process in 98
- energy recovery of used oil

Future Focus Areas

- hazardous waste
- solid waste
- pesticides
- stormwater
- energy
- air pollution
- erosion
- hazardous materials
- toxic substances

Ft. Bragg Pollution Prevention Status

Background Data

Impact	P2 status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	98 UFR
HW generation and disposal (ISR data)	49% reduction in off-site disposal vs CY92 451,000 lbs disposed in CY 96.	further reduction		300k			
Solid waste reduction (ISR and Redbook data)	-175% reduction since CY92; 2% diversion of solid waste to recycling; 220 million lbs generated in CY 96; $1.7M. Installation has/does not have a formal affirmative procurement program. Installation is/is not procuring materials with recycled content.	further improvement		150k	150k	150k	
Pesticide use (ISR and Redbook data)	X% reduction vice FY93;* X lbs active ingred. applied in FY96;* plan X% complete;* $374K in 96.	further improvement					
Water conservation (Redbook data)	2.9/2.1 million kgallons used in FY96/91; $1.1M in FY96; 49/54 kgallons/capita water used in FY 95/91; Wastewater is not reused for irrigation (0%); Vehicle washwater is recycled (60%); X acres of natural landscape on post.	maintain this level		210k			
Stormwater P3 (ISR data)	68% of BMPs completed (17/25)	further improvement	840k	90k	350k	350k	
Wastewater (Redbook data and ISR data; EPR and ACTS data on funds)	No industrial waste discharge sources on post; 0% (0/3) of permitted discharges meet permit requirements; 34.9 kgal/capita wastewater in FY95; 57.3 kgal/capita wastewater in FY 91; 1.9 million kgal in 96; $0.5 M.	maintain this level		700k			
Wellhead protection (installations)	Well water is not major drinking water source; A wellhead protection plan is not needed.						
Energy conservation (ISR data)	17% energy efficiency improvement per square foot from FY 85 to FY96; 3.0 million MBTU consumed FY96; Renewable energy is used (X%);* X% of buildings have energy monitors;* "Green construction" techniques are/are not used.	further improvement					

Impact	P2 status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	98 UFR
Dust	Dust suppression practices are/are not used; # miles.						
ODS (ISR data)	10,360 lbs of Class I ODS on post in 100 units; Recycling of ODSs is done: yes or no; An ODS management plan is not done.	maintain this level					
Annual emissions of criteria air pollutants (air permit, air emissions inventory)	273.87 tons of So_x; 112.38 tons of NO_x; 23.64 tons PM 10; 64.67 tons VOC; 20.25 tons CO; X lbs/year lead (very low).	further improvement	$100K	150K		$150K	
Hazardous air pollutants (air permit or emission inventory)	26.83 tons HAPs/year	further improvement					
Hazardous air pollutants (installations)	A Risk Management Plan is required.	RMP 100% completed by FY 98		$60K		$10K	0
Prescribed burns	Installation burns 33,000 acres each year.						
Noise reduction (installation)	Noise contours do go off post.	maintain this level					
Erosion and sedimentation (installation)	Soil loss is a significant impact; Sedimentation is a significant impact; 400 acres are reseeded each year; The installation has a complete erosion control plan that is routinely updated.	further improvement	2,291k	1,737k	476k	3,684k	
Spill planning and prevention (ISR data)	10% needed secondary containment in place; Spill response supplies are/are not readily available; Spill response team is trained and equipped; SPCCP is current; ISCP is current.	maintain this level		150k		$100K to develop facility response plan	
Hazardous material management (ISR data)	0% of units/activities/tenants participate in HM tracking and pharmacy operations.	20% enrollment by FY 99			120k	300k	

Appendix B: Ft. Campbell Pollution Prevention Program

Fort Campbell

INTRODUCTION: The mission of Fort Campbell is to train, mobilize, and deploy the world's premier Air Assault Forces, the 101st Airborne Division, the 5th Special Forces Group, and the 160th Special Operations Aviation Regiment. To fight and win anywhere, any time, against any foe, as directed by the constitutionally elected government of the United States of America. As MG William C. Lee said in 1942 when forming the 101st "we shall habitually go into action when the need is extreme and immediate and crush our nations enemies by falling upon them like a thunderbolt from the skies." To successfully accomplish this, it is imperative that we care for and support our soldiers, and their families, by actively managing our resources and environment.

Fort Campbell is a 105,649 acre military reservation which straddles the Kentucky and Tennessee border, the only U.S. Army Forces Command (FORSCOM) installation under the jurisdiction of two states. The average active duty soldier population at Fort Campbell has grown over the past few years to 25,000 with 6,000 vehicles and 320 combat aircraft (the Army's largest Aviation Brigade), the largest Army airfield and a rail system for rapid deployment. All supported by a civilian work force of 4,400 and garrisoned in 3,697 buildings. Fort Campbell is the largest employer within the region having a $1.52 billion role in the economies of the surrounding communities.

BACKGROUND: Fort Campbell, like many military installations, has a tremendous impact on the local environment and is in effect a large self-contained municipality which maintains the health and utility services necessary to support the Air Assault Force. It is geographically located in an area where the American tall grass plain meets the eastern deciduous forest. Its' terrain is a combination of open rivers, wetlands, hills and ridges all under laid with a porous limestone bedrock which is environmentally sensitive but provides excellent conditions for combat training.

The land area comprised of the 105,649 acres lies within four counties and two states with differing environmental requirements and regulations. Unlike a civilian municipality comprising of small unregulated activities, small quantity generators, and/or insignificant air emitters; all Fort Campbell entities must comply with all environmental aspects.

The Environmental Division is divided into three functional branches: *Compliance* which is responsible for current operations, such as sewage wastewater discharge, water treatment, and pollution abatement programs; *Conservation* which manages our cultural resources, archaeological preservation, forestry, wildlife and land management programs; and *Pollution Prevention*, our largest branch, which manages solid and hazardous materials/waste, spill contingency planning, regulatory reporting and documentation.

This lean organization recognizes that 22 people could not possibly protect Fort Campbell's environment without the cooperation and assistance of every individual who enters this installation. As such we have adopted a quality management approach which identifies our customers as every person who works on or visits our Post. The primary goal of Pollution Prevention is to make it easier for our customers to complete their mission with minimum possible impact on the environment. This is a challenge because of the thousands of maintenance processes and procedures using hazardous materials required to support the Air Assault Force. These processes are conducted in 500 maintenance facilities, using 103 EPCRA Section 313 hazardous constituents producing in excess of 150,000 pounds of hazardous wastes annually.

A Hazardous Material/Waste Management Board was established in 1996 to provide executive level oversight in conjunction with the Installation Environmental Quality Control Committee. This board is chaired by the Garrison Commander with representatives from affected organizations to tailor the direction of the installation in providing a 'cradle to grave' management of materials. Several working groups have been designated to investigate specific problem areas. These working groups include information management tracking, hazardous materials control, and hazardous waste management.

A Restoration Advisory Board was established in 1996 to allow a forum in which the civilian populace, regulatory agencies from the States of Tennessee/Kentucky, the Environmental Protection Agency, and U.S. Army personnel can openly discuss environmental issues and corrective measures required.

Program Summary. Almost six years ago the Fort Campbell Environmental Division was swamped with state and federal Notification of Violations. Facing normal staffing and funding problems, Fort Campbell recognized and accepted that it could not clear all the violations overnight. The Environmental Division carefully examined each violation, looked for common causes, prioritized them, and developed a long range plan. Of immediate concern, with the potential of shutting down the installation, were toxins being disposed into the wastewater/sewer system. The root cause in both this and most other violations was identified as poor training or lack of knowledge. The goal was to minimize the impact of post operations on the environment. To accomplish this, it was decided to set up a program to relieve the soldier from dealing with the complex environmental rules and regulations. This program would then allow the soldier to focus on his primary duties of the military mission. While our initial goal remains unchanged, our environmental plan has continued to evolve as steady progress and process evaluation directs our energies into new areas. We continue to investigate ways of minimizing solid and hazardous waste and improving our basic business practices.

ACCOMPLISHMENTS/RESULTS: The Pollution Prevention Branch was established in May 1994 to consolidate and coordinate efforts to comply with the Pollution Prevention Act and Executive Order 12856. This resulted in combining the solid waste, hazardous waste, and hazardous material issues within one branch. Current procedures were analyzed and programs developed to implement business practice changes across the installation.

SOLID WASTE MANAGEMENT:

Two solid waste convenience centers were established on post for the collection of solid waste and segregation of recyclables from the waste streams. Two major aspects of the convenience centers establishment were to provide managed solid waste disposal for the military units during/returning from field training exercises and for the military family housing occupants an outlet for recyclables, used oil, used antifreeze, and household hazardous waste. Since inception, the convenience centers have annually diverted over 660 tons of waste into recyclables. Although the collection of household hazardous waste has added another waste stream to the installation; it has captured this unregulated waste and prevents it from being disposed in the regional solid waste landfill.

Raw Wood (trees, brush, stumps, etc.,) was previously disposed at the regional solid waste landfill. It is now chipped/shredded with a tub grinder into mulch. This has not only decreased the solid waste disposal but until two years ago the installation was purchasing mulch at a price of $20 per cubic yard for landscaping purposes. We are now making our own mulch and saved over $27,000 in mulch purchases each year. The mulch is also being utilized by the school system in the playground areas and used in the military training areas to control unwanted vegetation.

During this past year we have converted 100 eight cubic yard refuse dumpsters to collection of cardboard only. This has increased the tonnage of cardboard that we have recycled by 100 percent.

Concertina wire has always been a problem for disposal. After months of research, a rotary shear shredder was leased and the wire was shredded into small pieces. After being shredded it was considered to be a high grade processed steel. A total of 100 - 150 tons per year has easily sold through the qualified recycling program.

Small propane cylinders were classified as hazardous waste for disposal due to the canisters being pressurized and potentially still flammable. Through research it was found that each cylinder had a valve stem on the side of the container that after removal the container would be considered scrap metal.
Valve stem removers were purchased and placed at each convenience center for the removal of these stems.

HAZARDOUS WASTE MANAGEMENT:

Hazardous Waste Management has changed dramatically over the last 3 years. Prior to 1994 there was little if any interactive management of the generation and disposal of hazardous waste and used oils. Our initial attempt at providing centralized management was to establish a single less than 90-day accumulation point (AP). Previous to this action an individual that had hazardous waste or used oil was required to make an appointment for turn-in and transport the waste to the Defense Reutilization and Marketing Office (DRMO). Initially we only substituted our AP with DRMO and still required unit personnel to transport the waste. Although this was an improvement, it was still burdensome on individual units and mismanagement was still evident.

We accelerated our hazardous waste management efforts in 1996 to a "you call - we haul" system. Each unit that generated hazardous waste was inspected and given an approval document to establish a hazardous waste satellite storage area. They would be limited to a maximum of 55 gallons of hazardous waste or smaller quantity if deemed appropriate. Containers were procured and distributed in each area for accumulation. A contract was developed for contractor personnel to service each satellite storage area by transporting the waste to the AP and ensuring that proper marking and labeling was applied to the containers.

Containers for storing used oil were also supplied to each generating point along with a secondary containment device. Contract personnel also services these areas by removing the used oil from the containers and transporting it to the Used Oil Collection Center. All used oil is recycled off post through a contract administered by DRMO. Approximately 120,000 gallons of used oil is recycled annually. To further reduce hazardous waste generation, used oil filter crushers were purchased. State regulations classified oil filters as hazardous waste unless they were drained and crushed.

In 1995, the installation disposed of approximately 10,000 gallons of used antifreeze at a cost of $14,450. We have designed a method of filtering the used antifreeze and replacing the additives to bring the recycled product up to specifications for reutilization on the installation. Thus saving disposal costs and cost avoidance in the purchase of new antifreeze.

To aid in the ozone depleting chemical (ODC) reduction effort we have taken out of service and shipped 11,745 pounds of halon fire extinguishers to the Halon Reserve Bank in Richmond, VA. An ODC inventory has been accomplished to determine products/processes that utilize ODCs and a management plan to establish the best method to decrease or eliminate the use of the chemical. Overall reduction of ODCs has resulted in a 5% decrease.

The installation has previously utilized Safety Kleen via a service contract to provide and maintain parts washers on the installation. Initially we requested that Safety Kleen change the type solvent that was being furnished to one that did not have any hazardous waste characteristics. This eliminated approximately 150,000 pounds of hazardous waste being generated. We have since been methodically replacing the Safety Kleen parts washers with a government owned parts washer and started an on-site recycling effort of the solvent. This will virtually eliminate solvent disposal from parts washers and reduce our annual expenditures by $234,000.

Through these management efforts we have decreased our hazardous waste by 54% since 1992 and reduced the 1997 disposal cost by 50% from 1996.

HAZARDOUS MATERIAL MANAGEMENT:

In 1995 the Fort Campbell Pollution Prevention Branch realized that further improvements in Hazardous Waste minimization would require changing the current hazardous material management business practices and developing a more common sense approach. The first and foremost objective of any new management system must include improved access for mission support. This would mean developing a hazardous material management plan centered on customer support. Every aspect of the plan would be evaluated and modified on how it supported the customer. Of course pollution prevention was a goal, but it would be achieved by making material management easier. After considerable research of Army, Navy and Air Force hazardous minimization programs, the Pollution Prevention Branch developed a rough procedural guideline and sought funding for a pilot Hazardous Material Control Center (HMCC). The pilot program was to run for 1 year at the SABRE Army Airfield serving 4 Aviation Assault Battalions who fly and maintain 95
UH-60L Blackhawk helicopters.

We knew that for the plan to work, our units would need to be able to pick up everything they own and deploy anywhere in the world with minimum notice. This, and anticipated cost savings, were to be two primary drivers in the programs success. We also wanted to improve access to hazardous materials for our daily maintenance operations while minimizing waste disposal. Finally, we wanted to reduce our reporting/paper trail.

The HMCC team decided that to adequately support our customers, we would need to establish a war stock or 45 day contingency operations inventory along with a work site 7 day garrison maintenance inventory. The HMCC would manage both inventories, rotating materials through the war stock to minimize shelf life losses. The initial inventory would be put together from the contingency assets the units had already stored.

With the planning complete, the HMCC team sat down with each battalion's maintenance supervisors and identified exactly what hazardous materials they required to complete their mission. Every hazardous material stored by the battalion was physically located, inventoried, and turned

in to the HMCC. The HMCC inventory identified each item, manufacturer, shelf-life, lot/batch number, storage requirements and assigned specified condition codes. Items no longer serviceable were conveniently located for maintenance personnel. Items requiring refrigerated storage were centrally located and delivered to the maintenance site when needed.

The contingency stocks requested were not at all similar to what the units had previously stored for meeting these requirements. The HMCC found that the units would have an excess of one item, no stock of another, and with no proper shelf-life management program, quite a bit of useless and unserviceable material. Now under control of the HMCC, contingency stocks are properly documented, ordered, stored and shelf-life is actively managed per Department of Defense directives. Individual unit savings are also significant since a lot of the maintenance requirements are met with excess inventory at no cost to the unit.

A simple system was developed where HMCC personnel visited each hazardous material locker daily, picked up empty containers, hazardous waste and restocked the lockers. Authorized soldiers and maintenance personnel would go to their site storage locker and log out their requirements. Empty containers were replaced automatically by HMCC employees and the units were charged accordingly.

After demonstrating great success with the pilot program, the installation decided to march forward towards installation-wide hazmat management with the HMCC program. The implementation of the HMCC program had proven itself to be an effective control mechanism for hazardous material distribution which had never before been carried out to the user level. This level of control has led to improved readiness, economics and environmental compliance.

Since implementation, the HMCC has introduced 100 product substitutions. The substitutions introduce environmentally friendly products, allowing avoided large vendor minimum issues (i.e., preventing issue of 55 gallons of acid by providing the ounces actually required), saving $100,000 in fiscal year 96. The HMCC maintains an intensive shelf life management program, having approved 1,157 shelf life extensions on 7,181 items, resulting in $65,336 cost savings. In addition, the HMCC reports an estimated $1,000,000 in disposal cost avoidance and $35,851 savings through product reuse.

The readiness posture has been greatly improved for all units involved in the program. The HMCC has supported active duty units with over 50 deployments and field exercises. Units have also been supported through "crisis" situations (last minute deployments, "aircraft on ground" situations, etc.,) With over 30% of the installation inducted, the HMCC now supports over 60 customers and is providing daily service to more than 100 lockers.

During the initial implementation of the HMCC throughout the Aviation Brigade, the HMCC recovered $530,000 of excess materials. Since that time, excess materials have accounted for over 20% of hazmat issues adding up to over $40,000 worth of acquisition avoidance for those units.

The Fort Campbell HMCC program is projected to encompass the entire installation by the year 2000, providing streamlined hazmat management to efficiently support the military mission.

EPCRA Compliance

Since calendar year 1994, all federal facilities have been required under Executive Order 12856 to comply with the Emergency Planning and Community Right-to-Know Act (EPCRA). Reporting requirements for EPCRA are encompassed by a three part structure, Section 311 reporting, Section 312 reporting (Tier I and II), and Section 313 reporting (Toxic Release Inventory or TRI).

The scope of EPCRA reporting is detailed so as to provide accurate information for emergency planning, spill response, and public awareness. Capturing this information provides a mechanism by which the installation can gauge the level and impact hazardous material usage may have on the surrounding community. A trend toward reduction in reported releases is an indicator that the installation is conducting sound business practices and successfully employing pollution prevention activities contributing to a healthier environment. Fort Campbell has managed in the three reporting years to reduce the number of chemicals to be reported by 75%, which not only meets, but greatly exceeds the Department of Defense goal of 50% reduction by the year 2000. This reduction clearly demonstrates that the improved material and waste management practices are paying off not only for the installation, but for the supporting community as well.

HSMS

In order to provide long-term, reliable data management for these activities, the Fort Campbell Pollution Prevention Branch chose to be a phase Ia implementation site for the Hazardous Substance Management System (HSMS). This meant that Fort Campbell would be a forerunner for HSMS activities within the Army and DOD, and would be providing important guidance and feedback for fielding of the system Army-wide.

The HSMS is a DOD mandated system for use in management of hazardous materials and waste. The system provides a tool for collecting data and producing reports which assist in effective management practices and environmental compliance. The HSMS incorporates all aspects of hazardous substance management such as materials, waste, safety and pollution in order to provide complete lifecycle management.

In January of 1997, Fort Campbell began using the HSMS for tracking of HMCC activities, and in March of 1997 the HMCC began sole reliance on the HSMS for all material data management functions. HSMS implementation has since progressed to the point of total tracking of all material management activities such as ordering, receiving, storage, shelf-life management, contingency and stockage management, issue, use, reuse and disposal. Projected implementation of the HSMS Waste Module in October 1997 will complete the necessary data link to provide the installation with complete cradle-to-grave tracking within one information management system.

The ultimate goal of HSMS is to provide push-button reporting for hazardous material and waste, and to maintain accurate records of all hazardous material and waste handled by the installation. Currently Fort Campbell is using contractor support totaling over $300,000 per year to complete reporting and tracking of these substances. By implementing HSMS, the installation will ultimately capture a significant cost savings by reducing the manpower used to capture, track and report the necessary information.

EDUCATION AND OUTREACH PROGRAMS:

Establishing Fort Campbell as a leader in pollution prevention began with the recognition that the people who enter our installation are concerned about the environment that they live, work and play in. It also required looking at the regulatory concerns and developing an environmental stewardship program which fit within Army organizational constraints. We did this by going to our Commanding General requesting his aid in establishing an Environmental Quality Officer (EQO) Program. This program dramatically changed how we manage the environment at Fort Campbell, and is the basis of our continuing improvement.

Every unit and activity at Fort Campbell has an EQO. They start as soldiers and civilians concerned with the environment. We provide the training and assistance they require to accept responsibility and make a positive impact. Fort Campbell EQO Program features 88 primary and 112 secondary EQOs designated in writing by their unit or activity commander. They attend a 40 hour course, taught by the actual scientist and experts assigned to the Environmental Division and pass a written examination. They attend
bi-monthly EQO meetings which addresses program changes and offers direct customer feedback to the Environmental Division. Their recommendations and/or complaints are promptly addressed and often directly incorporated.

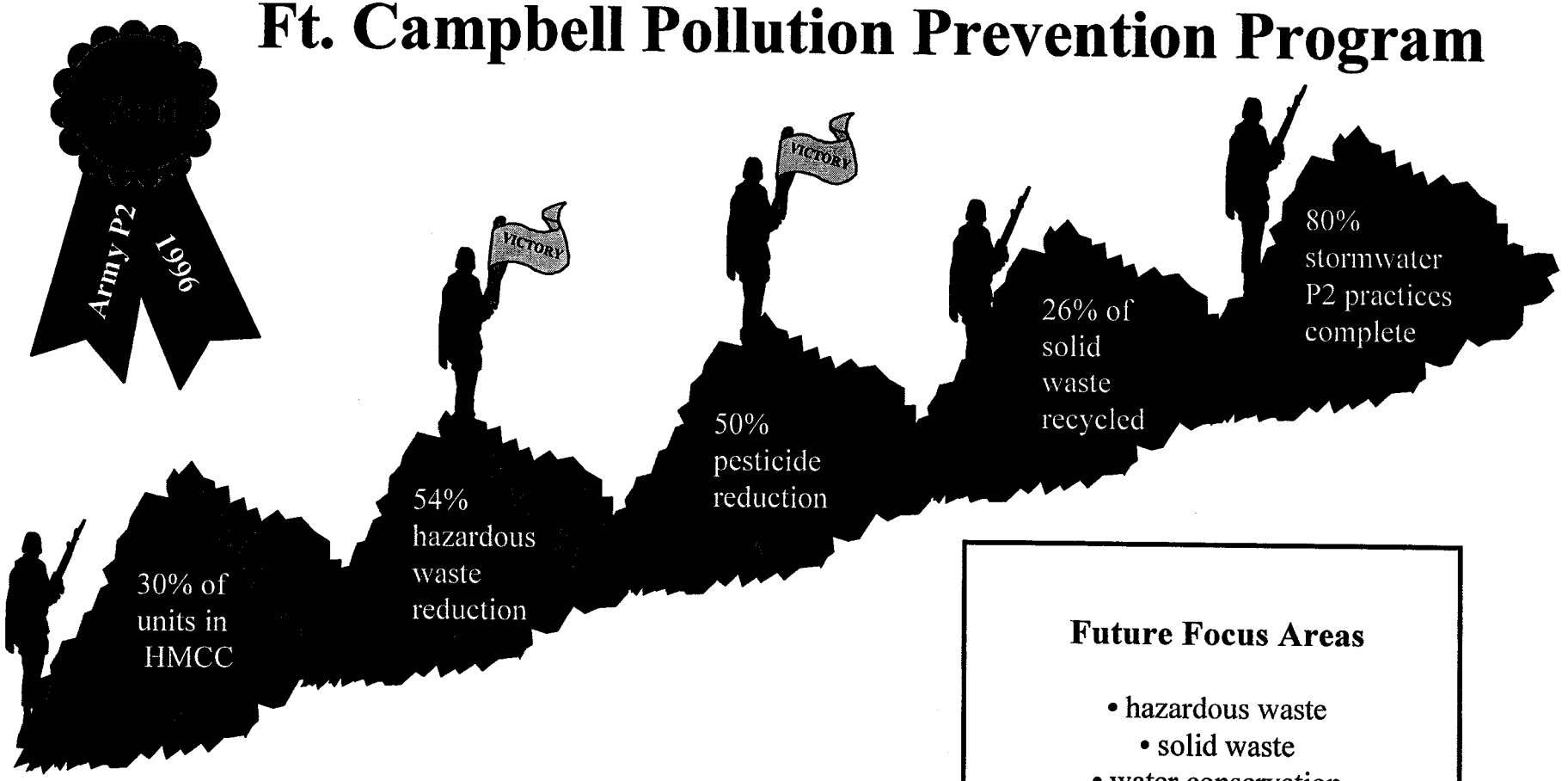
Fort Campbell has been selected by the U.S. Army Environmental Center to host quarterly tours of the Hazardous Material Control Center and demonstrate the Hazardous Substance Management System to representatives from other installations and major army commands. In addition, Fort Campbell has been requested to present informational briefings at the Garrison Commander's Conference, the Joint Service Pollution Prevention Conference, and the EPA Pollution Prevention/Green Manufacturing Conference.

CONCLUSION:

The primary focus of the Environmental Division is to support the military mission of the installation. This goal includes relieving the soldier from dealing with the complex environmental rules and regulations allowing the soldier to focus on his primary duties. This is accomplished by incorporating programs which ensure compliance with all facets of the environmental regulations governed by the States of Tennessee and Kentucky and the Environmental Protection Agency.

Our environmental plan has continued to evolve as steady progress and process evaluation directs our energies into new areas. We continue to investigate ways of minimizing solid and hazardous waste and to improve our basic business practices.

Ft. Campbell Pollution Prevention Program



Innovative Technologies and Practices

* a **tub grinder** is being leased to reduce demolition rubble volume by 70%
* **erosion control** by leasing jump zones to hay farmers
* **sludge application** to training ranges as soil ammendment
* first **HMCC** pilot site in FORSCOM

Future Focus Areas

- hazardous waste
- solid waste
- water conservation
- stormwater
- wastewater reduction
- air pollution
- erosion
- hazardous material management
- environmental training

Ft. Campbell Pollution Prevention Status

Background Data

Impact	P2 status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 98 UFR
HW generation and disposal (ISR data)	54% reduction in off-site disposal vs CY92; 369,000 lbs disposed in CY 96.	further improvement	130k				
Solid waste reduction (ISR data)	0% reduction since CY92; 26% diversion of solid waste to recycling; 34.8 million lbs generated in CY 96; $1.7M; Installation has/does not have a formal affirmative procurement program; Installation is/is not procuring materials with recycled content.	further improvement			170k	220k	
Pesticide use (ISR data)	50% reduction vice FY93; 8,120 lbs active ingred. applied in FY96; plan 100% complete; $262K in 96.	maintain this level			120k	$350K	
Water conservation (Redbook data)	Wastewater is not reused for irrigation; Vehicle washwater is recycled (50%). $834,000 in 96 1.7/1.6 million kgal used in FY96/91 45/37 kgal/capita water used in FY 95/91	further improvement					
Stormwater P3 (ISR data)	80% of BMPs completed (800/1000)	further improvement	1,595k	145k	401k	1145k	
Wastewater (Redbook data and ISR data; EPR and ACTS data on funds)	57% (100/175) of industrial waste discharge sources meet pretreatment requirements. 67% (2/3) of permitted discharges met permit requirements 1.4 million kgals in 96; $831k	further improvement					
Wellhead protection (installation)	Well water is major drinking water source; A wellhead protection plan is needed; If so, plan is 100% complete.	Plan 100% complete by FY97	120k	20k	10k	10k	
Energy conservation (ADDS data)	2% reduction over FY 85. 2,374,720 MBTU consumed FY96	?					
Dust	Dust suppression practices are/are not used? # miles?						
ODS (ISR data)	An ODS management plan is not done; 26,087 lbs of Class I ODS on post in 18 units; Recycling of ODSs is done.	further improvement					

Impact	P2 status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 98 UFR
Annual emissions of criteria air pollutants (air permit, air emissions inventory)	81.2 tons of So_x; 128.4 tons of NO_x; 21.5 tons PM 10; 111.4 tons VOC; 25.1 tons CO; 0.1 tons lead.	further improvement	1,320k		100k	100k	
Hazardous air pollutants (air permit or emission inventory)	10.0 tons HAPs/year; (Actuals) based on Title V.	further improvement			100k	100k	
Hazardous air pollutants (installation)	A Risk Management Plan is required (chlorine).	RMP 100% completed by FY 99			100k	200k	
Prescribed burns	Installation burns 30,000 acres each year		$40K	$40K		$92K	
Noise reduction (installation)	Noise contours do go off post	further improvement					
Erosion and sedimentation (installation)	Soil loss is not a significant environmental impact; Sedimentation is not a significant impact; ?____ acres are reseeded each year; The installation has a complete erosion control plan that is routinely updated.	further improvement	30k	200k	607k	2040k	
Spill planning and prevention (ISR data)	Spill response supplies are readily available; Spill response team is trained and equipped; Fire department have minimal staff available for response; SPCCP is not current; ISCP is not current.	further improvement		6k	6k	6k	
Hazardous material management (ISR data)	30% of units/activities/tenants participate in HM tracking and pharmacy operations.	100% enrollment by FY 00	1,000k	500k			
Toxic release reduction (ISR data)	5% reduction in TRI releases/disposals vs CY 94; 16,959 lbs released in CY 96.	further improvement	35k	80k	45k	45k	
Program planning (installation)	?Installation has/does not have a current P2 plan; Installation P2 plan covers: hm management and h2 management.	Plan 100% completed by FY 98			405k	705k	

Impact	P2 status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 98 UFR
Environmental education and awareness (installation)	23.6% unit environmental POCs trained in past FY; 1,300 personnel trained in maneuver damage prevention during past FY; 7% of workforce trained in P2; Environment is not covered in orientation briefing; P2 program elements are briefed at the installation EQCC.	further improvement	197k 300k	182k 400k	221k	361k	
TOTALS			$4,767.00	$1,573.00	$2,285.00	$5,374.00	$3,089.00

Appendix C: Ft. Carson Pollution Prevention Program

Fort Carson

Fort Carson, located in east-central Colorado, serves as a major training facility for Armored, Mechanized Infantry, and Special Forces units. Fort Carson manages the second largest training facility in the continental United States, the Pinon Canyon Maneuver Site (PCMS). Fort Carson has responded to a broad array of environmental concerns with an equally comprehensive environmental management system. Fort Carson's location, in an arid climate with fragile terrain, presents significant environmental challenges for a modern armored force. Through a well organized, command supported, and thoroughly coordinated program, Fort Carson has maintained maximum flexibility for the maneuver unit commander while meeting or exceeding environmental requirements and objectives.

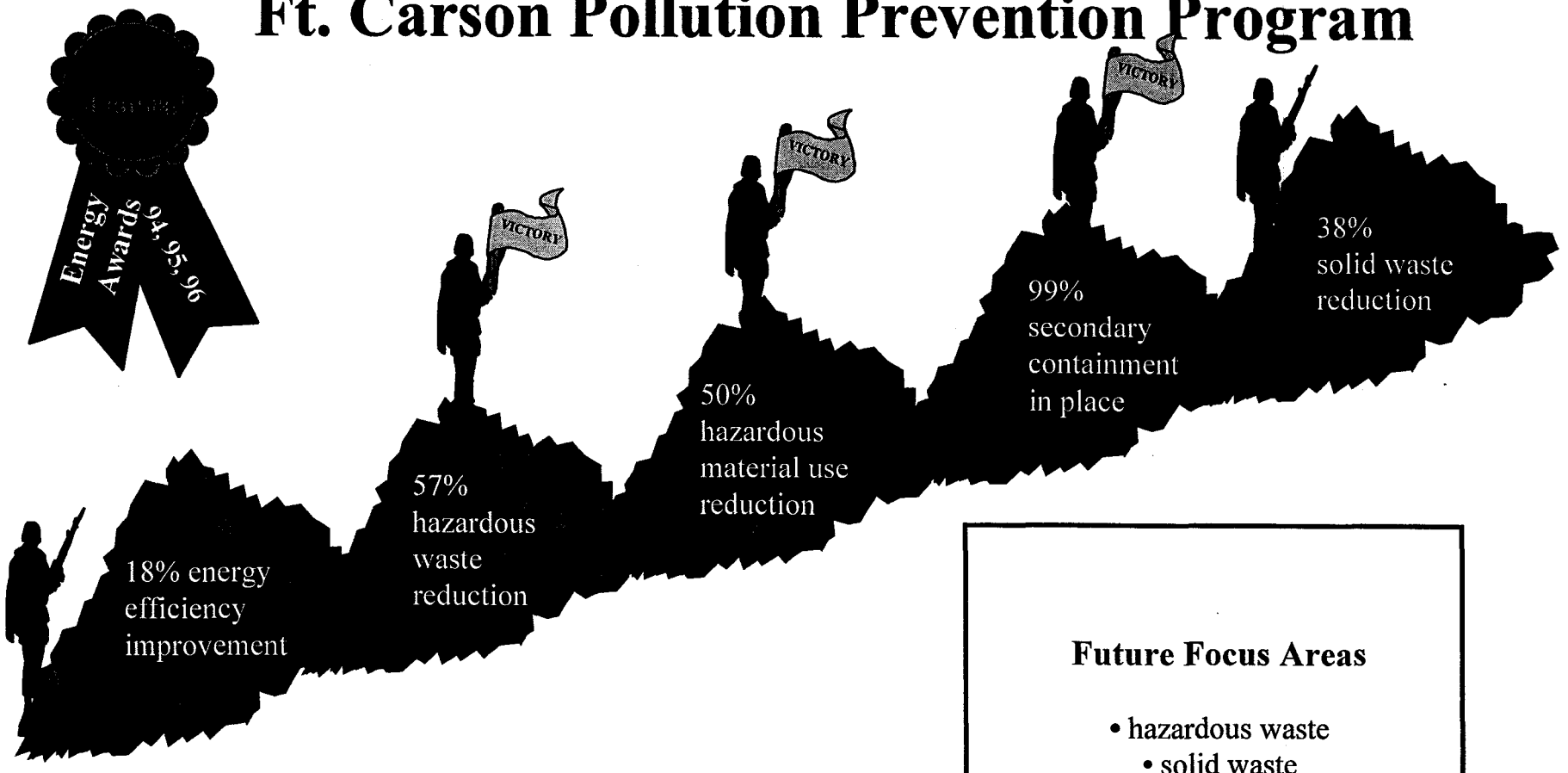
Fort Carson's pollution prevention program has achieved significant results from a "top down" management approach. P2 funding from FORSCOM helped to start the program. The Commanding General's active support of the program, combined with the participation of commanders of assigned and tenant units, has caused pollution prevention to become part of the command and management structure at all levels. Unit level Environmental Protection Officers and NCOs are full participants in the overall pollution prevention effort. Staff assistance visits conducted by the P2 Division are high payoff activities, resulting in both immediate reductions in waste generation and more long term reductions in energy and hazardous waste disposal costs.

Fort Carson is moving rapidly towards meeting all pollution prevention goals, having achieved: a 59% reduction in hazardous waste since FY93, a 49% reduction in hazardous material acquisition since FY 94, a 38% reduction in solid waste since FY93, an 18% reduction in pesticide use since FY 93, and a 71% increase in recycling since FY 92. Energy and water program have been equally impressive: an 18% reduction in energy use since FY 85, and a 28% reduction in water use since FY 94.

One of Fort Carson's most successful projects has been its HAZMART Pharmacy. This Pharmacy was selected as the FORSCOM beta test site and was nominated to host the functional validation assessments for DECIM's HSMS system. The current Pharmacy inventory value is $340k; $130 is excess material which was recovered and which is available for free issue. The Pharmacy is projected to reduce hazardous waste generation by 15 tons per year, and is projected to reduce hazardous material acquisition by 112 tons per year.

Many other initiatives, including weapons cleaning machines, filtration equipment on solvent tanks, HVLP paint guns, and antifreeze recycling systems, are ongoing. Fort Carson is an Army leader in recycling, having received the 1st place Department of the Army Recycling Award, for Non-Industrial Installations, in 1995, and the 2nd place award in 1996. Fort Carson achieved this distinction through an aggressive and comprehensive program to divert as much waste, of all types, from its waste stream.

Ft. Carson Pollution Prevention Program



Innovative Technologies and Practices

- old tank track used for erosion control
- installation design guide for "green" construction
- vehicle washrack captures rainwater, and is 100% recycled
- absorption chillers with natural gas and evaporative cooling

Future Focus Areas

- hazardous waste
- solid waste
- energy
- air pollution
- erosion
- hazardous material management

Ft. Carson Pollution Prevention Status

Background Data

Impact	P2 status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 98 UFR
HW generation and disposal (ISR data)	57% reduction in off-site disposal vs CY92 137,881 lbs disposed in CY 96.	further improvement	170k		100k	100k	
Solid waste reduction (ISR and Redbook data)	38.4% reduction since CY92; 38.4% diversion of solid waste to recycling; 92 million lbs generated in CY 96; $0.6M. Installation has a formal affirmative procurement program. Installation is procuring materials with recycled content.	further improvement	70k		122k	122k	
Pesticide use (ISR and Redbook data)	1% reduction vice FY93; 2,735 lbs active ingred. applied in FY96; plan 100% complete; $12K in 95.	further improvement					
Water conservation (Redbook data)	0.9/1.4 million kgallons used in FY 95/91; $1.3M in FY96; 34/41 kgallons/capita water used in FY 95/91; Wastewater is reused for irrigation (50%); Vehicle washwater is recycled (100%); 3,000 acres of natural landscape on post.	maintain this level					
Stormwater P3 (ISR data)	75% of BMPs completed (75/100)	maintain this level	350k	50k	300k	350k	
Wastewater (Redbook data and ISR data; EPR and ACTS data on funds)	No industrial waste discharge sources on post; 100% (3/3) of permitted discharges meet permit requirements; 29 kgal/capita wastewater in FY95; 19 kgal/capita wastewater in FY 91; 0.6 million kgal in 96; $0.9 M.	maintain this level					
Wellhead protection (installations)	Well water is not major drinking water source; A wellhead protection plan is needed.	plan 100% complete by FY 98	80k		30k	40k	
Energy conservation (ISR data)	18% energy efficiency improvement per square foot from FY 85 to FY96; 1.4 million MBTU consumed FY96; Renewable energy is used; 50% of buildings have energy monitors; "Green construction" techniques are used.	further improvement					

Impact	P2 status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 98 UFR
Dust	Dust suppression practices are used; 107 miles.	maintain this level			100k	100k	
ODS (ISR data)	10,000 lbs of Class I ODS on post in 100 units; Recycling of ODSs is done: yes; An ODS management plan is under development.	maintain this level					
Annual emissions of criteria air pollutants (air permit, air emissions inventory)	11 tons of So_x; 59 tons of NO_x; 43 tons PM 10; 115 tons VOC; 15 tons CO; 2.9 lbs/year lead.	further improvement	545k	200k	140k	200k	
Hazardous air pollutants (air permit or emission inventory)	8 tpy HAPs/year	further improvement					
Hazardous air pollutants (installations)	A Risk Management Plan is/is not required. This is under review to determine the requirement.	RMP 100% completed by FY TBD					
Prescribed burns	Installation burns 10,000 acres each year.						
Noise reduction (installation)	Noise contours do go off post.	maintain this level					
Erosion and sedimentation (installation)	Soil loss is a significant impact; Sedimentation is a significant impact; 6,000 acres are reseeded each year; The installation has a complete erosion control plan that is routinely updated.	further improvement					
Spill planning and prevention (ISR data)	99% needed secondary containment in place; Spill response supplies are readily available; Spill response team is trained and equipped; SPCCP is current; ISCP is current.	maintain this level		385k	55k	80k	
Hazardous material management (ISR data)	10% of units/activities/tenants participate in HM tracking and pharmacy operations.	100% enrollment by FY 98		260k			
Toxic release reduction (ISR data)	100% reduction in TRI releases/disposals vs CY 94 (1 lb in CY 94); 0 lbs released in CY 96.	minimal impact	45k		355k	355k	

Impact	P2 status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 98 UFR
Program planning (installation)	Installation does not have a current P2 plan; Installation P2 plan covers: hm management, hw management, solid waste, pesticides, criteria air pollutants, toxic air pollutants, water conservation, wastewater reduction, stormwater, spill prevention, energy, and noise.	Plan 100% complete by FY 98	609k		40k 352k	40k 414k	
Environmental education and awareness (installation)	650 unit environmental POCs trained in past FY; 600 personnel trained in haz waste/material management in past FY; 1,000 personnel trained in maneuver damage prevention during past FY; 80% of workforce trained in P2; Environment is covered in orientation briefing; P2 program elements are briefed at the installation EQCC.	maintain this level	468k		30k	100k	
TOTALS			$2,337.00	$ 895.00	$1,624.00	$1,901.00	$277.00

Appendix D: Ft. Drum Pollution Prevention Program

Fort Drum

Fort Drum, home of the 10th Mountain Division, has a long history as a major training site for the active Army, Army Reserve and the National Guard. Fort Drum has been a military training site since 1908, although its military history began in 1809 when infantry units were stationed there to prevent smuggling between northern New York and Canada. Fort Drum consists of 107,265 acres located in Jefferson and Lewis Counties, about 10 miles northeast of Watertown, New York. The installation's northern location, large size, and complex terrain have resulted in Fort Drum's becoming the premier Army winter warfare training center for active Army and Reserve Component units from across the country.

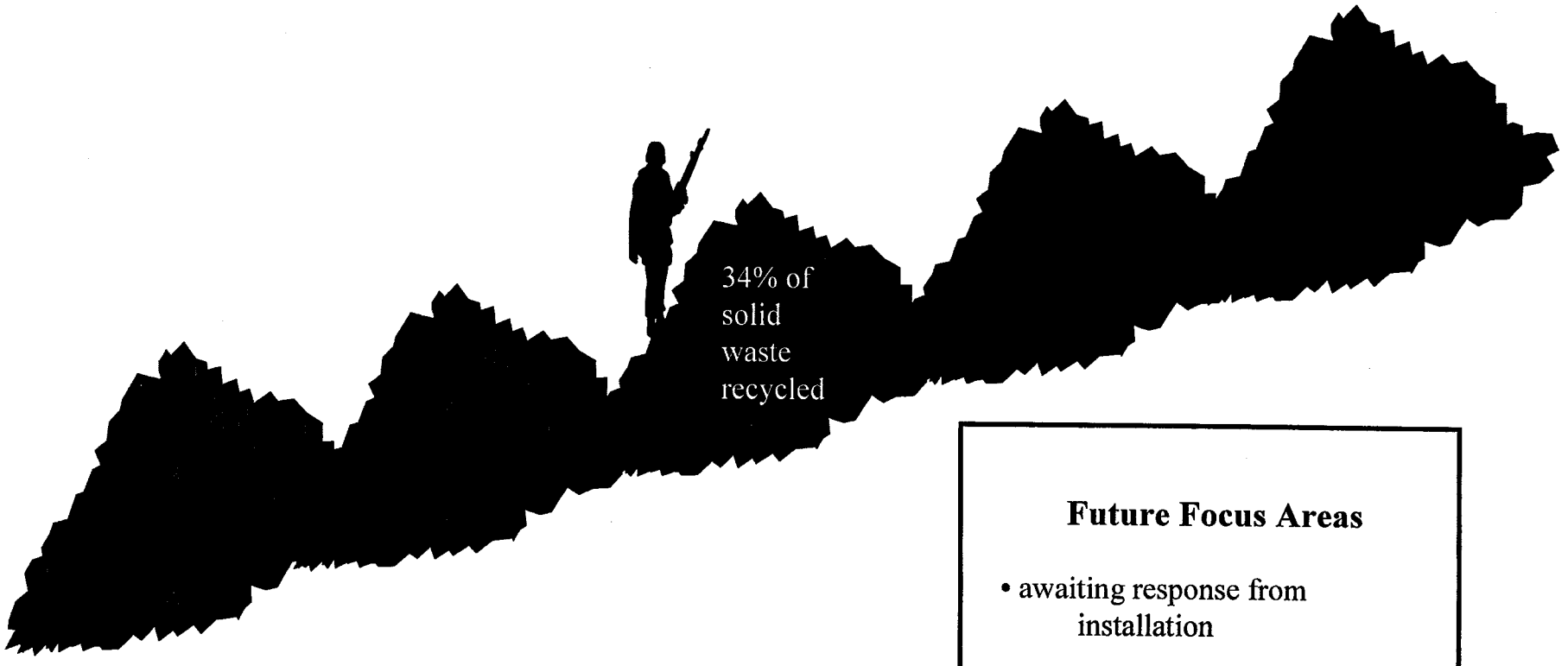
Fort Drum is located in a geologically complex area astride two distinct regions. The Lake Erie-Ontario Lowlands form the southwestern part of the installation, which is characterized by flat, sandy expanses interspersed with lakes and wetlands and incised by creeks and rivers. The Adirondack Uplands, occupying the northeastern third of Fort Drum, is a broad area of area of hills, narrow ridges, large lakes, and rock outcroppings. The varied terrain and vegetation, large land area, and climate make Fort Drum an ideal combined arms training areas for all types of operations, year-round. The same characteristics, however, which make Fort Drum a highly valuable training site create environmental stewardship challenges. The amount and variety of water resources demand special care be taken to protect these assets from POL products, and the vegetation on the sandy southern training areas is especially vulnerable to damage by wheeled and tracked vehicles.

In response to both intensive training requirements and an expanding regulatory situation, Fort Drum has implemented a multi-media pollution prevention program. The program's dual objectives are to ensure that Fort Drum can continue to provide maximum freedom of action for maneuver commanders while protecting and enhancing the natural ecosystem. Fort Drum has characterized its waste streams, assessed its activities, written a plan, and is now implementing several pollution prevention initiatives. A significant reduction in the generation of waste lead/acid batteries has been achieved by transitioning to a vendor operated recycling system. Fort Drum has reduced dramatically the generation of waste solvent. In 1993, waste solvent constituted 37% of its hazardous waste stream; by 1996, this had fallen to 5% of its waste stream. Further reductions, resulting from the elimination of low usage solvent sinks and an increase in the use of aqueous parts washers, are anticipated. The substitution of rechargeable nickel-metal hydride batteries, used in communications equipment, for single use lithium batteries is expected to reduce hazardous waste disposal quantities by 44,796 pounds and save $105,270 over the next year.

Fort Drum has implemented the Integrated Training Area Management (ITAM) program, and has taken numerous land management actions to restore vegetation and reduce damage from training. For most unit training activities, units are required to submit a Record of Environmental Consideration for approval prior to the commencement of training.

Fort Drum anticipates additional reductions in pollution generation rates, and is actively studying pharmacy implementation, modifications in waste tracking procedures, and increased training in pollution prevention as ways to continue its progress in overall installation environmental management.

Ft. Drum Pollution Prevention Program



Innovative Technologies and Practices

- in planning stages

Future Focus Areas

- awaiting response from installation

Ft. Drum Pollution Prevention Status

Background Data

Impact	P2 status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 98 UFR
HW generation and disposal (ISR data)	95% **increase** in off-site disposal vs CY92 843,160 lbs disposed in CY 96.	further improvement OR maintain this level OR minimal impact	27k		200k	300k	
solid waste reduction (ISR and Redbook data)	17 % **increase** since CY92; 34% diversion of solid waste to recycling; 21 million lbs generated in CY 96; $1.3M. Installation has/does not have a formal affirmative procurement program. Installation is/is not procuring materials with recycled content.	further improvement OR maintain this level OR minimal impact			700k	700k	
pesticide use (ISR data)	867% **increase** vice FY93; 145 lbs active ingred. applied in FY96; plan 100% complete. $128k in FY96	minimal impact					
water conservation (redbook data)	1.1/0.6 million kgallons used in FY96/91 29/15 kgallons/capita water used in FY 95/91 Wastewater is/is not reused for irrigation. (X%) Vehicle washwater is/is not recycled (X%). X acres of natural landscaping on post. $3.6M in FY96	further improvement OR maintain this level OR minimal impact					
stormwater P3 (ISR data)	X% of BMPs completed (X/X)	further improvement OR maintain this level OR minimal impact	795k	45k	40k	40k	
wastewater (redbook data and ISR data; EPR and ACTS data on funds)	no industrial waste discharge sources on post. 100% (3/3) of permitted discharges meet permit requirements. 19 kgal/capita wastewater in FY95; 13 kgal/capita wastewater in FY 91. 784,060 kgal in 96, $3.5 million	further improvement OR maintain this level OR minimal impact	30k				
wellhead protection (installations)	Well water is/is not major drinking water source; A wellhead protection plan is/is not needed; If so, plan is X% complete.	Plan 100% complete by FY ____.					

Impact	P2 status	Future Plans	**FY96 Program**	**FY97 Program**	**FY 98 Program**	**FY 98 Required**	**FY 98 UFR**
energy conservation (ADDS data)	1.7% energy efficiency improvement per square foot from FY 85 to FY96. 1.6 million MBTU consumed FY96; $21M Renewable energy is/is not used (X%) X% of buildings have energy monitors. "Green construction" techniques are/are not used.	further improvement OR maintain this level OR minimal impact					
dust	Dust suppression practices are/are not used. # miles						
ODS (ISR data)	X lbs of Class I ODS on post in X units Recycling of ODSs is done: yes or no; An ODS management plan is done/not done/under development	further improvement OR maintain this level OR minimal impact			100k	100k	
annual emissions of criteria air pollutants (air permit, air emissions inventory)	X tons of So_x; X tons of NO_x; X tons PM 10; X tons VOC; X tons CO: X tons lead:	further improvement OR maintain this level OR minimal impact			25k	50k	
hazardous air pollutants (air permit or emission inventory	X tons HAPs/year	further improvement OR maintain this level OR minimal impact			10k	10k	
hazardous air pollutants (installations)	A Risk Management Plan is/is not required	RMP 100% complete by FY ___					
prescribed burns	installation burns X acres each year						
noise reduction (installation)	noise contours do/do not go off post	further improvement OR maintain this level OR minimal impact					
erosion and sedimentation (installation)	Soil loss is/is not a significant impact; Sedimentation is/is not a significant impact; X acres are reseeded each year. The installation has/does not have/does not need a complete erosion control plan that is routinely updated.	further improvement OR maintain this level OR minimal impact					
spill planning and prevention	% needed secondary containment in place. Spill response supplies are/are not readily	further improvement OR				35k	35k

Impact	P2 status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 98 UFR
(ISR data)	available; Spill response team is/is not trained and equipped; SPCCP is/is not current; ISCP is/is not current.	maintain this level OR minimal impact					
hazardous material management (ISR data)	0% of units/activities/tenants participate in HM tracking and pharmacy operations.	____% enrollment by FY ____	50k			250k	250k
toxic release reduction (ISR data)	0% reduction in TRI releases/disposals vs CY 94 0 lbs released in CY 96.	minimal impact					
program planning (installation)	Installation has/does not have a current P2 plan. Installation P2 plan covers: hm management: yes or no hw management: yes or no solid waste: yes or no pesticides: yes or no criteria air pollutants: yes or no toxic air pollutants: yes or no water conservation: yes or no wastewater reduction: yes or no stormwater: yes or no spill prevention: yes or no energy: yes or no noise: yes or no erosion/sedimentation: yes or no	Plan 100% complete by FY ___.			25k 174k	174k	
environmental education and awareness (installation)	X unit environmental POCs trained in past FY. X% of workforce (or X personnel) trained in haz waste/material management in past FY X personnel trained in maneuver damage prevention during past FY. X% of workforce trained in P2. Environment is/is not covered in orientation briefing. P2 program elements are/are not briefed at the installation EQCC.	further improvement OR maintain this level	70k	70k			
TOTALS			$ 972.00	$ 115.00	$1,274.00	$1,659.00	$385.00

Appendix E: Ft. Hood Pollution Prevention Program

Fort Hood

Fort Hood has implemented an aggressive environmental program involving numerous pollution prevention projects to reduce the purchase of hazardous materials, minimize the generation of hazardous wastes and emissions, and recycle significant waste streams in cases where generation is unavoidable. Environmental excellence throughout Fort Hood begins with training. All soldiers receive environmental awareness training as part of their orientation to the installation. Specific environmental awareness courses are provided for more than 1700 students per year, with a particular focus on Senior NCOs and Company Grade Officers

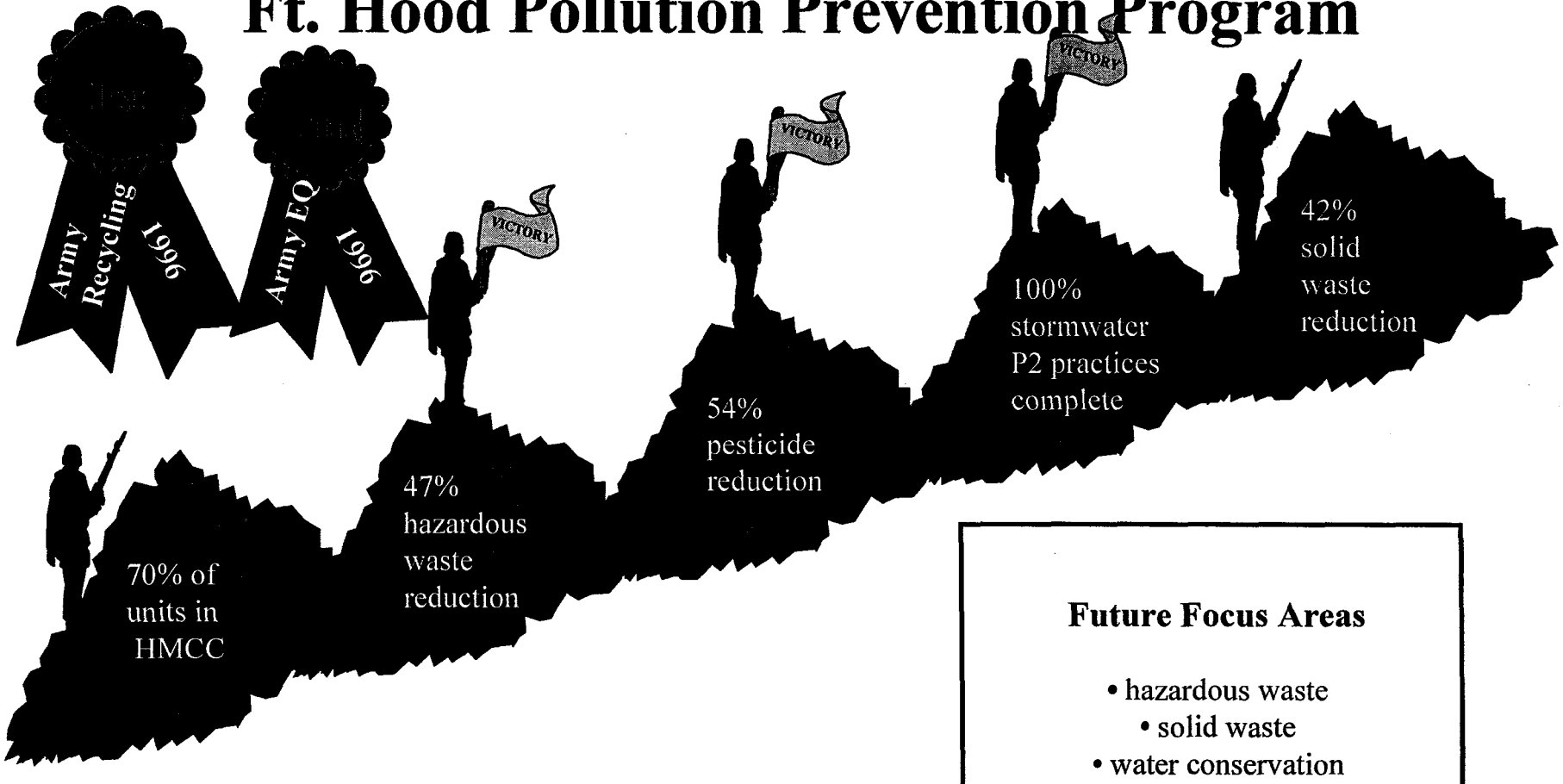
Fort Hood recently won the 1996 U.S. Army Recycling Award and received honorable mention in the Department of Defense competition. The Fort Hood Recycling Center processes more than 350 tons of paper, bottles, cans, and cardboard each month. Scrap metal recycling totals between 1.5 million to 2.5 million pounds each quarter. Other recycling activities include solvents from parts washers and the water from 4 closed loop washracks. In excess of 12,000 gallons of used antifreeze is given to a recycler every two weeks, who then sells back to the installation antifreeze containing 50% recycled content. Used oil is sold for energy recovery. Waste and recovered latex paint is sent off site to a fuel blender, who is able to recover the energy value of the waste paint. A current project is investigating paint recycling. Oil filters are crushed, then sent to recyclers who capture and reclaim the waste oil and scrap metal. Whenever possible, tires are retreaded rather than disposed. Fluorescent light bulbs are sent to recyclers. Since this program began, more than 2 pounds of mercury has been reclaimed through this light bulb recycling program.

Fort Hood utilizes pollution prevention technologies to aggressively reduce the generation of wastes. Battery life extension and recharging practices has allowed the installation to reduce the purchase of new batteries by more than 35%. High volume, low pressure paint guns have been in use for more than four years. Dry filter systems are used for many paint applications. Computer assisted compressor control systems and energy efficient ballasts and light bulbs are used to reduce energy consumption. Aqueous part washers are used for the cleaning of large parts, including engine blocks. Finally, Fort Hood personnel are currently cataloging all solvents used within DOL maintenance operations in an effort to select only those solvents that meet both performance and environmental criteria.

Fort Hood works to protect its natural resources through an aggressive erosion and sedimentation control program. Streams are protected through the placement of containment structures along their banks. Areas experiencing significant erosion on training lands are filled in, recontoured, and seeded to minimize the impacts of training activities.

As a result of these and other efforts, the Fort Hood Environmental Office was placed 2nd in the 1996 Army overall environmental quality award competition.

Ft. Hood Pollution Prevention Program



Innovative Technologies and Practices

- tire retread program
- flaring of propane gas cylinders
- waste latex paint reblended with fuel for energy recovery
- automated can shredder and washer
- 80% reduction in list of authorized hazmat

Future Focus Areas

- hazardous waste
- solid waste
- water conservation
- stormwater
- energy
- air pollution
- erosion
- hazardous material management
- environmental training

Ft. Hood Pollution Prevention Status

Background Data

Impact	P2 status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 98 UFR
HW generation and disposal (ISR data)	47% reduction in off-site disposal vs CY92 788,453 lbs disposed in CY 96.	further improvement		776k	200k	500k	
Solid waste reduction (ISR and Redbook data)	42% reduction since CY92; 6% diversion of solid waste to recycling; 173 million lbs generated in CY 96; $6.8M. Installation has a formal affirmative procurement program. Installation is procuring materials with recycled content.	further improvement		270k	400k	400k	
Pesticide use (ISR and Redbook data)	54% reduction vice FY93; 2,792 lbs active ingred. applied in FY96; plan 60% complete; $278K in 95.	further improvement				$50K	
Water conservation (Redbook data)	3.5/1.9 million kgallons used in FY96/91; $1.2M in FY96; 35/33 kgallons/capita water used in FY 95/91; Wastewater is not reused for irrigation; Vehicle washwater is recycled (100%); 198,000 acres of natural landscape on post.	further improvement					
Stormwater P3 (ISR data)	100% of BMPs completed (6/6)	further improvement	600k	300k	600k	600k	
Wastewater (Redbook data and ISR data; EPR and ACTS data on funds)	100% (10/10) of permitted discharges meet permit requirements; 21 kgal/capita wastewater in FY95; 23 kgal/capita wastewater in FY 91; 2.1 million kgal in 96; $0.97 M.	maintain this level	295k				
Wellhead protection (installations)	Well water is not major drinking water source; A wellhead protection plan is not needed.						
Energy conservation (ISR data)	15% energy efficiency improvement per square foot from FY 85 to FY96; 2.7 million MBTU consumed FY96; $23M Renewable energy is not used; 65% of buildings have energy monitors; "Green construction" techniques are used, if specified in Corps specifications	further improvement					

Impact	P2 status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 98 UFR
Dust	Dust suppression practices are used; ~4 miles.	further improvement					
ODS (ISR data)	1,141,493 lbs of Class I ODS on post in 1,041 units; Recycling of ODSs is done; An ODS management plan is done/not done/under development.	further improvement					
Annual emissions of criteria air pollutants (air permit, air emissions inventory)	2.75 tons of So_x; 59.5 tons of NO_x; 285.0 tons PM 10; 246.0 tons VOC; 60.5 tons CO; 13.5 lbs/year lead.	maintain this level					
Hazardous air pollutants (air permit or emission inventory)	97.8 tons HAPs/year	further improvement					
Hazardous air pollutants (installations)	A Risk Management Plan is not required.						
Prescribed burns	Installation burns 10,000 acres each year.					20K	
Noise reduction (installation)	Noise contours do not go off post.	maintain this level					
Erosion and sedimentation (installation)	Soil loss is a significant impact; Sedimentation is a significant impact; 4,500 acres are reseeded each year; The installation has a complete erosion control plan that is routinely updated.	further improvement					
Spill planning and prevention (ISR data)	100% of needed secondary containment is in place for fixed fuel storage points, TBD for fuel vehicles; Spill response supplies are readily available; Spill response team is trained and equipped; SPCCP is current; ISCP is current.	maintain this level					
Hazardous material management (ISR data)	70% of units/activities/tenants participate in HM tracking and pharmacy operations.	100% enrollment by FY 99			550k	550k	

Impact	P2 status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 98 UFR
Toxic release reduction (ISR data)	19% reduction in TRI releases/disposals vs CY 94; 45,730 lbs released in CY 96.	further improvement				80K	
Program planning (installation)	Installation has a current P2 plan; Installation P2 plan covers: hm management and hw management.	Plan 100% complete by FY 95. Will undergo updates FY 98.	95k		211k	50k 211k	
Environmental education and awareness (installation)	179 unit environmental POCs trained in past FY; 900 personnel trained in haz waste/material management in past FY; 1200 personnel trained in maneuver damage prevention during past FY; 10% of workforce trained in P2; Environment is covered in orientation briefing; P2 program elements are briefed at the installation EQCC.	further improvement		27k	50k	50k	
TOTALS			$ 990.00	$1,373.00	$2,011.00	$2,511.00	$500.00

Appendix F: Ft. Irwin Pollution Prevention Program

Fort Irwin

Fort Irwin, home of the National Training Center, has accomplished a variety of successful pollution prevention initiatives. Because of the intensive arms training which occurs in the arid, fragile desert terrain, pollution prevention has a direct and immediate effect on natural resources preservation. By ensuring that the natural environment is maintained, pollution prevention helps to assure long term access to this critical, natural training asset.

Fort Irwin has a 2 million gallon per day Waste Water Treatment Plant. Feasibility studies to perform tertiary treatment and water reclamation are in process. Reclaimed water will be used for irrigation. They have also renovated three vehicle wash racks that recycle the wash rack water, and seven more will be renovated or planned for FY 98.

Fort Irwin's antifreeze recycling system is saving money, lowering vehicle maintenance costs, and is reducing hazardous waste generation rates.

Fort Irwin has located a contractor willing to pay the installation for scrap, unserviceable concertina wire.

A recycling center, and a hazardous materials pharmacy are under construction and will be operating in FY-98. Future plans at Fort Irwin include a MCA project to construct a hazardous waste building.

Personnel at Fort Irwin have located an asphalt contractor that recycles contaminated soil into the asphalt mix. The resulting asphalt is stronger that concrete. They use it to pave roads that would otherwise would be dirt roads, and contribute to air pollution problems. During the first year of testing they used their backlog of 2700 tons of contaminated soil to create 2000 feet of asphalt road. Cost of disposing of this soil would have been $160/ton; the cost of using it to make roads is $53/ton, so this is a cost savings measure, as well as a beneficial reuses of a waste product.

At Fort Irwin, a Curation Facility to store artifacts is under construction. This facility will be in operation during FY-98.

Fort Irwin has a contractor to clean all military vehicle air filters. The life span of the filters increased 5 times normal usage. Any filters that are damaged beyond repair/reuses are sold to a scrap vendor for .05 cents per pound. The operation is going to save Fort Irwin approximately 1.5 million dollars next year and reduce the disposal of the filters in the landfill versus being sold to a scrap vendor.

Fort Irwin has arranged with a lead acid battery company to recycle all non-military lead acid batteries. Most non-military lead acid batteries are used for pop up targets down range. In the first three months of operations, the post saved over 32K in disposal costs with an annual savings of approximately 100K. The post also gets $ 1.50 credit per battery turned-in which is deducted off the purchase price of new batteries for the pop up targets.

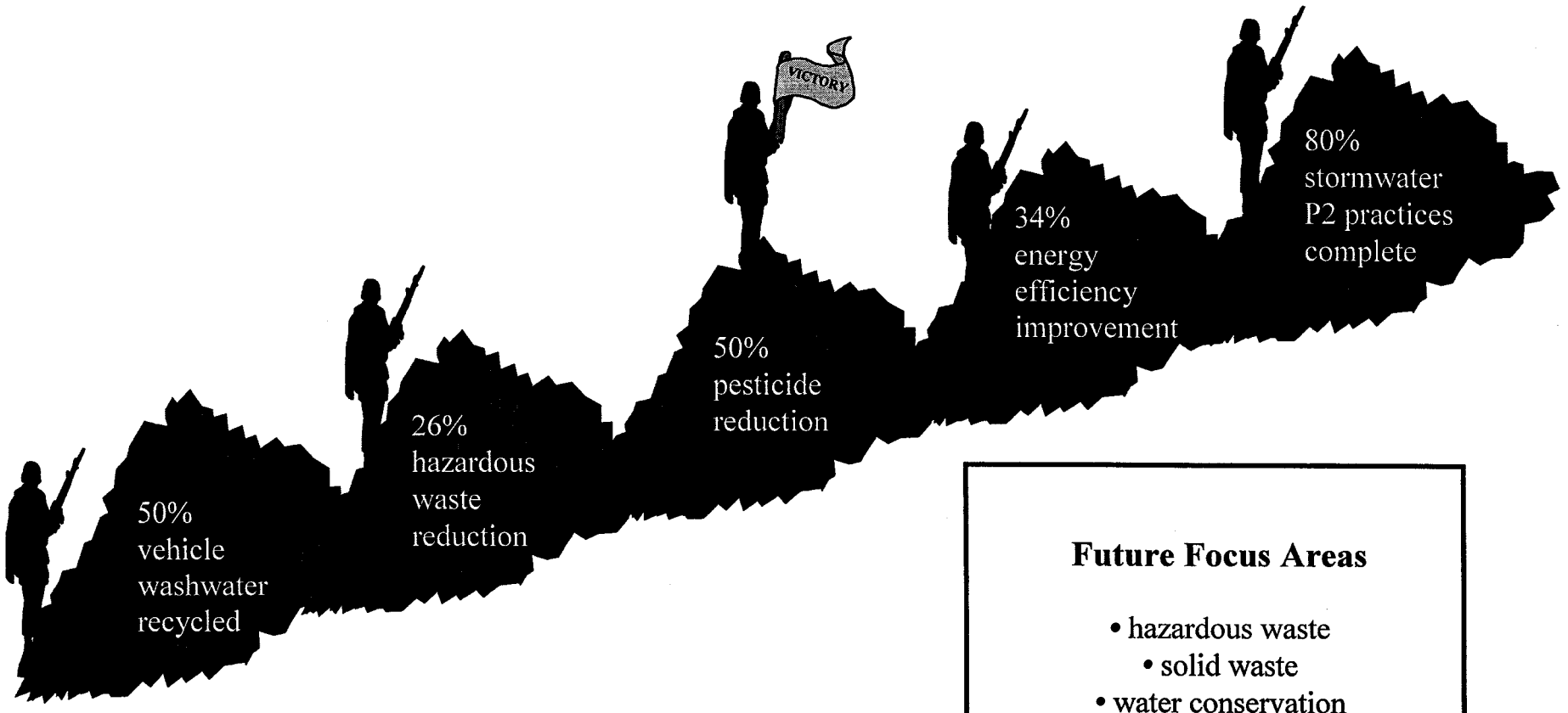
The installation has an environmental education program which includes information on spill prevention and clean-up, trash removal, training impact minimization, natural resources subjects,
cultural and archaeological subjects, unexploded ordinance, and desert safety. Also offers take home handouts and exportable multi-media products. The DPW Environmental Division provides Hazardous Materials Training for the 40 hour, 8 hours refresher courses for home station personnel, resulting in over 750 personnel being trained. A 8 hour California specific course for Rotation Unit Clean-up Teams was added last year

and produced an additional 240 trained personnel. These programs have received favorable comments from state regulators as well as ECAS inspectors. A total of approximately 3,000 soldiers received briefings and 75,000 soldier field cards were handed out in FY-97. The DPW and ITAM personnel work together to provide world class training for our world class Army.

Future Improvement :

Further improvement with implementation of in-processing brief, quarterly post brief, and civilian employee brief will be completed in early FY-98.

Ft. Irwin Pollution Prevention Program



Innovative Technologies and Practices

- wastewater used for irrigation
- recyling of POL-contaminated soil into asphalt
- recycling concertina wire

Future Focus Areas

- hazardous waste
- solid waste
- water conservation
- stormwater
- wastewater reduction
- energy
- air pollution
- erosion
- hazardous material management
- environmental training

Ft. Irwin Pollution Prevention Status

Background Data

Impact	P2 status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 required	FY 98 UFR
HW generation and disposal (ISR data)	26% reduction in off-site disposal vs CY92 2,131,038 lbs disposed in CY 96.	further improvement			500k	500k	
Solid waste reduction (ISR and Redbook data)	78 % **increase** since CY92; 9% diversion of solid waste to recycling; 73 million lbs generated in CY 96; $2.3 M. Installation does not have a formal affirmative procurement program. (IN DRAFT) Installation is procuring materials with recycled content.	further improvement		1,200k	1070k	1070k	
Pesticide use (ISR and Redbook data)	50% reduction vice FY93; 104 lbs active ingred. applied in FY96; $59k in 96 plan 50% complete.	minimal impact					
Water conservation (redbook data)	0.5/0.8 million kgallons used in FY96/91; $1.1 M in 96; 38/64 kgallons/capita water used in FY 95/91 Wastewater is not reused for irrigation. (X%) Vehicle washwater is recycled (50%). 432,031 acres of natural landscaping on post.	further improvement					
Stormwater P3 (ISR data)	80% of BMPs completed (8/10)	further improvement		250k	300k	350k	
Wastewater (redbook data and ISR data; EPR and ACTS data on funds)	No industrial waste discharge sources on post. 100% (1/1) of permitted discharges meet permit requirements. 21 kgal/capita wastewater in FY95; 45 kgal/capita wastewater in FY 91. 845,563 kgal in 96; $0.6 million	further improvement		1,300k			
Wellhead protection (installations)	Well water is major drinking water source; A wellhead protection plan is needed; If so, plan is 10% complete.	Plan 100% complete by FY 00		275k	10k	10k	
Energy conservation (ADDS data)	34% energy efficiency improvement per square foot from FY 85 to FY96. 0.44 million MBTU consumed FY96; $7.2 M. Renewable energy is not used (0%) 0% of buildings have energy monitors. "Green construction" techniques are used.	further improvement					

Impact	P2 status	Future Plans	**FY96 Program**	**FY97 Program**	**FY 98 Program**	**FY 98 required**	**FY 98 UFR**
Dust	Dust suppression practices are used. # miles: 4 Mi FY96, 25 Mi FY97	Under FORSCOM Dust Study Further Improvement	200k	500k		125K	
ODS (ISR data)	2,960 lbs of Class I ODS on post in 167 units Recycling of ODSs is done: yes An ODS management plan is done.	further improvement	40k		100k	200k	
Annual emissions of criteria air pollutants (air permit, air emissions inventory)	X tons of So_x; 1.1054 X tons of NO_x; 31.8602 TONS X tons PM 10; 2,674.3958 PER X tons VOC; 21.8879 YEAR X tons CO: 5.6452 X tons lead: 0.2778	further improvement	100k	25k	207k	212k	
Hazardous air pollutants (air permit or emission inventory	X tons HAPs/year 16.369 Tons Per Year	further improvement	25k	45k	450k	550k	
Hazardous air pollutants (installations)	A Risk Management Plan is required	RMP 100% complete by FY 98	25k	45k			
Prescribed burns	Installation burns 0 acres each year						
Noise reduction (installation)	noise contours do not go off post	minimal impact					
Erosion and sedimentation (installation)	Soil loss is a significant impact; Sedimentation is not a significant impact; 50 acres are revegetated each year. The installation has a complete erosion control plan that is routinely updated.	further improvement					
Spill planning and prevention (ISR data)	10% needed secondary containment in place. Spill response supplies are not readily available; Spill response team is not trained and equipped; SPCCP is current; ISCP is current.	further improvement	26K	96K 10K 24K 25K	35k	200K 50K 100K 50K 50K	
Hazardous material management (ISR data)	0% of units/activities/tenants participate in HM tracking and pharmacy operations.	80% enrollment by FY 98		450K	800k	1000k	
Toxic release reduction (ISR data)	100% reduction in TRI releases/disposals vs CY 94 (1 lb in 94) 0 lbs released in CY 96.	maintain this level		50K		50K	

Impact	P2 status	Future Plans	**FY96 Program**	**FY97 Program**	**FY 98 Program**	**FY 98 required**	**FY 98 UFR**
Program planning (installation)	Installation has a current P2 plan. Installation P2 plan covers: hm management, hw management, solid waste, wastewater reduction, and spill prevention.	Plan 100% complete by FY96.	575k		85k 350k	85k 350k	
Environmental education and awareness (installation)	67 unit environmental POCs trained in past FY. * 442 personnel trained in haz waste/material management in past FY 75,000 personnel trained in maneuver damage prevention during past FY. 0% of workforce trained in P2. Environment is covered in orientation briefing (65% of installation staff). P2 program elements are briefed at the installation EQCC. * Includes Rotational HazMat Clean-up Teams	further improvement		18K		20K	
TOTALS			$ 991.00	$4,313.00	$4,007.00	$4,872.00	$865.00

Appendix G: Ft. Lewis Pollution Prevention Program

Fort Lewis

Executive Order 12856 (Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements) was signed on 3 August 1993 and is the central directive to Federal agencies on pollution prevention for the coming years. The pollution prevention provisions of this Executive Order require Federal facilities to prepare a written pollution prevention plan. The Order calls on Federal agencies to establish a reduction goal of 50 percent by 1999 for releases of toxic chemicals or pollutants, from a baseline of 1994. It requires Federal agencies to establish goals and plans to eliminate or reduce the unnecessary acquisition of products that contain hazardous substances or toxic chemicals, and requires Federal agencies to comply with the planning and reporting provisions of EPCRA and the Pollution Prevention Act.

The Washington State Hazardous Waste Reduction Act of 1990 mandates the same waste management hierarchy as the Federal Pollution Prevention Act. This State law requires each hazardous waste generator and hazardous substance user to prepare and maintain a pollution prevention plan for voluntarily reducing hazardous substance use and hazardous waste generation, and to provide annual progress reports. Chapter 173-307 of the Washington Administrative Code (WAC 173-307) implements the Hazardous Waste Reduction Act.

The Fort Lewis Pollution Prevention (P2) Program is a major success. It is designed to reduce the volume of hazardous materials used and hazardous waste produced on the installation, as well as reduce energy consumption, air emissions, and solid wastes. In FY 95 and 96, the program saved more than $2 million by implementing innovative alternatives to standard processes.

The Fort Lewis Pollution Prevention Program is an on-going, comprehensive examination of operations on the installation. For example, Fort Lewis monitors approximately 800 waste streams and tracks over 7343 hazardous products stored and used on the installation. The primary goal of the P2 Program is to minimize types and volumes of hazardous materials used and hazardous waste generated in these waste streams, by identifying low cost, commercial-off-the-shelf (COTS) options that make sense, save money, and are in accordance with the law.

The Fort Lewis Pollution Prevention Program operates under these assumptions:

- Waste is an indicator of inefficiency, which is undesirable;
- There are numerous waste issues, including air emissions, indoor air quality, non-hazardous waste, energy, hazardous waste, injuries, loss of capacity (land, water, air, ecosystems), and resource waste (money spent on the wrong thing);
- We are capable of identifying and measuring waste; and
- We are capable of taking action to reduce waste.

By following these guidelines, the P2 program reduces operating costs, increases training readiness, protects public health and the environment, and reduces the risk of civil and criminal liability.

The Fort Lewis Pollution Prevention Plan provides a specific plan and implementation schedule for the reduction of hazardous substance use and hazardous waste generation through selected pollution prevention opportunities. A formalized five-year pollution prevention plan was

completed in September of 1992, with 1991 as the baseline year. We are currently preparing a new five-year plan. Fort Lewis is working with regulators to ensure that the new plan meets not only the state requirements, but also the requirements of the Department of Defense and Executive Order 12856. This new pollution prevention plan will have baseline years of 1992, 1994, and 1996 and will be submitted to Washington State Department of Ecology in September 1997.

In accordance with State law, Fort Lewis prepares and submits annual progress reports. These reports update the status of P2 projects implemented, while identifying waste and hazardous substance use reduction. In addition, cost savings associated with implemented P2 projects are included wherever possible. These reductions are tied directly to projects that were implemented during the reporting year. Fort Lewis prepared and submitted annual progress reports in 1993-1996.

To reduce reporting burdens on Fort Lewis and its subinstallations, Fort Lewis applied for and was granted inter-related facility status in May of 1996. This status allows Fort Lewis to prepare only one plan, prepare only one annual report, and pay only one hazardous waste generator's fee. Thus, inter-related facility status saves Fort Lewis both time and money.

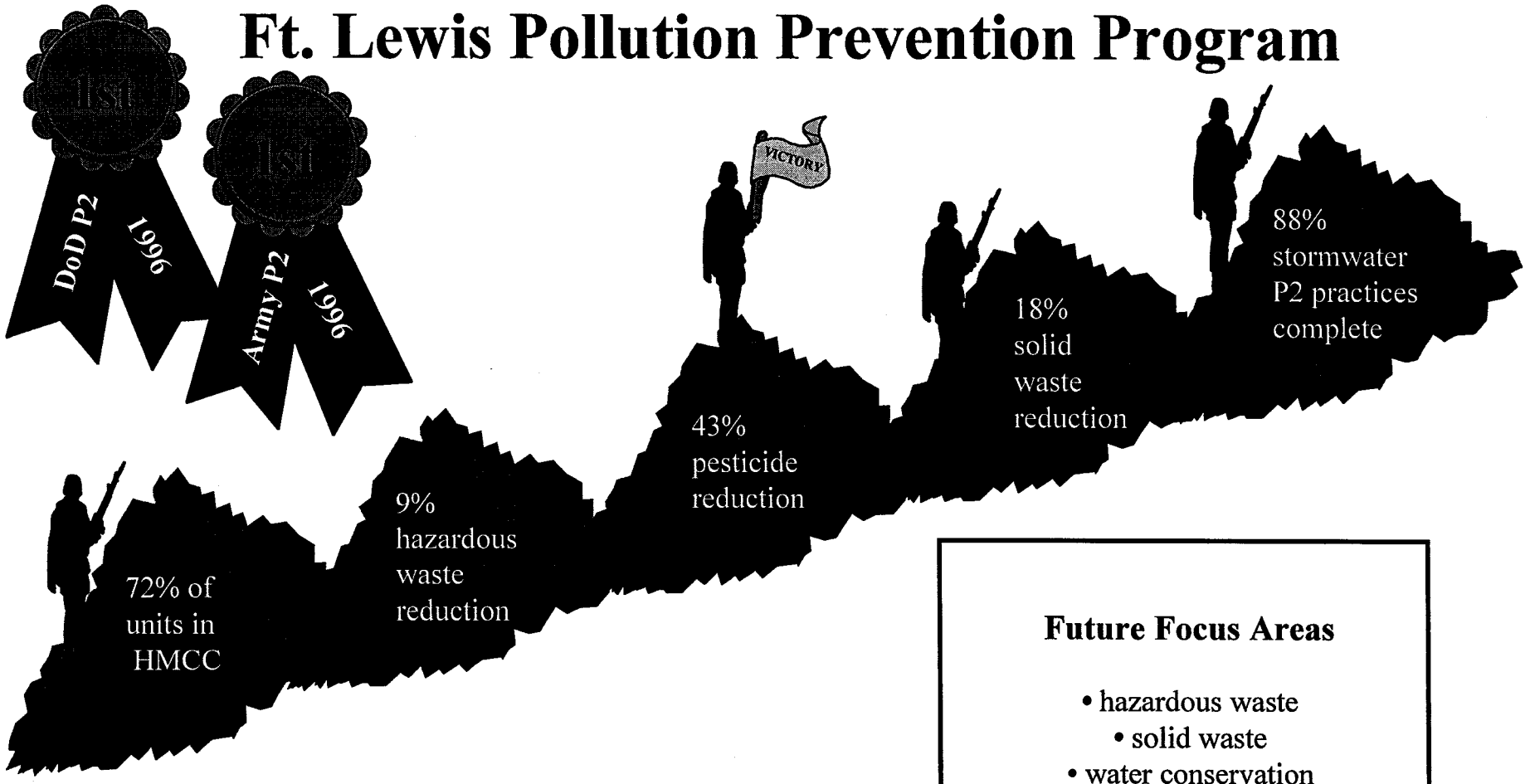
Fort Lewis established a Local Pollution Prevention Award Program in 1995. This annual award recognizes outstanding pollution prevention performance during the previous calendar year. A total of five awards are given in three categories. In the military category, awards are given at the company/battalion or equivalent level and at the brigade/group level. In the civilian category, awards are given at the activity and directorate level. The installation award is given to the best organization overall, either military or civilian. Incorporating the goals and objectives of Fort Lewis' Pollution Prevention Program, we use the following criteria to select winners from the five categories of participants. Data submitted in these award packages is used to prepare the Annual Pollution Prevention Progress Reports.

- Part I: Pollution Prevention Activity Documentation. This section identifies what the organization has been doing during the calendar year to prevent pollution. Specific criteria evaluated includes a). total number and significance of documented pollution prevention initiatives implemented, b). new pollution prevention initiatives implemented during the calendar year, and c). measurable reductions and cost savings associated with the projects implemented.
- Part II: Measurement Techniques Data. This information will be used to monitor pollution prevention progress towards established goals. Information provided supports many regulatory reports prepared by Fort Lewis.
- Part III: Baseline Environmental Compliance Section. Participation in other established programs indicates an organization's commitment to pollution prevention.

Program Recognition

The Fort Lewis Pollution Prevention Program received various awards in 1997 for Pollution Prevention efforts implemented in 1995 and 1996. Fort Lewis won both the Secretary of Defense Environmental Security Award and Army Environmental Award in the Pollution Prevention Non-Industrial category. Fort Lewis also received the 1997 Washington State Governor's Award for Outstanding Achievement in Pollution Prevention.

Ft. Lewis Pollution Prevention Program



Innovative Technologies and Practices

- 'one stop' hazardous waste service
- sodium hypochlorite substituted for chlorine
- reuse of 'de-fueled' fuel in tactical vehicles
- 'normalizing' of baseline data to account for mission changes
- installation permits for all industrial processes
- installation P2 awards for units and activities

Future Focus Areas

- hazardous waste
- solid waste
- water conservation
- stormwater
- wastewater reduction
- energy
- air pollution
- erosion
- hazardous material management
- environmental training

Ft. Lewis Pollution Prevention Status

Background Data

Impact	P2 status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 required	FY 98 UFR
HW generation and disposal (ISR data)	9% reduction in off-site disposal vs CY92 735,100 lbs disposed in CY 96. We are in process of validating our baseline year CY92, 93, 94. Full implementation of tracking system in 95.	further improvement	121k		425k	518k	
Solid waste reduction (ISR and Redbook data)	18 % reduction since CY92; 7% diversion of solid waste to recycling; 137 million lbs generated in CY 96; $1.6 M in 96. Installation has a formal affirmative procurement program. Installation is procuring materials with recycled content.	further improvement		100k	130k	130k	
Pesticide use (ISR and Redbook data)	43% reduction vice FY93; 3,480 lbs active ingred. applied in FY96; $281K in 96 Plan 100% complete.	further improvement				5k	
Water conservation (redbook data)	2.2/2.9 million kgallons used in FY96/91; $0.6 M in 96; 60/35 kgallons/capita water used in FY 95/91 Wastewater is not reused for irrigation. (0%) Vehicle washwater is recycled (95%). 3,000 acres of natural landscaping on post.	further improvement			10k	10k	
Stormwater P3 (ISR data)	88% of BMPs completed (106/120)	further improvement	290	160	180k	690k	
Wastewater (redbook data and ISR data; EPR and ACTS data on funds)	No industrial waste discharge sources on post. 100% of permitted discharges meet permit requirements. 42 kgal/capita wastewater in FY95; 20 kgal/capita wastewater in FY 91. 1.6 million kgal in 96; $1.2 million	further improvement					
Wellhead protection (installations)	Well water is a major drinking water source; A wellhead protection plan is needed; If so, plan is X% complete.	Plan 100% complete by FY 98	105k	25k	60k	60k	

Impact	P2 status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 required	FY 98 UFR
Energy conservation (ADDS data)	9% energy efficiency improvement per square foot from FY 85 to FY96. 2.4 million MBTU consumed FY96; $11 M. Renewable energy is not used (0%) 10% of buildings have energy monitors. "Green construction" techniques are not used.	further improvement					
Dust	Dust suppression practices are used. 7.5 miles (assume 24 ft. road width)				267k	267k	
ODS (ISR data)	10,919 lbs of Class I ODS on post in 12 units Recycling of ODSs is done: yes An ODS management plan is done.	further improvement		205k		325k	
Annual emissions of criteria air pollutants (air permit, air emissions inventory)	171.5 tons of So_x; 159.1 tons of NO_x; 20.8 tons PM 10; 55.5 tons VOC; 75.5 tons CO; 0.006 tons lead.	further improvement	100k	267k	20k	20k	
Hazardous air pollutants (air permit or emission inventory	7.6 tons HAPs/year	further improvement			5k	20k	
Hazardous air pollutants (installations)	A Risk Management Plan is required	RMP 100% complete by FY 99			50k	100k	
Prescribed burns	Installation burns 200 acres each year						
Noise reduction (installation)	Noise contours do go off post	further improvement					
Erosion and sedimentation (installation)	Soil loss is not a significant impact; Sedimentation is not a significant impact; X acres are revegetated each year. The installation does not need a complete erosion control plan that is routinely updated.	further improvement	800k	100k	980k	1746k	
Spill planning and prevention (ISR data)	X% needed secondary containment in place. Spill response supplies are readily available; Spill response team is trained and equipped; SPCCP is current; ISCP is current.			50k	937k	1117k	
Hazardous material management (ISR data)	72% of units/activities/tenants participate in HM tracking and pharmacy operations.	98% enrollment by FY 98					

Impact	P2 status	Future Plans	**FY96 Program**	**FY97 Program**	**FY 98 Program**	**FY 98 required**	**FY 98 UFR**
Toxic release reduction (ISR data)	20% increase in TRI releases/disposals vs CY 94 (increase due to better data collection) 57,256 lbs released in CY 96.	further improvement	95k			10k	
Program planning (installation)	Installation has a current P2 plan. Installation P2 plan covers: hm management, hw management, solid waste, and spill prevention.	Plan 100% complete by FY 92. Annual update rewrite of plan in FY 98 to meet State requirements.	409k	800k	150k 80k	435k 205k	
Environmental education and awareness (installation)	2,080 unit environmental POCs trained in past FY. 10% of workforce (3,000 personnel) trained in haz waste/material management in past FY X personnel trained in maneuver damage prevention during past FY. 10% of workforce trained in P2. Environment is covered in orientation briefing. P2 program elements are not briefed at the installation EQCC.	further improvement			87k	98k	
TOTALS			$1,799.00	$1,607.00	$3,381.00	$5,756.00	$2,375.00

Appendix H: Ft. McPherson Pollution Prevention Program

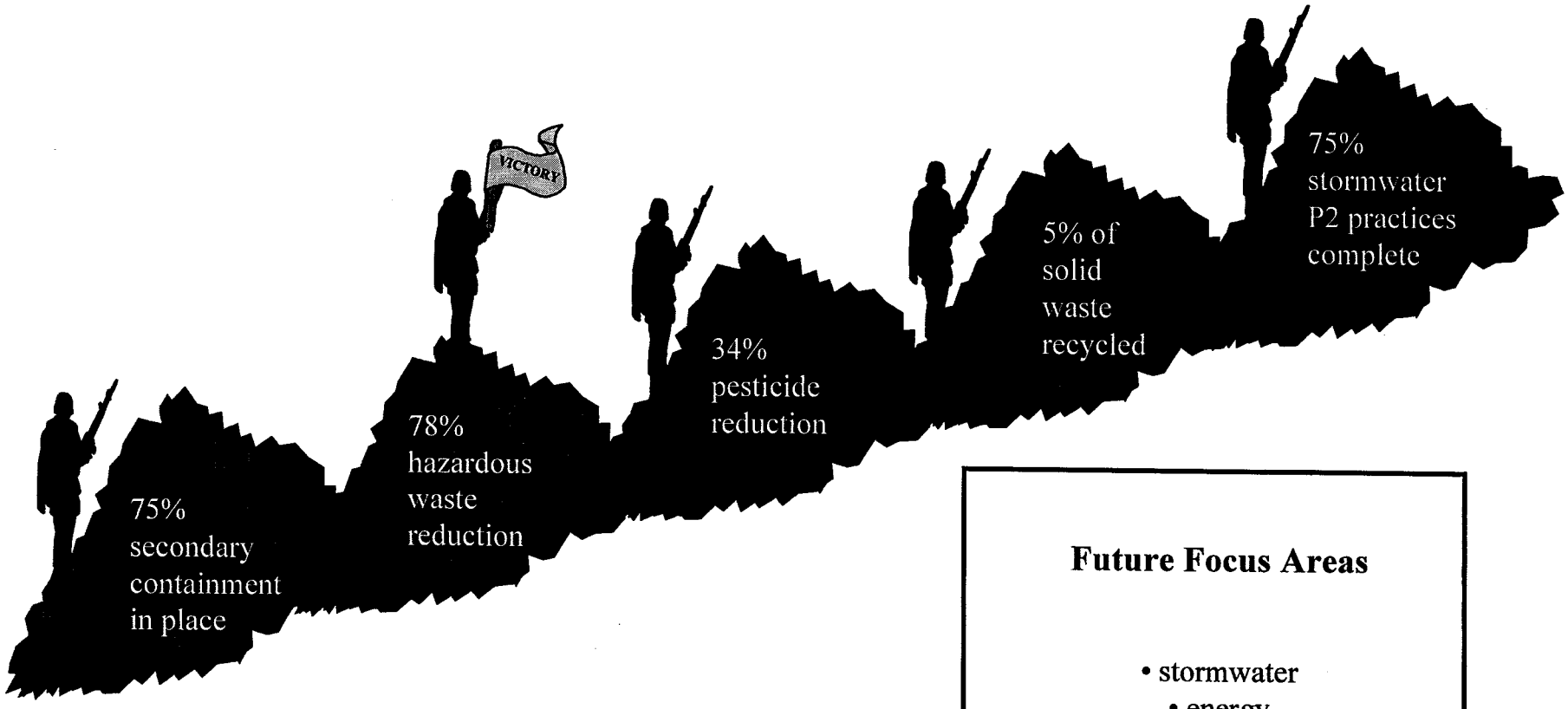
Fort McPherson

Fort McPherson has completed a number of pollution prevention, source reduction, and recycling projects in recent years. Fort McPherson recently replaced their traditional wet chemical print shop processes with a totally digital system, virtually eliminating the print shop hazardous waste streams. The paint booth uses high volume, low pressure paint guns and dry filter paint systems to minimize paint wastes. Approximately 50% of the parts washers in use at the installation are aqueous based machines.

Fort McPherson sends all fluorescent light bulbs and spent batteries off-site for recycling. Used oil is sent off-post for energy reclamation. One motor pool recycles all anti-freeze on site for reuse, the other two motor pools send antifreeze off-post for recycling. More than 5500 tons of cardboard, scrap metal, aluminum, and paper were collected in 1996 for recycling.

Fort McPherson has instituted a limited hazardous materials pharmacy to reduce the generation of high volume hazardous wastes. This pharmacy currently manages refrigerants and hazardous materials used for paint applications. To control erosion, Fort McPherson created embankments to protect two streams located near an on-post waste landfill from sediment laden runoff.

Ft. McPherson Pollution Prevention Program



Innovative Technologies and Practices

- wet printing processes completely replaced by digital technology
-

Future Focus Areas

- stormwater
- energy
- air pollution
- environmental training

Ft. McPherson Pollution Prevention Status
Background Data

Impact	P2 Status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 99-03 Required
HW generation and disposal (ISR data)	78% reduction in off-site disposal vs CY92 11,181 lbs disposed in CY 96.	maintain this level			50k	50k	
Solid waste reduction (ISR and Redbook data)	0% reduction since CY92; 5% diversion of solid waste to recycling; 13 million lbs generated in CY 96; $0.3 M; Installation does not have a formal affirmative procurement program; Installation is not procuring materials with recycled content.	maintain this level			40k	40k	
Pesticide use (ISR and Redbook data)	34% reduction vice FY93; FTM-599, FTG-227 lbs active ingred. applied in FY96; $158K in 96; Plan 90% complete.	maintain this level	5k				
Water conservation (Redbook data)	0.17/0.18 million kgallons used in FY96/91; $0.36 M in 96; 13/15 kgallons/capita water used in FY 95/91 Wastewater is not reused for irrigation. (0%) Vehicle washwater is not recycled (0%). FTM - 20, FTG-1,300 acres of natural landscaping on post.	minimal impact					
Stormwater P3 (ISR data)	75% of BMPs completed (9/12)	further improvement	788k	370k	50k	250k	
Wastewater (Redbook data and ISR data; EPR and ACTS data on funds)	No industrial waste discharge sources on post; 8 kgal/capita wastewater in FY95; 8 kgal/capita wastewater in FY 91; 845,563 kgal in 96; $0.6 million.	minimal impact					
Wellhead protection (installations)	Well water is not a major drinking water source; A wellhead protection plan is not needed.						
Energy conservation (ADDS data)	-38% energy efficiency improvement per square foot from FY 85 to FY96; 0.55 million MBTU consumed FY96; $5 M; Renewable energy is not used; X% of buildings have energy monitors; "Green construction" techniques are not used.	further improvement					

Impact	P2 Status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 99-03 Required
Dust	Dust suppression practices are not used; # miles.						
ODS (ISR data)	2,500 lbs of Class I ODS on post in 500 units; Recycling of ODSs is done; An ODS management plan is not done.	further improvement				80k	
Annual emissions of criteria air pollutants (air permit, air emissions inventory)	3.90 FTM/11.1 FTG tons of So_x; 7.41 FTM/13.8 FTG tons of NO_x; $5.12x10^{-1}$ FTM/1.37 FTG tons PM 10; 5.54 FTM/18.4 FTG tons VOC; 1.78 FTM/3.39 FTG tons CO; $4.41x10^{-4}$ FTM/$1.94x10^{-4}$ FTG tons lead.	further improvement					
Hazardous air pollutants (air permit or emission inventory	2.85 FTM/3.60 FTG tons HAPs/year.	further improvement					
Hazardous air pollutants (installations)	A Risk Management Plan is required.	RMP 100% complete by FY 99					
Prescribed burns	Installation burns 0 acres each year.						
Noise reduction (installation)	Noise contours do go off post.	minimal impact					
Erosion and sedimentation (installation)	Soil loss is not a significant impact; Sedimentation is not a significant impact; 0 acres are reseeded each year; The installation does not have a complete erosion control plan that is routinely updated.	maintain this level			10k	50k	
Spill planning and prevention (ISR data)	75% needed secondary containment in place; Spill response supplies are readily available; Spill response team is trained and equipped; SPCCP is current; ISCP is current.	maintain this level	50k		40k	40k	
Hazardous material management (ISR data)	0% of units/activities/tenants participate in HM tracking and pharmacy operations.	15% enrollment by FY 98					
Toxic release reduction (ISR data)	0% reduction in TRI releases/disposals vs CY 94; 1 lb released in CY 96.	minimal impact	40k				
Program planning (installation)	Installation has a current P2 plan; Installation P2 plan covers: hw management, solid waste, and stormwater.	Plan 100% complete	50k	50k		120k 75k	

Impact	P2 Status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 99-03 Required
Environmental education and awareness (installation)	0 unit environmental POCs trained in past FY; 0% of workforce trained in haz waste/material management in past FY; 10% of workforce trained in P2; Environment is not covered in orientation briefing; P2 program elements are briefed at the installation EQCC.	further improvement					
TOTALS			$ 933.00	$ 420.00	$ 190.00	$ 705.00	$515.00

Appendix I: Ft. Polk Pollution Prevention Program

Fort Polk

Fort Polk, located in west central Louisiana, is the Army's premier light infantry training center. The Joint Readiness Training Center 's mission to train infantry units in low intensity conflicts results in the addition of a Brigade sized task force to the installation each month. Fort Polk is a large installation: 198,963 acres, 98,125 of which belong to the United States Forest Service. Fort Polk's Pollution Prevention efforts are fully integrated into the military mission and are targeted to enhance and support that mission where possible. P2 is not a mission distracter, but a mission multiplier. Fort Polk's approach is global and multimedia. All waste streams and all releases to the environment from any process or activity are candidates for pollution prevention.

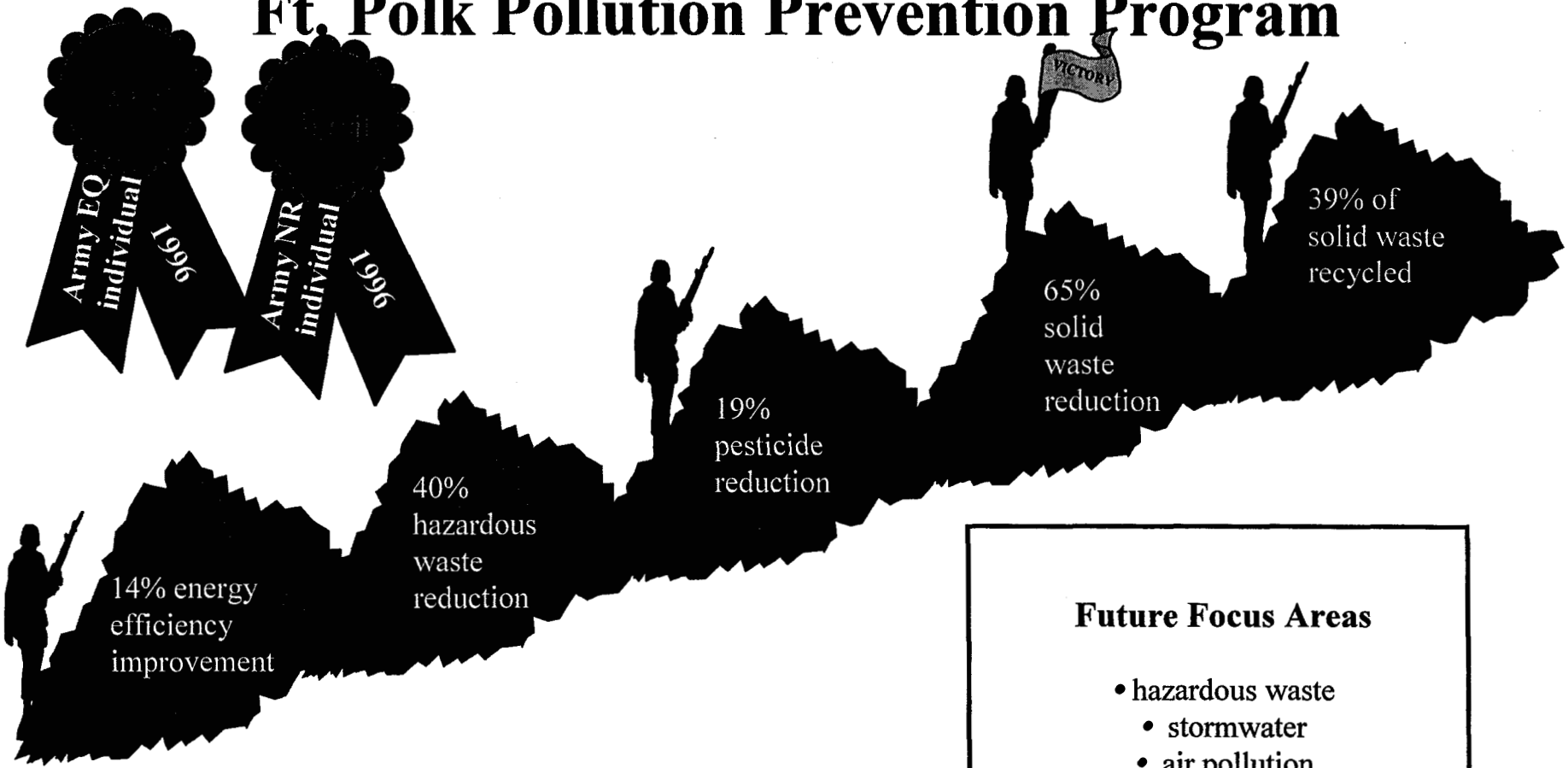
Fort Polk's Soil Reclamation Facility is a State permitted treatment unit for the natural attenuation of treated sewage sludge and petroleum contaminated soils. This unit treats approximately 1348 tons of waste annually and results in a cost avoidance of about $535,000 annually. Fort Polk has established a goal of 100% tracking of all hazardous materials, and anticipates meeting their 50% reduction in hazardous waste generation before the 1999 deadline. Progress towards this goal will be assured by two significant pollution prevention projects. First, Fort Polk is intensively managing its solvent waste stream, and has achieved a 186,000 pound reduction in solvent use for a savings of $150,000 since the 1992 baseline. Extended service schedules and the implementation of recycling parts washers will decrease solvent waste in FY 98 by and additional 40,000 pounds. Second, Fort Polk is implementing a HAZMART, which will provide inventory control, stock rotation, and shelf-life management. Combined with improved storage practices, the HAZMART system is anticipated to further reduce waste generation and lower costs.

Fort Polk has achieved success in other areas, as well. Used oil "iggies," which replaced USTs for used oil collection, provide better storage, decreasing the amount of water in the used oil. The cleaner oil has produced a very marketable commodity for DRMO. Two large antifreeze recyclers will be operated at the HAZMART; these are projected to eliminate over 1 million pounds of ethylene glycol annually and result in an annual cost savings of about $399,000. Other initiatives include an expanded, contractor operated solid waste recycling system, source separation of training exercise waste to separate hazardous materials from the waste stream, a lithium battery testing and reuse program which has saved approximately $50,000 per year, and the evaluation of hot water parts washers.

Fort Polk's future plans include inputting hazardous material inventories into the engineer's GIS. Once completed, users can click on a building and get a complete list of the types and amounts of HM stored inside This tool will help in emergency response and in EPCRA reporting. In addition, all DRMO waste will be bar coded with important generator information. Fort Polk is currently undergoing a Pollution Prevention Opportunity Assessment by the US Army Center for Health Promotion and Preventive Medicine (USACHPPM) . The results will be published in 1998. Pollution Prevention Equipment such as oil filter crusher and antifreeze recyclers have been purchased with implementation scheduled for 1997.

In September 1996, the Louisiana Department of Environmental Quality honored Fort Polk for leadership in environmental programs designed to minimize hazardous waste. Fort Polk received third place in the 1996 Army Natural Resources Conservation award. Two of Fort Polk's staff members were also recognized in the individual award competitions: Dr. Hull came in third in the Environmental Quality competition; Ms. Stevens came in third in the Natural Resource Conservation award.

Ft. Polk Pollution Prevention Program



Innovative Technologies and Practices

- used oil "iggies" used to replace USTs
- natural attentuation of sewage sludge and POL contaminated soils
- geothermal heat pumps in family housing

Future Focus Areas

- hazardous waste
- stormwater
- air pollution
- hazardous material management
- environmental training

Ft. Polk Pollution Prevention Status

Background Data

Impact	P2 Status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 98 UFR
HW generation and disposal (ISR data)	40% reduction in off-site disposal vs CY92; 233,483 lbs disposed in CY 95; Cy 96 = 78,000 lbs.	further improvement	450k		500k	500k	
Solid waste reduction (ISR and Redbook data)	65% reduction since CY92; 39% diversion of solid waste to recycling; 36 million lbs generated in CY 96; $0.0M; Installation has a formal affirmative procurement program; Installation is procuring materials with recycled content.	maintain this level			150k	150k	
Pesticide use (ISR and Redbook data)	19% reduction vice FY93; 1,062 lbs active ingred. applied in FY96; $149K in 96; Plan 100% complete.	?	50k				
Water conservation (Redbook data)	3.0/1.8 million kgallons used in FY96/91; $1.3 M in 96; 29/40 kgallons/capita water used in FY 95/91; Wastewater is/is not reused for irrigation (X%); Vehicle washwater is recycled (50%); X acres of natural landscaping on post.	?					
Stormwater P3 (ISR data)	25% of BMPs identified in our draft SWP3 are completed (X/X).	further improvement	415k	40k	140k	240k	
Wastewater (Redbook data and ISR data; EPR and ACTS data on funds)	7% of industrial waste discharge sources meet pretreatment requirements; 100% (4/4) of permitted discharges meet permit requirements; 23 kgal/capita wastewater in FY95; 29 kgal/capita wastewater in FY 91; 4.6 million kgal in 96; $0.9 million.	?					
Wellhead protection (installations)	Well water is major drinking water source; A wellhead protection plan is needed; If so, plan is 100% complete.	Plan 100% complete by FY97; updated annually					

Impact	P2 Status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 98 UFR
Energy conservation (ADDS data)	14% energy efficiency improvement per square foot from FY 85 to FY96; 1.1 million MBTU consumed FY96; $12.5 M; Renewable energy is used (20%); 10% of buildings have energy monitors; "Green construction" techniques are used.	further improvement					
Dust	Dust suppression practices are/are not used; # miles.						
ODS (ISR data)	Recycling of ODSs is done; An ODS management plan is done; Major units retrofitted.	further improvement				300k	
Annual emissions of criteria air pollutants (air permit, air emissions inventory)	0 tons of So_x; 26 tons of NO_x; 2 tons PM 10; 70 tons VOC; 8 tons CO; 0 tons lead. (96 data)	further improvement	60k		370k	370k	
Hazardous air pollutants (air permit or emission inventory	8.5 tons HAPs/year.	further improvement					
Hazardous air pollutants (installations)	A Risk Management Plan is required.	RMP 100% complete by FY 99					
Prescribed burns	Installation burns 26,000 acres each year.						
Noise reduction (installation)	Noise contours do not go off post.	maintain this level					
Erosion and sedimentation (installation)	Soil loss is/is not a significant impact; Sedimentation is/is not a significant impact; X acres are reseeded each year; The installation has/does not have/does not need a complete erosion control plan that is routinely updated.	?	100k				
Spill planning and prevention (ISR data)	~60% needed secondary containment in place; Spill response supplies are readily available; Spill response team is trained and equipped; SPCCP is not current; ISCP is not current.	further improvement		15k	15k	15k	
Hazardous material management (ISR data)	0% of units/activities/tenants participate in HM tracking and pharmacy operations.	0% enrollment by FY 99			200k	200k	

Impact	P2 Status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 98 UFR
Toxic release reduction (ISR data)	0% increase in TRI releases/disposals vs CY 94; 0 lbs released in CY95.	minimal impact	55k				
Program planning (installation)	Installation has/does not have a current P2 plan; Installation P2 plan covers: hm management, hw management, solid waste, criteria air pollutants, toxic air pollutants, and spill prevention.	Plan 100% completed in FY 98	285k		175k 277k	200k 277k	
Environmental education and awareness (installation)	2,000 unit environmental POCs trained in past FY; 2,000 personnel trained in haz waste/material management in past FY; 2,000 personnel trained in maneuver damage prevention during past FY.; 25% of workforce trained in P2; Environment is covered in orientation briefing; P2 program elements are briefed at the installation EQCC.	further improvement					
TOTALS			$1,415.00	$ 55.00	$1,827.00	$2,252.00	$425.00

Appendix J: Ft. Riley Pollution Prevention Program

Fort Riley

Fort Riley, the Home of America's Army, serves as the Army Center of Excellence for home station training of mechanized forces. Spanning across two counties, Fort Riley covers an area of 100,671 acres including 71,000 acres devoted to the training of active and reserve components. Fort Riley has a comprehensive program in place to reduce the amount of waste generated and to recycle as much material as possible, and the installation's Pollution Prevention Program is fully integrated into all mission activities at Fort Riley.

Significant reductions in a variety of waste streams have been achieved. Participation in DLA's Vehicular Battery Consignment Program has reduced the generation of spent battery electrolyte by nearly 82% since the Spring of 1996, and has resulted in a direct savings of nearly $10,000. Modifications to equipment and processes at the Quartermaster Laundry will result in reductions in the use of PERC from 1200 gallons a year to 120 gallons a year, for a savings of $14,000 per year. Transition to a recirculating water cooling system at this facility will save three million gallons of water and nearly $11,000 per year. Fort Riley has several related initiatives for hazardous waste reduction, including a Fort Riley Restricted List to control hazardous material procurement, a shelf-life extension program, and a household hazardous waste program. The DES and DOL are jointly investigating the establishment of a Hazardous Material Control Center, using the HSMS system to track products from acquisition to disposal. DES is currently developing an Antifreeze Management Program, which will reduce off-site transfers of ethylene glycol, reduce purchases of new antifreeze, and save approximately $16,000 per year. Improvements in solvent filtration techniques has reduced annual solvent generation by nearly 60%, from 169,525 pounds to 70, 051 pounds between 1994 and 1996.

Fort Riley has an extensive solid waste recycling program. Due to the cooperation of installation organizations and residents and because the installation is well equipped with recycling equipment, the amount of materials recycled at Fort Riley has increased by just over 70% between 1994 and 1996. The Troop Incentive Program was established in 1995 to encourage troops at Fort Riley to recycle. The DES Recycle Division gives an award to the battalion that brings in the most total pounds of recyclables; since the establishment of the award, over 90% of the units at Fort Riley have joined in the competition to receive an award.

In addition, Fort Riley units and residents participate in the Spring and Fall
Clean-Ups, which includes increased recycling activities and also provides an amnesty turn-in period for units to dispose of expired shelf-life products and other hazardous wastes. Composting is also an important program at Fort Riley . The installation's Compost Facility can compost 100 tons of material per season, and can recycle it into 33 to 50 tons of compost. This program will eventually save the installation over $50,000 per year in reduced disposal and mulch costs. Through the contributions and efforts of many people, Fort Riley's Recycle Division was awarded the title "The Leader in Recycling" from the Kansas Recycling Association in 1996.

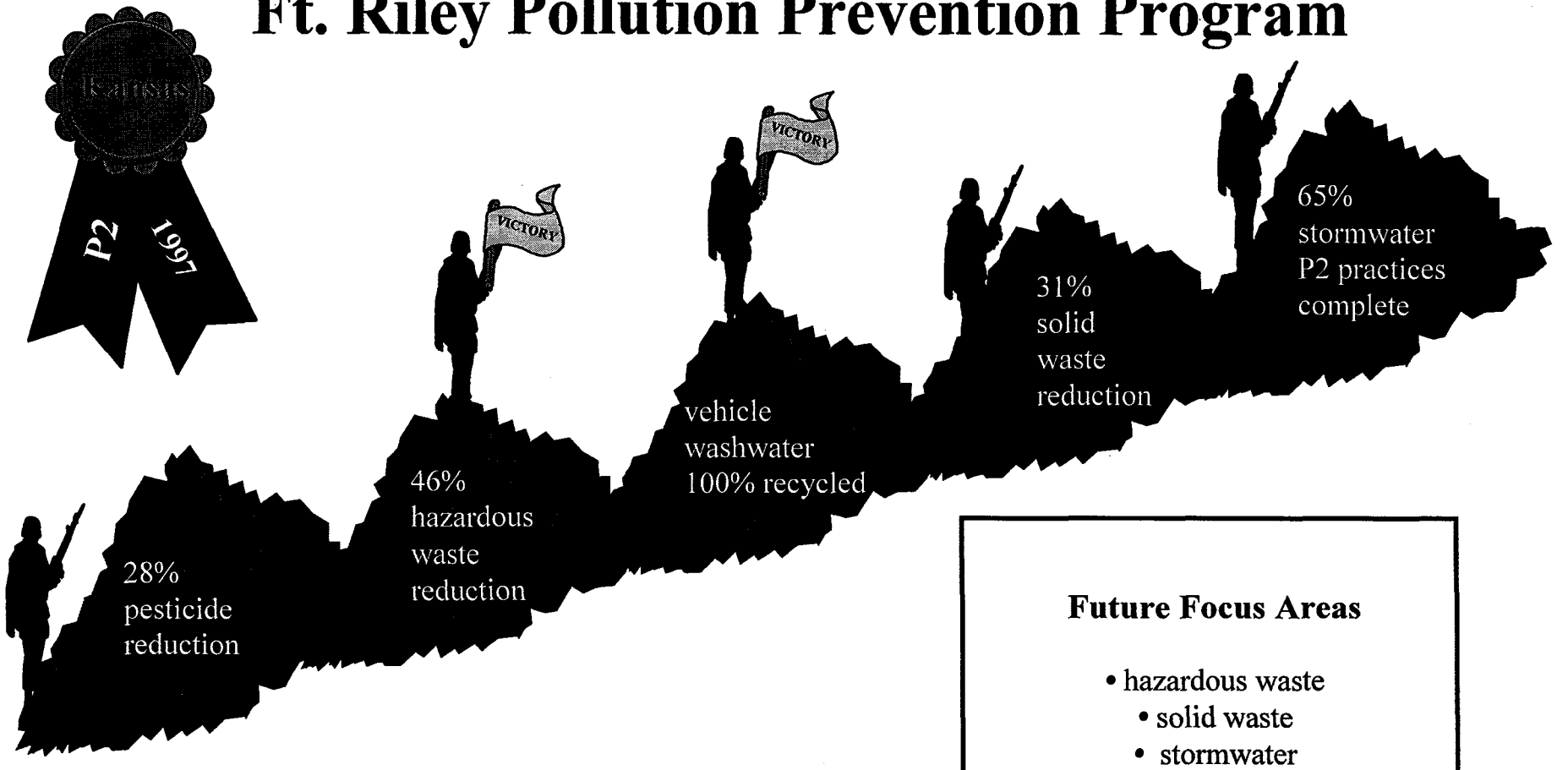
Currently, the DES is developing an Industrial Process Survey which will include a comprehensive assessment at all major industrial processes at representative units. These will be used to develop a series of detailed Pollution Prevention Opportunity Assessments which will result in further reductions in hazardous materials use and waste generation. These will also assist in the implementation of the HSMS system and the development of the HMCC.

Another initiative which will reduce hazardous waste is through the purchase of ALTO low-mercury fluorescent lamps, manufactured by Phillips Lighting Company. The amount of mercury contained in the ALTO lamps falls below the definition of a hazardous waste set by the EPA, and they can be thrown away after use. At DES' recommendation, Fort Riley's Directorate of Public Works (DPW) began ordering these lamps in early 1996, and will continue to order and install these across the installation.

The Fort Riley Bioremediation Facility opened in October 1995, and can be used to remediate POL-contaminated soil from UST removals, installation restoration projects, or from spill response activities. Current bioremediation techniques consist of holding and aerating the soil from UST removals on a concrete pad; after 18 months of holding the soil, microorganisms have been applied to the soil in order to remediate it to below acceptable levels of Total Petroleum Hydrocarbons (TPH). Fort Riley is testing the effects of "phyto-remediation", or growing vegetation on POL-contaminated washrack sediments, in partnership with EPA and Kansas State University. KSU will be doing field tests from FY97-99, growing vegetation on washrack sediments spread in a bermed area to determine if this method will improve the speed and effectiveness of the bioremediation process.

Fort Riley's pollution prevention efforts were given a Special Recognition for Notable Achievement in Pollution Prevention award by the Kansas Department of Health and Environment at it's annual environmental conference in September 1997.

Ft. Riley Pollution Prevention Program



Innovative Technologies and Practices

- modifications to Quartermaster Laundry to reduce water and solvent use
- composting of landscape wastes
- purchase of low-mercury fluourescent lamps
- Restricted List of hazardous materials

Future Focus Areas

- hazardous waste
- solid waste
- stormwater
- air pollution
- hazardous material management
- environmental training

Ft. Riley Pollution Prevention Status

Background Data

Impact	P2 Status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 99-03 Required
HW generation and disposal (ISR data)	46% reduction in off-site disposal vs CY92; 365,000 lbs disposed in CY 96.	further improvement					
Solid waste reduction (ISR and Redbook data)	31 % reduction since CY92; 18% diversion of solid waste to recycling; 36.5 million lbs generated in CY 96; $1.7M; Installation has a formal affirmative procurement program; Installation is procuring materials with recycled content.	further improvement	250k	22k	270k	270k	
Pesticide use (ISR and Redbook data)	28% reduction vice FY93; 12,103 lbs active ingred. applied in FY96; $265k in 96; plan 100% complete.	further improvement		25k	50k	50k	
Water conservation (Redbook data)	0.9/1.2 million kgallons used in FY96/91; $1.2 M in 96; 56/71 kgallons/capita water used in FY 95/91 Wastewater is not reused for irrigation (0%). Vehicle washwater is recycled (100%). 71,000 acres of natural landscaping on post.	maintain this level					
Stormwater P3 (ISR data)	65% of BMPs identified in our draft SWP3 are completed.	further improvement	560k	20k	70k	70k	
Wastewater (Redbook data and ISR data; EPR and ACTS data on funds)	1 industrial waste discharge source on post; 100% (4/4) of permitted discharges meet permit requirements; 102 kgal/capita wastewater in FY95; 104 kgal/capita wastewater in FY 91; 1.6 million kgal in 96; $0.98 million.	maintain this level					
Wellhead protection (installations)	Well water is major drinking water source; A wellhead protection plan is needed; Plan is 90% complete.	Plan 100% complete by FY 98.					
Energy conservation (ADDS data)	10% energy efficiency improvement per square foot from FY 85 to FY96; 1.7 million MBTU consumed FY96; $10.5 M; Renewable energy is not used (0%); 35% of buildings have energy monitors; "Green construction" techniques are not used.	further improvement					

Impact	P2 Status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 99-03 Required
Dust	Dust suppression practices re not used; 0 miles.						
ODS (ISR data)	180,000 lbs of Class I ODS on post in 490 units; Recycling of ODSs is done; An ODS management plan is done.	further improvement			410k	410k	
Annual emissions of criteria air pollutants (air permit, air emissions inventory)	0.55 tons of So_x; 80.27 tons of NO_x; 38.01 tons PM 10; 79.37 tons VOC; 21.87 tons CO: <0.01 tons lead:	further improvement					
Hazardous air pollutants (air permit or emission inventory	40.09 tons HAPs/year.	further improvement					
Hazardous air pollutants (installations)	A Risk Management Plan is required	RMP 100% complete by FY 99			50k	70k	
Prescribed burns	Installation burns 25,000 acres each year.						
Noise reduction (installation)	Noise contours do go off post.	minimal impact					
Erosion and sedimentation (installation)	Soil loss is not a significant impact; Sedimentation is not a significant impact; 150 acres are reseeded each year; The installation does not need a complete erosion control plan that is routinely updated.	maintain this level					
Spill planning and prevention (ISR data)	100% needed secondary containment in place; Spill response supplies are readily available; Spill response team is trained and equipped; SPCCP is current; ISCP is current.	further improvement		17k	19k	19k	
Hazardous material management (ISR data)	0% of units/activities/tenants participate in HM tracking and pharmacy operations.	25% enrollment by FY 00			273k	273k	
Toxic release reduction (ISR data)	2189% increase in TRI releases/disposals vs CY 94; 99,560 lbs released in CY95.	further improvement (one time generation of 99,000 lbs contaminated coolant in FY96)	30k	40k	60k	60k	

Impact	P2 Status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 99-03 Required
Program planning (installation)	Installation has a current P2 plan; Installation P2 plan covers: hm management, hw management, solid waste, toxic air pollutants, water conservation, wastewater reduction, and spill prevention.	Plan 100% completed in FY96	61k		150k 53k	150k 306k	
Environmental education and awareness (installation)	700 unit environmental POCs trained in past FY; 700 personnel trained in haz waste/material management in past FY; 420 personnel trained in maneuver damage prevention during past FY.; 0% of workforce trained in P2; Environment is covered in orientation briefing; P2 program elements are not briefed at the installation EQCC. EQCC will be implemented in first quarter FY 98.	further improvement		92k	126k	126k	
TOTALS			$ 901.00	$ 216.00	$1,531.00	$1,804.00	$273.00

Appendix K: Ft. Stewart Pollution Prevention Program

Fort Stewart

Fort Stewart is the largest Army installation east of the Mississippi River, encompassing an area of 279,270 acres. It spans five counties in southeast Georgia. Hunter Army Airfield is part of the Fort Stewart complex, and covers about 5,400 acres in Savannah, Georgia. Fort Stewart is the home of the 3rd Infantry Division . Because of the large size of the installation and the mild climate, Fort Stewart is an ideal training area for the Division.

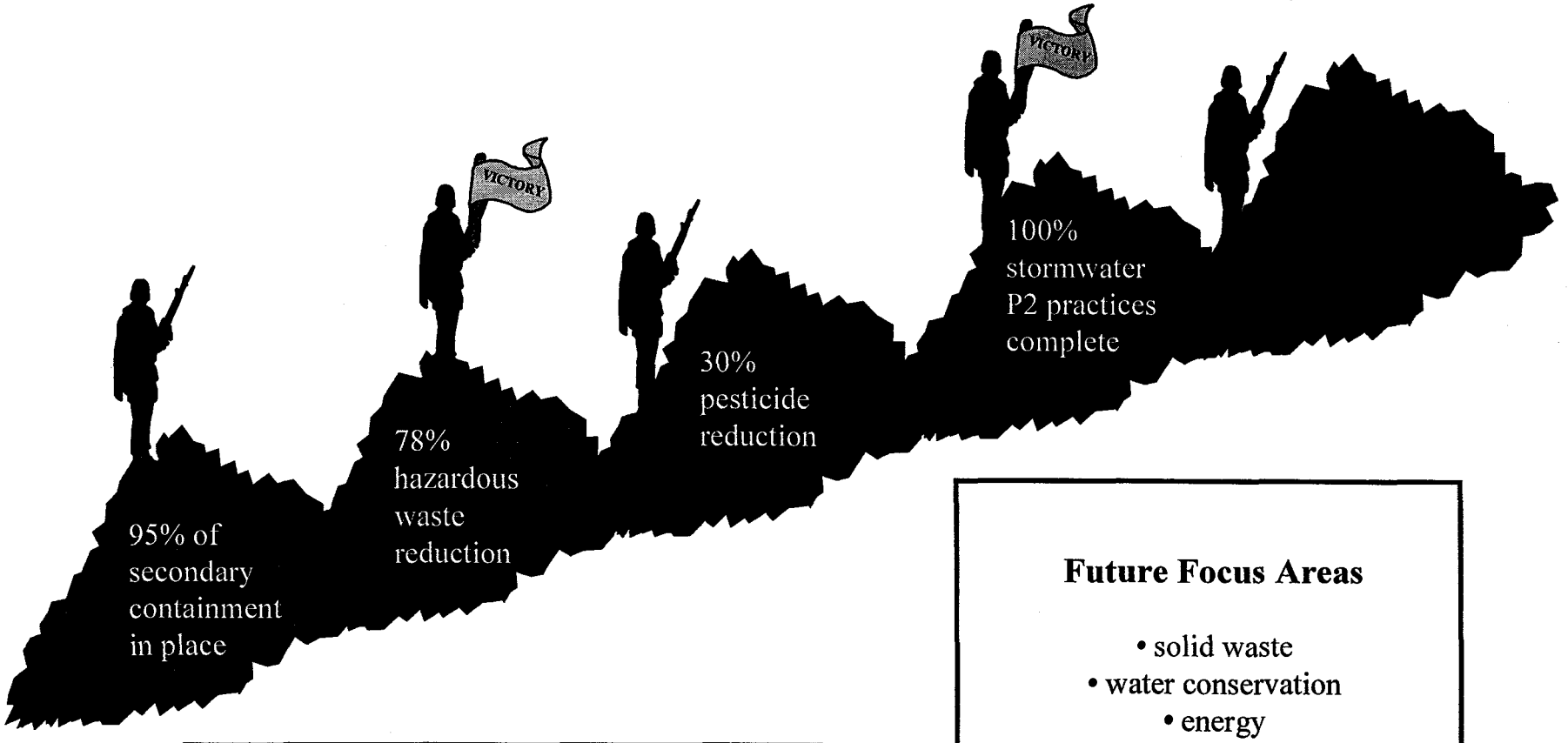
Fort Stewart has a pollution prevention goal of reducing hazardous waste generation by 50% by the end of 1999, using a 1994 baseline. Fort Stewart is well ahead of the required reductions to meet this goal, and should easily meet their goal.

Fort Stewart is currently preparing a solid waste management plan in an effort to reduce solid waste generation rates and to make maximum use of its excellent recycling program, which recycles over 17 different types of materials. Recycling of these materials generated $187,098 in revenues in 1996.

Fort Stewart has initiated numerous successful pollution prevention activities, and several additional initiatives are currently underway. Projects accomplished to date include consolidated hazardous materials distribution at battalion level, the elimination of the use of CARC paint at unit level, an installation wide shop towel laundering program, reductions in materials stockage levels, use of cyclonic parts washers, HVLP paint guns, and bulk distribution systems.

Fort Stewart has revised their original pollution prevention plan Additional opportunities being explored include antifreeze recycling and the burning of off-spec fuel for energy recovery. Fort Stewart is preparing a water conservation plan for both Fort Stewart and Hunter Army Airfield. The plan includes an evaluation of the use of surface waters and/or POTW effluent for nonpotable water needs.

Ft. Stewart Pollution Prevention Program



Innovative Technologies and Practices

- elimination of CARC use at unit level
- shop towel laundering program
- bulk distribution systems
- preparing water conservation plan

Future Focus Areas

- solid waste
- water conservation
- energy
- air pollution
- erosion
- hazardous material management

Ft. Stewart Pollution Prevention Status

Background Data

Impact	P2 Status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 98 UFR
HW generation and disposal (ISR data)	78.4 decrease in off-site disposal vs CY94; 165,787 lbs disposed in CY 96.	maintain this level	60k		104k	104k	
Solid waste reduction (ISR and Redbook data)	1% reduction since CY92; 1% diversion of solid waste to recycling; 72 million lbs generated in CY 96; $1.4M; Installation does not have a formal affirmative procurement program; Installation is procuring materials with recycled content.	further improvement			43k	43k	
Pesticide use (ISR and Redbook data)	30% reduction vice FY93; 1,050 lbs active ingred. applied in FY96; $240K in 96; Plan 100% complete.	maintain this level					
Water conservation (Redbook data)	1.0/1.1 million kgallons used in FY96/91; $0.11 M in 96; 37/60 kgallons/capita water used in FY 95/91 Wastewater is not reused for irrigation (0%). Vehicle washwater is recycled (10%). 500 acres of natural landscaping on post.	further improvement	60k				
Stormwater P3 (ISR data)	100% of BMPs completed (0/2).	maintain this level	300k	510k	310k	310k	
Wastewater (Redbook data and ISR data; EPR and ACTS data on funds)	No industrial waste discharge source on post; 75% (6/8) of permitted discharges meet permit requirements; 48 kgal/capita wastewater in FY95; 63 kgal/capita wastewater in FY 91; 0.9 million kgal in 96; $0.41 million.	maintain this level					
Wellhead protection (installations)	Well water is major drinking water source; A wellhead protection plan is needed; Plan is 95% complete.	Plan 100% complete by FY 98.	125k	125k	20k	20k	
Energy conservation (ADDS data)	-14% energy efficiency improvement per square foot from FY 85 to FY96; 1.5 million MBTU consumed FY96; $8.7 M; Renewable energy is used (42%); 100% of buildings have energy monitors; "Green construction" techniques are used.	further improvement					

Impact	P2 Status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 98 UFR
Dust	Dust suppression practices are not used; # miles.						
ODS (ISR data)	22,260 lbs of Class I ODS on post in _?_ units; Recycling of ODSs is done; yes or no An ODS management plan is not done.	further improvement		193k			
Annual emissions of criteria air pollutants (air permit, air emissions inventory)	44.5 tons of So_x; 81.0 tons of NO_x; 4.684 tons PM 10; 592 tons VOC; 36.55 tons CO; 1.59 tons lead. (Much of this comes from installation prescribed burns.)	further improvement					
Hazardous air pollutants (air permit or emission inventory	19.71 tons HAPs/year.	further improvement					
Hazardous air pollutants (installations)	A Risk Management Plan is not required.	RMP 100% complete by FY __ (NA).					
Prescribed burns	Installation burns 120,000 acres each year.						
Noise reduction (installation)	Noise contours do go off post.	maintain this level					
Erosion and sedimentation (installation)	Soil loss is not a significant impact; Sedimentation is not a significant impact; 0 acres are reseeded each year; The installation does not need a complete erosion control plan that is routinely updated.	further improvement					
Spill planning and prevention (ISR data)	95% needed secondary containment in place; Last secondary containment under construction will be finished (100%) by FY 98; Spill response supplies are readily available; Spill response team is trained and equipped; SPCCP is not current, will be complete by November 1997; ISCP is not current.	maintain this level		515k	130k 50k	130k 50k	
Hazardous material management (ISR data)	100% of units/activities/tenants participate in HM tracking and pharmacy operations.	100% enrollment by FY 99			150k	150k	
Toxic release reduction (ISR data)	100% reduction in TRI releases/disposals vs CY 94 (1 lb in 94); 0 lbs released in CY96.	minimal impact	50k				

Impact	P2 Status	Future Plans	FY96 Program	FY97 Program	FY 98 Program	FY 98 Required	FY 98 UFR
Program planning (installation)	Installation has a current P2 plan; Installation P2 plan covers: hm management, hw management, solid waste, water conservation, spill prevention, and energy.	Plan 100% completed in FY97			130k	130k	
Environmental education and awareness (installation)	435 unit environmental POCs trained in past FY; 10% of workforce trained in haz waste/ material management in past FY; 0 personnel trained in maneuver damage prevention during past FY.; 5% of workforce trained in P2; Environment is covered in orientation briefing; P2 program elements are briefed at the installation EQCC.	maintain this level					
TOTALS			$ 595.00	$1,343.00	$ 937.00	$ 937.00	

Appendix L. FORSCOM Environmental Impacts

Activities	Environmental Impacts	Target Environmental Media	Contaminants of Concern
Vehicle and Equipment Maintenance - at base	Wastes Emissions	All media	Petroleum products Petroleum cleaning solvents Chlorinated cleaning solvents Aerosol paints (xylene, toluene) Antifreeze (ethylene glycol) Hydraulic fluids Contaminated wash waters (oils and metals) Fuels Welding emissions
Vehicle and Equipment Maintenance - in field	Wastes Emissions	Soils and surface water critical issues because operation is performed in open areas	Petroleum products Petroleum cleaning solvents Chlorinated cleaning solvents Aerosol paints (xylene, toluene) Antifreeze (ethylene glycol) Hydraulic fluids Contaminated wash waters (oils and metals) Fuels
Aviation Maintenance	Wastes Emissions	All media depending on waste	Petroleum products Petroleum cleaning solvents Chlorinated cleaning solvents Aerosol paints (xylene, toluene) Hydraulic fluids Contaminated wash waters (oils and metals) Fuels Methanol
Industrial Maintenance	Emissions Wastes	All media depending on waste	Same as vehicle maintenance plus: Dye penetrants Penetrating oils Tapping and cutting fluids Scrap metals Coolants

Activities	Environmental Impacts	Target Environmental Media	Contaminants of Concern
			Adhesives
Painting and Depainting	Emissions Wastes	Air (VOCs) Soils Water	Paints (epoxies, CARC, enamels) Thinners/solvents (MEK, Toluene, Xylenes) Cleaning solvents (methylene chloride) Paint contaminated materials (blast media, rags, paper, equipment)
Field Training	Land impacts Erosion Sediments	Soils Ecosystems Air Wildlife Habitats	Damage to training areas Release of chemicals while training Dust Noise Erosion
Photography	Emissions	Water (sewered or to IWTP)	Silver-bearing solutions Fixer
Printing	Emissions Wastes	Air Water Soils	Solvents (MEK, Toluene, others) Cleaning solvents Inks (with metal pigments) Chemical contaminated rages/paper
Medical Activities	Emissions Wastes	Air Water	Chemicals (including ethylene oxide, freons, ethanol, xylene, methanol, veterinary chemicals, isotopes) Fixers Dental materials Medical wastes Cleaners and disinfectants Pharmaceuticals
Troop Deactivation			

Activities	Environmental Impacts	Target Environmental Media	Contaminants of Concern
Facility O&M	Wastes Emissions Contamination of Stormwaters	All Media	Building materials Paints and solvents Wash waters Pest control (anticoagulant, avitrol, boric acid, carbaryl, combat, drione, dursban, maxforce, oigothreg, perma-dust, pyraperm, pyrethrins, sevin, strychnine, wasp freeze) Weed control (campaign, confront, diquat, orthene, round up) Freons Coolants Fertilizers
Vehicle Washing	Wash water	Water Soils	Water with soaps, metals, oils and dirt
Waste Water Treatment	Waste water Sludges	Water Soils Air	Chlorine gas Sulfur dioxide Oils Sludges
Energy Production	Emissions Chemical releases	Air Water Soils	NOx, VOCs, CO and combustion products Boiler chemicals (sodium sulfite, caustic, tannin, morphalein) Biocides Oils and sludges Ash Scrubber residues and water
Land and Training Area Management	Land impacts Erosion Sediments	Soils Ecosystems Air Wildlife Habitats	Erosion Deforestation (wildfire prevention) Sedimentation in surface water Nutrients Habitat destruction

Appendix M. P2 Technologies in Use at FORSCOM Installations

	Process Efficiency	Aqueous Parts Washers	Dry Filter Paint Systems	HVLP Paint Guns	Improved Dry Cleaning Operations	Material Substitution	Printing Chemicals Reduction	Weapons Cleaning System	Geothermal Heat Pumps	Lighting Upgrades	Overall Energy Efficiency Improvements	Pesticide Reduction	Inventory Control	Bar-Coded Materials & Equipment	HazMat Pharmacy	Good Housekeeping	Environmental Awareness Training	Secondary Containment
Ft. Bragg		Y		Y			Y										Y	
Ft. Campbell		Y	Y	Y			Y	Y		Y		Y		Y	Y		Y	
Ft. Carson		Y		Y				Y		Y	Y	Y		Y	Y		Y	Y
Ft. Drum		Y		Y			Y	Y		Y	Y	Y		Y			Y	Y
Ft. Hood		Y	Y	Y						Y	Y				Y		Y	
Ft. Irwin																	Y	
Ft. Lewis		Y	Y	Y			Y	Y		Y	Y	Y		Y	Y		Y	
Ft. McPherson		Y	Y	Y			Y								Y			
Ft. Polk		Y		Y				Y	Y	Y				Y	Y		Y	
Ft. Riley					Y					Y		Y			Y			
Ft. Stewart		Y							Y			Y			Y		Y	

Appendix M. P2 Technologies in Use at FORSCOM Installations (continued)

	Reuse & Recycling	Qualified Recycling Program	Antifreeze Recycling	Battery Life Extension/ Recycling	POTW Outflow Used for Irrigation	Recycling Washrack	Solvent Recycling/ Reduction	Used Oil Management Program	Scrap Metal Recycling	Land Management	Prescribed Burn	Dust Suppression	Soil Erosion Reduction	Treated Sludge Applied to Land
Ft. Bragg			Y	Y							Y		Y	Y
Ft. Campbell		Y									Y		Y	Y
Ft. Carson		Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	
Ft. Drum		Y				Y	Y	Y	Y				Y	
Ft. Hood		Y	Y	Y		Y	Y	Y	Y		Y	Y	Y	
Ft. Irwin			Y			Y						Y	Y	
Ft. Lewis		Y	Y	Y		Y	Y	Y	Y		Y	Y	Y	
Ft. McPherson		Y	Y	Y				Y	Y				Y	
Ft. Polk			Y	Y	Y	Y	Y	Y	Y		Y		Y	
Ft. Riley		Y	Y	Y			Y		Y		Y			
Ft. Stewart		Y	Y					Y	Y		Y		Y	

Y denotes that the technology is in use at the installation.