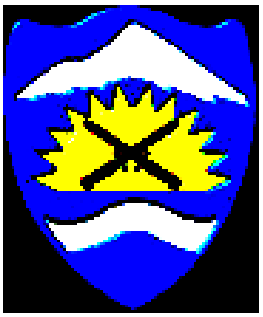
OREGON ARMY NATIONAL GUARD



ORARNGR 210-4
POLLUTION PREVENTION PLAN

1 July 2001

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OREGON ARMY NATIONAL GUARD REGULATION NUMBER 200-4 **1 July 2001**

Facilities Engineering
POLLUTION PREVENTION PLAN

SUMMARY. This regulation provides responsibilities and guidance for pollution prevention within the Oregon Army national Guard (ORARNG). Required by Army Regulation 200-1, Environmental Protection and Enhancement, this regulation is written to ensure ORARNG compliance with applicable federal, state and local laws and regulations. This regulation updates requirements to conform to federal and state regulatory rules, requiring additional action by ORARNG units and support activities.

SUGGESTED IMPROVEMENTS. The proponent of this regulation is the Environmental Branch of the Installations Office (AGI-ENV). Users are invited to send comments to the Oregon Military Department. ATTN: AGI-ENV, 1776 Militia Way, P.O. Box 14350, Salem, OR 97309-5047.

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Chapter 1
Introduction

1. Purpose and Scope

a. The Oregon Army National Guard's Pollution Prevention Plan (P2 Plan) is a tool for assisting an installation in a comprehensive program for defining responsibilities, developing guidelines, and establishing operating standards in preparing is individual pollution prevention plan.

b. The main objectives of the P2 plan are to establish standardized methods of doing the following:

- Identifying and tracking hazardous material usage and generation of waste at each of the installation's shops or operations.
- Identifying opportunities for reducing the volume of hazardous material usage and waste disposal through source reduction, recycle, or treatment.
- Identifying a procedure for preparing an implementation plan for the orderly adoption of pollution prevention projects.

c. Execution Order 12856 superceded by Executive Order 13148 targets chemicals that are reportable on the Emergency Planning and Community Right-to-Know Act (EPCRA) Section 313 Toxics Release Inventory (TRI), but the installation should focus its initial efforts on the largest material usage or waste streams generated at the installation. The largest streams typically offer the greatest opportunities of reduction.

2. P2 Plan Methodology

a. The P2 Plan was prepared in accordance with the methodology outlines in U.S. Environmental Protection Agency (EPA) guidance documents. The following specific activities are included as part of the plan:

- commitment and program implementation
- setting of goals
- baseline survey
- identification of pollution prevention opportunities
- preparation of an implementation plan
- annual pollution prevention reporting

b. The activities are described in the following paragraphs.

3. Commitment and Program Implementation

a. For a P2 Plan to be effective, it needs top management support in both policy statements and financial resource requests. Pollution prevention needs to be made a part of the

organizational policy. An installation commitment statement and a sample pollution prevention policy statement are included as part of this P2 plan.

b. The Environmental Quality Control Committee (EQCC) is established for the ORARNG in accordance and for the purposes defined in paragraph 12-13, AR 200-1. The EQCC will be called the Facilities and Environmental Management Board (FEMB), as established by memorandum of the Adjutant General on 15 Dec 93. The EQCC will be the policy-setting and decision-making body for pollution prevention for the ORARNG.

c. Each installation will designate a Pollution Prevention Coordinator who is responsible for facilitating effective implementation, monitoring, and evaluation of the program.

d. A Pollution Prevention Assessment Team(s) should be formed as needed to assess pollution prevention opportunities. The teams should be temporary, having a specific charter to evaluate a particular waste generation activity, hazardous material usage, or pollution emission from the installation. The primary responsibilities of the Pollution Prevention Assessment Team(s) are to:

- perform pollution prevention opportunity assessments
- present the findings of the assessment to the EQCC or equivalent body for approval funding
- implement projects approved by the EQCC or equivalent body
- monitor the performance of their pollution prevention projects

e. The PPAT should include personnel representing key installation functions that contribute to material usage or waste streams targeted for analysis. Other support elements necessary for implementing change in operations to facilitate the reductions also need to be represented. The team should include members who have direct knowledge of the processes that produce waste or other harmful emissions and technical advisors. Technical expertise can be supplemented by outside consultants and by calling on expertise from the following Army technical centers:

- Office of Director of Environmental Programs
- U.S. Army Environmental Center
- U.S. Army Environmental Hygiene Agency
- U.S. Army Environmental Policy Institute
- U.S. Army Acquisition Pollution Prevention Support Office
- U.S. Army Center for Public Works
- U.S. Army Construction Engineering Laboratory
- U.S. Army Armament Research, Development, and Engineering Center
- National Defense Center for Environmental Excellence

4. Setting of Goals

Each installation must set explicit goals for reducing the use of specific hazardous materials and reducing the volume and toxicity of waste generation within a reasonable time

frame. The goals should support the overall goals of the installation's major command and Army-wide goals.

5. Baseline Inventory

a. A baseline inventory shall be conducted to identify the waste streams generated and hazardous material usage at the installation and to determine the locations from which each stream originates. The baseline inventory shall be performed on the basis of data obtained form a review of data from industrial hygiene/safety staff (OHMIS/HHIM); the facility's Toxic Use Reduction Hazardous Waste Reduction Report (TURHWR); the DEQ Registration Verification Report; the annual Fire Marshall's report; Hazardous Waste Operations Log for the RCRA permitted hazardous waste storage area; DA Form 3917, "Refuse collection and Disposal; and DA Form 2788-R, "Facilities Engineering Technical Data," for turn-in of recyclable materials.

b. Shops identified as major sources of waste or as key components in the installation's handling system for hazardous waste shall be investigated during a site visit. Investigations may consist of interviews with shop supervisors and other personnel, a tour of the shop, and a review of the waste-generating procedures. The information gathered during shop visits can be used for the following activities:

- identifying specific waste-generating processes
- highlighting process efficiencies and inefficiencies
- identifying specific waste problems
- evaluating existing pollution prevention practices
- increasing concern of shop personnel for waste reduction
- questioning the need for use of particular hazardous materials

c. Information obtained in the baseline inventory shall be used to rank waste streams or material usage for reduction efforts. Ranking normally is base don noncompliance issues first, then on the cost of waste disposal, and finally on the volume of waste generated. Data from the waste audit also will be evaluated to identify the major sources of each type of waste. The results will allow a more narrow focus on the larger waste streams and generators.

6. Identification and Evaluation of Pollution Prevention Opportunities

a. A range of pollution prevention alternatives shall be developed and screened for each of the major waste streams and for waste management practices at the installation as a whole. Technological, operational, and managerial pollution prevention alternatives will be identified.

b. Pollution prevention alternatives that pass preliminary screening will be evaluated further for technical and economic feasibility. Economic analyses will be performed by comparing potential reductions in treatment and disposal costs with the estimated costs of implementing the change. Improvements in working conditions and worker safety also should be considered.

7. Preparation of an Implementation Plan

An implementation plan shall be prepared to incorporate all pollution prevention alternatives that were found economically feasible and technically practical. The plan shall outline the installation's overall commitment and planned approach to pollution prevention and describe how each of the chosen pollution prevention alternatives will be implemented, demonstrated, or evaluated further.

8. Annual Pollution Prevention Reporting

Installations have the following reporting requirements that relate to pollution prevention:

- annual hazardous substance inventory per EO 12856
- annual Toxic Chemical Release Inventory Section 313 EPCRA per EO 12856
- annual hazardous waste inventory per AR 200-1
- EPR Environmental Program Requirements per AR 200-1
- Army Material Command in its ACTS data call requires its installations to report waste generation and disposal by process category.

Chapter 2
Introduction and Regulatory Requirements

1. Introduction

a. Preventing pollution is the National Guard's top environmental priority. The current emphasis on pollution prevention is necessary to meet state and national pollution prevention policy goals, reduce long-term liabilities of waste disposal, save money by reducing the installation's raw material purchases and waste treatment and disposal costs, and protect publish health and the environment.

b. Pollution prevention is a cost-effective means of meeting environmental objectives in an era when Army installations are simultaneously subject to stricter standards for pollution control, public criticism of their environmental records, and declining budgets. The costs of failing to prevent pollution are dramatically evident; at some installation, cleanup costs are estimated in the hundreds of millions of dollars.

c. Environmental liabilities increase directly with the volume of hazardous substances and materials in use and increase to a lesser extent as a result of other materials used and the solid waste generated. Reducing these long-term liabilities requires a positive commitment, a sound plan, and an aggressive program for modifying past attitudes toward the conservation of all materials. Reducing liabilities also requires actively searching for opportunities to reduce the amount of waste generated and the use of toxic materials, fuels, and chemicals while still accomplishing the mission.

2. Background

Facility mission statements and information about impacts due to the physical location of the facility: environmental, sociopolitical, cultural, and environmental justices issues are contained in the appendices.

3. Regulatory and Policy Requirements

a. Federal Requirements

(1) Waste minimization (pollution prevention) is specifically mandated by the U.S. Congress in the 1984 hazardous and solid waste amendments to RCRA. As the federal agency responsible for writing regulations under RCRA, the EPA has an interest in ensuring that new methods and approaches are developed for minimizing hazardous waste and that such information is made available to the industries concerned.

(2) The EPA considers waste minimization to consist of source reduction and recycling. Of the two approaches, source reduction is usually the preferred method.

(3) Since September 1, 1985, generators of hazardous waste have been required to sign a certification o the hazardous waste manifest regarding efforts taken to minimize the amount and toxicity of waste generated. On October 1, 1986, the EPA modified the waste minimization statement to read as follows:

> "If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford."

(4) The Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), also known as Title III of the Superfund Amendments and Reauthorization Act, requires information regarding the nature, quantity, storage location, and release of hazardous substances, extremely hazardous substances, hazardous chemicals, and toxic chemicals to be made available to state and local emergency planning officials, and to the public. The Act is not limited to hazardous waste or chemicals subject to Toxics Release Inventory (TRI) reporting under Section 313. It also encompasses all hazardous substances, pollutants, or contaminants. Federal facilities, including Army installations were included in the requirements of the Act when, in 1993, President Clinton signed Executive Order 12856, setting the Federal Government's policy on pollution prevention. The President noted:

> . . . federal facilities will set the example for the rest of the country and become the leader in applying pollution prevention to daily operations, purchasing decisions and policies. In the process, federal facilities will reduce toxic emission, which helps avoid cleanup costs and promotes clean technologies.

(5) Section 313 of EPCRA created distinct reporting requirements for facilities that use specific EPA-listed chemicals in amounts at or above reporting thresholds. A facility is subject to reporting under EPCRA Section 313 if it meets *all* three of the following requirements:

- the facility is in Standard Industry Classification (SIC) Codes 20 to 39 or is a federal facility
- the facility has 10 or more employees
- the facility exceeds the EPA-set reporting thresholds for one or more listed chemicals. Through reporting year 1994 (Form R due by July 1, 1995), these thresholds are based on two sets of annual volumes:
  - 25,000 pounds of chemicals manufactured or processed at the facility during a calendar year, or
  - 10,000 pounds otherwise used at the facility during a calendar year

(6) The Pollution Prevention Act of 1990 (PPA) established a hierarchy for pollution prevention. The hierarchy ranks the most effective methodologies by which to reduce pollution, as follows:

- pollution should be prevented at the source whenever possible
- pollution that cannot be prevented should be recycled in an environmentally safe manner whenever feasible
- pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever possible
- disposal of other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner

(7) The EPA requires every hazardous waste generator that Transports waste offsite to report to the Oregon DEQ every year on the progress of its toxic use reduction hazardous waste reduction program, including actual changes in the volumes and toxicity of all hazardous wastes generated.

4. U.S. Army Requirements

a. The Department of the Army (DA) also has issued regulations that stress minimizing the negative effects of the Army's activities on the environment. Army Regulation (AR) 200-1, Environmental Quality: Environmental Protection and Enhancement, prescribes DA responsibilities, policies, and procedures for preserving, protecting, and restoring the quality of the environment. AR 200-1 sets the Army's policy for hazardous waste minimization. It requires Army installations to reduce the quantity or volume and the toxic city of hazardous wastes whenever economically practical or environmentally necessary.

b. Pollution prevention is any mechanism that successfully and cost-effectively avoids, prevents, or reduces the sources of pollutant discharges or emissions other than the traditional method of treating pollution at the discharge end of a pipe or stack. The Army's pollution prevention program is multi-media in that the objective is to reduce or eliminate the impact that any Army operation or activity may have on the total environment, including impacts to air,

surface waters, ground waters, and soils, through reduction or elimination of wastes, more efficient use of raw materials or energy, and/or reduced emissions of toxic materials to the environment.

c. Pollution prevention concentrates on, but is not limited to:

- modifying manufacturing processes, maintenance or other industrial practices
- modifying product designs
- recycling, especially in-process, closed loop
- preventing disposal and transfer of pollution between media
- promoting the acquisition and use of environmentally preferable products and services and implementation of preference programs favoring the procurement of items containing recovered materials
- increasing energy efficiency and materials conservation
- necessary training promoting use of nontoxic substances

d. The Army's primary focus is on source reduction, pollution prevention can be accomplished at any stage of the pollution management hierarchy. Any technique that meets the intent of the above definition may be involved, such as: material substitution; process modification, waste stream segregation; improved procurement practices and inventory control; good housekeeping or best management practices; proper storage; and employee training.

e. The Army's primary pollution prevention goal is to reduce reliance on products or processes that generate environmentally degrading impacts to as near zero as feasible. This will reduce or avoid future operating costs and liability associated with environmental compliance and cleanup, and from unnecessary generation of waste; as well as avoid disruption of mission operations due to regulatory compliance problems. Specific objectives include:

- reduce, in accordance with Executive Order 12856, total release and disposal of toxic chemicals at least 50 percent by 31 December 1999 (compared to a 1994 baseline)
- minimize the use of environmentally degrading materials and processes in all life cycle phases of new weapons system acquisition programs, in management, logistics support and modification of existing weapons system, and throughout installation/civil works facility management
- develop cost-effective approaches to eliminating or reducing contamination to all environmental media, to reducing energy use, and to conserving natural resources
- instill the pollution prevention ethic throughout the Army community and into all mission areas

5. State Requirements

a. The Resource conservation and Recovery Act (RCRA) amended in 1984, is a comprehensive attempt to deal with hazardous waste management on the national level. With this legislation, Congress committed the United States to eliminate or reduce hazardous waste

wherever possible and, where waste is unavoidable, to safeguard human health and the environment.

b. The Oregon legislature went one step further in enacting the Toxics Use Reduction and Hazardous Waste Reduction Act, which requires businesses to develop formal plans for reducing or eliminating the sue of toxic substances and the generation of hazardous wastes.

c. Oregon's Toxics Use Reduction and Hazardous Waste Reduction Act is intended to reduce, avoid, or eliminate the use of toxic substances and the generation of hazardous wastes. It became law when it was signed by the governor on July 24, 1989.

d. Oregon's new law covers chemical use from start to finish from toxic use to hazardous waste. The law reflects the legislature's determination that the best ways to reduce the adverse effects of chemicals in the workplace and in the environment are to:

- provide businesses with technical assistance concerning the reduction of toxic substances and hazardous waste
- require businesses and industries to develop measurable performance goals and to make long-term plans to reduce their use of toxic substances their generation of hazardous wastes
- monitor the use of toxic substances and the generation of hazardous wastes

e. The law requires three groups to develop plans: large toxic users, large quantity hazardous waste generators, and small quantity hazardous waste generators. These three groups are called "Toxics users." Conditionally exempt generators are not required to develop reduction plans, although they may wish to develop plans for their own benefit and, like other affected businesses, they are also eligible for technical assistance. The focus of the planning efforts will be on toxic substances and hazardous wastes for which performance goals are required. The plans must contain:

- a written policy of management commitment
- a written statement of goals, scope, and objectives
- measurable performance goals
- identification and evaluation of toxic substances and hazardous wastes and associated costs
- identification of reduction options and an implementation plan
- an employee training program
- an ongoing reduction program

f. Each affected business is also required to prepare an annual progress report. The purpose of the annual report is to evaluate progress, if any, in achieving performance goals This reporting requirement provides an opportunity for an annual re-evaluation of you facilities reduction program, options that could be considered for implementation, and an assessment of your progress. These reports may include amendments to a facility's original reduction plan along with explanations for these changes.

6. Definitions of Pollution Prevention Terms

a. Under Execution Order 12856, pollution prevention means source reduction and other practices that reduce or eliminate the creation of pollutants through:

- increased efficiency in the use of raw materials, energy, water, or other resources
- protection of natural resources by conservation

b. The Federal Pollution Prevention Act of 1990 defines "source reduction" to mean any practice that:

- reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) before recycling, treatment, or disposal
- reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminates

c. The term includes equipment of technology modifications, process or procedure modifications, reformulation or redesign of products, substitution of raw materials, and improvements in housekeeping, maintenance, training, and inventory control.

d. Under the Act, recycling, treatment, and disposal are not included in the definition of pollution prevention. However, some practices commonly described as "in-process recycling" may qualify as pollution prevention. Examples include solvent recycling using an integral still, continuous filtering of a plating bath, and recovery of volatile organic compounds (VOCs) from degreasing vents. Recycling that is conducted in an environmentally sound manner shares many of the advantages of prevention: It can reduce the need for treatment or disposal and conserve energy and natural resources.

e. Techniques for pollution prevention fall into six categories: source reduction, in-process recycling, process modification, improved plant operations, input substitutions, and changes in end-product. Before pollution prevention techniques can be used, a waste assessment must be conducted to show where reduction methods implemented by a facility can be most effective. Potential pollution prevention methods than are pinpointed. Pollution prevention requires a multimedia assessment. Transferring pollution from one medium to another does not constitute pollution prevention.

Chapter 3
Commitment Goals and Program Implementation

1. Commitment

The National Guard is committed to reducing the environmental effects of its activities through an active pollution prevention program. In support of this commitment, the

installation's pollution prevention policy statement (Figure 2-1) has been prepared and disseminated to all affected individuals in the organization.

2. Army Pollution Prevention Goals

a. Pollution prevention is the Army's preferred approach to maintaining compliance with environmental laws and regulations. When both preventive and control approaches are available to deal with an environmentally degrading activity, preventive measures must be used unless mitigating circumstances (such as excessive cost or time and technology limitations) exist and can be documented.

b. Pollution prevention should be used to complement, and eventually replace to the maximum extent possible, traditional pollution control and cleanup orientations in Army environmental program management.

c. Pollution will be prevented or reduced at the source. Wastes and by-products that cannot be eliminated will be recycled. Pollutants that cannot be recycled will be treated to minimize environmental hazards. Disposal or other release to the environment will be employed only as a last resort and will be e conducted in an environmentally safe manner.

d. All Army missions, operations, and products will incorporate pollution prevention planning throughout the mission, operation, or product life-cycle.

3. MACOM Pollution Prevention Goals

a. All MACOMs, Army installations, National Guard state commands, Army Reserve commands and civil works facilities will:

- conduct a Pollution Prevention Opportunity Assessment and establish a Pollution Prevention Plan. This plan will identify a systematic approach to reduce all adverse environmental impacts.
- establish a Pollution Prevention Program to implement the Pollution Prevention Plan.
- accomplish TRI reporting in accordance with Executive Order 12856.
- develop and implement an affirmative procurement program for all designated EPA guidelines items containing recovered materials.

b. The Army will, at the earliest possible stage, incorporate cost-effective pollution prevention principles and planning into operations, training, doctrine and plan development, logistical activities, infrastructure management, base operations, health and medical activities, contingency operations, industrial operations, and research, development, test and evaluation activities.

4. Installation Pollution Prevention Goals

The long-term goal of the National Guard is to eliminate the use of hazardous materials,

eliminate the generation of wastes, and eliminate emissions of pollutants to the environment (zero discharge). Achieving the goal of complete elimination is recognized as not being technically or economically feasible. These, goals have been adopted as interim measures with the ultimate goal of achieving zero discharge (Appendix A-E).

5. Program Implementation

The Pollution Prevention (P2) program with the National Guard will be managed in accordance with AR 200-1. This plan and the policies and procedures established to implement the plan are developed and approved by the EQCC or equivalent. The pollution prevention Program is implemented by the Installation's Pollution Prevention Coordinator, with the assistance of Pollution Prevention Assessment Teams as needed to develop, evaluate, and implement specific pollution prevention projects.

6. Environmental Quality Control Committee

a. The EQCC is the policy-setting and decision-making body for pollution prevention for the Oregon Army National Guard. The EQCC will closely coordinate their actions with the installation's Hazardous Waste Management Board (Ref. AR 420-47) to complement actions, not duplicate them. The EQCC will be called the Facilities and Environmental Management Board (FEMB) as established by memorandum of the Adjutant General on 15 Dec 93. The following list summarizes the responsibilities of the EQCC:

- Brief the installation commander (IC) on all actions necessary or under way to make a pollution prevention program successful
- Establish overall pollution prevention plaices and procedures
- Establish pollution prevention goals
- Direct activities of the Pollution Prevention Coordinator
- Rank the waste streams, processes, or facility areas for assessment
- Establish priorities for implementation of projects.
- Obtain funding and establish schedule for implementation
- Monitor or direct implementation progress

b. The primary functions of the EQCC are to:

- Advise the Adjutant General on ORARNG environmental policies, priorities, strategies, and programs
- Provide policy and guidance on implementing all aspects of the ORARNG program
- Act as and perform the duties of the Installation Compatible Use Zone (ICUZ) Committee in accordance with and for the purposes described in paragraph 7-5, AR 200-1
- Act as and perform the duties of the Hazardous Waste Management Committee established in paragraph 5 and 6, ORARNG 420-47
- Ensure that the ORARNG complies with requirements defined in paragraph 6-4, AR 200-1

c. The EQCC or equivalent is chaired by the following individual:

- Assistant Adjutant, General Army

d. The EQCC includes the organizations or departments that have significant operational or administrative interest in developing a pollution prevention plan. The EQCC has representatives of the following organizations:

- Army Aviation Support Facility
- AROPT-T
- AGI-ENV
- Directorate of Logistics – Operations
- AGI-RPOM
- 82 BDE
- DOL – M
- Camp Withycombe
- DOL - T
- SAO - S
- SJA
- USPFO
- 41 EIB
- Camp Rilea

Figure 2-1
OREGON ARMY NATIONAL GUARD
Pollution Prevention Policy Statement

The Oregon Army National Guard (ORARNG) is committed to an active policy of protecting the environment in all of our activities. This pollution prevention policy statement is based on our commitment to the following:

- providing a clean and safe environment in our community
- ensuring a safe and healthy workplace for our staff
- complying with all applicable laws and regulations
- efficiently accomplishing our mission
- reducing future liability for waste disposal
- reducing waste management costs

To accomplish these objectives, we will implement programs for reducing or eliminating generation of waste through source reduction and other pollution prevention methodologies. This policy extends to air, wastewater, and solid and hazardous wastes. In addition to meeting the objective, there are other important benefits related to pollution prevention.

ORARNG is committed to reducing the weight and toxicity of generated wastes. As part of this commitment, the Guard gives priority to source reduction. where source reduction is not feasible, other pollution prevention methods, such as recycling, will be implemented where feasible. The wastes that cannot be prevented will be converted to useful products or used beneficially, where feasible. Remaining wastes for which no pollution prevention option is warranted will be effectively treated (to decrease volume or toxicity) and responsibly managed. The ORARNG will select waste management methods that minimize present and future effects on human health and the environment.

Pollution prevention is the responsibility of all of our staff. The ORARNG is committed to identifying and implementing pollution prevention opportunities through solicitation, encouragement, and involvement of all employees.

7. Pollution Prevention Coordinator

a. The pollution prevention Coordinator has overall responsibility for the development and implementation of the P2 plan. The Pollution Prevention Coordinator has the responsibility for organizing, implementing, managing, or monitoring the following pollution prevention methods and programs:

- integrating pollution prevention in the installation's comprehensive planning
- preparing and updating baselines for hazardous material use and waste generation
- coordinating the performance of PPOAs to identify and evaluate pollution prevention procedural changes, projects, and equipment
- recommending priorities for funding pollution prevention projects and equipment
- establishing policies for identifying, procuring, and tracking hazardous materials

- developing the installation's pollution prevention training programs

8. Pollution Prevention Assessment Team(s)

a. Pollution Prevention Assessment Team(s) (PPAT) will be formed as needed to perform PPOAs. The teams will be temporary, having a specific charter to evaluate a particular waste generation activity, hazardous material use, or pollution emission from the installation. The primary responsibilities of the PPAT are to:

- perform PPOAs
- present the findings of the assessment to the EQCC for approval and funding
- implement projects approved by the EQCC
- monitor the performance of their pollution prevention projects

b. The PPAT may be led by the installation's Pollution Prevention Coordinator or by a team leader who has a vested interest in the particular waste streams or operations to be investigated.

c. The PPAT will include personnel representing key installation functions that contribute to material use or waste streams targeted for analysis. Other support elements necessary for implementing changes in operations to facilitate the reductions also will be represented. The team will include members who have direct knowledge of the processes that produce waste or other harmful emissions and technical advisors.

Chapter 4
Baseline Inventory

1. Purpose

a. A baseline inventory is necessary for two reasons. The quantities of waste generation or toxic material use are assessed to target specific waste streams, materials being used, or activities for pollution prevention. Annual reports on waste generation and toxic material use will be compared with the baseline inventories to evaluate the effectiveness of pollution prevention projects and to monitor progress in achieving the ORARNG's pollution prevention goals. For facilitating this comparison, the same formats are used for the baseline inventory and annual reports.

b. Measurements of materials used and wastes generated take into account production levels (such as vehicles maintained or number of soldiers trained), so that P2 is not accomplished solely due to reductions in training or maintenance.

c. Baseline inventories have been prepared for the following categories and subcategories of waste and material use.

- Hazardous Waste Generation
  - Solvent Waste Generation

- Waste Acids and Bases Generation

- EPA Toxic 17 Waste Generation
  - Benzene
  - Cadmium and compounds
  - Carbon Tetrachloride
  - Chloroform
  - Chromium and compounds
  - Cyanides
  - Dichloromethane
  - Lead and compounds
  - Mercury and compounds
  - Methyl Ethyl Ketone
  - Methyl Isobutyl Ketone
  - Nickel and compounds
  - Tetrachloroethylene
  - Toluene
  - Trichloroethane
  - Trichloroethylene
  - Xylene
- Solid Waste Generation
- Ozone-Depleting Chemicals (ODCs) Usage
  - Freons
  - Halons
  - Cleaning solvents
  - Paint Strippers
- TRI Reportable Releases

d. Some categories overlap (e.g., solvent wastes, waste acids and bases, and EPA Toxic 17 wastes also will appear as hazardous waste; some of the EPA Toxic 17 wastes can be solvents). The use of the baseline inventories will assist in developing projects for meeting the pollution prevention goals of the ORARNG.

e. The appendices contain detailed baseline information.

Chapter 5
Pollution Prevention Opportunity Assessment

1. Purpose

a. The PPOA enables the ORARNG to examine the alternatives available for pollution prevention. The modules identify the waste stream and the operation from which the stream may be generated, describe the process, and present several pollution prevention alternatives. Each alternative is described along with its advantages and disadvantages.

b. The installation will be required to furnish information on the assessment forms. The needed information is the estimated reduction, a technical evaluation, and an economic evaluation. Base personnel will have to describe site-specific conditions so that the amount of

reduction possible and the technical and economic feasibility of the alternative can be determined. The information generated by the installation will determine if these alternatives are good pollution prevention opportunities. Personnel performing the PPOA will have to work with the personnel generating the waste to find the best methods for reducing the waste stream.

c. Assessment modules for some of the most common wastestreams follows.

Pollution Prevention Opportunity Assessment Module
Application of Sealant/Adhesive

Waste Stream: Sealant/Adhesive waste

Operation: Equipment repair

Description

Sealant and adhesive application is typically required in the assembly, reassemble, and repair of equipment, containers, and other components throughout the ORARNG. Adhesives and sealants come in various packages including kits that require mixing, cans that require rags or brushes for application and tubes that facilitate direct application of the material to the component. Repair activities generally require small quantity uses of sealants and adhesives. Tubes of adhesive are frequently only partially used before they are discarded as hazardous waste.

Alternative 1: Implementation of management practices

Description

Management practices include training personnel to purchase and use only the amount of sealants and adhesives appropriate to the task. In additional, should laboratory testing of hardened adhesives indicate these materials are nonhazardous, end-users could mix excess adhesive and allow it to harden according to the manufacturer's instructions for disposal as municipal trash. This is the preferred method of disposal for the residual portion of the application of sealant/adhesive waste stream. If testing determines this to be a hazardous waste, the preferred method of disposal is incineration at a permitted disposal facility.

It is recommended that management practices, including purchasing appropriate sized containers, be instituted to decrease the amount of waste generated. It is also recommended that laboratory testing of hardened adhesives be performed: if these materials are nonhazardous, end-users could mix excess adhesive, per the manufacturers direction, for disposal as municipal; trash.

Alternative 2: Use non-hazardous products when possible.

Pollution Prevention Opportunity Assessment Module
Battery Acid/Lead-Acid Batteries From Vehicle Maintenance

Waste Stream: Battery Acid

Operation: Vehicle Maintenance

Description

Battery acid is a main component of lead acid batteries from vehicles. Sulfuric acid typically is used in lead acid batteries. Military installations have a high demand for batteries. There are two typical methods for handling battery acid from dead batteries: (1) draining the battery and neutralizing the acid and (2) shipping the battery to a recycler without removing the acid. Potential environmental and safety problems of battery acid are its corrosive nature and the typically high concentrations of lead. Use of metal equipment during draining operations should be prohibited.

Alternative 1: Return wet batteries.

Description

If the current operating practice is to drain batteries, explore the opportunities of returning or recycling batteries with the acid still inside. Returning wet batteries eliminates potential environmental problems from draining or treatment. The advantages include elimination of the acid waste stream that contains corrosive waste and lead. The disadvantages may include the limited number of vendors that want to accept batteries containing acid. Wet batteries also will require heated storage areas to prevent freezing and cracking of the batteries. This alternative is more desirable if such storage area is readily available.

Pollution Prevention Opportunity Assessment Module
Cleanup Solvents From Painting

Waste Stream: Cleanup Solvents

Operation: Painting

Description

Most painting an ORARNG installations is performed by conventional liquid spray technologies. The paint is mixed with a carrier, usually an organic solvent, and is applied to the surface with an air-pressurized sprayer. A major source of waste generated during painting is solvents used to clean painting equipment. Most paints are solvent-based, so they require solvents for cleanup. The solvents used depend on the type of paint used. Some of the more common solvents are methyl ethyl ketone (MEK); xylene; 1,1,1-trichlorethane; toluene; butyl acetate; ethylene glycol; and alcohol.

Alternative 1: Used painting methods that minimize solvent use.

Description

Solvent use can be reduced by changing painting methods. Powder coating or electrostatic dry-powder painting are two methods that minimize solvent use. Dry powder is air-blown onto the equipment, and the equipment is cured in an oven to bond the paint to the substrate. Electrostatic dry-powder painting sprays ionized dry powder onto a surface that has the opposite charge. The major limitation of dry-powder painting is that the items to be painted must be able to withstand the typical curing temperature of 350°F for 30 minutes.

Alternative 2: Use water-based paint when possible.

Description

Water-based paint is used to eliminate the need for solvent cleaners. The disadvantages of water-based paint are that the surface must be free of oil and grease so that the paint will adhere, longer drying times are required, and the transfer efficiency may not be as high as solvent-based paints.

Alternative 3: Use specialized cleaning equipment.

Description

Specialized equipment is available for cleaning paint guns and other paint-application equipment. Waste solvents requiring disposal as a hazardous waste can be eliminated.

Alternative 4: Collect and recycle cleaning solvent.

Description

Cleaning solvents can be collected and recycled using distillation. Several companies manufacture small distillation units or batch stills. Solvent can be recovered and reused. The residue from the distillation will have to be disposed of properly, most likely as a hazardous waste.

Pollution Prevention Opportunity Assessment Module
Electronic Equipment Battery Changeout

Waste Stream: Waste Batteries

Operation: Battery Replacement

Description

Most shops and maintenance activities use various pieces of equipment (i.e., flashlights, voltmeters, and radios) that are powered by AA, C, or D cell alkaline batteries. When alkaline batteries are no longer serviceable, personnel dispose of the batteries through DRMO as universal waste. Regular alkaline batteries are designed to be used once and then thrown away. Single-use, primary alkaline batteries are not designed to be recharged. Applying any type of charging current to a primary alkaline cell can cause the cell to short circuit internally, gas upon recharge, and present a leakage hazard. Alkaline batteries are not currently restricted from disposal in landfills.

Nickel-Cadmium (NiCd) and Nickel Metal Hydride (NiMH) batteries can be recharged and reused many times. However, these batteries are relatively expensive and have very poor shelf life characteristics. A fully charged battery will discharge itself over time when left in storage. NiCd batteries contain cadmium and require special handling for disposal or recycling. NiMH are perhaps less objectionable environmentally than NiCd cells, but may still be subject to local environmental regulations in some areas.

Alternative 1: Replace current batteries with rechargeable batteries

Description

The Rayovac RENEWAL is presently the only battery system to offer the high performance of alkaline batteries and the high cost savings of reusability. RENEWAL Reusable Alkaline batteries can be reused 25 times or more in any device that currently uses regular alkaline or heavy duty batteries. RENEWAL batteries come fully charged, are available in the most popular battery sizes - D, C, AA, and AAA, and feature a shelf life of five years. RENEWAL batteries perform up to three times longer per charge cycle than NiCd batteries, and hold their power in storage; NiCds lose 1 percent of their power per day when not in use. Alkaline batteries also do not have the memory problems associated with NiCd batteries.

The RENEWAL battery is one of the most environmentally responsible batteries available; they are low in mercury, reduce the number of throwaways, and do not contain cadmium. They are therefore not affected by legislation in many states requiring collection of NiCd rechargeable batteries. The cadmium content of many NiCd batteries results in them being classified as universal hazardous waste by the EPA.

Prevention Type: Source Reduction

Estimated Reduction:	Technical Evaluation:	Investment Cost: Capital Project Costs:	Annual Savings:	Payback Period: (capital project costs/expected annual savings)

Alternative 2: Off-Facility Recycling

Description

Use and reuse of a waste material can occur onsite or offsite. Many offsite recyclers take waste, recycle it, and sell the refined material back to the company at a price significantly lower than the cost of the original product. Companies that recycle can realize savings in both the purchase of raw materials and in treatment and disposal costs.

Prevention Type: Offsite Recycling

Estimated Reduction:	Technical Evaluation:	Investment Cost: Capital Project Costs:	Annual Savings:	Payback Period: (capital project costs/expected annual savings)

Pollution Prevention Opportunity Assessment Module
Halon Use in Fire Extinguishers

Waste Stream: Halon

Operation: Portable Fire Extinguishers

Description

Halon 1211 and 1301 are used as a liquid fire suppressant (streaming agent) in portable fire extinguishers. The fire extinguishers are used for fire suppression. Approximately 118 of these units are located throughout the Oregon Army National Guard, containing approximately 3890 pounds of Halon. Approximately 14.75 pounds of halons are emitted during testing of the fire extinguishers.

Alternative 1: Discontinue testing of fire extinguishers containing Halon.

Description

Testing of fire extinguishers containing Halons will be discontinued. Alternative chemicals and methods are available for testing.

Alternative 2: Substitute fire suppressant.

Description

Carbon dioxide, water, dry-chemical, or foam portable fire extinguishers are currently available. Therefore, complete replacement of portable fire extinguishers using halon could be accomplished in the short term.

Pollution Prevention Opportunity Assessment Module
Manual Surface Preparation Using Rags

Waste Stream: Waste Rags

Operation: Vehicle Maintenance

Description

Rags are used for manual surface preparation in lubrication operations, fluids changeouts, application of sealants and adhesives, painting operations, and cleaning and degreasing operations. These processes generate used rags contaminated with fuel, hydraulic fluid, motor oil, grease, paint, solvents, detergents, and cleaning compounds.

Alternative 1: Maximize rag laundering

Description

Oily rags and petroleum-contaminated rags can be recycled using a rag laundering service. Paint-contaminated rags are segregated and disposed of as hazardous waste. Maximizing current rag laundering efforts to reduce inadvertent rag disposal can include requiring units to pick up clean rags and turn in segregated rags before receiving additional clean rags.

Rag laundering services effectively eliminate the lightly to moderately soiled oily rag waste stream and provide a variety of services including supplying the unit with high quality shop rags that can be reused indefinitely. Lightly to moderately soiled rags are laundered; rags that are very soiled (i.e., used to clean up a spill) cannot be laundered and must be disposed of as hazardous waste. In a shop, soiled rags are typically segregated and stored in labeled containers provided by the rag laundering service. Laundered rags are usually returned at the time soiled rags are collected.

Pollution Prevention Opportunity Assessment Module
Paint Booth Scrubber Sludge

Waste Stream: Scrubber Sludge from Paint Booths

Operation: Painting

Description

Most painting on ORARNG installations is performed by conventional liquid spray technologies. The paint is mixed with a carrier, usually an organic solvent, and is applied to the surface with an air-pressurized sprayer. The largest volume of hazardous waste generated in painting involves air emissions that create paint sludge. For instance, during typical spray painting in a spray booth, 50 percent of the paint is deposited on the surface being painted, and the other 50 percent is sprayed into the air. As the paint dries, the solvent evaporates into the air. The air from the paint booth then is exhausted through a water scrubber that separates the paint from the air. The scrubber water normally is recycled, and paint solids are concentrated into a scrubber sump. When the sumps fill, the sludge is removed and put in drums for disposal.

Alternative 1: Use painting methods with higher transfer efficiencies.

Description

The amount of overspray from painting equipment should be minimized. Conventional air-atomized spray painting techniques are very inefficient. Some other coating methods that have higher transfer efficiencies include electrostatic spraying, airless spraying, dip coating, and powder coating.

Alternative 2: Use dry-filter paint booths.

Description

Changing the air-treatment system to dry filters will eliminate the scrubber system. This will reduce water use and potentially the amount of sludge to be disposed of. However, the filters from the system will have to be disposed of. Testing will be required to determine if the filters are hazardous waste.

Alternative 3: Use water-based paint when possible.

Description

Water-based paint is used to eliminate the need for solvents and the resulting VOC emissions. Water-based paints use a water-based solvent as the carrier. The disadvantages of water-based paint are that the surface must be free of oil and grease so

that the paint will adhere, longer drying times are required, and the transfer efficiency may not be as high as for solvent-based paints.

Alternative 4: Implement better employee operating practices.

Description

Paint-spray systems often are manually operated, so employee training will reduce the amount of paint used and promote waste reduction. Keeping the air pressure low and the spray gun perpendicular to the surface adds several degrees of accuracy to the system by preventing overspray and minimizing sludge in the air-treatment system.

Pollution Prevention Opportunity Assessment Module
Radiator-Cleaning Wastes

Waste Stream: Radiator-Cleaning Wastes

Operation: Radiator Cleaning

Description

Spent radiator-cleaning solution must be disposed of as hazardous waste because of its heavy-metal content. Radiators are drained and then cleaned by immersing them in a tank that is covered and heated. The tank is commonly called a "boil-out tank" or a "hot tank." Radiator-cleaning solution typically sodium hydroxide based, is prepared from a powdered concentrate and added to the boil-out tank. Depending on use, the radiator-cleaning solution is spent after 3 to 12 months of use. The buildup of dissolved oils and grease causes the solution to become buffered. There usually is no visual indication of a loss in strength, such as buildup of floating oil and grease in the tank. Increased foaming during heating can indicate a loss of strength. The spent solution typically contains up to 50,000 mg/L of lead at a pH of 11 to 12. The spent solution also contains solids, which normally settle to the bottom of the boil-out tank as sludge.

Alternative 1: Minimizing Change-Out of Boil-Out Tank

Description

The manufacturers of the cleaning solution typically state the minimum change-out frequency is once per year. Depending on the number of radiators cleaned, precleaning procedures, and bath maintenance, however, bath life can be extended to as long as 10 years. Sludge should be shoveled from the boil-out tank weekly, and a maintenance recharge of fresh chemical should be added to the bath every 2 weeks.

Bath life also can be extended by minimizing the buildup of oil and sludge by some combination of draining, rodding, flushing, or blowing out radiators before they are inserted into the boil-out tank. Also important is removing as much oil as possible from the oil cooler before insertion of the radiators into the boil-out tank.

Alternative 2: Reducing Waste Volume

Description

The volume of waste requiring disposal as a hazardous waste can be minimized by removing the bath and trapping the solids by settling or filtration. The separated liquid can be returned to the tank for reuse. Alternatively, the boil-out tank can be outfitted with a side-stream filter/strainer and pump to remove solids and oil from the bath, thereby minimizing sludge generation and extending bath life.

Another technique is to increase the temperature of the bath, open the bath cover, and evaporate as much of the bath as possible, thereby minimizing the volume for disposal. The sludge may be removed by shovel, and the bath may be reused.

Alternative 3: Replacing Boil-Out Tank

Description

The volume of waste generated may be minimized by modifying or replacing the existing boil-out tank. Consideration should be given to obtaining a smaller-volume boil-out tank. Considerations should be given to obtaining a smaller-volume boil-out tank capable of processing the same number of radiators. For example, 120-gallon tanks are available for processing up to 64 radiators per day. The dimensions of the cleaning bath must be matched to each radiator's dimensions.

Ultrasonic cleaning tanks that use as low as 50 gallons of cleaning solution also are available.

Alternative 4: Sludge Dewatering

Description

The sludge generated by the boil-out tank probably is heavily contaminated with lead. Disposal cost can be minimized by removing as much water as possible from the sludge. Sludge shoveled from the boil-out tank can be placed into drums and allowed to air-dry over time or can be placed in 5-gallon buckets, allowing the solids to settle before decanting the liquid to the boil-out tank. A cloth or paper filter can be used to separate the liquid from the solids. Sludge also can be dried in drums by using electric band drum heaters.

Pollution Prevention Opportunity Assessment Module Refrigerants (CFCs) from Refrigeration, Cooling-Equipment Maintenance

Waste Stream: Refrigerants (CFCs)

Operation: Refrigeration, Cooling-Equipment Maintenance

Description

Chlorofluorocarbons (CFCs) are used as heat-transfer fluids in the refrigeration cycle of air conditioners, freezers, and refrigerators. The refrigerant remains in a sealed system throughout the refrigeration cycle and is not emitted until the unit is disposed of, although small quantities may leak from the system or be emitted during servicing. The Clean Air Act Amendments require capture and recycling of refrigerants during servicing operation. The Clean Air Act Amendments and DOD Directive 6050.9 require phasing out various CFCs.

Alternative 1: CFC Substitution

Description

Much research has been and is being performed on finding replacements for CFCs. The advantage to CFC replacements is the reduced use of ozone-depleting chemicals. Reducing CFC use will comply with regulatory requirements and DOD directives.

Two problems are associated with CFC substitution. Replacement compounds not requiring retrofitting of equipment are not commercially available, and replacements that are available require equipment modification.

Fluoroiodocarbons recently were announced as true “drop-in” replacements for CFCs. However, these compounds are still undergoing testing and are not expected to be available for commercial use until 1996.

Most of the alternative refrigerants proposed and marketed today require physical retrofits of the equipment and the lubricants. They are less efficient than the CFCs they are replacing, which can lead to the need to replace existing equipment with higher-capacity equipment to accomplish the same level of service.

Substitute refrigerants include the following:

- HCFC-123 or HCFC-124 for CFC-11
- HFC-134a or HCFC-22 for CFC-12
- HFC-125 or HCFC-22 for CFC 502

Alternative 2: CFC recycling

Description

CFCs, like other solvents, can be recycled through distillation. The CFCs must be removed from the equipment by certified technicians using registered equipment. The CFCs then are reprocessed either on the site or off the site, using distillation technology. The CFCs removed from the equipment will be replaced with recycled CFCs. The advantage of CFC recycling is that it allows continued use of equipment until a suitable CFC replacement is commercially available, and no new supplies of CFCs will have to be purchases. The disadvantage is that DOD is directing the phase-out of ozone-depleting chemicals, so reusing CFCs contradicts regulatory and DOD requirements. The availability of CFC recyclers also may be a hindrance to this alternative.

Pollution Prevention Opportunity Assessment Module
Sandblasting

Waste Stream: Blast grit, paint chips, heavy metals

Operation: Sandblasting

Description

Paint maintenance services at ORARNG facilities include paint removal from vehicles and ground support equipment from onsite and offsite sources. Paint removal is performed in a blast booth that uses the impact force of sand to remove paint (sandblasting). The sand blast media is unused until it breaks down. The resulting waste is a blast grit that contains sand particles and paint chips containing heavy metals. The paint chips are considered hazardous because they contain chromium, lead, or other metals from the removal of multiple layers of paint. The blast media breaks down and enters the hazardous waste stream with the paint chips.

Alternative 1: Plastic Blasting Media

Description

Plastic blasting media breaks down more slowly and contributes less weight to the hazardous waste stream than sand. Plastic blast media can be reused 100 times more than sand blast media. Plastic blasting media is an abrasive, dry-blasting process that was designed to replace chemical and other blast media paint stripping operations. Blasting is performed in a ventilated enclosure such as a large room, walk-in booth, or small closet. Plastic blast media is similar to sandblasting except that angular, soft plastic particles are used as the blasting media. The plastic process propels the plastic medium at a lower pressure than does sandblasting (20 to 30 psi); the low pressure and relatively soft plastic medium have a minimal effect on surfaces under the paint. For this reason, plastic blast media is considered to be well suited for removing paint without risk of damage to delicate substrates such as fiberglass, aluminum, and thin-skinned parts that could not be striped any other way.

After blasting, the medium is passed through a reclamation system consisting of a cyclone separator and a vibrating screen separator. Reusable material is returned to the blast media supply pot. The medium can typically be recycled 10 to 20 times before it becomes too small to effectively remove paint. Waste material consists of plastic beads and paint chips that are too small to reuse. Plastic beads are manufactured in a variety of types, sizes, and harnesses. A military specification (MIL-P-85891) has been developed for plastic blast media. The specification provided general information on the characteristics and types of plastic media.

Alternative 2: Sodium Bicarbonate Medium

Description

Sodium bicarbonate stripping is used as an alternative to traditional chemical paint stripping. Sodium bicarbonate stripping process can be used with or without water. Sodium bicarbonate stripping process is most frequently used water primarily as the dust suppressant. In this form, compressed air delivers d-sodium bicarbonate media from a pressure pot to a nozzle, where the media mixes with a stream of water. The soda/water mixture impacts the coated surface and removes old coatings from the substrate. The water used dissipates the heat generated by the abrasive process, reduces the amount of dust in the air, and aids the paint removal by hydraulic action.

Sodium bicarbonate is a soft blast media with a heavier specific gravity and less harness than most plastic abrasives. Workers do not need to prewash or mask the surface. The dust is not an explosive hazard, nor is sodium bicarbonate toxic in this form. However, the airborne particulate generated from the stripping operation can contain toxic elements from the paint being removed. Because of the noise and dust produced (with or without water), a sodium bicarbonate stripping system should only be operated in an isolated area outdoors or indoors in an abrasive blast room.

The waste generated from use of a sodium bicarbonate stripping system in the wet form is a wet slurry consisting of sodium bicarbonate media, water, paint chips, and miscellaneous residues such as dirt and grease. In its dry form, waste generated includes nuisance dust, paint chips, and miscellaneous residues, such as dust and grease. Filtered water containing dissolved sodium bicarbonate may be treated at an industrial waste treatment plant. The solid waste may be suitable for a sanitary landfill. Verification of wastewater and solid treatment/disposal is required for each process. Wastewater and bicarbonate residue disposal requirements will depend on the toxicity of the coatings and pigments to be removed. The sodium bicarbonate media cannot be recycled. The paint chip and miscellaneous residue wastes may be considered a hazardous waste.

Alternative 3: Carbon Dioxide blasting Media

Description

No toxic or hazardous chemicals are introduced; however, most common blasting media become contaminated by mixing with the material being removed from the blasted surface. Solid carbon dioxide (CO2) blasting avoids the formation of contaminated media since the CO2 vaporizes shortly after impact, limiting waste disposal to the residue itself. CO2 pellets, being a uniform shape blasting medium, fall somewhere between the two main categories of pellet blasting, abrasive and impact blasting. Although the effectiveness of CO2 pellet blasting is similar to abrasive blasting, it does not affect the substrate; thus, it is technically not an abrasive operation. It can be used for cleaning, degreasing, some de-painting applications, surface preparation, and de-flashing (flashing is the excess material formed on the edges of molded parts).

The process begins with liquid CO2 stored under pressure. The liquid CO2 is fed to a palletizer, which converts the liquid into solid CO2 snow (dry ice flakes) and then compresses the dry ice flakes into pellets, typically at about -110 degrees F. The pellets are metered into a compressed air stream and applied to a surface by manual or automated cleaning equipment with specially designed blasting nozzles. The CO2 pellets are projected onto the target surface at high speed. As the dry ice pellets strike the surface, they induce an extreme difference in temperature (thermal shock) between the coating or contaminant and the underlying substrate, weakening the chemical and physical bonds between the surface materials and the substrate. Immediately after impact, the pellets begin to sublimate (vaporize directly from the solid phase to a gas), releasing CO2 gas at a very high velocity along the surface to be cleaned. The high velocity is due to the extreme density differences between the gas and solid phases. This kinetic energy dislodges the contaminants (coating systems, contaminants, flash, etc.), resulting in a clean surface. Variables which allow process optimization include the following: pellet density, mass flow, pellet velocity, and propellant stream temperature. Waste cleanup and disposal are minimized because only the coating or contaminant residue remains after blasting.

Alternative 4: Fluidized Bed paint Stripper

Description

The fluidized bed paint removal process has been evaluated as an alternative method to the chemical paint stripping and degreasing of metal parts. The fluidized bed paint stripper (FBPS) can be used for forged steel, but not aluminum or aluminum alloys. It is a potential replacement to caustic stripping of non-aluminum and non-heat-sensitive materials. Fluidized bed paint stripper is not a potential replacement for solvent stripping/degreasing of aluminum alloy materials.

The FBPS process removes paint or other organic coatings by heating the part to an elevated temperature above 650 degrees F to cause pyrolysis and decomposition of the organic portion of the paint. A granular material, aluminum oxide in most cases, is used as a heat transfer medium. Air passing through the bed keeps the media fluidized. Parts to be cleaned are lowered into the fluidized beds which quickly eats the part and its surface coatings paint, grease, oil etc.) to a temperature at which organic components of surface contamination and finishes pyrolyze into carbon oxides and other products of combustion. The thermal decomposition of paint produces gases and leaves some carbon-inorganic char on the part. Much of the char may be removed in the fluidized bed, but most parts require further cleaning before they can be repainted. The emissions from the process are combusted in an afterburner.
The FBPS typically consists of the following four components: 1) fluidized-bed furnace or retort, 2) fluidized-bed cooling system; 3) off-gas afterburner, and 4) low energy shot-blast unit.

The FBPS generates four waste streams (1) air exhaust from the afterburner and scrubber systems, (2) water discharge from the scrubber system, (3) dust collected in the cyclone

separator on the ventilation system between the fluidized bed and the afterburner, and (4) fluidized bed media.

Alternative 5: High and Medium Pressure water paint stripping processes

Description

High and medium pressure water systems blast surfaces with low-volume water streams at pressures ranging from 10,000 to 15,000 psi (medium pressure operations) to 25,000 to 55,000 psi (high pressure operations). The medium pressure systems may be augmented. For example, sodium bicarbonate may be added to the water stream, or environmentally compliant chemicals may be applied to painted surfaces prior to water blasting. High-pressure systems typically use pure water streams. With both medium and high-pressure water systems, specialized nozzles can be used to achieve effects ranging from a relatively gentle, layer-by-layer removal or organic paints to removal of metal flame spray and other tough, tightly adherent coatings. Water recycling systems can be sued with both medium and high-pressure water processes.

No material compatibility problems have been documented for use of high and medium pressure water processes to depart metallic surfaces. The use of specific chemicals to augment medium pressure water processes must be evaluated on a case-by-case basis.

Pollution Prevention Opportunity Assessment Module
Solid Waste

Waste Stream: Solid Waste

Operation: All Base Activities

Description

Solid waste is generated throughout the ORARNG and is disposed of at various landfills. A waste audit was performed by the Department of Environmental Quality for the State of Oregon and approximately 3.5 million pounds of solid waste were estimated as being generated in 1997.

Alternative 1: Modification of Purchasing Practices.

Description

Purchase products that are reusable and durable and that have reduced volume or weight.

1. Require suppliers to ship orders in reusable or returnable packaging, such as wooden pallets and polystyrene peanuts, so that those items can then be reused in the ORARNG packaging and shipping

operations.

2. Install hot-air dryers or cloth-towel rolls instead of using paper towels in restrooms.

Alternative 2: Staff Education

Description

Educate staff to use fewer materials:

1. Use central bulletin boards or computer bulletin boards for memos, reports, and announcements instead of making one copy for each staff member.

2. Use electronic mail.

3. Use double-sided copying.

Alternative 3: Donation of Sale of Usable Materials.

Description

Donate or sell usable materials:

1. Donate leftover and surplus food to a food bank.

2. Identify and donate old supplies to a charity or a school or offer them for sale to staff or to the general public.

Alternative 4: Reduction of Yard Waste

Description

Reduce the amount of yard waste generated:

1. Recycle grass clipping by leaving them on the lawn and allowing them to decompose naturally.

2. Convert clippings, brush, and pruned branches to yard mulch.

Alternative 5:

Description

Reduce the amount of solid waste disposed of:

1. Recycle waste paper by locating recycling bins at copy machines and other locations. Equip each office with a separate container for disposing of waste paper.

2. Recycle aluminum soft drink cans by locating recycling bins in kitchens, lunchrooms, break rooms, and other areas where soft drink machines and refrigerators are located. Provide manual can compactor to reduce volume of waste and quantity of cans that can be stored in the recycling bin.

Alternative 6:

Description

Reduce the amount of solid waste disposed of by segregating the following from the trash for curbside pickup:

1. Newspapers
2. Aluminum Cans
3. Ferrous Cans
4. Glass

Alternative 7: Mixed-Waste Recycling

Description

Mixed-waste or back-end recycling relies on separating recyclable from a mixed-waste stream at a centralized processing facility on the installation or off the installation if recycling is mandatory in the local community. Glass, plastic, aluminum cans, and ferrous cans can be removed from the mixed-waste stream and recycled. Organic materials (food, yard waste, etc.) can be composted. Other remaining wastes can be disposed of in a landfill or incinerated.

Pollution Prevention Opportunity Assessment Module
Used Antifreeze From Vehicle Repair and Maintenance

Waste Stream: Used Antifreeze

Operation: Vehicle Repair and Maintenance

Description

Used antifreeze is generated during repair and maintenance of gasoline and diesel engines. Antifreeze becomes a waste when it no longer meets the specifications required to perform its intended purpose (temperature and corrosion protection). Disposal and replacement are rarely based on performance; instead, they are based on e ngine running time or mileage.

Although antifreeze is not by itself regulated as a hazardous waste, contaminants, such as heavy metals, can make it hazardous.

Alternative 1: Antifreeze Testing (to extend life)

Description

Antifreeze properties that typically would be tested include specific gravity, freezing point, boiling point, pH, general corrosivity, aluminum corrosivity, and foaming. The American Society for Testing and Materials (ASTM) has established standard specifications for properties of antifreeze for automobile and light-duty engines and for heavy-duty engines. The standards and the ASTM test methods used to determine them are shown in Table 1.

Antifreeze testing can be applied through several types of programs. For large engines, such as power generators, when the appropriate laboratory facilities are available, it may be cost-effective to test antifreeze on an engine-by-engine basis. At regular intervals, samples would be collected and tested. Antifreeze not meeting specifications would be replaced, and the used antifreeze would be recycled or disposed of.

A less-extensive program would involve testing antifreeze samples from representative vehicles in a motor pool to establish an average antifreeze life for each vehicle class. On the basis of test results, a schedule for changing the antifreeze of all vehicles in that class would be implemented.

A third type of program would involve changing antifreeze on a regular basis and consolidating and testing the used antifreeze from number of vehicles. Test results would govern whether the antifreeze would be reused, recycled, or disposed of.

Alternative 2: Onboard Recycling

Description

Onboard recycling involves the use of filter systems that are installed on the engine. Antifreeze traveling through the engine cooling system is filtered to remove contaminants that adversely affect its properties. Onboard filtration systems can be either full-flow or bypass. Supplemental coolant additives can be added on a regular basis to replace corrosion and foam inhibitors.

Onboard filtration is particularly effective and often is necessary for long-running heavy-duty gasoline and diesel engines that need antifreeze to be maintained in prime condition to protect expensive components and reduce maintenance cost and vehicle downtime. This technology has been used in this application for more than 25 years. Most engines are not factory-equipped with onboard filters; typically, the filters are installed by the owner. Recommended coolant life and be as long as 240,000 engine miles when onboard recycling is used, compared with 36,000 to 40,000 miles when it is not. Onboard filtration has not been used much on automobiles and light trucks because it is not cost-effective. For small engines, off-board recycling technologies appear to be more useful.

Alternative 3: Antifreeze Recycling

Description

Off-specification antifreeze often can be restored through simple physical processes that remove contaminants and through replacement of chemical additives. Specific recycling methods that are seeing relatively widespread use include:

- standard particle filtration
- ultrafiltration
- distillation

In standard particle filtration, multistage filters in the 5- to 25-micron range are used to remove solids, such as dirt, rust, and suspended metals, that can act as abrasives and cause engine wear. This can be followed up with ion exchange, which removes dissolved metals that cause corrosion, or with aeration/filtration, which removes oils that can affect the freezing and boiling point or increase foaming. Additives usually must be added to precipitate out metals, reduce foam, and restore color. Virgin antifreeze can be added to lower the freezing point.

Several type of standard filtration systems are available in the automotive repair industry. Large stationary fleet-sized treatment units operate in 50- to 100-gal batches. The units can be set up to draw used antifreeze from a feed drum or a small tank, treat it, and discharge the recycled product to a second container. Portable units are available that can be hooked up directly to a vehicle's radiator. With all of these filtration units, filter elements must be replaced regularly and often have to be disposed of as a hazardous waste.

Another type of filtration system for antifreeze recently has been developed at the request of the U. S. Air Force. This relatively simple system uses rolls of household paper towels as elements and can remove particles smaller than 1 micron. The filters can be mounted on a portable skid or trailer and used throughout a maintenance facility to recycle antifreeze that has been collected in containers, or the filters can be attached directly to the engine to provide continuous filtration during engine use.

Ultrafiltration uses a multistage filtration process where the initial filter typically is in the 5-micron range and the final filter is in the 0.001-micron range.

Ultrafiltration is designed to remove molecular-size contaminants, such as sulfates and chlorides, which are the primary causes or corrosion.

There is an ultrafiltration unit that uses 5- and 0.0025-micron filters. This device is reportedly capable of restoring antifreeze to meet all applicable ASTM standards including corrosion. As with other antifreeze-recycling technologies that use filtration, additives and new antifreeze must be added to restore some properties.

Antifreeze distillation is a two-step process. In the first step, water is distilled under atmospheric pressure. In the second step, ethylene glycol is distilled under a vacuum. The two streams are condensed separately and collected in drums as processed ethylene glycol and distilled water. Dissolved and suspended solids and other contaminants remain in the process vessel and are disposed of. The recycled ethylene glycol then can be mixed with the proper amount of distilled water and additives and can be reused.

A batch-operated still, applicable for ruse in a maintenance garage, will operate in 15- to 20-gal batches. Each batch takes 10 to 15 hours to treat and generates 0.5 to 1 gal of still bottoms requiring disposal.

Pollution Prevention Opportunity Assessment Module
Used Oil Filters From Vehicle Maintenance

Waste Stream: Used Oil Filters

Operation: Vehicle Maintenance

Description

Used oil filters are generated during the regular maintenance of vehicles and equipment. DOD established the policy that dictates scheduled intervals. Normally, standard vehicles receive oil changes every 6 months or 6,000 miles. Special vehicles are serviced every 400 to 600 operating hours. Oil filters normally are changed as an integral part of the oil change. The Army Oil Analysis Program should be in place to reduce Time Dictated Oil Changes.

Federal regulations covering the disposal of used oil filters are in 40 CFR 261. The regulations require that used oil filters be tested for toxicity characteristics and disposed of accordingly. However, an exemption from testing is provided for non-tin-lead alloy plated used filters that are drained in any of the following ways:

- puncturing the filter and hot-draining for 12 hours
- hot-draining for 12 hours and crushing
- dismantling and draining for 12 hours
- using an equivalent oil-draining method that removes used oil

Alternative 1: Crush filters to reduce volume.

Description

Used filters are drained of as much oil or fuel as possible and then are crushed and disposed of in 55-gallon drums. This can be accomplished in a specially designed filter crusher. Filter draining and crushing is done for several reasons. First, it separates the liquid oil waste from the solid filter to the greatest extent possible. Second, it compacts the filter and allows more filters to be recycled in each drum, thereby reducing the number of drums and pounds for disposal.

Alternative 2: Recycle off the site.

Description

Recycling vendors for oil filters operate in many parts of the country. They process spent filters by shredding them and then separating the paper element from the metal casing. The metal casing is recycled as scrap metal, and the paper is disposed of or burned as a fuel.

Alternative 3: Separate filter elements and recycle metal.

Description

Oil filters can be cut open, and the paper element can be removed from the casing. The metal casing then can be drained and sold as scrap metal. There is an oil filter element cutter that, like a large can opener, cuts the bottom off the filter casing so that the element can be removed.

Pollution Prevention Opportunity Assessment Module
Used Oil From Vehicle Maintenance

Waste Stream: Used Oil

Operation: Vehicle Maintenance

Description

Waste included under this general clarification are lubricating and hydraulic fluids generated from servicing vehicles and other equipment. The major source of waste oil is the used motor oil generated by regular engine oil changes performed at motor pools. Oil changes routinely are performed on a set schedule as determined by Army policy. Standard vehicles receive oil changes every 6 months or 6,000 miles. Special vehicles are serviced every 400 to 600 operating hours. A single oil change can generate anywhere from 6 quarts for a gasoline engine in a typical automobile to 33 gallons for a 12-cylinder diesel engine.

Alternative 1: Motor Oil Testing (to extend life)

Description

Generation of used oil can be reduced by extending the time between oil changes. The current oil change standards are based on service-wide policy. However, the performance characteristics and life of motor oil varies, depending on the conditions under which the equipment is operated.

In an oil analysis program, oil samples are collected at a set interval and are submitted to a field laboratory for analysis. Analyses include a spectrometric test for metals and physical tests for water content, viscosity, and other contaminants.

Alternative 2: On-Board Bypass Filtration

Description

Most internal-combustion engines are equipped with a full-flow oil-filtration system. In this type of system, all of the oil that lubricates the engine first passes through an oil filter. The filter must be quite porous for the oil to pass at the required flow rate, so the filter is designed to remove only relatively large particles (larger than 40 microns) that could seriously damage an engine. Other contaminants that could degrade the oil's protective properties, create sludge, and cause engine wear, such as metals, microscopic dirt and carbon particles, and water, pass through readily. A bypass filter system consisting of a much less porous element slowly filters a portion of the oil flow (usually less than 1/2 gpm compared with the 4 to 5 gpm that is typical for a full-flow oil filter). Oil is drawn from the bottom of a crankcase, passed through the bypass filter, and

returned to the crankcase. Some bypass filters remove not only solids to the submicron level but also moisture.

Oil analyses have shown that a properly serviced bypass oil filter system can maintain motor oil in a condition where it need not be replaced. These systems have been shown to prolong engine life. Bypass filtration appears to be particularly effective on expensive large engines.

One filter system uses inexpensive paper-towel rolls as filter elements. These filters remove particulate contaminants down to 1 micron and reduce moisture to less than 40 ppm. Filter changes are recommended at 5,000 to 10,000 miles.

Alternative 3: Burning in Space Heaters

Description

Specially designed space heaters are available that can burn used oil and similar waste streams, such as automatic-transmission fluid, with little or no pretreatment. The heat generated from burning the waste oil is used for space heating, saving on disposal costs and lowering heating-fuel costs.

A typical space heater that burns used oil can generate between 150,000 and 500,000 BTU/hour by burning form 1 to 3.6 gallons of oil per hour. The heaters generally are located in a vehicle maintenance facility where the oil is produced.

Federal regulations for burning used oil in space heaters are addressed in 40 CFR 279 Subpart C. On-Specification used oil generated on the site can be burned in space heaters without restriction. Off-specification used oil can be burned only if the oil is generated on the site, the heater has a maximum capacity of 500,000 BTU/hour, and combustion gases are vented to the ambient air. Hazardous oil cannot be burned in space heaters.

Alternative 4: Offsite Oil Redefining

Description

Rerefining involves processing used lubricating oil to return it to virgin oil specifications so that it can be reused as a motor oil. Rerefining involves elaborate and expensive processing and is therefore only feasible as an offsite recycling program, handled either through a broker or directly with a rerefining facility. Current rerefining techniques include filtration, heating, settling, flash dehydration, vacuum stripping, and vacuum distillation.

Pollution Prevention Opportunity Assessment Module
Vehicle and Aircraft Washing

Waste Stream: Wastewater

Operation: Washing Vehicles and/or Aircraft Painting

Description

Several ORARNG facilities provide facilities to wash vehicle and aircraft in designated areas. Washing aircraft helps to minimize drag and prevents corrosion that can result in costly repair. Washing vehicles prevents corrosion and mechanical damage resulting from both the added friction between mechanical parts caused by hardening grease and the rubbing of dirt particles on moving parts. Rinse water from the washing of vehicles and aircraft has been found to contain solvents, dirt, gravel, detergents, fuel, grease, hydraulic fluid, etc. This wastewater is directed into an oil/water separator, which removes many of the contaminants as an oily sludge, which is a hazardous waste. Oily sludge from the oil/water separator is transported offsite for disposal. The water is discharged to the sewer system.

Alternative 1: Implementation of management practices

Description

Management practices include maintaining hoses, couplings, and related parts to minimize contaminated rinse water; implementing solvent control practices so that solvents do not contaminate rinse water; and limiting vehicle and aircraft washing to when necessary.

Alternative 2: Recycling wash water using closed loop wash racks

Description

The closed loop wash rack allows complete recycling of wash water used for vehicle cleaning. Facilities installing closed loop wash racks will attain zero discharge, and therefore eliminate any possibility for NPDES violations.

A typical process flow consists of the mechanical equipment (trucks, cars, etc.) stopping over a wash pad collection pit. The wash water will go through three treatments units (alpha, beta, and omega) before being recycled for reuse.

The purpose of the alpha unit is to separate free oil and dirt from the wastewater. The beta unit removes fine dirt particles and remaining hydrocarbons in the effluent alpha. The omega unit stores the water in a holding tank and then transfers it for reuse. The omega unit consists of a corrosion-proof polyethylene tank 1/4 inch thick, a centrifugal

pump with surge tank and switch to draw reclaimed water from the holding tank from reuse by the pressure cleaner, a level control valve for maintaining proper recycled water level, an overload drain system and an ozone generator.

Pollution Prevention Opportunity Assessment Module
VOC Emissions From Painting

Waste Stream: Volatile Organic Compounds Emission

Operation: Painting

Description

Volatile organic compounds (VOCs) are used during painting operations and are emitted to the air. Most painting on ORARNG installations is performed by conventional liquid spray technologies. The paint is mixed with a carrier, usually an organic solvent, and is applied to the surface with an air-pressurized sprayer. One of the largest volumes of waste generated during painting is air emissions. During typical spray painting in a spray booth, 50 percent of the paint is deposited on the surface being painted, and the other 50 percent is sprayed into the air. As the paint dries, the solvent evaporates into the air.

USEPA regulates VOCs emitted from paint coating. Federal VOC limits for paint are 420 g/L for paints that cure below 90°C and 360 g/L for paints that cure above 90°C. Some state air-pollution control agencies are setting strict VOC content limits for paint. For example, the South Coast Air Quality Management District in California has set a 300 g/L VOC limit for general air-dried paints used for coating metal parts and products in fabricating and painting shops. Local regulatory agencies also control VOCs by setting total permissible discharge limits from facilities. The limits include paint sources and fugitive sources. The U.S. Environmental Protection Agency is required to develop limits for toxic air emissions. The limits probably will have an effect on both the types of solvents used in paint and those used in cleanup.

Alternative 1: Use painting methods that minimize solvent use.

Description

VOC emissions can be reduced by changing painting methods. Powder coating or electrostatic dry-powder painting are two methods that minimize solvent use. Dry powder is air-blown onto the equipment, and the equipment is cured in an oven to bond the paint to the substrate. Electrostatic dry-powder painting sprays ionized dry powder onto a surface that has the opposite charge. The major limitation in dry-powder painting is that the items to be painted must be able to withstand the typical curing temperature of 350°F for 30 minutes.

Alternative 2: Used paint formulations that minimize or eliminate solvent use.

Description

VOC emissions can be reduced by using high-solid or low-VOC coatings. The coatings contain about 50 to 95% solids. The coatings require special spray equipment for application because of their high viscosity. Surface preparation for reducing the presence of grease or oil is more critical because of less solvent in the paint. In addition, spray application can be wasteful because there is a tendency to apply too much coating to achieve a "wet" appearance similar to that obtained with normal solvent coatings.

Alternative 3: Use water-based paint when possible.

Description

Use water-based paint to eliminate the need for solvents and the resulting VOC emissions. Water-based paint uses a water-based solvent as the carrier. The disadvantages of water-based paint are that the surface must be free of oil and grease so that the paint will adhere, longer drying times are required, and the transfer efficiency may not be as high as for solvent-based paints.

Pollution Prevention Opportunity Assessment Module
Waste Solvents From Parts Cleaning

Waste Stream: Waste Solvents

Operation: Parts Cleaning

Description

Waste solvents are routinely generated at military facilities during parts cleaning. Parts cleaning typically takes place during maintenance of vehicles and heavy equipment. The waste stream generated during these activities includes liquid waste solvent and degreasing compounds containing unwanted film material, air emissions of volatile solvents, solvent-contaminated wastewater, and solid waste consisting of oil, grease, soil particles, and other film material. There are three common solvent cleaning methods: cold cleaning, vapor degreasing, and precision cleaning. During cold cleaning, the solvent is applied either by brush or by dipping the items in a solvent dip tank. Vapor degreasing uses steam coils for heating the solvent to produce a vapor, and the item to be cleaned is inserted into the vapor region, where the solvent condenses, removes dirt and grease, and drips back into the tank. Precision cleaning flushes the article being cleaned with a solvent.

Alternative 1: Onsite Recycling Using distillation

Description

Distillation is a recycling method for spent solvents that involves boiling and recovering the solvent. A small amount of sludge remains. The sludge is the dirt and grease from the cleaning process. Distillation reduces the need for offsite transportation and manifesting. Distillation units come in various sizes and types. Small batch-style units would be appropriate for facilities with low solvent usage. Larger units are available that could be centrally located to service several users.

The advantage of on-site distillation is that the facility controls its own hazardous waste. Sending solvents off the site is expensive and requires manifesting of the waste. The disadvantages are that distillation requires labor, energy, cooling water, and maintenance. Solvents that are to be recovered by distillation must be segregated.

Prevention Type: Recycling

Estimated Reduction:	Technical Evaluation:	Investment Cost: Capital Project Costs:	Annual Savings:	Payback Period: (capital project costs/expected annual savings)

Alternative 2: Off-Facility Recycling

Description

Companies exist that provide the equipment and solvent for parts cleaning. The equipment is rented, and the company is contracted to pick up the spent solvent, supply fresh solvent, and recycle the spent material. The spent material will require a manifest. These units typically are dip tanks.

The advantage of this alternative is that the user does not have to dispose of waste solvents. The disadvantage is that the alternative is subject to the availability of local recyclers, is more expensive than having an in-house unit, is less convenient, and has the added liability of having an outside entity responsible for handling the installation's hazardous waste.

Prevention Type: Offsite Recycling

Estimated Reduction:	Technical Evaluation:	Investment Cost: Capital Project Costs:	Annual Savings:	Payback Period: (capital project costs/expected annual savings)

Alternative 3: Water-Based Cleaners

Description

Aqueous and semiaqueous cleaners are available that may be substituted for solvents. The cleaners can be alkaline or acidic or alcohol-based. The advantage of water-based cleaners is that solvent use can be eliminated. Eliminating solvents will reduce environmental liability and reporting and documentation requirements. The

disadvantages are that the effectiveness of water-based cleaners for a specific task will have to be measured. Water-based cleaning may not be acceptable for all materials or processes. Another disadvantage is that aqueous cleaning still can produce a significant volume of waste that has to be managed and may be classified as hazardous waste because of its contents or pH.

Prevention Type: Product Substitution

Estimated Reduction:	Technical Evaluation:	Investment Cost: Capital Project Costs:	Annual Savings:	Payback Period: (capital project costs/expected annual savings)

Chapter 6
Pollution Prevention Implementation Plan

1. Implementation

a. The following plan was developed to implement the pollution prevention options that have been determined to be feasible. Pollution Prevention projects are separated into three categories:

- Past Pollution Prevention Projects
- Current Pollution Prevention Projects
- Future Pollution Prevention Projects

Current and future pollution prevention projects are summarized in Table 5-1.

The installation should demonstrate management commitment to P2 by giving the dollars spent on P2 and P2 activities in the past and projected expenditures for the future.

In this section, discuss how P2 success has been measured in past efforts and how it will be measured in the future. Note that units of measurement should take into account production levels so that P2 is not accomplished simply by reducing the workload.

In this section identify barriers expected. Barriers include institutional (mission priorities, MILSPECS), financial, technical, and regulatory. Identify how the installation will find ways to reduce the effect of the barriers during implementation of P2. The following procedures can be tried to overcome the barriers.

2. Institutional Barriers

a. Institutional barriers can be overcome by raising the environmental awareness of the troops, civilian employees, contractors, and tenant organizations. Methods of accomplishing this include the following:

- Installation Commander's pollution prevention directives
- Pollution prevention news stories in post newspaper
- Outreach bulletins from environmental groups
- Pollution prevention training
- Clear definition of communication channels between groups

3. Financial Barriers

a. Financial barriers can be overcome by demonstrating that a pollution prevention project will result in a cost saving. Tools that may help in overcoming economic stumbling blocks include the following:

- Selecting projects with the greatest "bang for the buck"

- Using well-defined economic analyses. DOD has guidelines on economic analysis in DOD Initiative 7041 3, "Economic Analysis and Program Evaluation for Resource Management."
- Investigating alternative funding sources - IC's discretionary funds, recycling proceeds, O&M funds

4. Technical Barriers

Technical barriers can be overcome by attempting the following:

- Include installation's best technical expertise (personnel who operate the processes) during assessment, evaluation, planning, and implementation of P2 options.
- Include other expertise on the installation (civil engineering, logistics, design, maintenance).

5. Regulatory Barriers

a. Typical environmental regulations emphasize control, treatment, and end-of-pipe treatments. It may be difficult to break the thinking of doing only what is necessary to come into regulatory compliance. Try to be proactive and take a multimedia approach. Determine the regulatory effects on all media of implementing a P2 project

b. Note awards and incentives offered, both Army-wide (DOD P2 awards) and within the installation. Available awards include the following:

- ASA(FM) has an Army-wide hazardous waste reduction award program.
- Each installation is required to have an incentive award for encouraging and promoting maximum awareness of the installation's P2 program.
- The Secretary of Defense presents an annual award to the DOD installation that has achieved noteworthy improvements in environmental quality in the preceding 2 years. An individual award is given to the military or civilian employee who has made the most significant contribution to the environmental quality program during the preceding 2 years.
- The Secretary of the Army presents an environmental quality award to the individual and the installation that have shown the most noteworthy contributions toward protecting and preserving the quality of the environment during the preceding 2 years (see AR 200-1 for nominating procedures).

6. Past Pollution Prevention Projects

a. The status of past pollution prevention projects are discussed. Each project will be described to include location implemented, implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemical), actual waste, actual

implementation costs, actual savings, and funding sources. The following example is provided for guidance.

Project Title: Paint-Booth Conversion to Dry filtration
Description: Paint-booth scrubber sludge was eliminated through installation of dry filters. Filters are replaced on a _____ month interval.
Location: Paint booths in Motor Pool _____, Building _____
Implementation Date: December 10, 1993
Targeted Waste Type(s): Hazardous Wastes, Waste Solvents
Waste Reduction: 19,000 lbs/year
Implementation Costs: Parts and Labor: $9,500
Savings: Elimination of the waste stream has saved the installation $6,000 per year in reduced waste disposal cost.
Funding Source: O&M account

7. Current Pollution Prevention Projects

a. The status of currently funded pollution prevention projects are discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated savings, and funding sources. The following example is provided for guidance.

Project Title: Antifreeze Recycling

Description: Used antifreeze from nontactical vehicles is disposed of as a waste, sometimes as a characteristic hazardous waste. Planned equipment is a used-antifreeze filtration system, which will allow used antifreeze to be filtered and returned to the vehicle.
Location: Motor Pool _____, Building _____
Implementation Date: CY 1994
Targeted Waste Type(s): Hazardous Wastes, Solid Wastes
Waste Reduction: 5,000 lbs/year
Implementation Costs: $7,200
Savings: Elimination of the waste stream has saved the installation $1,000 per year in reduced costs of waste-antifreeze disposal and drum and drum handling.
Funding Source: O&M account

8. Future Pollution Prevention Projects

a. The status of proposed pollution prevention projects is discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs,, estimated savings, and funding sources. The following example is proceeded for guidance.

Project Title: Cardboard Balers
Description: The installation will be able to recycle corrugated cardboard currently disposed of in an off-base landfill. The corrugated cardboard will be collected by Recycling Program employees, baled at the recycling center, and sold.
Location: Recycling Center
Implementation Date: CY 1995
Targeted Waste Type(s): Solid Wastes
Waste Reduction: 400,000 lbs/year
Implementation Costs: $99,000
Savings: Waste Reduction - $10,000/year
Cardboard Sales- $20,000/year
Total Savings- $30,000/year
Funding Source: Capital account
EPR Status: Submitted

Chapter 7
Annual Pollution Prevention Reporting

1. Reports

a. To assess progress in achieving the installation's pollution prevention goals, the following reports will be generated annually and are in this P2 plan:

- Annual Hazardous Waste Generation Report (Table 6-1)
- Annual EPA Toxic 17 Waste Generation Report (Table 6-2)
- Annual Solid Waste Generation Report (Table 6-3)
- Annual Ozone-Depleting Chemicals (ODCs) Usage Report (Table 6-4)
- Annual Toxics Release Inventory Emissions Report (Table 6-5)
- Annual Pollution Prevention Goals Achievement Report (Table 6-6)

In addition, the following report will be prepared and disseminated to identify the costs of hazardous waste disposal.

- Annual Hazardous Waste Cost Allocation Report (Table 6-7)

The goal of the ORARNG is to charge individual operations for the costs of managing and disposing of their hazardous wastes.

Table 6-1
199_ ANNUAL HAZARDOUS WASTE GENERATION AT INSTALLATION-XXX

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
1. Solvent Wastes							
2. Acids & Bases							
3. Wastewater Treatment Sludges							
4. Fuels							
5.							

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
6.							
7.							
8.							
9.							
10.							
TOTAL			100%				

Table 6-2
199_ ANNUAL EPA TOXIC 17 WASTE GENERATION AT INSTALLATION-XXX

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
1. Benzene							
2. Cadmium & compounds							
3. Carbon Tetrachloride							
4. Chloroform							
5. Chromium & compounds							

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
6. Cyanides							
7. Dichloromethane							
8. Lead & compounds							
9. Mercury & compounds							
10. Methyl Ethyl Ketone							
11. Methyl Isobutyl Ketone							

Waste Type	Waste Code(s)	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
12. Nickel & compounds							
13 Tetrachloroethylene							
14. Toluene							
15. Trichloroethane							
16. Trichloroethylene							
17. Xylene							
TOTAL			100%				

Table 6-3
199_SOLID WASTE GENERATION AT INSTALLATION-XXX

Waste Type	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
1. Aluminum Cans						
2. Corrugated Cardboard						
3. Office Paper						
4. Newspaper						
5. Glass						

Waste Type	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
6. Ferrous Cans						
7. Plastic (PET soft drink bottles, HDPE milk jugs, etc.)						
8. Yard Waste						
9. Unclassified Waste						
10. Engine Oils						
11. Engine Coolants						

Waste Type	Waste (lbs)	% of Total Waste	Generator Unit/Shop	Process or Operation Generating Waste	Weight by Shop (lbs)	% of Waste Type
12.						
13.						
14.						
15.						
16.						
TOTAL		100%				

Table 6-4
199_USAGE OF OZONE DEPLETING CHEMICALS (ODCS) AT INSTALLATION-XXX

ODC Type	Usage (lbs)	% of Total Use	ODC Compound	User/Shop	Process or Operation Using ODC	Usage by Shop (lbs)	% of Type Usage
1. Freons							
2. Halons							
3. Cleaning Solvents							
4. Paint Strippers							
5.							

ODC Type	Usage (lbs)	% of Total Use	ODC Compound	User/Shop	Process or Operation Using ODC	Usage by Shop (lbs)	% of Type Usage
6.							
7.							
8.							
9.							
10.							
TOTAL		100%					

Table 6-5
199_ ANNUAL TOXICS RELEASE INVENTORY (TRI) EMISSIONS FOR INSTALLATION-XXX

TRI Chemical	Code	Release (lbs)	% of Total Release	Generator Unit/Shop	Process or Operation Emitting	Weight by Shop (lbs)	% of TRI Chemical
1.							
2.							
3.							
4.							
5.							

ODC Type	Usage (lbs)	% of Total Use	ODC Compound	User/Shop	Process or Operation Using ODC	Usage by Shop (lbs)	% of Type Usage
6.							
7.							
8.							
9.							
10.							
TOTAL			100%				

BY ORDER OF THE GOVERNOR:

OFFICIAL:

ALEXANDER H. BURGIN
Major General
The Adjutant General

DOUGLAS A. PRITT
COL, GS
Chief of Staff

DISTRIBUTION:
A (Army)

Appendix A
Abbreviations

AR	Army Regulation
CAAA90	Clean Air Act Amendment of 1990
COE	Corps of Engineers
DA	Department of the Army
DEH	Director of Engineering and Housing
DFE	Director of Facility Engineering
DIO	Director of Industrial Operations
DLA	Defense Logistics Agency
DOD	Department of Defense
DRMO	Defense Reutilization and Marketing Office
EO	Executive Order
EQCC	Environmental Quality Control Committee
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act of 1986
FAO	Finance and Accounting Office
FOA	Field Operating Agency
FE	Facility Engineer
GMP	Good Management Practice
GOCO	Government-Owned, Contractor-Operated
HMIS	Hazardous Material Information System
HWM	Hazardous Waste Management
IHWM	Installation Hazardous Waste Manager
IC	Installation Commander
ISCP	Installation Spill Control Plan
MACOM	Major Army Command
MCA	Military Construction, Army
MEDDAC	Medical Department Activity
MWR	Moral, Welfare, and Recreation
O&M	Operation and Maintenance
PPAT	Pollution Prevention Assessment Team
POL	Petroleum, Oil, and Lubricants
PPOA	Pollution Prevention Opportunity Assessment
RCRA	Resource conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act of 1986
SCP	Spill Contingency Plan
SPCC Plan	Spill Prevention Control and Countermeasures Plan
TRI	Toxics Release Inventory
TSCA	Toxic Substance Control Act
TSDF	Treatment, Storage or Disposal Facility
TSG	The Surgeon General
VOC	Volatile Organic Compound

Appendix B
Definitions

Appliance: Any device that contains and uses a Class I or Class II substance as a refrigerant and that is used for household or commercial purposes, including any air conditioner, refrigerator, chiller, or freezer.

Cartridge Filter: A discrete filter unit containing both filter paper and activated carbon that traps and removes contaminants from petroleum solvent, together with the piping and ductwork used in installing this device.

Characteristic Waste: The characteristics of ignitability, corrosivity, reactivity, and toxicity that identify hazardous waste.

Chemical Warfare Agent: A substance that because of its chemical properties is used in military operations to kill, seriously injure, or incapacitate humans or animals or deny use of indigenous resources.

Container: Any portable device in which a material is stored, transported, treated, disposed of, or otherwise handled.

Designated Facility: A hazardous waste treatment, storage, or disposal facility (TSDF) that is identified on a manifest as the destination of a hazardous waste shipment. The facility must have an appropriate permit, have interim status, or be regulated under specific recycling requirements.

Nonattainment Area: Any area designated as being in nonattainment with the National Ambient Air Quality Standard (NAAQS) for ozone pursuant to rulemaking under section 107(d)(4)(A)(ii) of the CAA.

Disposal: The discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or onto any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including groundwaters.

EPA Hazardous Waste Number: The number assigned by USEPA to each hazardous waste listed in 40 CFR 261, Subpart D, and to each characteristic identified in 40 CFR 261, Subpart C.

Facility: All contiguous land and structures, other appurtenances, and improvements of the land, used for treating, storing, or disposing of hazardous waste. A facility may consist of several treatment, storage, or disposal operational units (i.e., one or more landfills, surface impoundments, or combination of them).

Federally Enforceable: All limitations and conditions enforceable by the Administration, including those requirements developed pursuant to 40 CFR, requirements within any applicable state implementation plan, and any permit requirements established pursuant to 40 CFR.

Generator: Any person or group whose act or process produces hazardous waste identified or listed in 40 CFR 261 or whose act first causes a hazardous waste to become subject to regulations.

Good Management Practice (GMP): A practice that, although not mandated by law, is encouraged to promote safe operating procedures.

Hazardous Waste: A solid waste, not specifically excluded from the restrictions of Federal regulation (42 USC 6901), that meets the criteria listed in 40 CFR 261 or is specifically named as a hazardous waste in Federal regulations.

Household Waste: Includes material discarded by single and multiple residential dwellings, hotels, motels, and other similar permanent or temporary housing.

Incinerator: Any furnace used in the process of burning solid waste for the purpose of reducing the volume of the waste by removing combustible matter.

Infectious Waste: 1. Equipment, instruments, utensils, and fomites of a disposable nature from the rooms of patients who are suspected to have or have been diagnosed as having a communicable disease and who must therefore be isolated as required by public health agencies. 2. Laboratory waste, such as pathological specimens and disposable fomites (any substance that may harbor or transmit pathological organism). 3. Surgical operating room pathological specimens and disposable fomites attendant thereto and similar disposable materials from outpatient areas and emergency rooms.

Landfill: A disposal facility or a part of a facility where waste is placed in or on land and that is not a land treatment facility, a surface impoundment, an underground injection well, a salt bed formation, an underground mine, or a cave.

Hazardous Waste Management: The systematic control of the collection, source separation, storage, transportation, processing, treatment, recovery, and disposal of hazardous waste.

Material-Tracking System: Each generator developing an in-house system to ensure that all hazardous materials and wastes are controlled from purchase to release or disposal in order to reduce loss and spillage.

Medical Waste: When defined as applicable to municipal waste combustors, any solid waste generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in production or testing of biological agents. Medical waste does not include hazardous waste identified under RCRA-C or any household waste as defined in RCRA, subpart C.

Off-Specification Used Oil: Used oil burned for energy recovery and any fuel produced from used oil that exceeds the following allowable limits:

Arsenic	5 ppm max.
Cadmium	2 ppm max.
Chromium	10 ppm max.
Lead	100 ppm max.
Flash Point	100 °F min.
Total halogens	4000 ppm max.

Particulate Emissions: Any airborne finely divided solid or liquid material, except uncombined water, emitted to the ambient air.

Pollution Prevention: Source reduction and other practices that reduce or eliminate the creation of pollutants through increased efficiency in the use of raw materials, energy, water, or other resources, or protection of natural resources by conservation. Recycling, energy, treatment, and disposal are not included in the definition of pollution prevention. However, some practices commonly described as "in-process recycling" may qualify as pollution prevention. Examples might include solvent recycling, metal recovery from a spent plating bath, and recovery of volatile organic compounds (VOCs).

Qualifying Recycling Program: Organized operations that require concerted efforts to (a) divert or recover scrap or waste from waste streams; (b) identify, segregate, and maintain the integrity of the recyclable materials to maintain or enhance the marketability of the material.

Recyclable Material: Material that normally has been or would be discarded (such as scraps and waste) and material that may be reused after undergoing some type of physical or chemical processing. Recyclable materials may include discarded materials that have undergone demilitarization or mutilation at an installation before being transferred to the property disposal office for sale. Recyclable materials do not include (1) precious-metal-bearing scrap; (2) those items that may be used again for their original purpose or functions without any special processing, such as used vehicles, vehicle or machine parts, bottles (not scrap glass), electrical components, and unopened containers of unused oil or solvent.

Recycling: The process by which recovered materials are transformed into new or usable products.

Resource Recovery Facility: Any physical plant that processes residential, commercial, or institutional sold waste biologically, chemically, or physically and recovers useful products (such as shredded fuel, combustible oil or gas, steam, metal, or glass) for resale or reuse.

Sludge: Any solid, semisolid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility exclusive of the treated effluent from a wastewater treatment plant.

Source Reduction: Any practice that reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or emitted to the environment (including fugitive emissions) before recycling, treatment, or disposal. The term includes equipment or technology modifications, process or procedure modifications, reformulation or redesign of products,

substitution or raw materials, and improvements in housekeeping, maintenance, training, and inventory control.

Source Separation: The setting aside of recyclable materials at their points of generation by the generator.

Sump: Any pit or reservoir that meets the definition of tank and the troughs or trenches connected to it that serve to collect hazardous waste for transport to hazardous waste TSDFs, except that as used in the landfill, surface impoundment, and waste pile rules, "sump" means any lined pit or reservoir that serves to collect liquids drained from a collection and removal system or a leak-detection system for subsequent removal from the system.

Treatability Study: A study in which a hazardous waste is subjected to a treatment process to determine one or more of the following:

- Whether the waste is amenable to the treatment process
- What pretreatment, if any, is required
- The optimal process conditions needed to achieve the desired treatment
- The efficiency of a treatment process for a specific waste or wastes
- The characteristics and volumes of residuals from a particular treatment process

Treatment: Any method, technique, or process (including neutralization) designed to change the physical, chemical, or biological character or composition of any hazardous waste.

Used Oil: Any oil that has been refined from crude oil or any synthetic oil that has been used and as a result of such is contaminated by physical or chemical impurities.

Volatile Organic compound (VOC): Any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides, carbonates, and ammonium carbonate, that participates in atmospheric photochemical reactions.

Appendix C
References/Pollution Prevention Opportunity Assessments

ENVIRONMENTAL PROTECTION AGENCY GUIDANCE

General Guidance

Waste Minimization Opportunity Assessment manual, EPA/625/7-88/003, 1988.
Facility Pollution Prevention Guide, EPA/600/R-92/088, 1992.
Pollution Prevention in the Federal Government: Guide for Developing Pollution Prevention Strategies for Executive Order 12856 and Beyond, EPA/300/B-94/007, 1994.
Pollution Prevention and Right-to-Know in the Government: Executive Order 12856, EPA/100/K-93/001, 1993.
Setting Priorities for Hazardous Waste Minimization, EPA/530/R-94/015, 1994.
A Primer for Financial Analysis of Pollution Prevention Projects, EPA/600/R-93/059, 1993.
Pollution Prevention Act of 1990, Public Law 101-508, 1990.

Industry-Specific Guidance

These guides list source-reduction and recycling techniques for specific industries. The guides have been published by the Pollution Prevention Research Branch of EPA's Office of Research and Development as a series of industry-specific pollution prevention guidance manuals.

Industrial Category	EPA Document No.	Date
Automotive Refinishing Industry	*EPA/625/7-91/016*	*10/91*
Auto Repair Industry	*EPA/625/7-91/013*	*10/91*
Fiberglass Reinforced and Composite Plastics	*EPA/625/7-91/014*	*1991*
Mechanical Equipment Repair Industry	*EPA/625/R-92/008*	*1992*
Metal Finishing Industry	*EPA/625/R-92/011*	*1992*

Fact Sheets

The following fact sheets contain overviews, tips, or guidelines for pollution prevention. some provide only general information or advice on how to set up programs; others identify pollution prevention opportunities for specific industries, processes, or materials. EPA, state agencies, and local governments produced the fact sheets. In many cases, multiple sources have published fact sheets on particular topics. Fact sheets on the topic areas below are available from the EPA library, 401 M Street, SW, Washington DC 20460 (202/260-1963). The source of this information is *Pollution Prevention Resources and Training Opportunities in 1992,* EPA, Office of Pollution Prevention and Toxics and Office of Environmental Engineering and Technology Demonstration, EPA/5650/8-92-002, January 1992.

FACT SHEETS

General and Introductory Information

Conservation Tips for Business
General Guidelines
Getting More Use Out of What We Have
Glossary of Waste Reduction Terms
Guides to Pollution Prevention
Hazardous Waste Minimization
How Business Organizations Can Help
Local Governments and Pollution Prevention
Pollution Prevention (General)
Pollution Prevention Fees
Pollution Prevention Training and Education
Pollution Prevention Through Waste Reduction
Recent Publications
Reduce Hazardous Waste
Reuse Strategies for Local Government
Source Reduction Techniques for Local Government
U.S. EPA's Pollution Prevention Program
Waste Exchanges: Everybody Wins!
Waste Exchange Services
Waste Minimization Fact Sheet
Waste Minimization in the Workplace
Waste Reduction Can Work For You
Waste Reduction Overview
Waste Reduction/Pollution Prevention: Getting Started
Waste Reduction Tips for All Businesses
Waste Source Reduction
Waste Source Reduction Checklist
What is Pollution Prevention?
Why Reduce Waste?

Legislative Information/EPA and State Initiatives

EPA's 2% Set Aside Pollution Prevention Projects
EPA's "List of Lists" Projects
EPA's Pollution Prevention Enforcement Settlement Policy
EPA's Pollution Prevention Incentives for States
EPA's Pollution Prevention Strategy
New Form R Reporting Requirements
Oregon's Toxic Use Reduction Act
Pollution Prevention Act of 1990

Setting Up A Program

1991 Small Business Pollution Prevention Grants
An Organization Strategy for Pollution Prevention
Considerations in Selecting a Still for Onsite Recycling
Pollution Prevention Grant Program Summaries and Reports
Procuring Recycled Products
Recycling Market Development Program
Selecting a Supplier, Hauler, and Materials Broker
Solid Waste Management Financial Assistance Program
Source Reduction at Your Facility
Starting Your Own Waste Reduction Program
The Alexander Motor's Success Story
The Eastside Plating Success Story
The Wacker Payoff
Waste Reduction Checklists
- *General*
- *Cleaning*
- *Coating/Painting*
- *Formulating*
- *Machining*
- *Operating Procedures*
- *Plating/Metal Finishing*

Waste Source Reduction: Implementing a Program

Process/Material Specific

Aerosol Containers
Aircraft Rinsewater Disposal
Acids/Bases
Chemigation Practices to Prevent Groundwater Contamination
Corrugated Cardboard Waste Reduction
Demolition
Empty Containers
Gunwasher Maintenance
Lead Acid Batteries
Machine Coolants:
- *Prolonging Coolant Life*
- *Waste Reduction*

Metal Recovery:
- *Dragout Reduction*
- *Ion Exchange/Electrolytic Recovery*
- *Etchant Substitution*

Old Paints, Inks, Residuals, and Related Materials
Pesticides:
- *Disposal of Unused Pesticides, Tank Mixes, and Rinsewater*

In-Filled Sprayer Rinse System to Reduce Pesticide Wastes
Pesticide Container Disposal
Preventing Pesticide Pollution of Surface and Groundwater
Preventing Well Contamination by Pesticides
Protecting Mountain Springs from Pesticide contamination
Reducing and Saving Money Using Integrated Pest Management

Metals Recycling
Office Paper Waste Reduction
Plastics:

The Facts About Production, Use, and Disposal
The Facts on Degradable Plastics
The Facts on Recycling Plastics
The Facts on Source Reduction

Printing Equipment
Refrigerant Reclamation Equipment/Services
Reverse Osmosis
Safety Kleen, Inc. Users
Shop Rags from Printers
Small Silver Recovery Units
Solvents:

Alternatives to CFC-113 Used in the Cleaning of Electronic Circuit Boards
Onsite Solvent Reclamation
Reducing Shingle Waste at a Manufacturing Facility
Reducing Solvent Emissions from Vapor Degreasers
Small Solvent Recovery Systems
Solvent Loss Control
Solvent Management: Fiber Production Plant
Solvent Reuse: Technical Institute
Trichloroethylene and Stoddard Solvent Reduction Alternatives
Solvent Recovery: Fiber Production Plant
Solvent Reduction in Metal Parts Cleaning

Ultrafiltration
Used Containers: Management
Used Oil Recycling
Waste Management Guidance for Oil Cleanup
Water and Chemical Reduction for Cooling Towers
Waste Water Treatment Opportunities

<u>Industry-Specific</u>

Auto Body Shops
Automotive Painting
Automotive/Vehicle repair Shops
Asbestos Handling, Transport, and Disposal
Machine Toolers
Metal Finishers:

General
Effluent Minimization
Rinsewater Reduction

U.S. ARMY GUIDANCE

General Assistance

U.S. Army Construction Engineering Research Laboratory. P.O. Box 4005, Champaign, IL, 61820. 800-USA-CERL
U.S. Army Cold Regions Research and Engineering Laboratory (CERCL), Hanover, NH 03755-1290. 603-646-4200, DSN 684-4200
U.S. Army Environmental Hygiene Agency. Aberdeen Proving Ground, MD, 21010. (301) 671-
3651 or DSN 584-3651.
U.S. Army Environmental Office. The Pentagon, Washington, DC, 20310-2600, (703) 693-5032 or DSN 223-5032.
U.S. Army Environmental Center (formerly the U.S. Army Toxic and Hazardous Materials Agency). Aberdeen Proving Ground, MD, 21010. 800-USA-EVHL, (301) 671-2427 or DSN 584-2427.
U.S. Army Environmental Policy Institute. Champaign, IL, 61820. (217) 373-3320.

Pollution Prevention

U.S. Army Environmental Center (formerly the U.S. Army Toxic and Hazardous Material Agency). Environmental Compliance Division. (301) 671-2427 or DSN 584-2427.

Recycling

U.S. Army Engineering and Housing Support Center (USAEHSC). Directorate of Public Works. (703) 704-1606/1601.
Defense Logistics Agency. Check local Defense Reutilization and Marketing Organization (DRMO) Fort Lewis WA.

Air Pollution

U.S. Army Environmental Hygiene Agency. Air Pollution Engineering Division. Air Pollution Source Management (301) 671-3500 or DSN 584-3500: or Ambient Air Quality Management (301) 671-3954 or DSN 584-3954.
U.S. Army Environmental Center. Environmental Compliance Division. (301) 671-2427 or DSN 584-2427.

CFCs and Halon

U.S. Army Environmental Office. The Pentagon, Washington, DC 20310-2600, (703) 693-5032 or DSN 223-5032.

U.S. Army Environmental Center. Environmental Compliance Division. (301) 671-2427 or DSN 584-2427.

Endangered Threatened Species, Natural Resources

U.S. Army Environmental Center. Natural and Cultural Resource Division (703) 355-7968 or DSN 345-7968.
U.S. Army Engineering Waterways Experiment Station (CEWES), Vicksburg, MS 39180-6199, (601) 634-2512, FTS 542-2513.

Hazardous and Toxic Waste and Material Management

U.S. Army Environmental Center. Environmental Compliance Division. (301) 671-2427 or DSN 584-2427.
U.S. Army Environmental Hygiene Agency. Waste Disposal Engineering Division. (301) 671-3651 or DSN 584-3651.
Environmental Protection Agency-RCRA/Superfund Hotline. (800) 424-9346.
Environmental Protection Agency-TSCA Hotline. (202) 554-1404.

Hazardous Waste Minimization

U.S. Army Environmental Center. Environmental Compliance Division. Army HAZMIN Program. (301) 671-2427 or DSN 584-2427
U.S. Army Environmental Hygiene Agency. Waste Disposal Engineering Division, (301) 671-3651 or DSN 584-3651.

Solid Waste Management

U.S. Army Environmental Hygiene Agency. Ground Water and Solid Waste Management. (301) 671-2024.
U.S. Army Environmental Center. Environmental Compliance Division. (301) 671-2427 or DSN 584-2427.

General Environmental/Pollution Prevention

National Defense Center for Environmental Excellence. 1415 Scalp Avenue, Johnstown, PA 15904. (814) 269-2432
Air Force Center for Environmental Excellence, Pollution Prevention Division, Brooks Air Force Base, TX 78235-5318. (210) 526-4214, DSN 240-4214.
Navy Energy and Environmental Support Agency (NEESA). Port Hueneme, CA (805) 982-4897.
Annapolis Detachment of the Carderock Division, Naval Surface Warfare Center, Environmental Protection Branch, Craig Alig, Director, (410) 267-3526, DSN 281-3526.

Publications

U.S. Army Environmental Strategy into the 21st Century, 1992.
U.S. Army Engineering and Housing Support Center, *Installation Recycling Guide,* 1991.
U.S. Army Environmental Hygiene Agency, *A Commander's Guide to Infectious Waste Management at Army Health Care Facilities*, 1990.
U.S. Army Environmental Hygiene Agency, *A Commander's Guide to Hazardous Waste Minimization at Army Health Care Facilities*, 1990.
U.S. Army Corps of Engineers, *A Commander's Guide to Environmental Management*, 1990.
U.S. Army Corps of Engineers, *Hazardous Waste Management Systems Study*, 1991.
U.S. Army Environmental Center, *The Environmental Update, published quarterly*.
Army Environmental Policy Institutes, *Army Pollution Prevention Plan Manual: A Guide for Army Installation*, 1993.
Environmental Health Engineering Directorate. *U.S. Army Center for Health Promotion and Preventive Medicine Pollution Prevention Opportunity Assessment Protocol,* 1994.

Pollution Prevention Opportunity Assessments

ELECTROPLATING AND METAL FINISHING

Electrodialysis for Anodizing Bath Solutions
Electoless Nickel Bath Life Extension
High Velocity OXY-Fuel Thermal Spray
Non-Cyanide Nickel Strippers
Surface Coating by Physical Vapor Deposition
Sulfuric/Boric Acid Anodizing

HAZARDOUS MATERIALS/WASTE MANAGEMENT

Hazardous Material Affirmative Procurement Policies/Procedures
Hazardous Material Shelf Life Management
Waste Analysis Plan
Hazardous Materials Shelf Life Optimization
Hazardous Waste Container Labeling, Storage, and Transportation
hazardous Material/Hazardous Waste Management
Printed Circuit Board Recycling
Recycling Photo/X-Ray Processing and Printing Wastes
Software to Evaluate the Profitability of Pollution Prevention Investments using the Method of "Total Cost Assessment"
Spill Prevention Techniques

OZONE DEPLETING SUBSTANCES

Numbering System for CFCs, HCFCs, and Halons
R-502 Alternative
Purchase Restrictions on CFC-containing Appliances
Aerosol Can Puncturing and Crushing
Non-chlorofluorocarbon Alternatives for Air Conditioning and Refrigeration

Alternatives to CFC-12 Tracer Gas for Leak Detection
Aerosol Cooling Spray Substitutes for CFC-12 and HCFC-22
Halon 1211 Replacements
Halon 1301 Replacements
Halon Redistribution/Recovery/Recycling/Reclamation
ODS-free Portable Hand-Held Fire Extinguishers
Refrigerant Tracking Software
Restrictions on the sue of Hydrofluorocarbons
Recovery/Recycling of CFC-12 and CFC-134a
ODS-free Corrosion Inhibitors/Moisture Displacers
ODS-free Cooling/Freezing Product
ODS-free Leak Detector for Fuel Cells
ODS-free Substitute for General Purpose Aerosol Lubricant
ODS-free Aircraft Components Cleaning – Overview
R-5000 series Refrigerants – Overview
Refrigerant Recovery/Recycling/Reclamation
U.S. EPA's Significant New Alternatives Program (SNAP)
ODS-free Drinking Fountains
ODS-free Non-flammable Contact Cement ODS-free Product Substitute for Adhesive EA 9446
ODS-free Computer Keyboard Duster Products
ODS-free Substitute for Ink Cleaner
ODS-free Liquid Carburetor Cleaner
ODS-free Tubeless Tire Repair Kit
ODS-free Lubricant/Anti-seizing Compound
ODS-free Degreasing/Cleaning
Motor Vehicle Air Conditioning Refrigerant Conversion from CFC 12 to HFC-134a
Motor Vehicle Air Conditioning Refrigerant Alternatives
ODS-free Sterilization
Ethylene Oxide Sterilizer Alarm Systems
ODS-free Skin Refrigerant
ODS-free Substitute for Insulating foam
Fire Stop Setting Compounds

PAINTING

Dry Filter Paint Booth
Electrostatic Paint spray System
High Transfer Efficiency Paint Spray Systems
Plural Component Proportioning System for Epoxy Paints
Powder Coating Painting System
Unicoat Paint Technology
Waterborne Paint

DEPAINTING

Automatic Paint Gun Washer
Paint Stripping using Sodium Bicarbonate Medium
Carbon Dioxide Blasting Operations

Fluidized Bed Paint Stripper
High and Medium Pressure Water Paint Stripping Processes
Plastic Media Blasting (PMB) Paint Stripping
Degreasing and Paint Stripping using Sponge Blasting
Paint Stripping using Wheat Starch Blasting

PETROLEUM, OIL, AND LUBRICANTS

Used Oil Segregation and Storage
On-Site Recycling of Used Oil
Off-Site Recycling of Petroleum Base Hydraulic Fluid
Off-site Heat Recovery of Waste POL
Substituting Synthetic Oil for Conventional Oil
Permanent Filter for Vehicle Motor Oil
Bypass Filter for Vehicle Motor Oil
Oil Filter Crushing
Lubricant Analysis Programs
Substitute Lubricants (Non-Lead, Non-Ozone Depleting Substances)
Extension of Metal Working Fluid Service Life
Semi-synthetic and Synthetic Coolant Substitution
Antifreeze Recycling (On-site and Off-site)
Substitution and Recycling of Aircraft Deicing Products

SOLID WASTE MANAGEMENT

Corrugated Cardboard
Aluminum Cans
Steel Cans
Glass
Metal and Plastic Drums
Fluorescent Light Tubes and High Intensity Discharge Lamps
Diapers
Clothing and Household Items
Food Waste
Construction and Demolition Waste
Collection Containers
Recycling Trailers
Balers
Aerosol Can Puncturing and Crushing
Glass Pulverizers
Metal Drum Crushers
Concrete/Asphalt Crushers
Backyard and Small Scale Composting
Windrow Composting
Aerated Static Pile Composting
In-Vessel Composting
Vermicomposting
Tub Grinders

Paper Shredders
Trommel Screens
Compost Mixers
Front-end Loader
Windrow Turners

SOLVENT ALTERNATIVES

Cleaning and Degreasing
Paint Removal
Rust, Corrosion, and Heat Scale Removal
Carbon and Carbonaceous Deposit Removal
General Metal Cleaning
Emulsifier for cleaning bilges
Electronic and Electrical Equipment Cleaning
Fiberglass Surface Preparation and Epoxy Resin Cleaning
Surface Preparation – Welding and Painting
General Surface Preparation
Paint Removal and Painting Clean up
Rust Stain Removal
Flight Deck Cleaner
Corrosion Removal – Potable and Non-Potable Systems
Engine Degreasing
Surface Preparation Prior to Painting/Bonding/Adhesive
Ink Removal
Automotive – General Applications
Cleaning Prior to Sealing
Aircraft – Skydrol Removal
General Aircraft Cleaning
Corrosion Inhibitors
Chemical Cleaning as a Solvent Alternative
Immersion soaking
EPA's Solvent Alternatives Guide – SAGE 2.1
Solvent Recycling
The Clean-In-Place (CIP) Method to Reduce Hazardous Waste
Steam Cleaning as a solvent Alternative
Mechanical Cleaning Processes as a Solvent Alternative

WASTEWATER

Bilge and Oily Wastewater Treatment System (BOWTS)
Biological Aqueous Wastewater Treatment System
Recycling Wash Water Using Closed Loop Wash Racks
Electrolytic Recovery Technology for Silver Cyanide Recycling
Hydroblasting Wastewater Recycling System
Laser Reduction of Toxic Organic Compounds in Wastewater
Peroxide Advanced Oxidation Wastewater Treatment
Powdered Activated Carbon Wastewater Treatment

Precipitation and Microfiltration Wastewater Treatment Systems
Recycling Activated Carbon
Reverse Osmosis and Ultrafiltration Wastewater Treatment Process
Secondary Use of Acids and Alkalis for Wastewater Treatment

STORM WATER

Infiltration Trenches for Treating Storm Water Runoff
Sand Filters for Treating Storm Water Runoff
Vortex Solids Separators for Treating Storm Water runoff
Water Quality Inlets to Control Storm Water Runoff
Wet Detention Ponds to Treat Storm Water Runoff

Appendix D
Camp Withycombe

Baseline Inventory

A baseline inventory is necessary for two reasons. The quantities of waste generation or toxic material use are assessed to target specific waste streams, materials being used, or activities for pollution prevention. Annual reports on waste generation and toxic material use will be compared with the baseline inventories to evaluate the effectiveness of pollution prevention projects and to monitor progress in achieving Camp Withycombe's pollution prevention goals.

BASELINE INVENTORY FOR CAMP WITHYCOMBE 1994

Waste Type	RCRA Waste Code(s)	Waste (lbs.)	% of Total Waste	Process or Operation Generating Waste
Sulfuric Acid	D001, D006 D008	1162	9	Filling Lead-Acid Batteries
Petroleum Naphtha	D001	3356	38	Parts Cleaning
Waste Paint	D001, D008	599	6	Painting Operations
Cleaning Solvents	D001	144	1	Paint Gun Cleaning
Potassium Hydroxide-Mercury	D009	21	.5	Battery Changeout
Isopropanol	D001	44	1	Circuit Board Cleaning
Magnesium Salts Barium, Chromium	D005, D007	1444	9	Battery Changeout
Chromium Filters	D007	500	1	NBC Training
Antifreeze	D010	2400	1	Vehicle Maintenance
Sodium Hydroxide	D001, D002	500	.5	Radiator Cleaning
Wash Rack Sludge	F005	1200	31	Oil/Water Separator
Lithium Batteries	D001, D003	14	1	Battery Changeout
MEK	D001, D008	76	1	Parts Cleaning

CAMP WITHYCOMBE
POLLUTION PREVENTION GOALS

Waste Type	Subtype	Reduction Goal (%)	Baseline Year	Target Year
Hazardous Waste	Sulfuric Acid	100	1994	1995
Hazardous Waste	Petroleum Naphtha	50	1994	1999
Hazardous Waste	Waste Paint	46	1994	1997
Hazardous Waste	cleaning solvents	60	1994	1999
Hazardous Waste	Mercury Batteries		1994	
Hazardous Waste	Isopropanol		1994	
Hazardous Waste	Magnesium batteries		1994	
Hazardous Waste	Chromium filters		1994	
Hazardous Waste	Antifreeze	100	1994	1996
Hazardous Waste	Sodium Hydroxide	20	1994	1999
Hazardous Waste	Wash Rack Sludge	20	1994	1997
Hazardous Waste	Lithium Batteries		1994	
Solid Waste	Cardboard & Recyclable Paper			
Hazardous Waste	MEK	100	1994	1999
Ozone Depleting Chemical Use	Class I ODS	100	1994	2003
TRI Reportable Releases		50%	1994	1999

Pollution Prevention Opportunity Assessment

The PPOA enables Camp Withycombe to examine the alternatives available for pollution prevention. The modules identify the waste stream and the operations from which the stream may be generated, describe the process, and present several pollution prevention alternatives. Each alternative is described along with its advantages and disadvantages.

Assessment modules that apply to Camp Withycombe are:

Application of Sealant/Adhesives
Battery Acids/Lead-Acid Batteries from Vehicle Maintenance
Cleanup Solvents from Painting
Electronic Equipment Battery Changeout
Halon Use in Fire Extinguishers
Manual Surface Preparation Using Rags
Paint Booth Scrubber Sludge
Radiator-Cleaning Waste
Refrigerants (CFCs) from Refrigeration, Cooling-Equipment Maintenance
Sandblasting
Solid Waste
Used Antifreeze from Vehicle Maintenance
Used Oil Filters from Vehicle Maintenance
Used Oil from Vehicle Maintenance
Vehicle and Aircraft Washing
VOC Emissions from Painting
Waste Solvents from Parts Cleaning

➢ Past Pollution Prevention Projects

The status of past pollution prevention projects are discussed. Each project is described to include location implemented, implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemical), actual waste, actual implementation costs, actual savings, and funding sources.

Project Title: ZEP Parts Washer
Description: Replace Safety Kleen parts washer with the ZEP washer that uses an aqueous based solution. OR00093006
Location: CSMS and 3670th OMS
Implementation Date: 1993
Targeted Waste Type(s): Hazardous Wastes, EPA Toxic 17
Waste Reduction:
Implementation Costs:
Savings: Elimination of the waste stream has saved the installation _____ per year in reduced waste disposal cost.
Funding Source: Year end funds.

Project Title: Battery Acid/Lead Acid Batteries from Vehicle Maintenance
Description: Lead Acid Batteries are being exchanged on a one-for-one basis with a commercial vendor.
Location: CSMS
Implementation Date: 1995
Targeted Waste Type(s): Hazardous Wastes, EPA Toxic 17
Waste Reduction:
Implementation Costs:
Savings: Elimination of the waste stream has saved the installation _____ per year in reduced waste disposal cost.
Funding Source:

Project Title: Surface preparation using rags
Description: Utilizing a rag laundering service reduced the volume of solid waste generated by the CSMS, and also reduces the potential for contaminants on landfilled rags to leach into the soil and groundwater.
Location: Camp-wide
Implementation Date: 1995
Targeted Waste Type(s): Solid Waste
Waste Reduction:
Implementation Costs:
Savings: Elimination of the waste stream has saved the installation _____ per year in reduced waste disposal cost.
Funding Source:

Project Title: Parts Cleaning and Washing
Description: Installation of a Better Engineered aqueous parts washer to reduce reliance on solvents. The CSMS plans to use the aqueous parts washer for cleaning large engine and drive train components. Use of the aqueous parts washer will reduce the volume of solvent requiring disposal as hazardous waste, reduce the associated disposal costs, and reduce worker exposure to solvent emissions.
Location: CSMS
Implementation Date: 1995-1996
Targeted Waste Type(s): Hazardous Waste/EPA Toxic 17/Solvent Wastes
Waste Reduction:
Implementation Costs:
Savings: Elimination of the waste stream has saved the installation _____ per year in reduced waste disposal cost.
Funding Source:

Project Title: Antifreeze Recycling
Description: Utilization of contracted on-site antifreeze recycling services. Filtering and refortification of antifreeze prior to reintroduction in vehicles has reduced the volume of antifreeze requiring disposal. Recycling antifreeze has also significantly reduced the quantity of new antifreeze procured.
Location: CSMS

Implementation Date: 1996
Targeted Waste Type(s): Hazardous Wastes
Waste Reduction:
Implementation Costs: $1845.00
Savings: Elimination of the waste stream has saved the installation _____ per year in reduced waste disposal cost.
Funding Source:

Project Title: Used Oil Filters from Vehicle Maintenance
Description: An oil filter crusher is being used to reduce the amount of waste oil in the filter and allowing the filter to be recycled as a metal.
Location:
Implementation Date: 1996
Targeted Waste Type(s):
Waste Reduction:
Implementation Costs:
Savings: Elimination of the waste stream has saved the installation _____ per year in reduced waste disposal cost.
Funding Source:

Project Title: Vehicle and Aircraft Washing Oil/Water Separator Sludge
Description: The wash rack is equipped with a Landa Alpha 3100D Waster Maze coalescing filter system with an ozone generator. Wash water will discharge to the oil/water separator, then pass through the coalescing filter prior to discharge to the sanitary sewer system. The Landa is an in-line filtration system, but does not have water recycling and storage capability.
Location:
Implementation Date: 1997
Targeted Waste Type(s):
Waste Reduction:
Implementation Costs:
Savings: Elimination of the waste stream has saved the installation _____ per year in reduced waste disposal cost.
Funding Source:

Project Title: VOC Emissions from Painting/Scrubber Sludge from Paint Booths/Cleanup Solvent from Painting.
Description: The paint booth is a rear-draft system where air, VOC emissions, and paint mists are drawn through filters in the back wall. HVLP paint guns are used for more efficient application of paint, reduction of paint overspray, and reduction of VOC emissions. Paint guns and pots are cleaned using a Safety Kleen Model 1107-paint gun cleaning system. Paint-related wastes are disposed through the Safety Kleen contract.

The paint booth is a fully enclosed Binks system equipped with dry filters and a manometer. The manometer measures differential pressure across the filters and indicates when filters require replacement. The facility is also equipped with a multi-media blasting system to remove oil paint form equipment surfaces. The new system is capable of using garnet, glass, and plastic

blast media. An attached cyclone unit will separate dry paint chips from blast media, allowing for reuse of the blast media. Paint residue will be sampled and analyzed to determine proper disposal.
Location: CSMS
Implementation Date: 1997
Targeted Waste Type(s): Hazardous waste and waste solvents
Waste Reduction:
Implementation Costs:
Savings:
Funding Source:

Project Title: Antifreeze Recyclers
Description: The Techguard Coolant Recycler 88550 Antifreeze Recycler is connected to the vehicle being serviced by using the assortment of connectors provided with the 88550. The vehicle's coolant is circulated through the 88550 that removes scale, suspended material and dissolved toxic metals from the coolant. In essence the coolant never leaves the vehicle. The coolant is restored to ASTM standard 3306 and is warranted for 2 years. EPR number OR00099001.
Location: CSMS
Implementation Date: 1998
Targeted Waste Type(s): Hazardous Chemicals listed on EPA's 17 ind. Toxics List
Waste Reduction: Ethylene Glycol
Implementation Costs: $1,845.00
Savings: $2,536.00
Funding Source: 1998 Year-end funds

Project Title: Oil Filter Crusher
Description: The Oberg Model P-300 filter crusher is used to eliminate the amount of oil left in the filter after it is removed from service. The P-300 deposits the crushed filters directly into a transport drum for disposal. EPR number OR00099003.
Location: 3670th OMS
Implementation Date: 1998
Targeted Waste Type(s): Hazardous Chemicals listed on EPA's 17 ind. Toxics List
Waste Reduction: Recovery of metal by eliminating the oil from the element allowing the metal to be recycled, and keeping the oil saturated filters out of the landfill.
Implementation Costs: 2 units @ $3,988.80 ea. Total Investment $7,977.60
Savings: $1,935.50 annually per unit. Total expected annual savings $3,871.00
Funding Source: 1998 Year-end funds

Project Title: Aerosol Can Depressurizer
Description: A Lab Safety Aerosol Can Depressurizer that relieves the pressure in aerosol cans and allows the residual contents to be collected for disposal. With the contents thoroughly depleted the can may be recycled as scrap metal. EPR number OR 00099004.
Location: State Shop
Implementation Date: 1998
Targeted Waste Type(s): Solid Waste (metal), Reactive Hazardous Waste generic.

Waste Reduction: Metal, Reactive HW
Implementation Costs: $577.00 each
Savings: $1,350.00 each
Funding Source: 1998 year end funds

Project Title: Aerosol Can Depressurizer
Description: A Lab Safety Aerosol Can Depressurizer that relieves the pressure in aerosol cans and allows the residual contents to be collected for disposal. With the contents thoroughly depleted the can may be recycled as scrap metal. EPR number OR 00099004.
Location: State Shop and 3670th OMS
Implementation Date: 1999
Targeted Waste Type(s): Solid Waste (metal), Reactive Hazardous Waste generic.
Waste Reduction: Metal, Reactive HW
Implementation Costs: $577.00 each
Savings: $1,350.00 each
Funding Source: 1999 year end funds.

Project Title: ODS Elimination Water Coolers
Description: Eliminate all appliances and equipment that use ozone-depleting substances. These include fire extinguishers using Halon 1301 and refrigeration systems containing CFCS. EPR number OR00099006.
Location: Camp Withycombe All Facilities (CSMS, 3670th)
Implementation Date: 1999
Targeted Waste Type(s): Refrigerants-*R11, R12, R22 etc.*
Waste Reduction: Ozone Depleting Substances
Implementation Costs: $9,720.64
Savings:
Funding Source: AGI EPR

Project Title: Hot Pressure Washer
Description: Purchase of a Karcher HDS 650 hot pressure washer will replace the current method of removing large automotive components from vehicles and transporting them to the washrack. It will prevent oil and other automotive fluids from dripping onto the bay floors and leaving a trail of contaminated soil from the bay to the washrack. EPR number OR00099007.
Location: State Shop
Implementation Date: 1999
Targeted Waste Type(s): Hazardous Waste/Hydrocarbons
Waste Reduction: Elimination of contaminated soils.
Implementation Costs: $3.867.00
Savings: $2,525.00 annually.
Funding Source: AGI-EPR

Project Title: Aqueous Parts Washer
Description: Landa Automatic Parts Washer SJ-10H is used to replace a system that uses a paraffinic hydrocarbon solution for parts cleaning. The new system uses an aqueous solution

that, once filtered, can be disposed of through the local sewer system. The new system uses a biodegradable detergent. EPR number OR00099011.
Location: 3670th OMS
Implementation Date: 1999
Targeted Waste Type(s): Hazardous Waste/EPA Toxic 17/Solvent Wastes
Waste Reduction: The elimination of a hazardous solution.
Implementation Costs: $3,153.50
Savings: Elimination of the waste stream has saved the installation $2,515.00 per year in educed waste disposal cost.
Funding Source: AGI-EPR

Project Title: Weapons Cleaning/Parts Washer System IT48WC
Description: The Inland Technology IT-48WC Weapons Cleaning System NSN 6850-01-397-2539 is a high volume usage system that recycles the Breakthrough solvent continuously through a high efficiency filtration system. EPR number OR00099002.
Location: 3670th OMS
Implementation Date: 1999
Targeted Waste Type(s): Other Hazardous Materials
Waste Reduction: 1,1,1-Trichloroethane
Implementation Costs: $3,684.15
Savings: $2,031.00
Funding Source: AGI-EPR

Project Title: Paint Gun Cleaner
Description: A self-contained Inland Technology IT-100 paint gun washer. NSN 4250-01-465-3191 using EP-921 Solvent. The IT-100's features include stainless steel construction, filtration technology and standard 6.5 GPM free flow delivery air-operated diaphragm pump unit that uses solvent to clean paint guns. EPR number OR00099008.
Location: Camp Withycombe CSMS
Implementation Date: 1999
Targeted Waste Type(s): Safety Kleen
Waste Reduction: Solvents
Implementation Costs: $2,680.55 ea
Savings: $3,810.00 ea
Funding Source: 1999 year end funds

Project Title: Propane Cylinder Recycling System
Description: The New Pig ProSolve system safely removes the valve stem so canister can be recycled as scrap steel. Activated carbon filters help remove Volatile Organic Compounds from propellant. EPR number OR00000001.
Location: State Shop and 3670th OMS
Implementation Date: 2000
Targeted Waste Type(s): Reactive hazardous waste - generic compressed gas, Volatile Organic compounds.
Waste Reduction: Metal, Reactive HW
Implementation Costs: $697.44 ea

Savings: $5,112.00
Funding Source: 2000 year end funds

Project Title: Paint Gun Cleaner
Description: A self-contained Inland Technology IT-100 paint gun washer. NSN 4250-01-465-3191 using EP-921 Solvent. The IT-100's features include stainless steel construction, filtration technology and standard 6.5 GPM free flow delivery air-operated diaphragm pump unit that uses solvent to clean paint guns. EPR number OR00099008.
Location: State Shop
Implementation Date: 2000
Targeted Waste Type(s): Safety Kleen
Waste Reduction: Solvents
Implementation Costs: $2,680.55 ea
Savings: $3,810.00 ea
Funding Source: 2000 year end funds

Project Title: Weapons Cleaning/Parts Washer System IT48WC
Description: The Inland Technology IT-48WC Weapons Cleaning System NSN 6850-01-397-2539 is a high volume usage system that recycles the Breakthrough solvent continuously through a high efficiency filtration system. EPR number OR00099002.
Location: Camp Withycombe CSMS
Implementation Date: 2001
Targeted Waste Type(s): Other Hazardous Materials
Waste Reduction: 1,1,1-Trichloroethane
Implementation Costs: $3,684.15
Savings: $2,031.00
Funding Source: 2001 Year-end funds.

Project Title: Oil Filter Crusher
Description: The Oberg Model P-300 filter crusher is used to eliminate the amount of oil left in the filter after it is removed from service. The P-300 deposits the crushed filters directly into a transport drum for disposal. EPR number OR00099003.
Location: Two crushers bought for the CSMS
Implementation Date: 2001
Targeted Waste Type(s): Hazardous Chemicals listed on EPA's 17 Toxics List
Waste Reduction: Recovery of metal by eliminating the oil from the element allowing the metal to be recycled, and keeping the oil saturated filters out of the landfill.
Implementation Costs: $3,988.80 ea.
Savings: $1,935.50 annually per unit.
Funding Source: 2001 year end money

Project Title: Propane Cylinder Recycling System
Description: The New Pig ProSolve system safely removes the valve stem so canister can be recycled as scrap steel. Activated carbon filters help remove Volatile Organic Compounds from propellant. EPR number OR00000001.
Location: CSMS

Implementation Date: 2001
Targeted Waste Type(s): Reactive hazardous waste - generic compressed gas, Volatile Organic Compounds.
Waste Reduction: Metal, Reactive HW
Implementation Costs: $697.03 ea
Savings: $5,112.00
Funding Source: AGI-EPR

Project Title: Secondary Containment Structures
Description: As required by the SPCCP for this facility and 40 CFR 112.3 and OAR 340-047-0160. A secondary containment structure is needed to be built to house the fuel hauling vehicles that are located at this facility. EPR OR035000021.
Location: Compound A and D.
Implementation Date: 2002
Targeted Waste Type(s): Petroleum's, Oils and Lubricants
Waste Reduction: Soil contamination.
Implementation Costs: $199,533.00
Savings:
Funding Source:

➢ Current Pollution Prevention Projects

The status of currently funded pollution prevention projects are discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated savings, and funding sources.

Project Title: Containment Structures
Description: Implement camp-wide SPCCP as required in 40 CFR 112 and OAR 340-047-0160. This project will fund the purchase of hazardous materials storage cabinets and a secondary containment unit that will be used to store drums or containers which contain hazardous materials. Funds will purchase six 60(sixty) gallon self-closing hazardous materials storage cabinets and one walk-in storage building with shelves, door and ramp. EPR OR035.
Location: State Shop
Implementation Date:
Targeted Waste Type(s): Petroleum's, Oils and Lubricants
Waste Reduction: Soil contamination.
Implementation Costs: $14,000
Savings:
Funding Source:

Project Title: Aerosol Can Depressurizer
Description: A Lab Safety Aerosol Can Depressurizer that relieves the pressure in aerosol cans and allows the residual contents to be collected for disposal. With the contents thoroughly depleted the can may be recycled as scrap metal. EPR number OR 00099004.
Location:

Implementation Date:
Targeted Waste Type(s): Solid Waste (metal), Reactive Hazardous Waste generic
Waste Reduction: Metal, Reactive HW
Implementation Costs: $1468.10
Savings: $1,350.00
Funding Source:

Project Title: Ultrasonic Radiator Dip Tank
Description: A dip tank operating with ultrasound as the cleaning agent in the repair and maintenance of radiators. EPR number 00099010.
Location: CSMS
Implementation Date:
Targeted Waste Type(s): Potassium Hydroxide and sludge with heavy metals.
Waste Reduction: Potassium Hydroxide
Implementation Costs: $21,000.00
Savings:
Funding Source: AGI-EPR

Project Title: Antifreeze Recyclers
Description: The BG PF4HO High Output Power Flush and Coolant Recycling System flushes the entire cooling system and recycles dirty antifreeze into clean, inhibited automotive spec coolant without draining or handling. The BG PF4HO eliminates the need to drain used antifreeze from the vehicle, drastically reducing the high cost of hazardous waste disposal. Utilizing a closed-loop system, the used antifreeze is circulated through a filtration process which removes impurities. EPR number OR0099001.
Location: State Maintenance Shop
Implementation Date:
Targeted Waste Type(s): Hazardous Chemicals listed on EPA's 17 ind. Toxics List
Waste Reduction: Ethylene Glycol
Implementation Costs: $9354.79
Savings: $2,536.00
Funding Source: AGI-EPR

Project Title: Propane Cylinder Recycling System
Description: The New Pig ProSolve system safely removes the valve stem so canister can be recycled as scrap steel. Activated carbon filters help remove Volatile Organic Compounds from propellant. EPR number OR00000001.
Location: State Shop
Implementation Date:
Targeted Waste Type(s): Reactive hazardous waste - generic compressed gas, Volatile Organic Compounds.
Waste Reduction: Metal, Reactive HW
Implementation Costs: $697.03 ea
Savings: $5,112.00
Funding Source: AGI-EPR

Project Title: Secondary Containment Structures
Description: As required by the SPCCP for this facility and 40 CFR 112.3 and OAR 340-047-0160. A secondary containment structure is needed to be built to house the fuel hauling vehicles that are located at this facility. EPR OR03500002.
Location: Compound A and D
Implementation Date: 2002
Targeted Waste Type(s): Petroleum's, Oils and Lubricants
Waste Reduction: Soil contamination.
Implementation Costs: $199,533
Savings:
Funding Source: NGB

➢ Future Pollution Prevention Projects

The status of proposed pollution prevention projects is discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated saving, and funding sources.

Project Title: Containment Structures
Description: Implement camp-wide SPCCP as required in 40 CFR 112 and OAR 340-047-0160. This project will fund the purchase of hazardous materials storage cabinets and a secondary containment unit that will be used to store drums or containers which contain hazardous materials. Funds will purchase six 60(sixty) gallon self-closing hazardous materials storage cabinets and one walk-in storage buildings. EPR OR230.
Location: State Shop
Implementation Date:
Targeted Waste Type(s): Petroleum's, Oils and Lubricants
Waste Reduction: Soil contamination.
Implementation Costs: $14,000
Savings:
Funding Source:
EPR Status: Submitted

ECONOMIC ANALYSIS SUMMARY FOR FUTURE POLLUTION PREVENTION PROJECTS

Polluting Process	P2 Opportunity	Investment Cost ($)	Net Annual Savings ($)	Payback Period (Years)	Net Present Value of Operation ($)
Safety Kleen	Solvent Waste Station Purchase and Modification	198,500	(5,841)	No Payback	(243,603)

POLLUTION PREVENTION IMPLEMENTATION PLAN FOR FUTURE PROJECTS							
Project Title	**Location**	**Waste Type**	**Reduction Expected (lbs./year)**	**Estimated Cost($)**	**Estimated Savings ($/yr.)**	**Expected Implement Date**	**EPR Status**
Cardboard Baler	Recycling Center	Solid Waste	400,000	99,000	30,000	CY95	Entered

CAMP WITHYCOMBE'S POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1997					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Sulfuric Acid	100	1162	0	100
Hazardous Waste	Petroleum Naphtha	50	3356	1498	44.6
Hazardous Waste	Waste Paint	46	599	1021	(170)
Hazardous Waste		60	144	0	100
Hazardous Waste	Mercury Batteries		21	255	(1214)
Hazardous Waste	Isopropanol	100	44	0	100
Hazardous Waste	Magnesium batteries		1444	4971	(344)
Hazardous Waste	Chromium filters		500	1655	(331)
Hazardous Waste	Antifreeze	100	2400	0	100
Hazardous Waste	Sodium Hydroxide	20	500	9133	(1826)
Hazardous Waste	Wash Rack Sludge	20	1200	939	78.25
Hazardous Waste	Lithium Batteries		14	1650	(11785)
Hazardous Waste	MEK	100	76	0	100
Solid Waste Ozone Depleting Chemical Use	Class I ODS	100	2003		

CAMP WITHYCOMBE'S POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1998					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Sulfuric Acid	100	1162	0	100
Hazardous Waste	Petroleum Naphtha	50	3356	1162	34.62
Hazardous Waste	Waste Paint	46	599	1124	(187)
Hazardous Waste	Cleaning solvents	60	144	0	100
Hazardous Waste	Mercury Batteries		21	0	100
Hazardous Waste	Isopropanol		44	0	100
Hazardous Waste	Magnesium batteries		1444	0	100
Hazardous Waste	Chromium filters		500	138	27.60
Hazardous Waste	Antifreeze	100	2400	0	100
Hazardous Waste	Sodium Hydroxide	20	500	0	100
Hazardous Waste	Wash Rack Sludge	20	1200	0	100
Hazardous Waste	Lithium Batteries		14	0	100
Solid Waste					
Hazardous Waste	MEK	100	76	0	100
Ozone Depleting Chemical Use	Class I ODS	100	2003	110.5	

CAMP WITHYCOMBE'S POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1999					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Sulfuric Acid	100	1162	0	100
Hazardous Waste	Petroleum Naphtha	50	3356	2	5959
Hazardous Waste	Waste Paint	46	599	1449	(241)
Hazardous Waste	Cleaning solvents	60	144	0	100
Hazardous Waste	Mercury Batteries		21	48	(228)
Hazardous Waste	Isopropanol		44	0	100
Hazardous Waste	Magnesium batteries		1444	618	42.79
Hazardous Waste	Chromium filters		500	517	(103)
Hazardous Waste	Antifreeze	100	2400	0	100
Hazardous Waste	Sodium Hydroxide	20	500	0	100
Hazardous Waste	Wash Rack Sludge	20	1200	0	100
Hazardous Waste	Lithium Batteries		14	1414	(10100)
Solid Waste					
Hazardous Waste	MEK	100	76	0	100
Ozone Depleting Chemical Use	Class I ODS	100	2003		

CAMP WITHYCOMBE'S POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2000					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Camp Withycombe has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology for battery usage and NBC equipment.					

CAMP WITHYCOMBE'S POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2001					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Camp Withycombe has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology for battery usage and NBC equipment.					

Appendix E
Camp Rilea

Baseline Inventory

A baseline inventory is necessary for two reasons. The quantities of waste generation or toxic material use are assessed to target specific waste streams, materials being used, or activities for pollution prevention. annual reports on waste generation and toxic material use will be compared with the baseline inventories to evaluate the effectiveness of pollution prevention projects and to monitor progress in achieving Camp Rilea's pollution prevention goals.

Some categories overlap (e.g., solvent wastes, waste acids and bases, and EPA Toxic 17 wastes also will appear as hazardous waste; some of the EPA Toxic 17 wastes can be solvents). The use of the baseline inventory will assist in developing projects for meeting the pollution prevention goals of Camp Rilea's.

BASELINE INVENTORY FOR CAMP RILEA 1994				
Waste Type	**RCRA Waste Code(s)**	**Waste (lbs)**	**% of Total Waste**	**Process or Operation Generating Waste**
Petroleum Naphtha	D001	1643	16	Parts Cleaning
Waste Paint	D001, D008	417	4	Painting Operations
Potassium Hydroxide-Mercury	D009	9	2	Battery Changeout
Chromium Filters	D007	592	50	NBC Training
Lithium Batteries	D001, D003	282	24	Battery Changeout
Gasoline	D001	417	4	Vehicle Maintenance

CAMP RILEA POLLUTION PREVENTION GOALS				
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline Year**	**Target Year**
Hazardous Waste	Petroleum Naphtha		1994	
Hazardous Waste	Waste Paint		1994	
Hazardous Waste	Potassium Hydroxide-Mercury		1994	
Hazardous Waste	Chromium Filters		1994	
Hazardous Waste	Lithium Batteries		1994	
Hazardous Waste	Gasoline		1994	
Solid Waste Ozone Depleting Chemical Use	Class I ODS	100	1994	2003
TRI Reportable Releases		50%	1994	1999

Pollution Prevention Opportunity Assessment

The PPOA enables Camp Rilea to examine the alternatives available for pollution prevention. The modules identify the waste stream and the operation from which the stream may be generated, describe the process, and present several pollution prevention alternatives. Each alternative is described along with its advantages and disadvantages.

Assessment modules that apply to Camp Rilea are:

Battery Acids/Lead-Acid Batteries from Vehicle Maintenance
Cleanup Solvents from Painting
Electronic Equipment Battery Changeout
Halon Use in Fire Extinguishers
Manual Surface Preparation Using Rags
Radiator-Cleaning Waste
Refrigerants (CFCs) from Refrigeration, Cooling-Equipment Maintenance
Sandblasting
Solid Waste
Used Antifreeze from Vehicle Maintenance
Used Oil Filters from Vehicle Maintenance
Used Oil from Vehicle Maintenance
VOC Emissions from Painting
Waste Solvents from Parts Cleaning

➢ Past Pollution Prevention Projects

The status of past pollution prevention projects are discussed. Each project is described to include location implemented, implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemical), actual waste, actual implementation costs, actual savings, and funding sources.

Project Title: ZEP Parts Washer
Description: Replace Safety Kleen parts washer with the ZEP washer that uses an aqueous based solution. OR23000001.
Location: UTES
Implementation Date: 1993
Targeted Waste Type(s): Hazardous Wastes, EPA Toxic 17
Waste Reduction:
Implementation Costs:
Savings: Elimination of the waste stream has saved the installation _____ per year in reduced waste disposal cost.
Funding Source: Year end funds.

Project Title: Battery Acid/Lead Acid Batteries from Vehicle Maintenance
Description: Lead Acid Batteries are being exchanged on a one-for-one basis with a commercial vendor.

Location:
Implementation Date: 1995
Targeted Waste Type(s): Hazardous Wastes, EPA Toxic 17
Waste Reduction:
Implementation Costs:
Savings: Elimination of the waste stream has saved the installation _____ per year in reduced waste disposal cost.
Funding Source:

Project Title: Parts Cleaning and Washing
Description: Installation of a Better Engineering aqueous parts washer to reduce reliance on solvents. The UTES plans to use the aqueous parts washer for cleaning large engine and drive train components. Use of the aqueous parts washer will reduce the volume of solvent requiring disposal as hazardous waste, reduce the associated disposal costs, and reduce worker exposure to solvent emissions.
Location: UTES
Implementation Date: 1995-1996
Targeted Waste Type(s): Hazardous Waste/EPA Toxic 17/Solvent Wastes
Waste Reduction:
Implementation Costs:
Savings: Elimination of the waste stream has saved the installation _____ per year in reduced waste disposal cost.
Funding Source:

Project Title: Antifreeze Recyclers
Description: The Techguard Coolant Recycler 88550 Antifreeze Recycler is connected to the vehicle being serviced by using the assortment of connectors provided with the 88550. The vehicle's coolant is circulated through the 88550 that removes scale, suspended material and dissolved toxic metals from the coolant. In essence the coolant never leaves the vehicle. The coolant is restored to ASTM standard 3306 and is warranted for 2 years. EPR number OR00099001.
Location: UTES
Implementation Date: 1998
Targeted Waste Type(s): Hazardous Chemicals listed on EPA's 17 Toxics List
Waste Reduction: Ethylene Glycol
Implementation Costs: $3,332.16
Savings: $2,536.00
Funding Source: 1998 Year end funds

Project Title: Weapons Cleaning/Parts Washer System IT48WC
Description: The Inland Technology IT-48WC Weapons Cleaning System NSN 6850-01-397-2539 is a high volume usage system that recycles the Breakthrough solvent continuously through a high efficiency filtration system. EPR number OR00099002.
Location: UTES (3 systems)
Implementation Date: 1999
Targeted Waste Type(s): Other Hazardous Materials

Waste Reduction: 1,1,1-Trichloroethane
Implementation Costs: $11,052.45
Savings: $6,093.00
Funding Source: AGI-EPR

Project Title: Paint Gun Cleaner
Description: A self-contained Inland Technology IT-100 paint gun washer. NSN 4250-01-465-3191 using EP-921 Solvent. The IT-100's features include stainless steel construction, filtration technology and standard 6.5 GPM free flow delivery air-operated diaphragm pump unit that uses solvent to clean paint guns. EPR number OR00099008.
Location: UTES
Implementation Date: 1999
Targeted Waste Type(s): Petroleum Napthas (Safety Kleen)
Waste Reduction: Solvents
Implementation Costs: $2,680.55
Savings: $3,810.00
Funding Source: AGI-EPR

Project Title: ODS Elimination Water Coolers
Description: Eliminate all appliances and equipment that use ozone depleting substances. These include fire extinguishers using Halon and refrigeration systems containing CFCS. EPR number OR00099006.
Location: Camp Rilea (All Facilities to include UTES and the Maintenance areas)
Implementation Date: 1999
Targeted Waste Type(s): Refrigerants-R11, R12, R22 etc.
Waste Reduction: Ozone Depleting Substances
Implementation Costs: $4,619.52
Savings:
Funding Source: AGI EPR

Project Title: Oil Filter Crusher
Description: The Oberg Model P-300 filter crusher is used to eliminate the amount of oil left in the filter after it is removed from service. The P-300 deposits the crushed filters directly into a transport drum for disposal. EPR number OR00099003.
Location: Camp Rilea UTES
Implementation Date: 1999
Targeted Waste Type(s): Hazardous Chemicals listed on EPA's 17 Toxics List
Waste Reduction: Recovery of metal by eliminating the oil from the element allowing the metal to be recycled, and keeping the oil saturated filters out of the landfill.
Implementation Costs: 1 unit @ $3,988.80 ea.
Savings: $1,935.50 annually per unit.
Funding Source: AGI-EPR

Project Title: Aerosol Can Depressurizer
Description: A Lab Safety Aerosol Can Depressurizer that relieves the pressure in aerosol cans and allows the residual contents to be collected for disposal. With the contents thoroughly

depleted the can may be recycled as scrap metal. EPR number OR 00099004.
Location: Camp Rilea UTES
Implementation Date: 2000
Targeted Waste Type(s): Solid Waste (metal), Reactive Hazardous Waste generic
Waste Reduction: Metal, Reactive HW
Implementation Costs: $577.00
Savings: $1,350.00
Funding Source: 2000 year end funds

Project Title: Propane Cylinder Recycling System
Description: The New Pig ProSolve system safely removes the valve stem so canister can be recycled as scrap steel. Activated carbon filters help remove Volatile Organic Compounds from propellant. EPR number OR00000001.
Location: UTES
Implementation Date: 2000
Targeted Waste Type(s): Reactive hazardous waste - generic compressed gas, Volatile Organic compounds.
Waste Reduction: Metal, Reactive HW
Implementation Costs: $697.44 ea
Savings: $5,112.00
Funding Source: 2000 year end funds.

Project Title: Secondary Containment Structures
Description: As required by the SPCCP for this facility and 40 CFR 112.3 and OAR 340-047-0160. A secondary containment structure is needed to be built to house the fuel hauling vehicles that are located at this facility. EPR OR23000001.
Location: UTES
Implementation Date: 2002
Targeted Waste Type(s): Petroleum's, Oils and Lubricants
Waste Reduction: Soil contamination.
Implementation Costs: $167,775
Savings:
Funding Source: NGB

➢ Current Pollution Prevention Projects

The status of currently funded pollution prevention projects are discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated savings, and funding sources.

Project Title: Containment Structures
Description: Implement camp-wide SPCCP as required in 40 CFR 112 and OAR 340-047-0160. This project will fund the purchase of hazardous materials storage cabinets and two secondary containment units that will be used to store drums or containers which contain

hazardous materials. Funds will purchase three 45(fortyfive) gallon self-closing hazardous materials storage cabinets and two walk-in storage buildings. EPR OR230.
Location: UTES
Implementation Date:
Targeted Waste Type(s): Petroleum's, Oils and Lubricants
Waste Reduction: Soil contamination.
Implementation Costs: $20,000
Savings:
Funding Source:

➢ Future Pollution Prevention Projects

The status of proposed pollution prevention projects is discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated saving, and funding sources.

ECONOMIC ANALYSIS SUMMARY FOR FUTURE POLLUTION PREVENTION PROJECTS

Polluting Process	P2 Opportunity	Investment Cost ($)	Net Annual Savings ($)	Payback Period (Years)	Net Present Value of Operation ($)
Safety Kleen	Solvent Waste Station Purchase and Modification	198,500	(5,841)	No Payback	(243,603)
Safety Kleen	Aqueous Cleaner with Jetwasher	701,050	44,639	15.7	(356,345)

POLLUTION PREVENTION IMPLEMENTATION PLAN FOR FUTURE PROJECTS

Project Title	Location	Waste Type	Reduction Expected (lbs./year)	Estimated Cost($)	Estimated Savings ($/yr.)	Expected Implement Date	EPR Status
Cardboard Baler	Recycling Center	Solid Waste	400,000	99,000	30,000	CY95	Entered

CAMP RILEA'S POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1997					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha		1643	68	413
Hazardous Waste	Waste Paint		417	585	(140)
Hazardous Waste	Potassium Hydroxide-Mercury		9	24	(266)
Hazardous Waste	Chromium Filters			39	
Hazardous Waste	Lithium Batteries		282		
Solid Waste	Cardboard and recyclable paper				
Hazardous Waste	Gasoline		417	130	31
Ozone Depleting Chemical Use	CFCs *(R-12, R-22)* Fire Suppressants *(Halons)*	100			

CAMP RILEA'S POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1998					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha		1643	50	304
Hazardous Waste	Waste Paint		417	149	35.73
Hazardous Waste	Potassium Hydroxide-Mercury		9		
Hazardous Waste	Chromium Filters		592	293	
Hazardous Waste	Lithium Batteries		282		
Solid Waste	Cardboard and recyclable paper				
Hazardous Waste	Gasoline		417		
Ozone Depleting Chemical Use	CFCs *(R-12, R-22)* Fire Suppressants *(Halons)*	100			

CAMP RILEA'S POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1999					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha		1643	147	
Hazardous Waste	Waste Paint		417	240	
Hazardous Waste	Potassium Hydroxide-Mercury		9		
Hazardous Waste	Chromium Filters			202	
Hazardous Waste	Lithium Batteries		282		
Solid Waste	Cardboard and recyclable paper				
Hazardous Waste	Gasoline		417		
Ozone Depleting Chemical Use	CFCs *(R-12, R-22)* Fire Suppressants *(Halons)*	100			

CAMP RILEA'S POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2000					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Camp Rilea has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology for battery usage and NBC equipment.					

CAMP RILEA'S POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2001					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Camp Rilea has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology for battery usage and NBC equipment.					

Appendix F
1/186 Infantry Organization Maintenance Shop

Baseline Inventory

A baseline inventory is necessary for two reasons. The quantities of waste generation or toxic material use are assessed to target specific waste streams, materials being used, or activities for pollution prevention. Annual reports on waste generation and toxic material use will be compared with the baseline inventories to evaluate the effectiveness of pollution prevention projects and to monitor progress in achieving the 1/186 Infantry Organizational Maintenance Shop's.

Some categories overlap (e.g., solvent wastes, waste acids and bases, and EPA Toxic 17 wastes also will appear as hazardous waste; some of the EPA Toxic 17 wastes can be solvents). The use of the baseline inventory will assist in developing projects for meeting the pollution prevention goals of the 1/186 Infantry Organizational Maintenance Shop's.

BASELINE INVENTORY FOR 1/186TH INF OMS 1994				
Waste Type	**RCRA Waste Code(s)**	**Waste (lbs)**	**% of Total Waste**	**Process or Operation Generating Waste**
Solvent	D001, D006	65	100	Parts cleaning

1/186th INF OMS POLLUTION PREVENTION GOALS				
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline Year**	**Target Year**
Hazardous Waste	Cleaning solvents	50	1994	1999
Solid Waste Ozone Depleting Chemical Use	Class I ODS	100	1994	2003
TRI Reportable Releases		50%	1994	1999

Pollution Prevention Opportunity Assessment

The PPOA enables the 1/186 Infantry Organizational Maintenance Shop to examine the alternatives available for pollution prevention. The modules identify the waste stream and the operations from which the stream may be generated, describe the process, and present several pollution prevention alternatives. Each alternative is described along with its advantages and disadvantages.

Assessment modules that apply to 1/186 Infantry OMS are:

Application of Sealant/Adhesives
Battery Acids/Lead-Acid Batteries from Vehicle Maintenance
Cleanup Solvents from Painting
Electronic Equipment Battery Changeout
Halon Use in Fire Extinguishers
Manual Surface Preparation Using Rags
Refrigerants (CFCs) from Refrigeration, Cooling-Equipment Maintenance
Solid Waste
Used Antifreeze from Vehicle Maintenance
Used Oil Filters from Vehicle Maintenance
Used Oil from Vehicle Maintenance
Vehicle and Aircraft Washing
VOC Emissions from Painting
Waste Solvents from Parts Cleaning

➢ Past Pollution Prevention Projects

The status of past pollution prevention projects are discussed. Each project is described to include location implemented, implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemical), actual waste, actual implementation costs, actual savings, and funding sources.

Project Title: Parts Cleaning and Washing
Description: Installation of a ZEP parts cleaner has significantly reduced the generation because the solvent is never removed from the parts washer. Due to evaporation, small quantities of new solvent are added, as required.
Location: 1/186 IN OMS
Implementation Date: 1994
Targeted Waste Type(s): Hazardous Waste/EPA Toxic 17/Solvent Wastes
Waste Reduction: 100%
Implementation Costs: $5,000.00
Savings: Elimination of the waste stream has saved the installation $2,400.00 per year in reduced waste disposal cost.
Funding Source: NGB

Project Title: Battery Acid/Lead Acid Batteries from Vehicle Maintenance
Description: Lead Acid Batteries are being exchanged on a one-for-one basis with Sterling Battery Company.
Location: 1/186 IN OMS
Implementation Date: 1996
Targeted Waste Type(s): Hazardous Wastes, EPA Toxic 17
Waste Reduction: 100%
Implementation Costs: N/A
Savings: Elimination of the waste stream has saved the installation $2,870.00 per year in reduced waste disposal cost.
Funding Source: N/A

Project Title: Oil Filter Crusher
Description: The Oberg Model P-300 filter crusher is used to eliminate the amount of oil left in the filter after it is removed from service. The P-300 deposits the crushed filters directly into a transport drum for disposal. EPR number OR00099003.
Location: 1/186th OMS
Implementation Date: 1998
Targeted Waste Type(s): Hazardous Chemicals listed on EPA's 17 ind. Toxics List
Waste Reduction: Recovery of metal by eliminating the oil from the element allowing the metal to be recycled, and keeping the oil saturated filters out of the landfill.
Implementation Costs: 1 unit @ $3,988.80
Savings: $1,935.50 annually per unit.
Funding Source: 1998 Year-end funds

Project Title: ODS Elimination Water Coolers
Description: Eliminate all appliances and equipment that use ozone-depleting substances. These include fire extinguishers using Halon and refrigeration systems containing CFCS. EPR number OR00099006
Location: 1/186 IN OMS
Implementation Date: 2000
Targeted Waste Type(s): Refrigerants-*R11, R12, R22 etc.*
Waste Reduction: Ozone Depleting Substances
Implementation Costs: $2,459.44
Savings:
Funding Source: 2000 year end funds

Project Title: Aerosol Can Depressurizer
Description: A Lab Safety Aerosol Can Depressurizer that relieves the pressure in aerosol cans and allows the residual contents to be collected for disposal. With the contents thoroughly depleted the can may be recycled as scrap metal. EPR number OR 00099004.
Location: 1/186 IN OMS
Implementation Date: 2000
Targeted Waste Type(s): Solid Waste (metal), Reactive Hazardous Waste generic.
Waste Reduction: Metal, Reactive HW
Implementation Costs: $577.00 each

Savings: $1,350.00 each
Funding Source: 2000 year end funds.

Project Title: Aerosol Can Depressurizer
Description: A Lab Safety Aerosol Can Depressurizer that relieves the pressure in aerosol cans and allows the residual contents to be collected for disposal. With the contents thoroughly depleted the can may be recycled as scrap metal. EPR number OR 00099004.
Location: 1/186 IN OMS
Implementation Date: 2001
Targeted Waste Type(s): Solid Waste (metal), Reactive Hazardous Waste generic.
Waste Reduction: Metal, Reactive HW
Implementation Costs: $577.00 each
Savings: $1,350.00 each
Funding Source: 2001 year end funds.

Project Title: Secondary Containment Structures
Description: As required by the SPCCP for this facility and 40 CFR 112.3 and OAR 340-047-0160. A secondary containment structure is needed to be built to house the fuel hauling vehicles that are located at this facility. EPR OR12000001.
Location: OMS
Implementation Date: 2002
Targeted Waste Type(s): Petroleum's, Oils and Lubricants
Waste Reduction: Soil contamination.
Implementation Costs: $80,000
Savings:
Funding Source: NGB

➢ Current Pollution Prevention Projects

The status of currently funded pollution prevention projects are discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated savings, and funding sources.

Project Title: Propane Cylinder Recycling System
Description: The New Pig ProSolve system safely removes the valve stem so canister can be recycled as scrap steel. Activated carbon filters help remove Volatile Organic Compounds from propellant. EPR number OR00000001.
Location:
Implementation Date:
Targeted Waste Type(s): Reactive hazardous waste - generic compressed gas, Volatile Organic compounds.
Waste Reduction: Metal, Reactive HW
Implementation Costs: $697.44 ea
Savings: $5,112.00
Funding Source:

➢ Future Pollution Prevention Projects

The status of proposed pollution prevention projects is discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated saving, and funding sources.

ECONOMIC ANALYSIS SUMMARY FOR FUTURE POLLUTION PREVENTION PROJECTS

Polluting Process	P2 Opportunity	Investment Cost ($)	Net Annual Savings ($)	Payback Period (Years)	Net Present Value of Operation ($)
Safety Kleen	Solvent Waste Station Purchase and Modification	198,500	(5,841)	No Payback	(243,603)
Safety Kleen	Aqueous Cleaner with Jetwasher	701,050	44,639	15.7	(356,345)

POLLUTION PREVENTION IMPLEMENTATION PLAN FOR FUTURE PROJECTS

Project Title	Location	Waste Type	Reduction Expected (lbs./year)	Estimated Cost($)	Estimated Savings ($/yr.)	Expected Implement Date	EPR Status
Cardboard Baler	Recycling Center	Solid Waste	400,000	99,000	30,000	CY95	Entered

1/186th INF OMS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1997					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Solid Waste	Cardboard				
Hazardous Waste	Solvent	50	65	320	
Ozone Depleting Chemical Use	Class I ODS	100			

1/186th INF OMS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1998					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Solid Waste	Cardboard				
Hazardous Waste	Solvent	50	65		
Ozone Depleting Chemical Use	Class I ODS	100		48	

1/186th INF OMS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1999					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Solid Waste	Cardboard				
Hazardous Waste	Solvent	50	65		
Ozone Depleting Chemical Use	Class I ODS	100		48	

1/186 INF OMS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2000					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
1/186 INF OMS has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology.					

1/186 INF OMS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2001					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
1/186 INF OMS has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology.					

Appendix G
2/162 Infantry Organizational Maintenance Shop

Baseline Inventory

A baseline inventory is necessary for two reasons. The quantities of waste generation or toxic material use are assessed to target specific waste streams, materials being used, or activities for pollution prevention. annual reports on waste generation and toxic material use will be compared with the baseline inventories to evaluate the effectiveness of pollution prevention projects and to monitor progress in achieving the 2/162 Infantry Organizational Maintenance Shop.

Some categories overlap (e.g., solvent wastes, waste acids and bases, and EPA Toxic 17 wastes also will appear as hazardous waste; some of the EPA Toxic 17 wastes can be solvents). The use of the baseline inventory will assist in developing projects for meeting the pollution prevention goals of the 2/162 Infantry Organizational Maintenance Shop.

BASELINE INVENTORY FOR 2/162 Infantry Organizational Maintenance Shop 1994				
Waste Type	**RCRA Waste Code(s)**	**Waste (lbs)**	**% of Total Waste**	**Process or Operation Generating Waste**
Petroleum Naphtha	D001	463	100	Parts Cleaning

2/162 Infantry Organizational Maintenance Shop POLLUTION PREVENTION GOALS				
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline Year**	**Target Year**
Hazardous Waste	Petroleum Naphtha Lead/Acid Battery Aerosol Cans	100% 100% 100%	1994	1994 1996 1995
Solid Waste	Office paper Cardboard Antifreeze	50% 100% 50%	1994	1995 1995 1996
Ozone Depleting Chemical Use	Class I ODS	100	1994	2003
TRI Reportable Releases		50%	1994	1999

Pollution Prevention Opportunity Assessment

The PPOA enables the 2/162 Infantry Organizational Maintenance Shop to examine the alternatives available for pollution prevention. The modules identify the waste stream and the operations from which the stream may be generated, describe the process, and present several pollution prevention alternatives. Each alternative is described along with its advantages and disadvantages.

Assessment modules that apply to 2/162 INF OMS are:

Battery Acids/Lead-Acid Batteries from Vehicle Maintenance
Electronic Equipment Battery Changeout
Halon Use in Fire Extinguishers
Manual Surface Preparation Using Rags
Solid Waste
Used Antifreeze from Vehicle Maintenance
Used Oil Filters from Vehicle Maintenance
Used Oil from Vehicle Maintenance
Vehicle Washing
Waste Solvents from Parts Cleaning (ZEP)

- **Past Pollution Prevention Projects**

The status of past pollution prevention projects are discussed. Each project is described to include location implemented, implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemical), actual waste, actual implementation costs,

actual savings, and funding sources. Through implementation of the past projects the 2/162 Infantry Organizational Maintenance Shop has achieved a Conditionally Exempt Generator Status.

Project Title: Parts Cleaning and Washing
Description: Installation of a ZEP parts cleaner has significantly reduced the generation because the solvent is never removed from the parts washer. Due to evaporation, small quantities of new solvent are added, as required.
Location: 2/162 IN OMS
Implementation Date: 1994
Targeted Waste Type(s): Hazardous Waste/EPA Toxic 17/Solvent Wastes
Waste Reduction: 100%
Implementation Costs: $5000.00
Savings: Elimination of the waste stream has saved the installation $2400.00 per year in reduced waste disposal cost.
Funding Source:

Project Title: Paper/Cardboard Recycling Sub Site
Description: Manual recycling of office paper and cardboard into recycling bins
Location: 2/162 IN OMS
Implementation Date: 1995
Targeted Waste Type(s): Solid Waste
Waste Reduction: 50% office paper and 100% cardboard
Implementation Costs: N/A
Savings: Reduction of the waste stream has saved the installation _____ per year in reduced waste disposal cost.
Funding Source:

Project Title: Aerosol Can Puncturing Device
Description: Aerosol can puncturing device to be installed in the OMS bay area
Location: 2/162 IN OMS
Implementation Date: 1995
Targeted Waste Type(s): ODS
Waste Reduction: 100%
Implementation Costs: N/A
Savings: $1350.00
Funding Source:

Project Title: Battery Acid/Lead Acid Batteries from Vehicle Maintenance
Description: Lead Acid Batteries are being exchanged on a one-for-one basis with Sterling Battery Company.
Location: 2/162 IN OMS
Implementation Date: 1996
Targeted Waste Type(s): Hazardous Wastes, EPA Toxic 17
Waste Reduction: 100%
Implementation Costs: N/A

Savings: Elimination of the waste stream has saved the installation $2870.00 per year in reduced waste disposal cost.
Funding Source:

Project Title: Antifreeze Recycler
Description: Antifreeze filter type recycling system
Location: 2/162 IN OMS
Implementation Date: 1996
Targeted Waste Type(s): Ethylene Glycol
Waste Reduction: 50%
Implementation Costs: $2200.00
Savings: Reduction of waste stream has saved the installation $1500.00 per year in reduced waste disposal costs.
Funding Source:

Project Title: Oil Filter Crusher
Description: The Oberg Model P-300 filter crusher is used to eliminate the amount of oil left in the filter after it is removed from service. The P-300 deposits the crushed filters directly into a transport drum for disposal. EPR number OR00099003.
Location: 2/162 IN OMS
Implementation Date: 1998
Targeted Waste Type(s): Hazardous Chemicals listed on EPA's 17 ind. Toxics List
Waste Reduction: Recovery of metal by eliminating the oil from the element allowing the metal to be recycled, and keeping the oil saturated filters out of the landfill.
Implementation Costs: 1 unit @ $3,988.80
Savings: $1,935.50 annually per unit.
Funding Source: 1998 Year end funds

Project Title: Weapons Cleaning/Parts Washer System IT48WC
Description: The Inland Technology IT-48WC Weapons Cleaning System NSN 6850-01-397-2539 is a high volume usage system that recycles the Breakthrough solvent continuously through a high efficiency filtration system. EPR number OR00099002.
Location: 2/162 IN OMS
Implementation Date: 1998
Targeted Waste Type(s): Other Hazardous Materials
Waste Reduction: 1,1,1-Trichloroethane
Implementation Costs: $3684.15
Savings: $2,031.00
Funding Source: 1998 year end funds.

Project Title: Weapons Cleaning/Parts Washer System IT48WC
Description: The Inland Technology IT-48WC Weapons Cleaning System NSN 6850-01-397-2539 is a high volume usage system that recycles the Breakthrough solvent continuously through a high efficiency filtration system. EPR number OR00099002.
Location: 2/162 IN OMS
Implementation Date: 1999

Targeted Waste Type(s): Other Hazardous Materials
Waste Reduction: 1,1,1-Trichloroethane
Implementation Costs: $3684.15
Savings: $2,031.00
Funding Source: 1999 year end funds

Project Title: ODS Elimination Water Coolers
Description: Eliminate all appliances and equipment that use ozone depleting substances. These include fire extinguishers using Halon 1301 and refrigeration systems containing CFCS. EPR number OR00099005.
Location: 2/162 IN OMS
Implementation Date: 1999
Targeted Waste Type(s): Refrigerants-*R11, R12, R22 etc.*
Waste Reduction: Ozone Depleting Substances
Implementation Costs: $627.44
Savings:
Funding Source: 1999 year end funds

Project Title: Weapons Cleaning/Parts Washer System IT48WC
Description: The Inland Technology IT-48WC Weapons Cleaning System NSN 6850-01-397-2539 is a high volume usage system that recycles the Breakthrough solvent continuously through a high efficiency filtration system. EPR number OR00099002.
Location: 2/162 IN OMS
Implementation Date: 2001
Targeted Waste Type(s): Other Hazardous Materials
Waste Reduction: 1,1,1-Trichloroethane
Implementation Costs: $3,684.15 (purchased two systems)
Savings: $2,031.00
Funding Source: 2001 Year-end funds.

Project Title: Propane Cylinder Recycling System
Description: The New Pig ProSolve system safely removes the valve stem so canister can be recycled as scrap steel. Activated carbon filters help remove Volatile Organic Compounds from propellant. EPR number OR00000001.
Location: 2/162 IN OMS
Implementation Date: 2001
Targeted Waste Type(s): Reactive hazardous waste - generic compressed gas, Volatile Organic Compounds.
Waste Reduction: Metal, Reactive HW
Implementation Costs: $697.03 ea
Savings: $5,112.00
Funding Source: 2001 Year-end funds.

Project Title: Aerosol Can Depressurizer
Description: A Lab Safety Aerosol Can Depressurizer that relieves the pressure in aerosol cans and allows the residual contents to be collected for disposal. With the contents thoroughly

depleted the can may be recycled as scrap metal. EPR number OR 00099004.
Location: 2/162 OMS
Implementation Date: 2001
Targeted Waste Type(s): Solid Waste (metal), Reactive Hazardous Waste generic
Waste Reduction: Metal, Reactive HW
Implementation Costs: $1468.10
Savings: $1,350.00
Funding Source: 2001 Year-end funds.

➢ Current Pollution Prevention Projects

The status of currently funded pollution prevention projects are discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated savings, and funding sources.

Project Title: Secondary Containment Structures
Description: As required by the SPCCP for this facility and 40 CFR 112.3 and OAR 340-047-0160. A secondary containment structure is needed to be built to house the fuel hauling vehicles that are located at this facility. EPR OR11200001.
Location:
Implementation Date:
Targeted Waste Type(s): Petroleum's, Oils and Lubricants
Waste Reduction: Soil contamination.
Implementation Costs: $66,000
Savings:
Funding Source:

Project Title: Containment Structures
Description: Implement camp-wide SPCCP as required in 40 CFR 112 and OAR 340-047-0160. This project will fund the purchase of a secondary containment unit that will be used to store drums or containers which contain hazardous materials. Funds will purchase one walk-in storage buildings. EPR OR112.
Location:
Implementation Date:
Targeted Waste Type(s): Petroleum's, Oils and Lubricants
Waste Reduction: Soil contamination.
Implementation Costs: $28,000
Savings:
Funding Source:

➢ Future Pollution Prevention Projects

The status of proposed pollution prevention projects is discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste

type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated saving, and funding sources.

ECONOMIC ANALYSIS SUMMARY FOR FUTURE POLLUTION PREVENTION PROJECTS

Polluting Process	P2 Opportunity	Investment Cost ($)	Net Annual Savings ($)	Payback Period (Years)	Net Present Value of Operation ($)
Safety Kleen	Solvent Waste Station Purchase and Modification	198,500	(5,841)	No Payback	(243,603)
Safety Kleen	Aqueous Cleaner with Jetwasher	701,050	44,639	15.7	(356,345)

POLLUTION PREVENTION IMPLEMENTATION PLAN FOR FUTURE PROJECTS

Project Title	Location	Waste Type	Reduction Expected (lbs./year)	Estimated Cost($)	Estimated Savings ($/yr.)	Expected Implement Date	EPR Status
Cardboard Baler	Recycling Center	Solid Waste	400,000	99,000	30,000	CY95	Entered

2/162 INF OMS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1997					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha	100%	463	0	
Hazardous Waste	Sulfuric Acid	100%		0	
Hazardous Waste	Aerosol Cans	100%		0	
Solid Waste	Cardboard	100%		4000	
Solid Waste	Antifreeze	50%		1500	
Solid Waste	Office Paper	50%		2000	
Ozone Depleting Chemical Use	Class I ODS	100%			

2/162 INF OMS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1998					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha	100%	463	32	
Hazardous Waste	Sulfuric Acid	100%			
Hazardous Waste	Aerosol Cans	100%			
Solid Waste	Cardboard	100%			
Solid Waste	Antifreeze	50%			
Solid Waste	Office Paper	50%			
Ozone Depleting Chemical Use	Class I ODS	100%		16	

2/162 INF OMS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1999					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha	100%	463	0	
Hazardous Waste	Sulfuric Acid	100%			
Hazardous Waste	Aerosol Cans	100%			
Solid Waste	Cardboard	100%			
Solid Waste	Antifreeze	50%			
Solid Waste	Office Paper	50%			
Ozone Depleting Chemical Use	Class I ODS	100%			

2/162 INF OMS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2000					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
2/162 INF OMS has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology.					

2/162 INF OMS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2001					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
2/162 INF OMS has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology.					

Appendix H
Central Oregon Unit Training Equipment Site

Baseline Inventory

A baseline inventory is necessary for two reasons. The quantities of waste generation or toxic material use are assessed to target specific waste streams, materials being used, or activities for pollution prevention. annual reports on waste generation and toxic material use will be compared with the baseline inventories to evaluate the effectiveness of pollution prevention projects and to monitor progress in achieving the Central Oregon UTES's pollution prevention goals.

Some categories overlap (e.g., solvent wastes, waste acids and bases, and EPA Toxic 17 wastes also will appear as hazardous waste; some of the EPA Toxic 17 wastes can be solvents). The use of the baseline inventory will assist in developing projects for meeting the pollution prevention goals of the Central Oregon UTES.

BASELINE INVENTORY FOR Central Oregon Unit Training Equipment Site 1994				
Waste Type	**RCRA Waste Code(s)**	**Waste (lbs)**	**% of Total Waste**	**Process or Operation Generating Waste**
Petroleum Naphtha	D001	737	41	Parts Cleaning
Potassium Hydroxide-Mercury	D009	54	3	Battery Changeout
Magnesium Salts Barium, Chromium	D005, D007	38	2	Battery Changeout
Antifreeze	D010	929	51	Vehicle Maintenance
Lithium Batteries	D001, D003	33	1	Battery Changeout

Central Oregon Unit Training Equipment Site POLLUTION PREVENTION GOALS				
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline Year**	**Target Year**
Hazardous Waste	Petroleum Naphtha	100	1994	1994
Hazardous Waste	Potassium Hydroxide-Mercury	20	1994	1999
Hazardous Waste	Magnesium Salts Barium, Chromium	20	1994	1999
Hazardous Waste	Antifreeze	100	1994	1999
Hazardous Waste	Lithium Batteries	20	1994	1999
Solid Waste	Cardboard	100		
Ozone Depleting Chemical Use	Class I ODS	100	1994	2003
TRI Reportable Releases		50%	1994	1999

Pollution Prevention Opportunity Assessment

The PPOA enables the Central Oregon UTES to examine the alternatives available for pollution prevention. The modules identify the waste stream and the operation from which the stream may be generated, describe the process, and present several pollution prevention alternatives. Each alternative is described along with its advantages and disadvantages.

Assessment modules that apply to Central Oregon UTES are:

Application of Sealant/Adhesives
Battery Acids/Lead-Acid Batteries from Vehicle Maintenance
Cleanup Solvents from Painting
Electronic Equipment Battery Changeout
Halon Use in Fire Extinguishers
Manual Surface Preparation Using Rags
Radiator-Cleaning Waste
Refrigerants (CFCs) from Refrigeration, Cooling-Equipment Maintenance
Sandblasting
Solid Waste

Used Antifreeze from Vehicle Maintenance
Used Oil Filters from Vehicle Maintenance
Used Oil from Vehicle Maintenance
Vehicle and Aircraft Washing
VOC Emissions from Painting
Waste Solvents from Parts Cleaning

➢ Past Pollution Prevention Projects

The status of past pollution prevention projects are discussed. Each project is described to include location implemented, implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemical), actual waste, actual implementation costs, actual savings, and funding sources.

Project Title: Parts Cleaning and Washing
Description: Installation of a ZEP parts cleaner has significantly reduced the generation because the solvent is never removed from the parts washer. Due to evaporation, small quantities of new solvent are added, as required.
Location: COUTES
Implementation Date: 1994
Targeted Waste Type(s): Hazardous Waste/EPA Toxic 17/Solvent Wastes
Waste Reduction: 100%
Implementation Costs: $5000.00
Savings: Elimination of the waste stream has saved the installation $2400.00 per year in reduced waste disposal cost.
Funding Source: NGB

Project Title: Parts Cleaning and Washing
Description: Installation of a Better Engineered aqueous parts washer to reduce reliance on solvents. The CSMS plans to use the aqueous parts washer for cleaning large engine and drive train components. Use of the aqueous parts washer will reduce the volume of solvent requiring disposal as hazardous waste, reduce the associated disposal costs, and reduce worker exposure to solvent emissions.
Location: COUTES
Implementation Date: 1995-1996
Targeted Waste Type(s): Hazardous Waste/EPA Toxic 17/Solvent Wastes
Waste Reduction:
Implementation Costs:
Savings: Elimination of the waste stream has saved the installation _____ per year in reduced waste disposal cost.
Funding Source:

Project Title: Battery Acid/Lead Acid Batteries from Vehicle Maintenance
Description: Lead Acid Batteries are being exchanged on a one-for-one basis with Sterling Battery Company.
Location: COUTES

Implementation Date: 1996
Targeted Waste Type(s): Hazardous Wastes, EPA Toxic 17
Waste Reduction: 100%
Implementation Costs: N/A
Savings: Elimination of the waste stream has saved the installation $2870.00 per year in reduced waste disposal cost.
Funding Source:

Project Title: Cardboard Recycling
Description: Cardboard is collected and recycled in a bin provided by High-Desert recycling. The collected material is picked up once each month.
Location: COUTES
Implementation Date: 1996
Targeted Waste Type(s): Solid Waste
Waste Reduction:
Implementation Costs: None
Savings:
Funding Source: N/A

Project Title: Oil Filter Crusher
Description: The Oberg Model P-300 filter crusher is used to eliminate the amount of oil left in the filter after it is removed from service. The P-300 deposits the crushed filters directly into a transport drum for disposal. EPR number OR00099003.
Location: COUTES
Implementation Date: 1999
Targeted Waste Type(s): Hazardous Chemicals listed on EPA's 17 ind. Toxics List
Waste Reduction: Recovery of metal by eliminating the oil from the element allowing the metal to be recycled, and keeping the oil saturated filters out of the landfill.
Implementation Costs: 1 unit @ $3,988.80
Savings: $1,935.50 annually per unit.
Funding Source: 1999 year end funds.

Project Title: Antifreeze Recycler
Description: The Techguard Coolant Recycler 88550 Antifreeze Recycler is connected to the vehicle being serviced by using the assortment of connectors provided with the 88550. The vehicle's coolant is circulated through the 88550 that removes scale, suspended material and dissolved toxic metals from the coolant. In essence the coolant never leaves the vehicle. The coolant is restored to ASTM standard 3306 and is warranted for 2 years. EPR number OR00099001.
Location: COUTES
Implementation Date: 1999
Targeted Waste Type(s): Hazardous Chemicals listed on EPA's 17 ind. Toxics List
Waste Reduction: Ethylene Glycol
Implementation Costs: $1,845.00
Savings: $2,536.00
Funding Source: 1999 year end funds

Project Title: ODS Elimination Water Coolers
Description: Eliminate all appliances and equipment that use ozone-depleting substances. These include fire extinguishers using Halon and refrigeration systems containing CFCS. EPR number OR00099005.
Location: COUTES
Implementation Date: 1999
Targeted Waste Type(s): Refrigerants-R11, R12, R22 etc.
Waste Reduction: Ozone Depleting Substances
Implementation Costs: $627.44
Savings: None
Funding Source: AGI-EPR

Project Title: Aqueous Parts Washer
Description: Landa Automatic Parts Washer is used to replace a system that uses a paraffinic hydrocarbon solution for parts cleaning. The new system uses an aqueous solution that, once filtered, can be disposed of through the local sewer system. The new system uses a biodegradable detergent. EPR number OR00099011.
Location: COUTES
Implementation Date: 1999
Targeted Waste Type(s): Hazardous Waste/EPA Toxic 17/Solvent Wastes
Waste Reduction: The elimination of a hazardous solution.
Implementation Costs: $3,153.50
Savings: Elimination of the waste stream has saved the installation $2,515.00 per year in reduced waste disposal cost.
Funding Source: 1999 year end funds.

Project Title: Paint Gun Cleaner
Description: A self-contained Inland Technology IT-100 paint gun washer. NSN 4250-01-465-3191 using EP-921 Solvent. The IT-100's features include stainless steel construction, filtration technology and standard 6.5 GPM free flow delivery air-operated diaphragm pump unit that uses solvent to clean paint guns. EPR number OR00099008.
Location: COUTES
Implementation Date: 2000
Targeted Waste Type(s): Safety Kleen
Waste Reduction: Solvents
Implementation Costs: $2,680.55 ea
Savings: $3,810.00 ea
Funding Source: 2000 year end funds

Project Title: Weapons Cleaning/Parts Washer System IT48WC
Description: The Inland Technology IT-48WC Weapons Cleaning System NSN 6850-01-397-2539 is a high volume usage system that recycles the Breakthrough solvent continuously through a high efficiency filtration system. EPR number OR00099002.
Location: COUTES
Implementation Date: 2000

Targeted Waste Type(s): Other Hazardous Materials
Waste Reduction: 1,1,1-Trichloroethane
Implementation Costs: $3,684.15
Savings: $2,031.00
Funding Source: 2000 year end funds.

Project Title: Propane Cylinder Recycling System
Description: The New Pig ProSolve system safely removes the valve stem so canister can be recycled as scrap steel. Activated carbon filters help remove Volatile Organic Compounds from propellant. EPR number OR00000001.
Location: COUTES
Implementation Date: 2001
Targeted Waste Type(s): Reactive hazardous waste - generic compressed gas, Volatile Organic Compounds.
Waste Reduction: Metal, Reactive HW
Implementation Costs: $697.03 ea
Savings: $5,112.00
Funding Source: 2001 Year-end funds.

Project Title: Secondary Containment Structures
Description: As required by the SPCCP for this facility and 40 CFR 112.3 and OAR 340-047-0160. A secondary containment structure is needed to be built to house the fuel hauling vehicles that are located at this facility. EPR OR17500001.
Location: OMS
Implementation Date: 2002
Targeted Waste Type(s): Petroleum's, Oils and Lubricants
Waste Reduction: Soil contamination.
Implementation Costs: $123,000
Savings:
Funding Source: NGB

➢ Current Pollution Prevention Projects

The status of currently funded pollution prevention projects are discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated savings, and funding sources.

Project Title: Hot Pressure Washer
Description: Purchase of a Karcher HDS 650 hot pressure washer will replace the current method of removing large automotive components from vehicles and transporting them to the washrack. It will prevent oil and other automotive fluids from dripping onto the bay floors and leaving a trail of contaminated soil from the bay to the washrack. EPR number OR00099007.
Location:
Implementation Date:
Targeted Waste Type(s): Hazardous Waste/Hydrocarbons

Waste Reduction: Elimination of contaminated soils.
Implementation Costs: $3.867.00
Savings: $2,525.00 annually.
Funding Source:

Project Title: Ultrasonic Radiator Dip Tank
Description: A dip tank operating with ultrasound as the cleaning agent in the repair and maintenance of radiators. EPR number 00099010.
Location:
Implementation Date:
Targeted Waste Type(s): Potassium Hydroxide and sludge with heavy metals.
Waste Reduction: Potassium Hydroxide
Implementation Costs: $21,000.00
Savings:
Funding Source: AGI-EPR

➢ Future Pollution Prevention Projects

The status of proposed pollution prevention projects is discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated saving, and funding sources.

ECONOMIC ANALYSIS SUMMARY FOR FUTURE POLLUTION PREVENTION PROJECTS

Polluting Process	P2 Opportunity	Investment Cost ($)	Net Annual Savings ($)	Payback Period (Years)	Net Present Value of Operation ($)
Safety Kleen	Solvent Waste Station Purchase and Modification	198,500	(5,841)	No Payback	(243,603)

POLLUTION PREVENTION IMPLEMENTATION PLAN FOR FUTURE PROJECTS							
Project Title	**Location**	**Waste Type**	**Reduction Expected (lbs./year)**	**Estimated Cost($)**	**Estimated Savings ($/yr.)**	**Expected Implement Date**	**EPR Status**
Cardboard Baler	Recycling Center	Solid Waste	400,000	99,000	30,000	CY95	Entered

Central Oregon Unit Training Equipment Site POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1997					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha	100	737		
Hazardous Waste	Potassium Hydroxide-Mercury		54		
Hazardous Waste	Magnesium Salts Barium, Chromium		38		
Hazardous Waste	Antifreeze	100	929		
Hazardous Waste	Lithium Batteries		33		
Ozone Depleting Chemical Use	Class I ODS	100			
Solid Waste	Cardboard	80			85

Central Oregon Unit Training Equipment Site POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1998					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha	100	737		
Hazardous Waste	Potassium Hydroxide-Mercury		54		
Hazardous Waste	Magnesium Salts Barium, Chromium		38		
Hazardous Waste	Antifreeze	100	929		
Hazardous Waste	Lithium Batteries		33		
Ozone Depleting Chemical Use	Class I ODS	100		16	
Solid Waste	Cardboard	80	1994		

Central Oregon Unit Training Equipment Site POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1999					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha	100	737		
Hazardous Waste	Potassium Hydroxide-Mercury		54		
Hazardous Waste	Magnesium Salts Barium, Chromium		38		
Hazardous Waste	Antifreeze	100	929	16	
Hazardous Waste	Lithium Batteries		33		
Ozone Depleting Chemical Use	Class I ODS	100			
Solid Waste	Cardboard	80	1994		

Central Oregon Unit Training Equipment Site POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2000					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
COUTES has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology.					

Central Oregon Unit Training Equipment Site POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2001					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
COUTES has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology.					

Appendix I
3/116 Cavalry Organizational Maintenance Shop

Baseline Inventory

A baseline inventory is necessary for two reasons. The quantities of waste generation or toxic material use are assessed to target specific waste streams, materials being used, or activities for pollution prevention. annual reports on waste generation and toxic material use will be compared with the baseline inventories to evaluate the effectiveness of pollution prevention projects and to monitor progress in achieving the 3/116 Cavalry Organizational Maintenance Shop.

Some categories overlap (e.g., solvent wastes, waste acids and bases, and EPA Toxic 17 wastes also will appear as hazardous waste; some of the EPA Toxic 17 wastes can be solvents). The use of the baseline inventory will assist in developing projects for meeting the pollution prevention goals of the 3/116 Cavalry Organizational Maintenance Shop.

BASELINE INVENTORY FOR 3/116 Cavalry Organizational Maintenance Shop 1994				
Waste Type	**RCRA Waste Code(s)**	**Waste (lbs)**	**% of Total Waste**	**Process or Operation Generating Waste**
Magnesium Salts Barium, Chromium	D005, D007	447	68	Battery Changeout
Chromium Filters	D007	201	32	NBC Training

3/116 Cavalry Organizational Maintenance Shop POLLUTION PREVENTION GOALS				
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline Year**	**Target Year**
Hazardous Waste	Magnesium Salts Barium, Chromium	50%	1994	1999
Hazardous Waste	Chromium Filters	75%	1994	1999
Solid Waste Ozone Depleting Chemical Use	Class I ODS	60% 40%	1994	1999 2003
TRI Reportable Releases		50%	1994	1999

Pollution Prevention Opportunity Assessment

The PPOA enables the 3/116 Cavalry Organizational Maintenance Shop to examine the alternatives available for pollution prevention. The modules identify the waste stream and the operations from which the stream may be generated, describe the process, and present several pollution prevention alternatives. Each alternative is described along with its advantages and disadvantages.

Assessment modules that apply to 3/116 CAV OMS are:

Application of Sealant/Adhesives
Battery Acids/Lead-Acid Batteries from Vehicle Maintenance
Cleanup Solvents from Painting
Electronic Equipment Battery Changeout
Halon Use in Fire Extinguishers
Manual Surface Preparation Using Rags
Refrigerants (CFCs) from Refrigeration, Cooling-Equipment Maintenance
Solid Waste
Used Antifreeze from Vehicle Maintenance
Used Oil Filters from Vehicle Maintenance
Used Oil from Vehicle Maintenance
VOC Emissions from Painting
Waste Solvents from Parts Cleaning

➢ Past Pollution Prevention Projects

The status of past pollution prevention projects are discussed. Each project is described to

include location implemented, implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemical), actual waste, actual implementation costs, actual savings, and funding sources.

Project Title: Battery Acid/Lead Acid Batteries from Vehicle Maintenance
Description: Lead Acid Batteries are being exchanged on a one-for-one basis with Sterling Battery Company.
Location: 3-116th CAV OMS
Implementation Date: 1992
Targeted Waste Type(s): Hazardous Wastes, EPA Toxic 17
Waste Reduction: 100%
Implementation Costs: $2,800.00
Savings: Elimination of the waste stream has saved the installation $2,800 per year in reduced waste disposal cost.
Funding Source:

Project Title: Parts Cleaning and Washing
Description: Installation of a ZEP parts cleaner has significantly reduced the generation because the solvent is never removed from the parts washer. Due to evaporation, small quantities of new solvent are added, as required.
Location: 3-116th CAV OMS
Implementation Date: 1994
Targeted Waste Type(s): Hazardous Waste/EPA Toxic 17/Solvent Wastes
Waste Reduction: 100%
Implementation Costs: $5,000
Savings: Elimination of the waste stream has saved the installation _____ per year in reduced waste disposal cost.
Funding Source:

Project Title: Laundry of Shop Rags and Coveralls
Description: Commercial laundering of shop rags/coveralls to prevent contaminants in homes.
Location: 3-116th CAV OMS
Implementation Date: 1994
Targeted Waste Type(s): Hazardous Waste, EPA Toxic 17
Waste Reduction: 100%
Implementation Costs: $2,500.00
Savings: N/A
Funding Source:

Project Title: Aerosol Can Depressurizer
Description: A Lab Safety Aerosol Can Depressurizer that relieves the pressure in aerosol cans and allows the residual contents to be collected for disposal. With the contents thoroughly depleted the can may be recycled as scrap metal. EPR number OR 00099004.
Location: 3-116 CAV OMS
Implementation Date: 1999
Targeted Waste Type(s): Solid Waste (metal), Reactive Hazardous Waste generic

Waste Reduction: Metal, Reactive HW
Implementation Costs: $577.00
Savings: $1,350.00
Funding Source: 1998 Year end funds

Project Title: Antifreeze Recyclers
Description: The BG PF4HO High Output Power Flush and Coolant Recycling System flushes the entire cooling system and recycles dirty antifreeze into clean, inhibited automotive spec coolant without draining or handling. The BG PF4HO eliminates the need to drain used antifreeze from the vehicle, drastically reducing the high cost of hazardous waste disposal. Utilizing a closed-loop system, the used antifreeze is circulated through a filtration process which removes impurities. EPR number OR0099001.
Location: 3/116 CAV OMS
Implementation Date: 2000
Targeted Waste Type(s): Hazardous Chemicals listed on EPA's 17 ind. Toxics List
Waste Reduction: Ethylene Glycol
Implementation Costs: $4335.60
Savings: $2,536.00
Funding Source: 2000 year end funds

Project Title: Oil Filter Crusher
Description: The Oberg Model P-300 filter crusher is used to eliminate the amount of oil left in the filter after it is removed from service. The P-300 deposits the crushed filters directly into a transport drum for disposal. EPR number OR00099003.
Location: 3/116 CAV OMS
Implementation Date: 2001
Targeted Waste Type(s): Hazardous Chemicals listed on EPA's 17 ind. Toxics List
Waste Reduction: Recovery of metal by eliminating the oil from the element allowing the metal to be recycled, and keeping the oil saturated filters out of the landfill.
Implementation Costs: $3,988.80 ea.
Savings: $1,935.50 annually per unit.
Funding Source: 2001 Year-end funds.

Project Title: Weapons Cleaning/Parts Washer System IT48WC
Description: The Inland Technology IT-48WC Weapons Cleaning System NSN 6850-01-397-2539 is a high volume usage system that recycles the Breakthrough solvent continuously through a high efficiency filtration system. EPR number OR00099002.
Location: 3/116 CAV OMS
Implementation Date: 2001
Targeted Waste Type(s): Other Hazardous Materials
Waste Reduction: 1,1,1-Trichloroethane
Implementation Costs: $3,684.15
Savings: $2,031.00
Funding Source: 2001 Year-end funds.

Project Title: Propane Cylinder Recycling System
Description: The New Pig ProSolve system safely removes the valve stem so canister can be recycled as scrap steel. Activated carbon filters help remove Volatile Organic Compounds from propellant. EPR number OR00000001.
Location: 3/116 CAV OMS
Implementation Date: 2001
Targeted Waste Type(s): Reactive hazardous waste - generic compressed gas, Volatile Organic Compounds.
Waste Reduction: Metal, Reactive HW
Implementation Costs: $697.03 ea
Savings: $5,112.00
Funding Source: 2001 Year-end funds.

Project Title: Secondary Containment Structures
Description: As required by the SPCCP for this facility and 40 CFR 112.3 and OAR 340-047-0160. A secondary containment structure is needed to be built to house the fuel hauling vehicles that are located at this facility. EPR OR10000001.
Location: OMS
Implementation Date: 2002
Targeted Waste Type(s): Petroleum's, Oils and Lubricants
Waste Reduction: Soil contamination.
Implementation Costs: $297,480
Savings:
Funding Source: NGB

➢ Current Pollution Prevention Projects

The status of currently funded pollution prevention projects are discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated savings, and funding sources.

Project Title: Hot Pressure Washer
Description: Purchase of a Karcher HDS 650 hot pressure washer will replace the current method of removing large automotive components from vehicles and transporting them to the washrack. It will prevent oil and other automotive fluids from dripping onto the bay floors and leaving a trail of contaminated soil from the bay to the washrack. EPR number OR00099007.
Location: 3/116 CAV OMS
Implementation Date:
Targeted Waste Type(s): Hazardous Waste/Hydrocarbons
Waste Reduction: Elimination of contaminated soils.
Implementation Costs: $3.867.00
Savings: $2,525.00 annually.
Funding Source: AGI-EPR

➢ Future Pollution Prevention Projects

The status of proposed pollution prevention projects is discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated saving, and funding sources.

ECONOMIC ANALYSIS SUMMARY FOR FUTURE POLLUTION PREVENTION PROJECTS

Polluting Process	P2 Opportunity	Investment Cost ($)	Net Annual Savings ($)	Payback Period (Years)	Net Present Value of Operation ($)
Safety Kleen	Solvent Waste Station Purchase and Modification	198,500	(5,841)	No Payback	(243,603)
Safety Kleen	Aqueous Cleaner with Jetwasher	701,050	44,639	15.7	(356,345)

POLLUTION PREVENTION IMPLEMENTATION PLAN FOR FUTURE PROJECTS

Project Title	Location	Waste Type	Reduction Expected (lbs./year)	Estimated Cost($)	Estimated Savings ($/yr.)	Expected Implement Date	EPR Status
Cardboard Baler	Recycling Center	Solid Waste	400,000	99,000	30,000	CY95	Entered

3/116 Cavalry Organizational Maintenance Shop POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1997					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Magnesium Salts Barium, Chromium	50	447		
Hazardous Waste	Chromium Filters	75	201		
Solid Waste Ozone Depleting Chemical Use	Class I ODS	100			

3/116 Cavalry Organizational Maintenance Shop POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1998					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Magnesium Salts Barium, Chromium	50	447		
Hazardous Waste	Chromium Filters	75	201	135	
Solid Waste Ozone Depleting Chemical Use	Class I ODS	100			

3/116 Cavalry Organizational Maintenance Shop POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1999					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Magnesium Salts Barium, Chromium	50	447		
Hazardous Waste	Chromium Filters	75	201	135	
Solid Waste Ozone Depleting Chemical Use	Class I ODS	100			

3/116 Cavalry Organizational Maintenance Shop POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2000					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
3/116 CAV OMS has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology.					

3/116 Cavalry Organizational Maintenance Shop POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2001					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
3/116 CAV OMS has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology.					

Appendix J
AASF #1

Baseline Inventory

A baseline inventory is necessary for two reasons. The quantities of waste generation or toxic material use are assessed to target specific waste streams, materials being used, or activities for pollution prevention. annual reports on waste generation and toxic material use will be compared with the baseline inventories to evaluate the effectiveness of pollution prevention projects and to monitor progress in achieving the Army Aviation Support Facility's pollution prevention goals.

BASELINE INVENTORY FOR AASF #1 1994				
Waste Type	**RCRA Waste Code(s)**	**Waste (lbs)**	**% of Total Waste**	**Process or Operation Generating Waste**
Petroleum Naphtha	D001	1144	100	Parts Cleaning

AASF #1 POLLUTION PREVENTION GOALS				
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline Year**	**Target Year**
Hazardous Waste	Petroleum Naphtha	80%	1994	1997
Solid Waste	Cardboard	80%	1994	1996
Ozone Depleting Chemical Use	Class I and Class II	40% 60%	1994	1997 2003
TRI Reportable Releases		50%	1994	1999

Pollution Prevention Opportunity Assessment

The PPOA enables the Army Aviation Support Facility to examine the alternatives available for pollution prevention. The modules identify the waste stream and the operations from which the stream may be generated, describe the process, and present several pollution prevention alternatives. Each alternative is described along with its advantages and disadvantages.

Assessment modules that apply to the AASF are:

Electronic Equipment Battery Changeout
Halon Use in Fire Extinguishers
Manual Surface Preparation Using Rags
Refrigerants (CFCs) from Refrigeration, Cooling-Equipment Maintenance
Solid Waste
Aircraft Washing
Waste Solvents from Parts Cleaning

➢ Past Pollution Prevention Projects

The status of past pollution prevention projects are discussed. Each project is described to include location implemented, implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemical), actual waste, actual implementation costs, actual savings, and funding sources.

Project Title: Parts Washer
Description:. Switched from Safety-Kleen washers to ZEP washers
Location: Hangar #1 and #2
Implementation Date: Spring 1995
Targeted Waste Type(s): Solvents
Waste Reduction: 80%
Implementation Costs: $5,000
Savings: $2,800
Funding Source: AGI-ENV

Project Title: Removal of old water cooler
Description: Replaced old water cooler with a non-ODS cooler.
Location: Hangar #1
Implementation Date: July 1996
Targeted Waste Type(s): ODS
Waste Reduction:
Implementation Costs:
Savings:
Funding Source:

Project Title: Cardboard Recycling
Description: Implemented a cardboard recycling center in Hangar #2

Location: Hangar #2
Implementation Date: 1995
Targeted Waste Type(s): Cardboard
Waste Reduction: Landfill Solid Waste
Implementation Costs: None
Savings:
Funding Source:

Project Title: Replacement air conditioners
Description: Replaced old air conditioners that used ODS with non-ODS conditioners
Location: Hangar #2 Avionics
Implementation Date: May 1997
Targeted Waste Type(s): Ozone Depleting Substances
Waste Reduction:
Implementation Costs:
Savings:
Funding Source:

Project Title: Aerosol Can Depressurizer
Description: A Lab Safety Aerosol Can Depressurizer that relieves the pressure in aerosol cans and allows the residual contents to be collected for disposal. With the contents thoroughly depleted the can may be recycled as scrap metal. EPR number OR 00099004.
Location: Hangar #2
Implementation Date: 1998
Targeted Waste Type(s): Solid Waste (metal), Reactive Hazardous Waste generic
Waste Reduction: Metal, Reactive HW
Implementation Costs: $577.00
Savings: $1,350.00
Funding Source: 1998 Year-end funds

Project Title: ODS Elimination Water Coolers
Description: Eliminate all appliances and equipment that use ozone-depleting substances. These include fire extinguishers using Halon and refrigeration systems containing CFCs. EPR number OR00099006.
Location: AASF#1
Implementation Date: 1999
Targeted Waste Type(s): Refrigerants-R11, R12, R22 etc.
Waste Reduction: Ozone Depleting Substances
Implementation Costs: $5,224.08
Savings:
Funding Source: 1999 year end funds.

Project Title: Weapons Cleaning/Parts Washer System IT48WC
Description: The Inland Technology IT-48WC Weapons Cleaning System NSN 6850-01-397-2539 is a high volume usage system that recycles the Breakthrough solvent continuously through a high efficiency filtration system. EPR number OR00099002.

Location: AASF #1
Implementation Date: 2000
Targeted Waste Type(s): Other Hazardous Materials
Waste Reduction: 1,1,1-Trichloroethane
Implementation Costs: $2,476.00
Savings: $2,031.00
Funding Source: 2000 year end funds.

Project Title: Propane Cylinder Recycling System
Description: The New Pig ProSolve system safely removes the valve stem so canister can be recycled as scrap steel. Activated carbon filters help remove Volatile Organic Compounds from propellant. EPR number OR00000001.
Location: AASF #1
Implementation Date: 2001
Targeted Waste Type(s): Reactive hazardous waste - generic compressed gas, Volatile Organic Compounds.
Waste Reduction: Metal, Reactive HW
Implementation Costs: $697.03 ea
Savings: $5,112.00
Funding Source: 2001 Year-end funds.

Project Title: Secondary Containment Structures
Description: As required by the SPCCP for this facility and 40 CFR 112.3 and OAR 340-047-0160. A secondary containment structure is needed to be built to house the fuel hauling vehicles that are located at this facility. EPR OR20500001.
Location: Airfield refueling and C-23 Hangar
Implementation Date: 2002
Targeted Waste Type(s): Petroleum's, Oils and Lubricants
Waste Reduction: Soil contamination.
Implementation Costs: $128,774
Savings:
Funding Source:

➢ Current Pollution Prevention Projects

The status of currently funded pollution prevention projects are discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated savings, and funding sources.

➢ Future Pollution Prevention Projects

The status of proposed pollution prevention projects is discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated saving, and funding sources.

Project Title: Replacement of NiCad Batteries
Description: Replace NiCad batteries with lead/acid gel batteries.
Location: AASF#1
Implementation Date: 2003
Targeted Waste Type(s): Fire Suppressants-*Halons*, Refrigerants-*R11, R12, R22 etc.*
Waste Reduction: Ozone Depleting Substances
Implementation Costs: 75,600
Savings:
Funding Source: AGI-EPR

ECONOMIC ANALYSIS SUMMARY FOR FUTURE POLLUTION PREVENTION PROJECTS

Polluting Process	P2 Opportunity	Investment Cost ($)	Net Annual Savings ($)	Payback Period (Years)	Net Present Value of Operation ($)
Safety Kleen	Solvent Waste Station Purchase and Modification	198,500	(5,841)	No Payback	(243,603)
Safety Kleen	Aqueous Cleaner with Jetwasher	701,050	44,639	15.7	(356,345)
A/C Washing	Closed loop System	>100,000			
Replacement of NiCad Batteries	Use Lead-Acid gel batteries				

POLLUTION PREVENTION IMPLEMENTATION PLAN FOR FUTURE PROJECTS

Project Title	Location	Waste Type	Reduction Expected (lbs./year)	Estimated Cost($)	Estimated Savings ($/yr.)	Expected Implement Date	EPR Status
Cardboard Baler	Recycling Center	Solid Waste	400,000	99,000	30,000	CY95	Entered

ARMY AVIATION SUPPORT FACILITY'S POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1997					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha	80%	1144	30	
Solid Waste	Cardboard	80%			
Ozone Depleting Chemical Use	Class I ODS	100%			

ARMY AVIATION SUPPORT FACILITY'S POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1998					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha	80%	1144	390	
Solid Waste	Cardboard	80%			
Ozone Depleting Chemical Use	Class I ODS	100%		112	

ARMY AVIATION SUPPORT FACILITY'S POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1999					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha	80%	1144		
Solid Waste	Cardboard	80%			
Ozone Depleting Chemical Use	Class I ODS	100%			

ARMY AVIATION SUPPORT FACILITY'S POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2000					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
AASF#1 has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology.					

ARMY AVIATION SUPPORT FACILITY'S POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2001					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
AASF#1 has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology.					

Appendix K
141st SPT BN OMSS

Baseline Inventory

A baseline inventory is necessary for two reasons. The quantities of waste generation or toxic material use are assessed to target specific waste streams, materials being used, or activities for pollution prevention. annual reports on waste generation and toxic material use will be compared with the baseline inventories to evaluate the effectiveness of pollution prevention projects and to monitor progress in achieving the 141st SPT BN Organizational Maintenance Sub-Shop pollution prevention goals.

BASELINE INVENTORY FOR 141st SPT BN Organizational Maintenance Sub-Shop 1994				
Waste Type	**RCRA Waste Code(s)**	**Waste (lbs)**	**% of Total Waste**	**Process or Operation Generating Waste**
Petroleum Naphtha	D001	207	6	Parts Cleaning
Waste Paint	D001, D008	433	14	Painting Operations
Potassium Hydroxide-Mercury	D009	114	3	Battery Changeout
Coating Solution	D001	19	.06	Vehicle Maintenance
Magnesium Salts Barium, Chromium	D005, D007	1240	40	Battery Changeout
Chromium Filters	D007	153	5	NBC Training
Lithium Batteries	D001, D003	882	28	Battery Changeout

141st SPT BN Organization Maintenance Sub-Shop POLLUTION PREVENTION GOALS				
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline Year**	**Target Year**
Hazardous Waste	Petroleum Naphtha	100	1994	1995
Hazardous Waste	Waste Paint	100	1994	1995
Hazardous Waste	Potassium Hydroxide-Mercury	100	1994	1995
Hazardous Waste	Coating Solution	100	1994	1995
Hazardous Waste	Magnesium Salts Barium, Chromium		1994	
Hazardous Waste	Chromium Filters		1994	
Hazardous Waste	Lithium Batteries		1994	
Solid Waste Ozone Depleting Chemical Use	Class I ODS	100	1994	2003
TRI Reportable Releases		50%	1994	1999

Pollution Prevention Opportunity Assessment

The PPOA enables the 141st SPT BN OMSS to examine the alternatives available for pollution prevention. The modules identify the waste stream and the operation from which the stream may be generated, describe the process, and present several pollution prevention alternatives. Each alternative is described along with its advantages and disadvantages.

Assessment modules that apply to 141st SPT BN OMSS are:

Battery Acids/Lead-Acid Batteries from Vehicle Maintenance
Electronic Equipment Battery Changeout
Manual Surface Preparation Using Rags
Refrigerants (CFCs) from Refrigeration, Cooling-Equipment Maintenance
Solid Waste
Used Antifreeze from Vehicle Maintenance
Used Oil Filters from Vehicle Maintenance
Used Oil from Vehicle Maintenance
Vehicle and Aircraft Washing

Waste Solvents from Parts Cleaning

➢ Past Pollution Prevention Projects

The status of past pollution prevention projects are discussed. Each project is described to include location implemented, implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemical), actual waste, actual implementation costs, actual savings, and funding sources.

Project Title: Parts Cleaning and Washing
Description: Installation of a ZEP parts cleaner has significantly reduced the generation because the solvent is never removed from the parts washer. Due to evaporation, small quantities of new solvent are added, as required.
Location: 141 SPT BN OMSS
Implementation Date: 1994
Targeted Waste Type(s): Hazardous Waste/EPA Toxic 17/Solvent Wastes
Waste Reduction: 100%
Implementation Costs: $5000.00
Savings: Elimination of the waste stream has saved the installation $2400.00 per year in reduced waste disposal cost.
Funding Source: AGI-EPR

Project Title: Battery Acid/Lead from vehicle maintenance
Description: Lead Acid batteries are being exchanged on a one-for-one basis with Sterling Battery Company
Location: 141st SPT BN OMSS
Implementation Date: 1996
Targeted Waste Type(s): Hazardous wastes EPA Toxic 17
Waste Reduction: 100%
Implementation Costs: N/A
Savings:
Funding Source:

Project Title: Cardboard Recycling
Description: Cardboard is collected in a bin provided by an off-site vendor for pickup and reclamation.
Location: 141st SPT BN OMSS
Implementation Date: 1996
Targeted Waste Type(s): Solid Waste
Waste Reduction: 80%
Implementation Costs: N/A
Savings:
Funding Source: N/A

Project Title: Antifreeze Reclamation
Description: Used antifreeze is collected and picked up at the activity location by an outside vendor.
Location: 141st SPT BN OMSS
Implementation Date: September 1997
Targeted Waste Type(s): Ethylene Glycol
Waste Reduction: Hazardous waste
Implementation Costs: None
Savings: $2,536.00.
Funding Source: N/A

Project Title: ODS Elimination Water Coolers
Description: Eliminate all appliances and equipment that use ozone depleting substances. These include fire extinguishers using Halon and refrigeration systems containing CFCS. EPR number OR00099006.
Location: 141 SPT BN OMSS
Implementation Date: 1999
Targeted Waste Type(s): Refrigerants-R11, R12, R22 etc.
Waste Reduction: Ozone Depleting Substances
Implementation Costs: $2,496.00
Savings:
Funding Source: 1999 year end funds.

Project Title: Oil Filter Crusher
Description: The Oberg Model P-300 filter crusher is used to eliminate the amount of oil left in the filter after it is removed from service. The P-300 deposits the crushed filters directly into a transport drum for disposal. EPR number OR00099003.
Location: 141 SPT BN OMSS
Implementation Date: 2000
Targeted Waste Type(s): Hazardous Chemicals listed on EPA's 17 ind. Toxics List
Waste Reduction: Recovery of metal by eliminating the oil from the element allowing the metal to be recycled, and keeping the oil saturated filters out of the landfill.
Implementation Costs: 1 units @ $3,988.80 ea. Total Investment $3,988.80
Savings: $1,935.50 annually per unit. Total expected annual savings $1,935.50.
Funding Source: 2000 Year end funds

Project Title: Propane Cylinder Recycling System
Description: The New Pig ProSolve system safely removes the valve stem so canister can be recycled as scrap steel. Activated carbon filters help remove Volatile Organic Compounds from propellant. EPR number OR00000001.
Location: 141st SPT BN OMSS
Implementation Date: 2001
Targeted Waste Type(s): Reactive hazardous waste - generic compressed gas, Volatile Organic Compounds.
Waste Reduction: Metal, Reactive HW
Implementation Costs: $697.03 ea

Savings: $5,112.00
Funding Source: 2001 Year-end funds.

Project Title: Secondary Containment Structures
Description: As required by the SPCCP for this facility and 40 CFR 112.3 and OAR 340-047-0160. A secondary containment structure is needed to be built to house the fuel hauling vehicles that are located at this facility. EPR OR16000001.
Location: OMS
Implementation Date: 2002
Targeted Waste Type(s): Petroleum's, Oils and Lubricants
Waste Reduction: Soil contamination.
Implementation Costs: $149,650
Savings:
Funding Source: NGB

➢ Current Pollution Prevention Projects

The status of currently funded pollution prevention projects are discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated savings, and funding sources.

➢ Future Pollution Prevention Projects

The status of proposed pollution prevention projects is discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated saving, and funding sources.

ECONOMIC ANALYSIS SUMMARY FOR FUTURE POLLUTION PREVENTION PROJECTS					
Polluting Process	**P2 Opportunity**	**Investment Cost ($)**	**Net Annual Savings ($)**	**Payback Period (Years)**	**Net Present Value of Operation ($)**
Safety Kleen	Solvent Waste Station Purchase and Modification	198,500	(5,841)	No Payback	(243,603)
Safety Kleen	Aqueous Cleaner with Jetwasher	701,050	44,639	15.7	(356,345)
Vehicle Washing Washrack	Wash rack sludge Oil/Water Separator	45,000			

POLLUTION PREVENTION IMPLEMENTATION PLAN FOR FUTURE PROJECTS							
Project Title	**Location**	**Waste Type**	**Reduction Expected (lbs./year)**	**Estimated Cost($)**	**Estimated Savings ($/yr.)**	**Expected Implement Date**	**EPR Status**
Cardboard Baler	Recycling Center	Solid Waste	400,000	99,000	30,000	CY95	Entered

141st SPT BN OMSS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1997					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha	100	207		
Hazardous Waste	Waste Paint	100	433		
Hazardous Waste	Potassium Hydroxide-Mercury	100	114		
Hazardous Waste	Coating Solution	100	19		
Hazardous Waste	Magnesium Salts Barium, Chromium		1240		
Hazardous Waste	Chromium Filters		153		
Hazardous Waste	Lithium Batteries		882		
Ozone Depleting Substances	CFCs *(refrigerants)* and Fire Suppressants *(Halons)*	100			
Solid Waste	Cardboard	85			

141st SPT BN OMSS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1998					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha	100	207		
Hazardous Waste	Waste Paint	100	433		
Hazardous Waste	Potassium Hydroxide-Mercury	100	114		
Hazardous Waste	Coating Solution	100	19		
Hazardous Waste	Magnesium Salts Barium, Chromium		1240		
Hazardous Waste	Chromium Filters		153		
Hazardous Waste	Lithium Batteries		882		
Ozone Depleting Substances	CFCs *(refrigerants)* and Fire Suppressants *(Halons)*	100		48	
Solid Waste	Cardboard	85			

141st SPT BN OMSS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1999					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha	100	207		
Hazardous Waste	Waste Paint	100	433		
Hazardous Waste	Potassium Hydroxide-Mercury	100	114		
Hazardous Waste	Coating Solution	100	19		
Hazardous Waste	Magnesium Salts Barium, Chromium		1240		
Hazardous Waste	Chromium Filters		153		
Hazardous Waste	Lithium Batteries		882		
Ozone Depleting Substances	CFCs *(refrigerants)* and Fire Suppressants *(Halons)*	100		48	
Solid Waste	Cardboard	85			

141st SPT BN OMSS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2000					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
141st SPT BN OMSS has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology.					

141st SPT BN OMSS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2001					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
141st SPT BN OMSS has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology.					

Appendix L
141st SPT BN OMS

Baseline Inventory

A baseline inventory is necessary for two reasons. The quantities of waste generation or toxic material use are assessed to target specific waste streams, materials being used, or activities for pollution prevention. annual reports on waste generation and toxic material use will be compared with the baseline inventories to evaluate the effectiveness of pollution prevention projects and to monitor progress in achieving the 141st Support Battalion Organizational Maintenance Shop pollution prevention goals.

BASELINE INVENTORY FOR 141st SPT BN Organizational Maintenance Shop 1994				
Waste Type	**RCRA Waste Code(s)**	**Waste (lbs)**	**% of Total Waste**	**Process or Operation Generating Waste**
Petroleum Naphtha	D001	96	15	Parts Cleaning
Chromium filters	D007	105	16	NBC Training
Lithium Batteries	D001, D003	66	12	Battery Changeout
Magnesium Salts Barium, Chromium	D005, D007	350	56	Battery Changeout
Potassium Hydroxide-Mercury	D009	5	1	Battery Changeout

141st SPT BN OMS POLLUTION PREVENTION GOALS				
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline Year**	**Target Year**
Hazardous Waste	Petroleum Naphtha	100	1994	1995
Hazardous Waste	Chromium filters		1994	
Hazardous Waste	Lithium Batteries		1994	
Hazardous Waste	Magnesium Salts Barium, Chromium		1994	
Hazardous Waste	Potassium Hydroxide-Mercury	100	1994	1995
Solid Waste	Cardboard and Recyclable Paper	85	1994	1998
Ozone Depleting Chemical Use	CFCs *(refrigerants i.e. R-12, R-22)* Fire Suppressants *(Halons)*	100	1994	2003
TRI Reportable Releases		50%	1994	1999

Pollution Prevention Opportunity Assessment

The PPOA enables the 141st SPT BN OMS to examine the alternatives available for pollution prevention. The modules identify the waste stream and the operations from which the stream may be generated, describe the process, and present several pollution prevention alternatives. Each alternative is described along with its advantages and disadvantages.

Assessment modules that apply to the 141st BN OMS are:

Application of Sealant/Adhesives
Battery Acids/Lead-Acid Batteries from Vehicle Maintenance
Cleanup Solvents from Painting
Electronic Equipment Battery Changeout
Halon Use in Fire Extinguishers
Manual Surface Preparation Using Rags
Radiator-Cleaning Waste
Refrigerants (CFCs) from Refrigeration, Cooling-Equipment Maintenance
Solid Waste
Used Antifreeze from Vehicle Maintenance

Used Oil Filters from Vehicle Maintenance
Used Oil from Vehicle Maintenance
Vehicle and Aircraft Washing
Waste Solvents from Parts Cleaning

➢ Past Pollution Prevention Projects

The status of past pollution prevention projects are discussed. Each project is described to include location implemented, implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemical), actual waste, actual implementation costs, actual savings, and funding sources.

Project Title: Parts Cleaning and Washing
Description: Installation of a ZEP parts cleaner has significantly reduced the generation because the solvent is never removed from the parts washer. Due to evaporation, small quantities of new solvent are added, as required.
Location: 141 SPT BN
Implementation Date: 1994
Targeted Waste Type(s): Hazardous Waste/EPA Toxic 17/Solvent Wastes
Waste Reduction: 100%
Implementation Costs: $5000.00
Savings: Elimination of the waste stream has saved the installation $2400.00 per year in reduced waste disposal cost.
Funding Source:

Project Title: Battery Acid/Lead from vehicle maintenance
Description: Lead Acid batteries are being exchanged on a one-for-one basis with Sterling Battery Company
Location: 141 SPT BN
Implementation Date: 1996
Targeted Waste Type(s): Hazardous wastes EPA Toxic 17
Waste Reduction: 100%
Implementation Costs: N/A
Savings:
Funding Source:

Project Title: Cardboard Recycling
Description: Cardboard is collected in a bin provided by an off-site vendor for pickup and reclamation.
Location: 141 SPT BN OMS
Implementation Date: 1996
Targeted Waste Type(s): Solid Waste
Waste Reduction: 80%
Implementation Costs: N/A
Savings:
Funding Source: N/A

Project Title: Antifreeze Recycler
Description: The Techguard Coolant Recycler 88550 Antifreeze Recycler is connected to the vehicle being serviced by using the assortment of connectors provided with the 88550. The vehicle's coolant is circulated through the 88550 that removes scale, suspended material and dissolved toxic metals from the coolant. In essence the coolant never leaves the vehicle. The coolant is restored to ASTM standard 3306 and is warranted for 2 years. EPR number OR00099001.
Location: 141st BN OMS
Implementation Date: 1998
Targeted Waste Type(s): Hazardous Chemicals listed on EPA's 17 ind. Toxics List
Waste Reduction: Ethylene Glycol
Implementation Costs: $3,332.16
Savings: $2,536.00
Funding Source: 1998 year end funds

Project Title: ODS Elimination Water Coolers
Description: Eliminate all appliances and equipment that use ozone-depleting substances. These include fire extinguishers using Halon 1301 and refrigeration systems containing CFCS. EPR number OR00099006.
Location: 141 SPT BN OMS
Implementation Date: 1999
Targeted Waste Type(s): Refrigerants-R11, R12, R22 etc.
Waste Reduction: Ozone Depleting Substances
Implementation Costs: $1,664.00
Savings:
Funding Source: AGI EPR

Project Title: Oil Filter Crusher
Description: The Oberg Model P-300 filter crusher is used to eliminate the amount of oil left in the filter after it is removed from service. The P-300 deposits the crushed filters directly into a transport drum for disposal. EPR number OR00099003.
Location: 141 SPT BN OMS
Implementation Date: 2000
Targeted Waste Type(s): Hazardous Chemicals listed on EPA's 17 ind. Toxics List
Waste Reduction: Recovery of metal by eliminating the oil from the element allowing the metal to be recycled, and keeping the oil saturated filters out of the landfill.
Implementation Costs: 1 units @ $3,988.80 ea. Total Investment $3,988.80
Savings: $1,935.50 annually per unit. Total expected annual savings $1,935.50.
Funding Source: 2000 Year end funds

Project Title: Propane Cylinder Recycling System
Description: The New Pig ProSolve system safely removes the valve stem so canister can be recycled as scrap steel. Activated carbon filters help remove Volatile Organic Compounds from propellant. EPR number OR00000001.
Location: 141st SPT BN OMS

Implementation Date:
Targeted Waste Type(s): Reactive hazardous waste - generic compressed gas, Volatile Organic compounds.
Waste Reduction: Metal, Reactive HW
Implementation Costs: $697.44 ea
Savings: $5,112.00
Funding Source: AGI-EPR

Project Title: Secondary Containment Structures
Description: As required by the SPCCP for this facility and 40 CFR 112.3 and OAR 340-047-0160. A secondary containment structure is needed to be built to house the fuel hauling vehicles that are located at this facility. EPR OR16500001.
Location: OMS
Implementation Date: 2002
Targeted Waste Type(s): Petroleum's, Oils and Lubricants
Waste Reduction: Soil contamination.
Implementation Costs: $249,416
Savings:
Funding Source: NGB

➢ Current Pollution Prevention Projects

The status of currently funded pollution prevention projects are discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated savings, and funding sources.

➢ Future Pollution Prevention Projects

The status of proposed pollution prevention projects is discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated saving, and funding sources.

ECONOMIC ANALYSIS SUMMARY FOR FUTURE POLLUTION PREVENTION PROJECTS					
Polluting Process	**P2 Opportunity**	**Investment Cost ($)**	**Net Annual Savings ($)**	**Payback Period (Years)**	**Net Present Value of Operation ($)**
Safety Kleen	Solvent Waste Station Purchase and Modification	198,500	(5,841)	No Payback	(243,603)
Safety Kleen	Aqueous Cleaner with Jetwasher	701,050	44,639	15.7	(356,345)

POLLUTION PREVENTION IMPLEMENTATION PLAN FOR FUTURE PROJECTS							
Project Title	**Location**	**Waste Type**	**Reduction Expected (lbs./year)**	**Estimated Cost($)**	**Estimated Savings ($/yr.)**	**Expected Implement Date**	**EPR Status**
Cardboard Baler	Recycling Center	Solid Waste	400,000	99,000	30,000	CY95	Entered

141st SPT BN OMS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1997					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha	100	96	0	
Hazardous Waste	Chromium filters		105	3	
Hazardous Waste	Lithium Batteries		66	400	
Hazardous Waste	Magnesium Salts Barium, Chromium	100	350		
Hazardous Waste	Potassium Hydroxide-Mercury		5		
Solid Waste	Cardboard and Recyclable Paper	85			
Ozone Depleting Chemical Use	CFCs *(refrigerants i.e. R-12, R-22)* Fire Suppressants *(Halons)*	100			

141st SPT BN OMS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1998					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha	100	96		
Hazardous Waste	Chromium filters		105		
Hazardous Waste	Lithium Batteries		66		
Hazardous Waste	Magnesium Salts Barium, Chromium	100	350		
Hazardous Waste	Potassium Hydroxide-Mercury		5		
Solid Waste	Cardboard and Recyclable Paper	85			
Ozone Depleting Chemical Use	CFCs *(refrigerants i.e. R-12, R-22)* Fire Suppressants *(Halons)*	100		32	

141st SPT BN OMS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1999					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha	100	96		
Hazardous Waste	Chromium filters		105		
Hazardous Waste	Lithium Batteries		66		
Hazardous Waste	Magnesium Salts Barium, Chromium	100	350		
Hazardous Waste	Potassium Hydroxide-Mercury		5		
Solid Waste	Cardboard and Recyclable Paper	85			
Ozone Depleting Chemical Use	CFCs *(refrigerants i.e. R-12, R-22)* Fire Suppressants *(Halons)*	100		32	

141st SPT BN OMS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2000					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
141st SPT BN OMS has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology.					

141st SPT BN OMS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2001					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
141st SPT BN OMS has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology.					

Appendix M
HQ STARC (-) OMS

Baseline Inventory

A baseline inventory is necessary for two reasons. The quantities of waste generation or toxic material use are assessed to target specific waste streams, materials being used, or activities for pollution prevention. annual reports on waste generation and toxic material use will be compared with the baseline inventories to evaluate the effectiveness of pollution prevention projects and to monitor progress in achieving the Headquarters State Area Command Organizational Maintenance Shop pollution prevention goals.

BASELINE INVENTORY FOR HQ STARC (-) Organizational Maintenance Shop 1994				
Waste Type	**RCRA Waste Code(s)**	**Waste (lbs)**	**% of Total Waste**	**Process or Operation Generating Waste**
Petroleum Naphtha	D001	870	72	Parts Cleaning
Ethanol	D001	33	2	NBC Training
Chromium filters	D007	105	8	NBC Training
Lead	D008	23	3	Indoor Firing Range
Lithium Batteries	D001, D003	47	5	Battery Changeout
Sodium Hydroxide	D001, D002	66	6	Printing Process
Magnesium Salts Barium, Chromium	D005, D007	39	3	Battery Changeout
Potassium Hydroxide-Mercury	D009	12	1	Battery Changeout

HQ STARC (-) OMS POLLUTION PREVENTION GOALS				
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline Year**	**Target Year**
Hazardous Waste	Petroleum Naphtha	100	1994	1998
Hazardous Waste	Ethanol	100	1994	1998
Hazardous Waste	Chromium filters	100	1994	1998
Hazardous Waste	Lead	100	1994	1998
Hazardous Waste	Lithium Batteries	100	1994	1998
Hazardous Waste	Sodium Hydroxide	100	1994	1998
Hazardous Waste	Magnesium Salts Barium, Chromium	100	1994	1998
Hazardous Waste	Potassium Hydroxide- Mercury	100	1994	1998
Ozone Depleting Chemical Use	CFCs *(refrigerants i.e. R-12, R-22)* Fire Suppressant Systems *(Halons)*	80	1994	1999
Solid Waste	Cardboard & Recyclable Paper	85	1994	2000
TRI Reportable Releases		50%	1994	1999

Pollution Prevention Opportunity Assessment

The PPOA enables the HQ STARC (-) OMS to examine the alternatives available for pollution prevention. The modules identify the waste stream and the operation from which the stream may be generated, describe the process, and present several pollution prevention alternatives. Each alternative is described along with its advantages and disadvantages.

Assessment modules that apply to HQ STARC (-) OMS are:

Application of Sealant/Adhesives
Battery Acids/Lead-Acid Batteries from Vehicle Maintenance
Cleanup Solvents from Painting
Electronic Equipment Battery Changeout

Halon Use in Fire Extinguishers
Manual Surface Preparation Using Rags
Refrigerants (CFCs) from Refrigeration, Cooling-Equipment Maintenance
Solid Waste
Used Antifreeze from Vehicle Maintenance
Used Oil Filters from Vehicle Maintenance
Used Oil from Vehicle Maintenance
Vehicle and Aircraft Washing
Waste Solvents from Parts Cleaning

➢ Past Pollution Prevention Projects

The status of past pollution prevention projects are discussed. Each project is described to include location implemented, implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemical), actual waste, actual implementation costs, actual savings, and funding sources.

Project Title: Parts Cleaning and Washing
Description: Installation of a ZEP parts cleaner has significantly reduced the generation because the solvent is never removed from the parts washer. Due to evaporation, small quantities of new solvent are added, as required.
Location: 141 SPT BN
Implementation Date: 1994
Targeted Waste Type(s): Hazardous Waste/EPA Toxic 17/Solvent Wastes
Waste Reduction: 100%
Implementation Costs: $5000.00
Savings: Elimination of the waste stream has saved the installation $2400.00 per year in reduced waste disposal cost.
Funding Source:

Project Title: Antifreeze Recyclers
Description: The Techguard Coolant Recycler 88550 Antifreeze Recycler is connected to the vehicle being serviced by using the assortment of connectors provided with the 88550. The vehicle's coolant is circulated through the 88550 that removes scale, suspended material and dissolved toxic metals from the coolant. In essence the coolant never leaves the vehicle. The coolant is restored to ASTM standard 3306 and is warranted for 2 years. EPR number OR00099001.
Location: HQ STARC (-) OMS
Implementation Date: 1998
Targeted Waste Type(s): Hazardous Chemicals listed on EPA's 17 ind. Toxics List
Waste Reduction: Ethylene Glycol
Implementation Costs: $3,332.16
Savings: $2,536.00
Funding Source: 1998 year end funds

Project Title: Oil Filter Crusher
Description: The Oberg Model P-300 filter crusher is used to eliminate the amount of oil left in the filter after it is removed from service. The P-300 deposits the crushed filters directly into a transport drum for disposal. EPR number OR00099003.
Location: HQ STARC (-) OMS
Implementation Date: 1998
Targeted Waste Type(s): Hazardous Chemicals listed on EPA's 17 ind. Toxics List
Waste Reduction: Recovery of metal by eliminating the oil from the element allowing the metal to be recycled, and keeping the oil saturated filters out of the landfill.
Implementation Costs: 2 units @ $3,988.80 ea. Total Investment $7,977.60
Savings: $1,935.50 annually per unit. Total expected annual savings $3,871.00
Funding Source: 1998 Year end funds

Project Title: ODS Elimination Water Coolers
Description: Eliminate all appliances and equipment that use ozone-depleting substances. These include fire extinguishers using Halon and refrigeration systems containing CFCS. EPR number OR00099006.
Location: HQ STARC (-) OMS
Implementation Date: 1999
Targeted Waste Type(s): Refrigerants-R11, R12, R22 etc.
Waste Reduction: Ozone Depleting Substances
Implementation Costs: $832.00
Savings:
Funding Source: Year-end funds.

Project Title: Aqueous Parts Washer
Description: Landa Automatic Parts Washer SJ-10H is used to replace a system that uses a paraffinic hydrocarbon solution for parts cleaning. The new system uses an aqueous solution that, once filtered, can be disposed of through the local sewer system. The new system uses a biodegradable detergent. EPR number OR00099011.
Location: HQ STARC OMS
Implementation Date: 1999
Targeted Waste Type(s): Hazardous Waste/EPA Toxic 17/Solvent Wastes
Waste Reduction: The elimination of a hazardous solution.
Implementation Costs: $3,153.50
Savings: Elimination of the waste stream has saved the installation $2,515.00 per year in reduced waste disposal cost.
Funding Source: AGI-EPR

Project Title: Weapons Cleaning/Parts Washer System IT48WC
Description: The Inland Technology IT-48WC Weapons Cleaning System NSN 6850-01-397-2539 is a high volume usage system that recycles the Breakthrough solvent continuously through a high efficiency filtration system. EPR number OR00099002.
Location: HQ STARC (-) OMS
Implementation Date: 2000
Targeted Waste Type(s): Other Hazardous Materials

Waste Reduction: 1,1,1-Trichloroethane
Implementation Costs: $3,684.15
Savings: $2,031.00
Funding Source: Year-end funds.

Project Title: ODS Elimination Water Coolers
Description: Eliminate all appliances and equipment that use ozone-depleting substances. These include fire extinguishers using Halon and refrigeration systems containing CFCS. EPR number OR00099006.
Location: HQ STARC (-) OMS
Implementation Date: 2000
Targeted Waste Type(s): Refrigerants-R11, R12, R22 etc.
Waste Reduction: Ozone Depleting Substances
Implementation Costs: $832.00
Savings:
Funding Source: Year-end funds.

Project Title: Propane Cylinder Recycling System
Description: The New Pig ProSolve system safely removes the valve stem so canister can be recycled as scrap steel. Activated carbon filters help remove Volatile Organic Compounds from propellant. EPR number OR00000001.
Location: HQ STARC(-) OMS
Implementation Date: 2001
Targeted Waste Type(s): Reactive hazardous waste - generic compressed gas, Volatile Organic Compounds.
Waste Reduction: Metal, Reactive HW
Implementation Costs: $697.03 ea
Savings: $5,112.00
Funding Source: Year-end funds.

Project Title: Secondary Containment Structures
Description: As required by the SPCCP for this facility and 40 CFR 112.3 and OAR 340-047-0160. A secondary containment structure is needed to be built to house the fuel hauling vehicles that are located at this facility. EPR OR21000002.
Location: OMS
Implementation Date: 2002
Targeted Waste Type(s): Petroleum's, Oils and Lubricants
Waste Reduction: Soil contamination.
Implementation Costs: $148,585
Savings:
Funding Source: NGB

➢ Current Pollution Prevention Projects

The status of currently funded pollution prevention projects are discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted

waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated savings, and funding sources.

➢ Future Pollution Prevention Projects

The status of proposed pollution prevention projects is discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated saving, and funding sources.

ECONOMIC ANALYSIS SUMMARY FOR FUTURE POLLUTION PREVENTION PROJECTS

Polluting Process	P2 Opportunity	Investment Cost ($)	Net Annual Savings ($)	Payback Period (Years)	Net Present Value of Operation ($)
Safety Kleen	Solvent Waste Station Purchase and Modification	198,500	(5,841)	No Payback	(243,603)
Safety Kleen	Aqueous Cleaner with Jetwasher	701,050	44,639	15.7	(356,345)

POLLUTION PREVENTION IMPLEMENTATION PLAN FOR FUTURE PROJECTS

Project Title	Location	Waste Type	Reduction Expected (lbs./year)	Estimated Cost($)	Estimated Savings ($/yr.)	Expected Implement Date	EPR Status
Cardboard Baler	Recycling Center	Solid Waste	400,000	99,000	30,000	CY95	Entered

HQ STARC (-) OMS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1997					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha	100	870	240	
Hazardous Waste	Ethanol	100	33		
Hazardous Waste	Chromium filters	100	105	52	
Hazardous Waste	Lead	100	23		
Hazardous Waste	Lithium Batteries	100	47		
Hazardous Waste	Sodium Hydroxide	100	66		
Hazardous Waste	Magnesium Salts Barium, Chromium	100	39	26	
Hazardous Waste	Potassium Hydroxide-Mercury	100	12	60	
Ozone Depleting Chemical Use	CFCs *(refrigerants i.e. R-12, R-22)* Fire Suppressants *(Halons)*	50			
Solid Waste	Cardboard and Recyclable Paper	85			

HQ STARC (-) OMS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1998					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha	100	870	360	
Hazardous Waste	Ethanol	100	33	66	
Hazardous Waste	Chromium filters	100	105	83	
Hazardous Waste	Lead	100	23		
Hazardous Waste	Lithium Batteries	100	47		
Hazardous Waste	Sodium Hydroxide	100	66		
Hazardous Waste	Magnesium Salts Barium, Chromium	100	39		
Hazardous Waste	Potassium Hydroxide-Mercury	100	12		
Ozone Depleting Chemical Use	CFCs (refrigerants i.e. R-12, R-22) Fire Suppressants (Halons)	50			
Solid Waste	Cardboard and Recyclable Paper	85			

HQ STARC (-) OMS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1999					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha	100	870	1165	
Hazardous Waste	Ethanol	100	33	50	
Hazardous Waste	Chromium filters	100	105		
Hazardous Waste	Lead	100	23		
Hazardous Waste	Lithium Batteries	100	47		
Hazardous Waste	Sodium Hydroxide	100	66		
Hazardous Waste	Magnesium Salts Barium, Chromium	100	39		
Hazardous Waste	Potassium Hydroxide-Mercury	100	12		
Ozone Depleting Chemical Use	CFCs (refrigerants i.e. R-12, R-22) Fire Suppressants (Halons)	50			
Solid Waste	Cardboard and Recyclable Paper	85			

HQ STARC(-) OMS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2000					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
HQ STARC(-) OMS has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology.					

HQ STARC(-) OMS POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2001					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
HQ STARC(-) OMS has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology.					

Appendix N
3/116 Cavalry Organizational Maintenance Sub-Shop

Baseline Inventory

A baseline inventory is necessary for two reasons. The quantities of waste generation or toxic material use are assessed to target specific waste streams, materials being used, or activities for pollution prevention. Annual reports on waste generation and toxic material use will be compared with the baseline inventories to evaluate the effectiveness of pollution prevention projects and to monitor progress in achieving the 3/116 Cavalry Organizational Maintenance Shop.

Some categories overlap (e.g., solvent wastes, waste acids and bases, and EPA Toxic 17 wastes also will appear as hazardous waste; some of the EPA Toxic 17 wastes can be solvents). The use of the baseline inventory will assist in developing projects for meeting the pollution prevention goals of the 3/116 Cavalry Organizational Maintenance Shop.

BASELINE INVENTORY FOR 3/116 Cavalry Organizational Maintenance Shop 1994				
Waste Type	**RCRA Waste Code(s)**	**Waste (lbs)**	**% of Total Waste**	**Process or Operation Generating Waste**
Magnesium Salts Barium, Chromium	D005, D007	447	68	Battery Changeout
Chromium Filters	D007	201	32	NBC Training

3/116 Cavalry Organizational Maintenance Shop POLLUTION PREVENTION GOALS				
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline Year**	**Target Year**
Hazardous Waste	Magnesium Salts Barium, Chromium	50%	1994	1999
Hazardous Waste	Chromium Filters	75%	1994	1999
Solid Waste Ozone Depleting Chemical Use	Class I ODS	60% 40%	1994	1999 2003
TRI Reportable Releases		50%	1994	1999

Pollution Prevention Opportunity Assessment

The PPOA enables the 3/116 Cavalry Organizational Maintenance Shop to examine the alternatives available for pollution prevention. The modules identify the waste stream and the operations from which the stream may be generated, describe the process, and present several pollution prevention alternatives. Each alternative is described along with its advantages and disadvantages.

Assessment modules that apply to 3/116 CAV OMS are:

Application of Sealant/Adhesives
Battery Acids/Lead-Acid Batteries from Vehicle Maintenance
Cleanup Solvents from Painting
Electronic Equipment Battery Changeout
Halon Use in Fire Extinguishers
Manual Surface Preparation Using Rags
Refrigerants (CFCs) from Refrigeration, Cooling-Equipment Maintenance
Solid Waste
Used Antifreeze from Vehicle Maintenance
Used Oil Filters from Vehicle Maintenance
Used Oil from Vehicle Maintenance
VOC Emissions from Painting
Waste Solvents from Parts Cleaning

- ➢
- ➢
- ➢

➢ Past Pollution Prevention Projects

The status of past pollution prevention projects are discussed. Each project is described to include location implemented, implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemical), actual waste, actual implementation costs, actual savings, and funding sources.

Project Title: Battery Acid/Lead Acid Batteries from Vehicle Maintenance
Description: Lead Acid Batteries are being exchanged on a one-for-one basis with Sterling Battery Company.
Location: 3-116th Cav OMS
Implementation Date: 1992
Targeted Waste Type(s): Hazardous Wastes, EPA Toxic 17
Waste Reduction: 100%
Implementation Costs: $2,800.00
Savings: Elimination of the waste stream has saved the installation $2,800 per year in reduced waste disposal cost.
Funding Source:

Project Title: Parts Cleaning and Washing
Description: Installation of a ZEP parts cleaner has significantly reduced the generation because the solvent is never removed from the parts washer. Due to evaporation, small quantities of new solvent are added, as required.
Location: 3-116th Cav OMS
Implementation Date: 1994
Targeted Waste Type(s): Hazardous Waste/EPA Toxic 17/Solvent Wastes
Waste Reduction: 100%
Implementation Costs: $5,000
Savings: Elimination of the waste stream has saved the installation _____ per year in reduced waste disposal cost.
Funding Source:

Project Title: Laundry of Shop Rags and Coveralls
Description: Commercial laundering of shop rags and coveralls to prevent contaminants in homes
Location: 3-116th OMS
Implementation Date: 1994
Targeted Waste Type(s): Hazardous Waste, EPA Toxic 17
Waste Reduction: 100%
Implementation Costs: $2,500.00
Savings: N/A
Funding Source:

Project Title: Aerosol Can Depressurizer
Description: Aerosol Can Depressurizer relieves the pressure in aerosol cans and allows the

residual contents to be collected for disposal. With the contents thoroughly depleted the can may be recycled as scrap metal.
Location: 3-116 CAV OMS
Implementation Date: 1998
Targeted Waste Type(s): Solid Waste (metal), Reactive Hazardous Waste generic
Waste Reduction: Metal, Reactive HW
Implementation Costs: $577.00
Savings: $1,350.00
Funding Source: 1998 Year end funds

Project Title: Antifreeze Recyclers
Description: The BG PF4HO High Output Power Flush and Coolant Recycling System flushes the entire cooling system and recycles dirty antifreeze into clean, inhibited automotive spec coolant without draining or handling. The BG PF4HO eliminates the need to drain used antifreeze from the vehicle, drastically reducing the high cost of hazardous waste disposal. Utilizing a closed-loop system, the used antifreeze is circulated through a filtration process which removes impurities. EPR number OR0099001.
Location: 3/116 CAV OMS
Implementation Date: 2001
Targeted Waste Type(s): Hazardous Chemicals listed on EPA's 17 ind. Toxics List
Waste Reduction: Ethylene Glycol
Implementation Costs: $4195.00
Savings: $2,536.00
Funding Source: Year end funds.

Project Title: Oil Filter Crusher
Description: The Oberg Model P-300 filter crusher is used to eliminate the amount of oil left in the filter after it is removed from service. The P-300 deposits the crushed filters directly into a transport drum for disposal.
Location: 3/116 CAV OMS
Implementation Date: 2001
Targeted Waste Type(s): Hazardous Chemicals listed on EPA's 17 ind. Toxics List
Waste Reduction: Recovery of metal by eliminating the oil from the element allowing the metal to be recycled, and keeping the oil saturated filters out of the landfill.
Implementation Costs: $3,988.80 ea.
Savings: $1,935.50 annually per unit.
Funding Source: Year end funds.

Project Title: Propane Cylinder Recycling System
Description: The New Pig ProSolve system safely removes the valve stem so canister can be recycled as scrap steel. Activated carbon filters help remove Volatile Organic Compounds from propellant. EPR number OR00000001.
Location: 3/116 CAV OMS
Implementation Date: 2001
Targeted Waste Type(s): Reactive hazardous waste - generic compressed gas, Volatile Organic Compounds.

Waste Reduction: Metal, Reactive HW
Implementation Costs: $697.44 ea
Savings: $5,112.00
Funding Source: Year-end funds.

➢ Current Pollution Prevention Projects

The status of currently funded pollution prevention projects are discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated savings, and funding sources.

Project Title: Secondary Containment Structures
Description: As required by the SPCCP for this facility and 40 CFR 112.3 and OAR 340-047-0160. A secondary containment structure is needed to be built to house the fuel hauling vehicles that are located at this facility.
Location:
Implementation Date:
Targeted Waste Type(s): Petroleum's, Oils and Lubricants
Waste Reduction: Soil contamination.
Implementation Costs: $62,243
Savings:
Funding Source: NGB

Project Title: Containment Structures
Description: Funds are required to supplement the Statewide SPCCP by purchasing secondary containment units as a best management practice. Project required by Army Regulation 200-1. This project will funds the purchase of secondary containment units that will be used to store drums/containers which contain hazardous materials. Funds will purchase six secondary containment pallets with ramps.
Location:
Implementation Date:
Targeted Waste Type(s): Petroleum's, Oils and Lubricants
Waste Reduction: Soil contamination.
Implementation Costs: $2,416
Savings:
Funding Source:

➢ Future Pollution Prevention Projects

The status of proposed pollution prevention projects is discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated saving, and funding sources.

ECONOMIC ANALYSIS SUMMARY FOR FUTURE POLLUTION PREVENTION PROJECTS					
Polluting Process	**P2 Opportunity**	**Investment Cost ($)**	**Net Annual Savings ($)**	**Payback Period (Years)**	**Net Present Value of Operation ($)**
Safety Kleen	Solvent Waste Station Purchase and Modification	198,500	(5,841)	No Payback	(243,603)
Safety Kleen	Aqueous Cleaner with Jetwasher	701,050	44,639	15.7	(356,345)

POLLUTION PREVENTION IMPLEMENTATION PLAN FOR FUTURE PROJECTS							
Project Title	**Location**	**Waste Type**	**Reduction Expected (lbs./year)**	**Estimated Cost($)**	**Estimated Savings ($/yr.)**	**Expected Implement Date**	**EPR Status**
Cardboard Baler	Recycling Center	Solid Waste	400,000	99,000	30,000	CY95	Entered

3/116 Cavalry Organizational Maintenance Shop POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1997					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Magnesium Salts Barium, Chromium	50	1994		
Hazardous Waste	Chromium Filters	75	1994		
Solid Waste Ozone Depleting Chemical Use	Class I ODS	100			

3/116 Cavalry Organizational Maintenance Shop POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1998					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Magnesium Salts Barium, Chromium	50	1994		
Hazardous Waste	Chromium Filters	75	1994	135	
Solid Waste Ozone Depleting Chemical Use	Class I ODS	100			

3/116 Cavalry Organizational Maintenance Shop POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1999					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Magnesium Salts Barium, Chromium	50	1994		
Hazardous Waste	Chromium Filters	75	1994		
Solid Waste Ozone Depleting Chemical Use	Class I ODS	100			

3/116 Cavalry Organizational Maintenance Sub Shop POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2000					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
3/116 CAV OMSS has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology.					

3/116 Cavalry Organizational Maintenance Sub Shop POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2001					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
3/116 CAV OMSS has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology.					

Appendix O
AASF #2

Baseline Inventory

A baseline inventory is necessary for two reasons. The quantities of waste generation or toxic material use are assessed to target specific waste streams, materials being used, or activities for pollution prevention. annual reports on waste generation and toxic material use will be compared with the baseline inventories to evaluate the effectiveness of pollution prevention projects and to monitor progress in achieving the Army Aviation Support Facility's pollution prevention goals. A baseline inventory for AASF #2 is not available.

BASELINE INVENTORY FOR AASF #2 1994				
Waste Type	**RCRA Waste Code(s)**	**Waste (lbs)**	**% of Total Waste**	**Process or Operation Generating Waste**

AASF #2 POLLUTION PREVENTION GOALS				
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline Year**	**Target Year**
Hazardous Waste				
Solid Waste				
Ozone Depleting Chemical Use				
TRI Reportable Releases				

Pollution Prevention Opportunity Assessment

The PPOA enables the Army Aviation Support Facility to examine the alternatives available for pollution prevention. The modules identify the waste stream and the operations from which the stream may be generated, describe the process, and present several pollution prevention alternatives. Each alternative is described along with its advantages and disadvantages.

Assessment modules that apply to the AASF are:

Electronic Equipment Battery Changeout
Halon Use in Fire Extinguishers
Manual Surface Preparation Using Rags
Refrigerants (CFCs) from Refrigeration, Cooling-Equipment Maintenance
Solid Waste
Aircraft Washing
Waste Solvents from Parts Cleaning

➢ Past Pollution Prevention Projects

The status of past pollution prevention projects are discussed. Each project is described to include location implemented, implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemical), actual waste, actual implementation costs, actual savings, and funding sources.

Project Title: ZEP Parts Washer
Description: Replace Safety Kleen parts washer with the ZEP washer that uses an aqueous based solution. OR23000001.
Location: AASF #1
Implementation Date: 1993
Targeted Waste Type(s): Hazardous Wastes, EPA Toxic 17
Waste Reduction:
Implementation Costs:
Savings: Elimination of the waste stream has saved the installation _____ per year in reduced waste disposal cost.
Funding Source: Year end funds.

Project Title: Aerosol Can Depressurizer
Description: A Lab Safety Aerosol Can Depressurizer that relieves the pressure in aerosol cans and allows the residual contents to be collected for disposal. With the contents thoroughly depleted the can may be recycled as scrap metal. EPR number OR 00099004.
Location: AASF #2
Implementation Date: 2000
Targeted Waste Type(s): Solid Waste (metal), Reactive Hazardous Waste generic
Waste Reduction: Metal, Reactive HW
Implementation Costs: $577.00
Savings: $1,350.00
Funding Source: 2000 year end funds

Project Title: Weapons Cleaning/Parts Washer System IT48WC
Description: The Inland Technology IT-48WC Weapons Cleaning System NSN 6850-01-397-2539 is a high volume usage system that recycles the Breakthrough solvent continuously through a high efficiency filtration system. EPR number OR00099002.

Location: AASF #2
Implementation Date: 2000
Targeted Waste Type(s): Other Hazardous Materials
Waste Reduction: 1,1,1-Trichloroethane
Implementation Costs: $3,684.15
Savings: $2,031.00
Funding Source: 2000 year end funds.

Project Title: Secondary Containment Structures
Description: As required by the SPCCP for this facility and 40 CFR 112.3 and OAR 340-047-0160. A secondary containment structure is needed to be built to house the fuel hauling vehicles that are located at this facility. EPR OR15200001.
Location: AASF#2
Implementation Date: 2002
Targeted Waste Type(s): Petroleum's, Oils and Lubricants
Waste Reduction: Soil contamination.
Implementation Costs: $72,218
Savings:
Funding Source: NGB

➢ Current Pollution Prevention Projects

The status of currently funded pollution prevention projects are discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated savings, and funding sources.

Project Title: Propane Cylinder Recycling System
Description: The New Pig ProSolve system safely removes the valve stem so canister can be recycled as scrap steel. Activated carbon filters help remove Volatile Organic Compounds from propellant. EPR number OR00000001.
Location: AASF #2
Implementation Date:
Targeted Waste Type(s): Reactive hazardous waste - generic compressed gas, Volatile Organic Compounds.
Waste Reduction: Metal, Reactive HW
Implementation Costs: $697.44 ea
Savings: $5,112.00
Funding Source: AGI-EPR

Future Pollution Prevention Projects

The status of proposed pollution prevention projects is discussed next. Each project will be described to include location to be implemented, anticipated implementation date, targeted waste type (e.g., hazardous waste, EPA Toxic 17 Wastes, ozone-depleting chemicals), expected waste reduction, estimated implementation costs, estimated saving, and funding sources.

ECONOMIC ANALYSIS SUMMARY FOR FUTURE POLLUTION PREVENTION PROJECTS

Polluting Process	P2 Opportunity	Investment Cost ($)	Net Annual Savings ($)	Payback Period (Years)	Net Present Value of Operation ($)
Safety Kleen	Solvent Waste Station Purchase and Modification	198,500	(5,841)	No Payback	(243,603)
Safety Kleen	Aqueous Cleaner with Jetwasher	701,050	44,639	15.7	(356,345)

POLLUTION PREVENTION IMPLEMENTATION PLAN FOR FUTURE PROJECTS

Project Title	Location	Waste Type	Reduction Expected (lbs./year)	Estimated Cost($)	Estimated Savings ($/yr.)	Expected Implement Date	EPR Status
Cardboard Baler	Recycling Center	Solid Waste	400,000	99,000	30,000	CY95	Entered

ARMY AVIATION SUPPORT FACILITY'S POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1997					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha				
Solid Waste	Cardboard				
Ozone Depleting Chemical Use	Class I ODS				

ARMY AVIATION SUPPORT FACILITY'S POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1998					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha				
Solid Waste	Cardboard				
Ozone Depleting Chemical Use	Class I ODS				

ARMY AVIATION SUPPORT FACILITY'S POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 1999					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
Hazardous Waste	Petroleum Naphtha				
Solid Waste	Cardboard				
Ozone Depleting Chemical Use	Class I ODS				

ARMY AVIATION SUPPORT FACILITY'S POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2000					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
AASF#2 has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology.					

ARMY AVIATION SUPPORT FACILITY'S POLLUTION PREVENTION ACHIEVEMENT REPORT FOR 2001					
Waste Type	**Subtype**	**Reduction Goal (%)**	**Baseline 1994 (lbs./year)**	**Current (lbs./year)**	**Achieved to Date (%)**
AASF#2 has achieved the goals required in EO 12856 using 1994 as the baseline year. Hazardous waste being generated at this time is at a minimal level. Any further reduction is dependent upon new and advanced technology.					