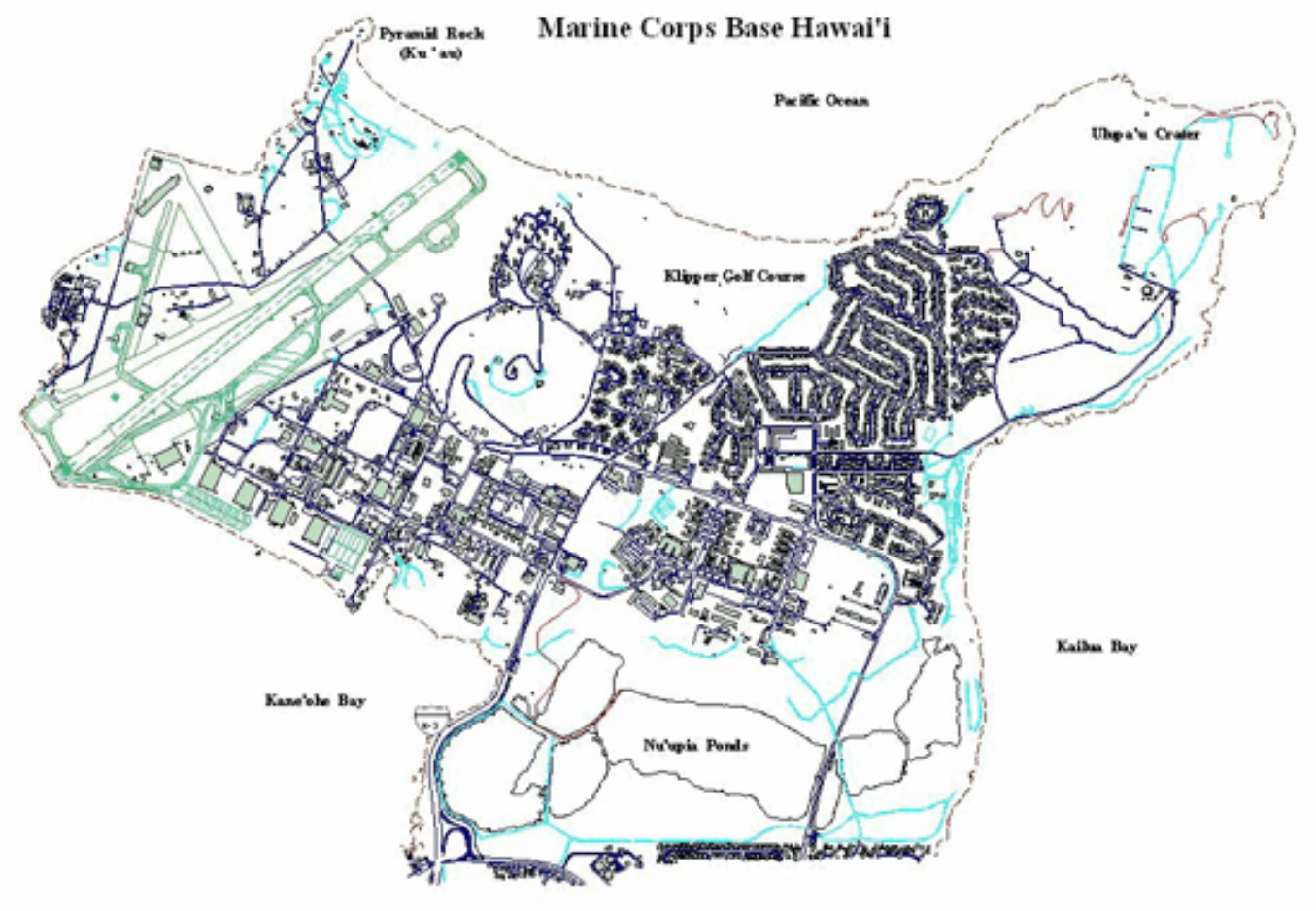
FY 1998
Secretary of Defense
Environmental Security Award Submission
Pollution Prevention
(Non-Industrial Installation)

Marine Corps Base Hawaii



INTRODUCTION

Mission, Population, and Acreage

Marine Corps Base Hawaii (MCBH) was created in 1994 to consolidate Marine Corps assets in Hawaii. The following properties comprise MCBH on Oahu: 2,951-acre Mokapu Peninsula; 220-acre Camp H. M. Smith; 137-acre Pu'uloa Range Facility; 27-acre Pearl City Warehouse Annex; 63-acre Manana Housing Area; and 187-acre Waikane Valley. On the island of Molokai, MCBH owns the 12-acre Molokai Training Facility. In 1999 the Air Force will also transfer control of 1,045 acres of training area from Bellows Air Force Station to MCBH.

The mission of MCBH is to maintain facilities and provide services that support readiness and global projection of operating forces. At Mokapu, the tenants include Combat Service Support Group-3, 1st Marine Aircraft Wing Aviation Support Element, 1st Radio Battalion, 3rd Marine Regiment, and Marine Corps Air Facility Kaneohe Bay. Tenants at Camp Smith include the U.S. Commander-in-Chief Pacific, Special Operations Command Pacific, Marine Forces Pacific, and Joint Task Force Full Accounting. The military and civilian workforce is over 9,300 strong with 4,600+ military dependents. Approximately 10,000 retirees access base service facilities. In 1999, as a result of the Base Realignment and Closure Commission (BRACC), approximately 2,100 sailors and civilians, along with 2,600 military dependents, are expected to relocate to MCBH from the former Naval Air Station Barbers Point.

Environmental and Geographical Setting

The Hawaiian islands are the most isolated land masses in the world, with a unique natural and cultural resource heritage. The richness and sensitivity of natural resources in Hawaii is reflected by the fact that over 25 percent of all endangered species in the United States are found here. The diverse cultural resources peculiar to Hawaii are also greatly valued by local residents. This is especially so among the Native Hawaiian community, where many outspoken groups are keenly interested in the protection of these resources. Most groups advocating cultural and environmental protection make their headquarters on Oahu, where nearly all MCBH property is located.

Among the properties comprising MCBH, the Mokapu peninsula is the largest, most visible, and has the greatest environmental sensitivity. The peninsula is bordered by Kailua Bay to the east, the Pacific Ocean to the north, Kaneohe Bay to the south and southwest, and Nu'upia Ponds to the south. State water quality standards here are more stringent than federal ones. Water activities are highly popular for public recreation here. At the same time, living coral reefs and threatened green sea turtles inhabit these waters, with endangered humpback whales and Hawaiian monk seals making seasonal visits. The ponds are a protected Wildlife Management Area and an eligible National Historic Property.

On land, the peninsula is subject to a multitude of environmental constraints such as endangered species habitat, historic sites, and erosion-prone coastlines. Aircraft flight paths are governed by noise impacts and accident risks to the adjacent communities of Kaneohe and Kailua, which have a resident population of about 118,000. Cultural resource concerns also restrict digging due to possible disturbance of ancient Hawaiian burial sites in coastal areas around the peninsula.

BACKGROUND

Marine Corps Base Hawaii is committed to being a model steward of the naturally and culturally rich lands under

its control. Concurrently, MCBH provides responsive support to operating forces in order to enhance combat readiness and global power projection. Successfully executing these potentially competing tasks requires hard work and innovative solutions. For MCBH, the best innovative solutions involve prevention.

Pollution prevention (P2) principles are integrated into processes throughout MCBH by using the environmental/waste management hierarchy. Our first choice in achieving compliance and developing environmental solutions is to prevent pollution at the source; reuse, beneficial use, or recycling is attempted for waste that cannot be prevented; and any remaining waste is treated in an environmentally safe manner.

The EC&PD staff works with customers to reduce waste and hazardous material usage, encourage recycling, and promote environmental awareness. Base and tenant commands provide hazardous material (HM) and hazardous waste (HW) coordinators who partner with us to implement P2 policies and procedures, while providing valuable feedback to promote continuous improvement. In concert with total quality management principles, teams were developed to tackle specific environmental issues such as corrosion control methods for tactical vehicles, implementation of Hazardous Material Consolidation Program, basewide conversion from hazardous to non-hazardous fluorescent lamps, installation of weapons cleaning systems, and integration of a basewide recycling program. With extensive customer participation at every step in the process, we benefit not only from their expertise, but as team players, they are committed to the successful implementation of the solution. Success stories are disseminated basewide, fostering the communication of innovative ideas and continuous improvement to our customers.

The significant environmental challenges facing MCBH today are:

- Reducing HM and HW generated from over 100 processes.
- Protecting the marine environment surrounding Mokapu peninsula, Wildlife Management Areas (WMAs), and wetlands from point and non-point pollution.
- Protecting MCBH property and human health in the event of an oil or hazardous substance mishap.
- Building the trust of local community and Native Hawaiian organizations in our ability to protect and preserve the diverse and unique cultural resources aboard the base.
- Using a systems approach and adopting a long-term view in developing plans, policies, and procedures to ensure compliance with myriad environmental laws and regulations, while protecting natural and cultural resources into the 21st century.

Base Environmental Compliance and Protection Department (EC&PD) Organization, Management Approach, and Staffing

The EC&PD was established as a department in 1993. Heightened command attention to the environment is reflected in the growth and realignment of the staff (increased from five to 25 in five years). In 1996 the first environmental engineers were brought on staff, and EC&PD efforts were refocused on regulatory compliance and responsive service.

Total Quality Leadership (TQL) is integrated into the management of EC&PD's environmental programs. MCBH fosters an environment that capitalizes on innovative ideas for using limited resources; relies on effective teamwork; weighs the environmental effects of all mission-critical decisions; and assumes a leadership role to protect, restore, and enhance the environment in those decisions.

The EC&PD is comprised of the following four divisions:

Environmental Affairs Division	● Oversees natural resources program. ● Oversees cultural resources program. ● Ensures an ecosystem management approach through integrated natural/cultural/community outreach programs.

Environmental Compliance Division	Ensures Compliance with federal, state, and local regulations pertaining to: ● Air Quality ● Water Quality ● Solid Waste Mgmt ● UST/AST Mgmt ● Materials Recovery ● Stormwater Runoff Mgmt ● Sanitary Landfill Ops ● Groundwater Monitoring ● Oil Water Separator Mgmt ● Installation Restoration
Environmental Compliance Inspection Division	● Maintains inspection oversight. ● Provides training for base and tenant commands.
Hazardous Material/ Pollution Prevention Divsion	● Ensures compliance with federal, state, and local regulations relating to HM/HW management. ● Provides emergency response planning. ● Oversees P2 Program initiatives.

The MCBH P2 Program was established in October 1995 and currently consists of:

- The P2 Program Manager, responsible for implementing and overseeing P2 initiatives and directing HM management/minimization programs at MCBH.
- Three contractor personnel responsible for operation of the MCBH Hazardous Materials Minimization (HAZMIN) Center. Duties include providing responsive and proactive customer support services regarding HM requisition processing; researching for environmentally-friendly substitutes; administering the shop towel recycling program; and weapons cleaning system maintenance.

PROGRAM SUMMARY

Objectives

The primary objectives of the MCBH P2 Program, aligned with the MCBH TQL Strategic Plan, are to:

- Promote pollution prevention as an integral part of supporting mission readiness;
- Reduce environmental liabilities and protect public health and the environment by eliminating or minimizing the volume and toxicity of hazardous substances used aboard the installation; and
- Actively participate and contribute to the identification, implementation and evaluation of innovative methods and technologies that will achieve DoD Measures of Merit (MOM), USMC, Federal, State, and local pollution reduction goals.

Outstanding Program Features

Realizing that P2 efforts, seeking to increase efficiency and decrease waste in equipment and systems, generally equate to enhanced mission capability, P2 Program initiatives are fully supported and actively promoted on MCBH. This is demonstrated through multi-disciplinary and interdepartmental participation in P2 issues. Working closely with departments such as the Base Safety Center, Facilities Department, and Federal Fire Department, P2 concepts and tools have been integrated to the lowest levels. As a result, we routinely receive calls from shop personnel offering feedback on P2 equipment, and often submitting new ideas concerning P2 opportunities. Many of their suggestions have been implemented. This type of enthusiasm and involvement has

been critical to the success of the P2 Program.

Close coordination with environmental counterparts at Headquarters Marine Corps has proven invaluable in evaluating the feasibility of potential P2 initiatives. This has led to the execution of significant P2 projects, such as implementation of the Hazardous Materials Consolidation Program (HCP), installation of the Geographical Information System (GIS)/Hazardous Materials Information System (HICS) graphical user interface (GUI), and the acquisition of weapons cleaning systems.

Networking and partnering with other services has led to productive sharing of information and resources that facilitates rapid implementation of new systems and procedures. EC&PD has partnered with Fleet Industrial Supply Center (FISC), Pearl Harbor in implementing the HCP, the Hawaii Joint Interservice Regional Support Group in establishing a joint service recycling and marketing cooperative, and the U. S. Coast Guard and Hawaii Department of Health in coordinating emergency response exercises. Active networking with other DoD activities in Hawaii has also proven productive.

Our commitment to reduce waste generation, with a secondary emphasis on reuse and recycling, has yielded impressive results. HW generation has decreased from 127,519 pounds in 1992 to 78,281 pounds in 1998. Ozone Depleting Substance (ODS) Class I usage has dropped 60% from 1995 to 1998. Although the P2 Program is only three years old, great strides have been made toward reaching goals of waste and toxicity reductions. As the P2 Program refines the management and tracking of waste streams and continues to incorporate innovative technologies and approaches, greater savings will be achieved.

ACCOMPLISHMENTS

Material Substitution

- On the densely populated island of Oahu, water conservation and pollution control measures are critical to preserving limited drinking water supplies. For over 20 years, MCBH has contributed to state water conservation efforts by using its Water Reclamation Facility (WRF) treated effluent (R2-quality) for irrigation. Currently, the one location allowed to use R2-quality water for irrigation is the base golf course, which consumes 80 million gallons annually. A project to upgrade the WRF to R1-quality effluent using ultraviolet technology is currently underway. This type of effluent can be used for all irrigation aboard MCBH, as well as industrial vehicle wash facilities, which will greatly reduce the use of potable water.

  Due to the implementation of Section 112(r) of the Clean Air Act, costly Risk Management Plans (RMPs) are required for facilities using large quantities of hazardous substances. Chlorine gas, used to disinfect effluent from the WRF, would have required an RMP. Conversion to ultraviolet disinfection will eliminate the use of 4,000 pounds of chlorine gas currently stored at the WRF, thereby eliminating the expensive requirement for an RMP. More importantly, this material substitution eliminates the base's most dangerous substance – a chemical that poses a catastrophic threat to the base population and surrounding community.

  Impact: Upgrading the MCBH WRF from R2- to R1-quality effluent will save over 260 million gallons of potable water for an annual savings of $382K. This upgrade, accomplished by converting the disinfection method from chlorine gas to ultraviolet technology, has the added benefit of eliminating a dangerous environmental liability and the need for an RMP.

- The MCBH Ozone Depleting Substances (ODS) Management Plan was established to minimize releases through substitution of products that contain Class I ODS refrigerants, solvents, and fire suppression chemicals; systematically phase out inefficient equipment; and implement new management practices.

  In 1994, MCBH began ODS phase-out. An in-house analysis of all refrigeration systems was conducted to prioritize which systems should be changed, modified, or replaced. System size, remaining life, refrigerant type, and impact to quality of life were factored into the analysis. Based on these criteria, the largest mess hall chillers and barracks air conditioners were replaced with non-chlorofluorocarbon (non-CFC)

containing systems.

Maintenance and repair processes and equipment retrofits were tailored to maximize the efficiency of all refrigeration units and minimize the amount of ODS compounds released into the environment. Improved management practices adopted by the refrigeration shop include: no recharging of refrigeration units until leaks are located and repaired, and equipment retrofits replacing disc, purge, and filter components with high efficiency isolation systems on all large-volume refrigeration systems. This equipment retrofit method allows for the containment of refrigerant in the event of a system failure. These changes serve as proactive environmental measures and conserves expensive replacement refrigerant.

While planning for Halon recovery operations, measures were taken to verify that equipment purchased was outfitted with proper control devices to minimize Halon releases during recovery operations. Effective front-end planning has maximized our ability to reduce ODS emissions at the source.

A recall of cleaner, lubricant, preservative (CLP) Type I (manufactured before May 93) was successfully accomplished in February 1997, eliminating the use of this Class I ODS product. Base and tenant commands were directed to request the newly-formulated CLP, which no longer contains 1,1,1 trichloroethane.

Impact: Establishment of the ODS Management Plan and subsequent refrigeration system changes, modifications, and replacement have resulted in a 60% reduction in ODS Class I inventory. Recall of CLP Type I has eliminated disposal costs and liability for this HW stream. Improved management practices and proactive measures promise further ODS reductions.

- A shop towel recycling program was implemented in FY98, which eliminated 99% of this waste stream. HAZMIN Center personnel oversee and monitor the progress of this program. Yearly savings total $17K for shop towel purchases and $14K for HW disposal.

  Impact: The shop towel recycling program has cut the shop towel waste stream by 99%, eliminating 50,000 pounds of waste and saving $31K annually.

- MCBH has begun a conversion from fluorescent lamps which are classified as HW, to a non-HW alternative, Phillips' *Alto* lamps. These lamps contain mercury in concentrations considered non-hazardous. By eliminating the use of hazardous fluorescent lamps, liability is eliminated and HW disposal costs avoided, saving $17K per year.

  Impact: Non-hazardous fluorescent lights save $17K per year in HW disposal costs and eliminate liability.

Process Modification or Improvement

The MCBH P2 Plan identified, evaluated, and provided cost-effective improvements for over 90 processes aboard MCBH

- In September 1998, armories aboard MCBH installed weapons cleaning systems utilizing a non-toxic, non-OSHA listed solvent substitute for PD-680 called "Breakthrough". This cleansing compound has been selected and designated by DoD for maintenance cleaning of weapons, aviation parts, and ground vehicles.

  The enhanced cleansing properties of "Breakthrough", paired with the exceptional filtering and multiple user-accommodating properties of the dip tank holding the solvent has reduced the time it takes to clean a weapon by over 50% (equating to a real-time savings of over two hours per weapon). With over 3,000 weapons cleaned each week at MCBH, some 360,000 hours are saved per year. *That's 7,000 hours per week, saved by just five parts washers.* The estimated annual savings of over $4 million worth of Marine labor paid for the initial capital cost and the annual expenses in just *1 day*.

  Impact: Marine labor for cleaning weapons has been reduced by over 50%, equating to an impressive savings estimated at over 360,000 hours per year. Annual savings of $4 million in Marine labor would cover the capital and annual costs in 1 day

- Working closely with base and tenant commands first echelon corrosion control problems of 450 tactical vehicles painted with Chemical Agent Resistant Coating (CARC) were resolved through the acquisition of a shrouded vacuum tool system. Essential first and second echelon maintenance on vehicles coated with CARC paint was at a virtual standstill due to lack of facilities where corrosion control activity was permitted. Corrosion control activities are prohibited in open areas due to potential contamination from CARC-related contaminants (lead, cadmium, chromium, and isocyanates) to the protected wetlands in the immediate area. Consequently, vehicles were left to rust until parts became unserviceable, requiring expensive replacement via depot level maintenance. Vehicles with an expected life of five years were only surviving one year because of the corrosive effects of the salt air and lack of timely maintenance.

  A team was organized to research systems that prevent the release of CARC-related contaminants into the air, ground, and water during corrosion control operations. Testing of various CARC removal protocols was completed over a 90-day period, which included air monitoring and residue sampling. This provided users with the most flexible and economical work method that met regulatory and technical-manual requirements. Upon completion of testing, it was concluded that the vacuum tool system was a viable solution when operated with containment controls. Operating procedures were published to provide guidance to user organizations. Annual savings in maintenance avoidance for Comat Service Support Group-3, 3rd Marines Regiment, and 1st Radio Battalion is estimated at $440K.

  Impact: Partnering with tenant commands, EC&PD developed a solution that gives organizations the ability to perform preventative corrosion control on CARC-painted vehicles. Crucial in extending vehicle life, this initiative will save MCBH units an estimated $440K annually while protecting the environment

and enhancing combat readiness.

- Oil Water Separators (OWS) pre-treat oily wastewater prior to discharging to the MCBH Water Reclamation Facility (WRF). To protect the WRF, reduce waste, and increase mission readiness, several enhancements to OWS operations were incorporated during 1998. Sludge that was previously manually drummed and wasted out, is now removed by vacuum truck, and dried on site. This dried sludge can then be biologically or thermally treated to remove petroleum contamination, and used as fill material. This new removal/disposal technique not only reduces quantity of waste generated and manpower requirements, but also saves approximately $15K annually in disposal costs while increasing worker safety. Waste oil from OWS are now tested, removed and recycled by outside contract. This relieves the operating activity from drumming and transporting waste oil, and saves approximately $2.00/gallon on disposal costs. Ongoing OWS initiatives include establishing an approved OWS cleaner/detergent list to increase OWS effectiveness and protect the WRF from emulsified oil contamination.

  Impact: Sludge from oil water separators (OWS), formerly drummed and disposed of at a cost of $2/gallon, is now dried on site, sanitized, and reused as fill material. Manpower requirements are significantly reduced and $15K in savings is realized.

- A 1998 upgrade to the Assault Amphibious Vehicle (AAV) Maintenance Facility designed to alleviate flooding and erosion problems in the area, has the added benefit of reducing water usage and preventing potential contamination of the Nu'upia Ponds Wildlife Management Area and the WRF. Reduced flooding and erosion in the area has substantially decreased the quantity of sediment picked up by AAVs, which has cut vehicle-washing time by 50%, saving an estimated 2.7 million gallons per year of valuable potable water. An improved rinse pad and sedimentation basin prevents sediment from entering the Nu'upia Ponds wetland area and wash pad OWS, protecting the wetlands from potential petroleum contamination, while maintaining OWS efficiency.

  Impact: A vehicle maintenance facility update has reduced vehicle wash time by 50%, saving 2.7 million gallons of potable water annually and reducing manpower requirements. Nearby wetlands are protected from contamination, while maintaining OWS efficiency.

- The following improvements to existing processes, and the P2 equipment that has often been key to these enhancements, have been successfully integrated over the past two years into daily work practices at MCBH. These improvements have resulted in significant reductions in HM use and HW generation, and enhanced combat readiness due to decreased personnel requirements.

The following processes have been simplified or enhanced in the past two years:	
❍ Paint gun washers	❍ Particle counters for patch testing
❍ Steel grit blasters	❍ High volume low pressure (HVLP) paint guns
❍ Antifreeze recyclers	❍ Plastic blast media (PMB) for paint stripping
❍ Aqueous parts washers	❍ Weapons cleaning systems
❍ Dry filter paint booths	

The following equipment has been installed in the past two years:		
❍ Weed control	❍ Degreasing	❍ Corrosion control
❍ Painting/depainting	❍ Surface cleaning	❍ Fluid changeout

The following process modifications have been enacted in the past two years:

- Aerosol can puncturing to consolidate waste paint and recycle canisters as scrap.
- Oil testing prior to changeout at motor pools.
- Waste oil reclamation via FISC Pearl Harbor Fuel Laboratory.
- Termite detection equipment to minimize pesticide use.
- Freon recovery units and leak detectors to prevent escape of CFCs.

Improved Material Management

The MCBH commitment to effectively reducing environmental liability starts at the beginning of the process -- eliminating or reducing the use of hazardous materials.

- The most outstanding P2 initiative undertaken in the last two years is the implementation of the Hazardous Material Consolidation Program (HCP), which consolidates HM basewide to improve inventory control and reduce operating costs. The HCP was developed to meet DoD P2 goals to reduce HM inventory levels and the generation of HW. The first Navy and Marine Corps HCP partnership was established when a Memorandum of Understanding (MOU) was signed in 1997 between MCBH and Fleet and Industrial Supply Center (FISC) Pearl Harbor.

  Managed by the P2 Program Manager and staffed by three contractor personnel, the HM Minimization (HAZMIN) Center was created to headquarter the HCP. The phased basewide implementation of HCP began with the 1st Marine Air Wing Aviation Support Element (1st MAW ASE), in October 1997.

A total of 400 HM line items in over 50 flammable lockers located in the various work centers were inventoried, barcoded, and evaluated for condition and shelf life expiration. Excess material was then removed to the HAZMIN Center for the purpose of free reissue to base and tenant commands, or to Defense and Reutilization Marketing Office (DRMO) for resale. After fourteen months in operation, the HCP has saved a total of $368K in HM procurement and HW disposal cost avoidance. The capital costs of the HAZMIN Center and operating costs of the HCP were repaid in just ten months. The HAZMIN Center efforts have diverted 68,000 pounds of HM from disposal as HW. Most importantly, this program has enhanced the combat effectiveness of 1st MAW ASE by significantly reducing personnel requirements to manage HM.

The effectiveness of the HCP has been clearly demonstrated in that:

➢Requisitions are filled and delivered to work centers in less than two hours, due to the responsiveness of HAZMIN Center personnel.

- The rate at which requisitions are successfully filled has improved from 65 to 90%.
- HM storage requirements in 1st MAW ASE work centers have decreased by 45%.
- ASE has achieved a decrease in operational funds tied up in excess inventory.
- ASE personnel now spend 85% less time managing and following up on HM requisitions.

- The HAZMIN Center has begun the second phase of implementation at CSSG-3, with 3rd Marines to follow. In addition, planning has begun for units transferring from Naval Air Station Barbers Point due to that facility's closure under the Base Realignment and Closure Commission (BRACC). With available funding, HCP will be implemented basewide within the next two years.

  Impact: The HCP has dramatically reduced HM inventory levels and HW generation since October 1997. Over 68,000 pounds of HW has been diverted and $368K saved in HM procurement and HW disposal costs avoided. Improvements in response times and requisition fill rates, paired with an 85% reduction in personnel required to manage HM has enhanced combat readiness.

- The HAZMIN Center has initiated material management improvements through the development of a basewide authorized use list (AUL), beginning with the 1st MAW ASE. This allows for the screening of HM for environmental and safety criteria, restricts the use of unauthorized HM, minimizes the purchase of HM, reduces the number of supply line items, and streamlines environmental reporting and planning. The AUL, implemented in concert with HCP, will significantly reduced HM procurement and HW disposal costs.

  The HAZMIN Center personnel have also developed an effective offload procedure to handle unused HM from units returning from deployment. In the past, all unused HM was assumed to be HW. Today, HAZMIN Center personnel prevent unnecessary disposal of this material by inspection, determining the best use of the material following the P2 management hierarchy. In this way, HW disposal costs are often avoided.

  Impact: Implementation of an AUL to screen and streamline HM, and procedures to capture HM from units returning from deployment complement the HCP in reducing HM procurement and HW disposal costs.

- **Solid Waste Reduction and Diversion Program.** The solid waste reduction and diversion program is very active, reaching beyond traditional recyclables to include food waste, wood waste, pallets, construction and demolition waste, batteries, and reusable items, and even Christmas trees. Additionally, recycling programs that collect paper, cardboard, glass, aluminum cans, plastic bottles, and scrap metal are operated at Mokapu, Camp Smith, and Pu'uloa Range. In both FY97 and FY98, MCBH personnel focused on expanding recycling to include wood and construction debris which have enormous potential for waste reduction, and are often simple and cost effective to implement.

  - **Landfill Pass Screening.** The Recycling Center screens all loads of self-haul trash before they enter the landfill. This allows the base to reduce landfill material by removing reusable items, recyclables, wood, and pallets. It also prevents dumping of residential waste, HW, and other prohibited items.

  - **Housing Contract Modifications.** Since 1989, MCBH has been contracting curbside pickup of recyclables and Christmas trees in family housing areas. The contract cost the base $150,000 per year and resulted in a 3% diversion rate. In order to improve the payback for the curbside program, the Recycling Program Manager analyzed factors leading to high cost and determined that extensive record keeping/reporting costs coupled with inefficient transport added a great deal to the overall cost. Participation in the program was low due to lack of interest and no perceptible benefits to residents.

In 1998 the recycling contract was modified so that recyclables that were previously hauled long distances to processing centers will now be brought to the on-base recycling center. The recycling program will also take on responsibility for the success of the program and participate in the education and outreach for housing residents. This change is expected to result in cost savings ranging from $32K to $84K per year on the contract price, as well as increasing participation by housing residents. The additional materials at the recycling center are expected to increase revenues by a minimum of $5,000 per year and the increased quantities will improve the price received for all recyclables. The cost savings were used to justify hiring a permanent Recycling Center Work Leader that will allow for program growth and improvement.

Collection from the Barracks. Recycling in the barracks has always been a problem due to irregular and haphazard servicing of containers by residents. Recycling bins were often overflowing, causing residents to throw recyclables in the trash. A pilot project to organize and establish regular pickup has been very successful at servicing the bins and encouraging recycling. The recycling rate has increased for the unit in the project and other units will be incorporated into the program in 1999.

Reduction of Wood Waste. A tub grinder is used at MCBH that turns wood waste into chips that are used for weed abatement and trail dressing. During 1998, the base started a wood screening program that prioritized reuse over chipping and reduced the amount of wood waste.

All waste wood on base is brought to the Recycling Center where it is screened for reuse. The convenience of the Recycling Center wood stockpile makes small projects quick and easy. The wood reuse program became very popular as the word has spread, and wood is now going out as fast as it is coming in. Only wood that is termite infested, odd sized, small, or of poor quality is currently ground into chip.

In addition, all pallets generated on base are brought to the Recycling Center and made available for reuse. Excess standard pallets are sold to a pallet re-manufacturer for a small sum, and wing pallets are taken to DRMO.

Construction and Demolition Waste Recycling. Ongoing BRAC projects that involve demolition and new construction have provided many opportunities for recycling construction waste in the last two years. In FY97, a huge concrete and rubble recycling project saved roughly $1 million in disposal fees and cost of new aggregate. Concrete, soil, and coral are also diverted from smaller projects and stockpiled for future use.

Food Waste Composting. Food Waste from the Commissary and Mess Hall are picked up by a contractor and composted at a unique in-vessel operation in the surrounding community. The waste produces a nutrient-rich liquid and methane gas to operate the plant. It also produces compost products, which are sold locally.

Rainbow Reuse Store. Usable items destined for the landfill are segregated and stockpiled for reuse. In 1998, part of the Recycling Center indoor space was partitioned off for the Rainbow Reuse Store. People can pick up items for official use at no cost. Materials are displayed in the following sections: hardware, office supplies, containers, appliances, glass/Plexiglas, and building materials.

Traditional Recyclables. Prices for metals and plastics dropped during 1998, and losses were magnified by the Asian economic crisis. In spite of this challenging situation the Recycling Center operations continued to expand. Hardbound books have been added to the list of recycled items, and quantities of metals and plastics recycled have shown solid growth.

Impact: Diversion efforts have resulted in a $5 million cost savings, due to waste disposal and material purchase avoidance.

Concrete crushing operation

Christmas tree mulching operation

Compliance with Executive Order (EO) 12856

Prior to the onset of EO 12856 and the requirement for federal facilities to comply with Emergency Planning and Community Right-To-Know Act (EPCRA), MCBH has been extremely proactive in EPCRA compliance.

- **EPCRA Compliance.** As evidence of the Marine Corps' commitment to P2 and to being a good neighbor to the local community, the former Marine Corps Air Station, Kaneohe Bay, submitted an EPCRA Section 313 report in 1993, two full years prior to the reporting deadline. Subsequently, MCBH has continued to demonstrate that commitment by providing timely and accurate EPCRA reports to the appropriate federal, state, and local agencies, and promptly notifying appropriate officials in case of a hazardous substance release. This has helped MCBH earn a reputation as a front-runner in emergency planning and response with federal, state, and local agencies, as well professionals from private industry.

  During 1996, MCBH successfully eliminated two chemicals from the EPCRA Section 311/312 reporting requirements. Through P2 efforts, the amount of antifreeze and solvent that is used or stored aboard the base has been reduced to a level where it no longer exceeds reporting thresholds. In December 1997, another EPCRA reportable chemical, DS-2 (a decontaminating agent), was almost completely removed from MCBH, and thus no longer meets the EPCRA reporting threshold.

  Since the onset of EPCRA 313 reporting requirements of 1 March 1995, there have been no EPCRA Section 313 reportable chemicals identified at MCBH, which exceeded threshold quantities and/or failed to fall under one of the authorized exemptions. This is indicative of our efforts to reduce hazardous chemical use and promote P2 principles.

- **Spill Prevention and Response.** Transport and storage of fuel is critical to continued base operations and military readiness at MCBH. In order to maintain our essential operations, and concurrently avoid major oil or hazardous substance spills, we are committed to maintaining base personnel at a high level of spill response readiness and to executing projects that upgrade fuel systems with modern spill prevention features.

  The MCBH commitment to spill prevention and response is exemplified in the Marine Corps Base Hawaii Strategic Plan subgoal to "Improve Efficiency and Response Time to Hazardous Substance Spills". Accordingly, MCBH has initiated the Emergency Planning and Response Program.

  Our base integrated equipment, training, and partnering with federal, state, and local emergency planning

agencies, and participated in multi-agency drills to produce a more capable and responsive spill team, recognized as the *primary* spill response team on the windward side of Oahu. This recognition stems from accomplishments such as:

➢Conducting realistic Facility Response Team Training and Hazardous Substance Incident Response Training.

➢Preparation of an Integrated Contingency Plan to centrally manage the plans and legislation below. We are one of the first federal facilities to develop an ICP.

- Oil/Hazardous Substance Spill Contingency Plan (OHSSCP)
- RCRA Contingency Plan (RCP)
- Spill Prevention, Control and Countermeasures Plan (SPCC)
- Oil Pollution Act of 1990 Facility Response Plan (FRP)
- Risk Management Plan (RMP)
- Emergency Planning and Community Right-To-Know Act (EPCRA)

➢Formation of a Spill Management Team (SMT) using Incident Command System principles during regular SMT exercises. The readiness of the SMT was attested to in 1996 when US Coast Guard (USCG) in Honolulu conducted its first unannounced exercise for a federal facility at MCBH. The exercise after-action report stated, "It was evident that each person involved needed little or no instruction to complete their assigned tasks -- obvious results of a superior training program."

➢In August 1997, MCBH was the only federal facility to participate in the Hawaii Area PREP Exercise "Operation Ko'olau", a full-scale HM field exercise developed by the City and County of Honolulu, State of Hawaii, and U. S. Environmental Protection Agency. As part of the exercise, we transported our mobile command trailer up to the windward side of the H-3 highway tunnel, providing a forward command post as well as ICS response management personnel to assist the exercise Facility Incident Commander

➢Conducted a Worst Case Discharge Table Top Exercise in June 1998 that brought together key players from federal and state agencies, as well as leading professionals from the spill response industry. A Unified Command response structure that combined Federal and State On-Scene Coordinators and the base Incident Command was utilized.

➢Hosted the first "Marine Corps On-scene Coordinators" course in November 1998 that brought together spill response professionals from around the country to share the latest in spill response technology, techniques, and systems.

- **Spill Prevention Projects.** In addition to maintaining a high level of spill response readiness order to sustain federal, state, and community support for fuel transport and storage aboard MCBH, the base continually upgrades fuel tank and piping systems with modern spill prevention features. MCBH has recently completed or is preparing to execute over $10 million worth of fuel tank and piping improvement projects that not only satisfy spill prevention requirements and employ P2 initiatives, but also enhance military readiness by maintaining and updating the fueling capability of aircraft and tactical vehicles. The following projects have been initiated or completed:

➢Replacement of a non-compliant 210,000 gallon underground storage tank (UST) with an aboveground storage tank (AST) surrounded by lined, bermed secondary containment; replacement

of over 2000 feet of rusted JP-5 pipeline with stainless steel piping.

➢Construction of centralized diesel and mogas ASTs and a fueling station with secondary containment that replaced the need for four non-compliant USTs at two locations.

➢Construction of new tank bottoms and lined, bermed secondary containment for two

➢JP-5 ASTs with a total capacity of 2.5 million gallon.

➢Decommission of two boiler plants, a 400,000 gallon diesel AST, and over 5,000 feet of piping.

➢Construction of aircraft refueling lanes; replacement of steel with stainless steel piping.

Education, Outreach, and Partnering

The EC&PD shares its vision, objectives and strategies using a variety of approaches. In order to improve understanding and participation, we create opportunities to communicate awareness of P2 program goals and how they can be achieved through:

- Quarterly meetings with HM and HW representatives from base and tenant commands to discuss current HW/P2 projects, HM reduction goals, environmentally-friendly HM substitutions, and concerns with any aspect of either HW or P2 programs. This has helped us to establish cooperative working relationships, which have been instrumental in the implementation of numerous P2 initiatives.
- Training hosted by EC&PD to educate and maintain certification status for personnel throughout the base. Classes include:

• Shelf Life Management	• HM Inventory Control System (HICS)
• Environmental Law	• HW Operations and Emergency Response
• Environmental Chemistry	• Spill Management Team Tabletop Exercise
• Transportation of HM	• Hazardous Substance Incident Response
• HW Facility Operations	

- Partnerships with FISC Pearl Harbor and eight other commands under its Hawaii region through the on-line, electronic sharing of HM inventory databases via the Regional HM Management System (RHMMS). This has enabled us to share and expand our sources of no-cost HM, much to the benefit of MCBH base and tenant activities.
- Active participation in federal, state, local, and commercial spill response drills and exercises. We provide a critical interface with the civilian community in emergency response planning, as the Marine Corps' representative to the Local Emergency Planning Committee (LEPC), the State Emergency Response Commission (SERC), the U. S. Coast Guard Honolulu Area Committee, and various Honolulu Area Committee subcommittees.
- Leadership and participation in the Hawaii Joint Interservice Regional Support Group (HJIRSG) activities for recycling. The HJIRSG includes all DoD on Oahu. The group met monthly in 1998 to explore the possibility of establishing a joint service recycling and marketing cooperative and provides a forum for information exchange and small partnerships. Stemming from HJIRSG efforts, the Marine Corps and Navy have combined recyclable materials for consolidated marketing that results in better prices for all.
- Publication of articles in the base newspaper, *Hawaii Marine*. This has publicized the efforts of the HAZMIN Center, outlined upcoming events celebrating Earth Day, detailed EC&PD's participation in Operation Ko'olau (an emergency response exercise), and described the MCBH Rainbow Recycling

Center. The HAZMIN and Recycling Centers were also featured on local television newscast.

- Monthly orientations for new MCBH personnel. A user-friendly handout, distributed at this brief, was developed to provide pertinent information and points of contact for questions related to HM, HW, and emergency spill response.
- Development of a web page that provides an orientation brief, success stories, P2 legislation and environmental drivers. Currently under development is a program that will list free reuse HM available at the HAZMIN Center, updated on an hourly basis.
- Establishment of a partnership with the surrounding community to grind Christmas trees into mulch. Several drop-off days are scheduled in which trees from Kailua or Kaneohe are delivered by the City and County to the grinding site on base.
- Inclusion of P2 in all host-tenant support agreements.
- Earth Day demonstration of the use of environmentally-friendly products, such as non-hazardous substitutes for household HM. State of Hawaii Department of Health household hazardous waste booklets and information wheels were also distributed. Hundreds of these informational items have also been delivered to MCBH Housing Office for incoming residents.

Research, Development and Technology Demonstration/Validation

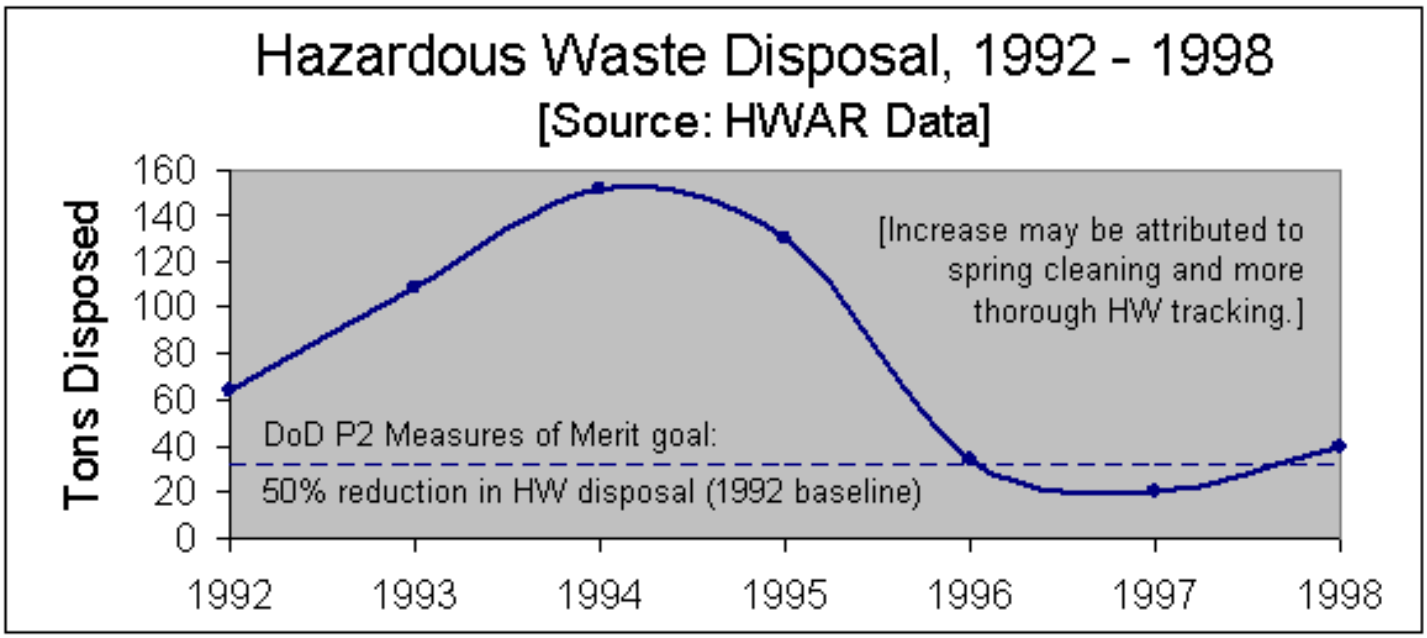
The EC&PD has aggressively pursued both high and low technology solutions to environmental problems, ranging from reducing chemical herbicide usage to developing integrated HM and geographical data information systems. These technologies enhance combat readiness through increased efficiency and reduced military labor requirements.

- EC&PD has researched, identified, and funded for Salt-X, a corrosion control product for use on tactical and commercial vehicles. Salt-X is simply mixed with water and applied to vehicles to form a protective corrosion inhibitor coating. Since MCBH is subject to extremely corrosive environmental conditions, use of this desalinization compound has reduced maintenance associated with rust, lowered repair and replacement costs, allowed units to devote a greater portion of their time to training and mission-essential duties.
- As part of an ongoing effort to reduce herbicide use, the EC&PD has installed the Aqua Heat weed control system, which uses hot water (420ºF) to kill unwanted vegetation by melting the waxy coating of plants, causing dehydration within 24 hours. It also kills insects, molds and pathogens. Since no chemicals are involved in Aqua Heat weed control system, it is an outstanding P2 alternative that is as effective as herbicides in controlling weeds, but without the chemical hazards to workers and the environment.
- A graphical user interface between the EC&PD Geographical Information System (GIS) and the HAZMIN Center's HICS is being developed to track HM and HW by their physical locations. In the event of a mishap, critical information can be provided to emergency responders and spill management personnel in a timely manner.

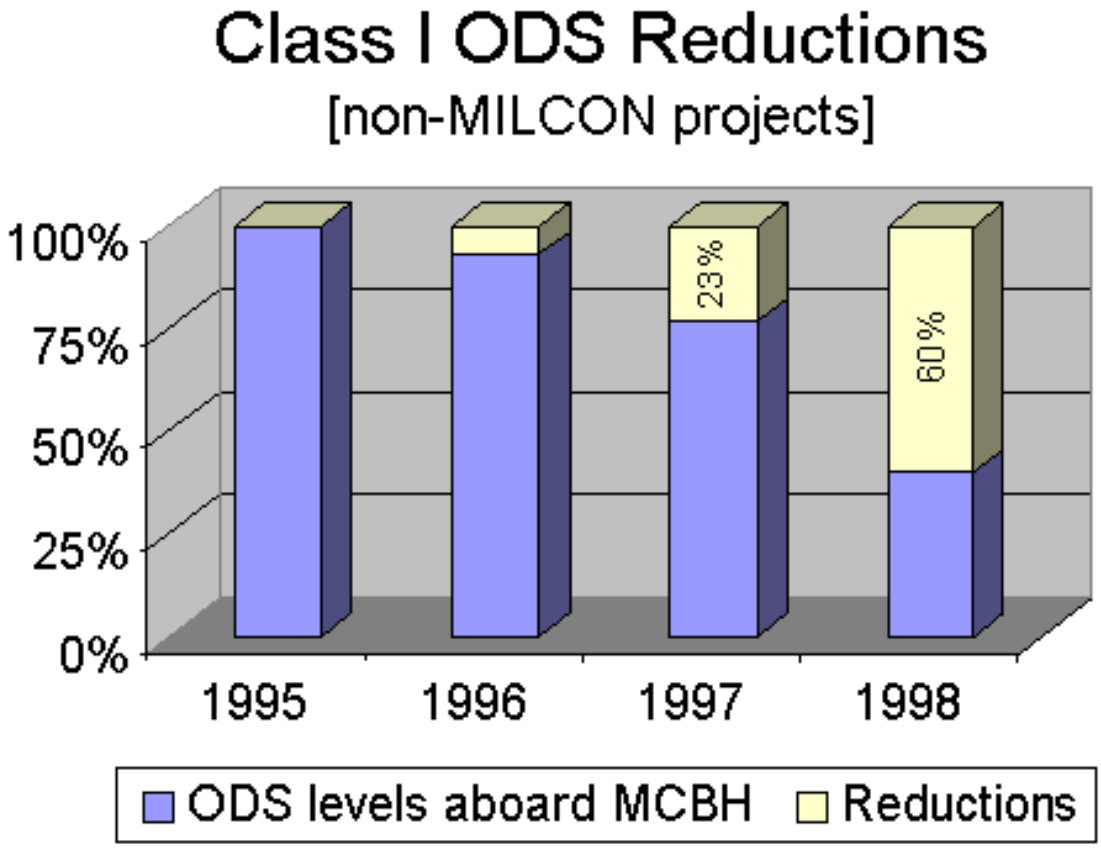
Aqua Heat Steam Vegetation Control System

Reductions Achieved

- **HW and HM Reductions.**



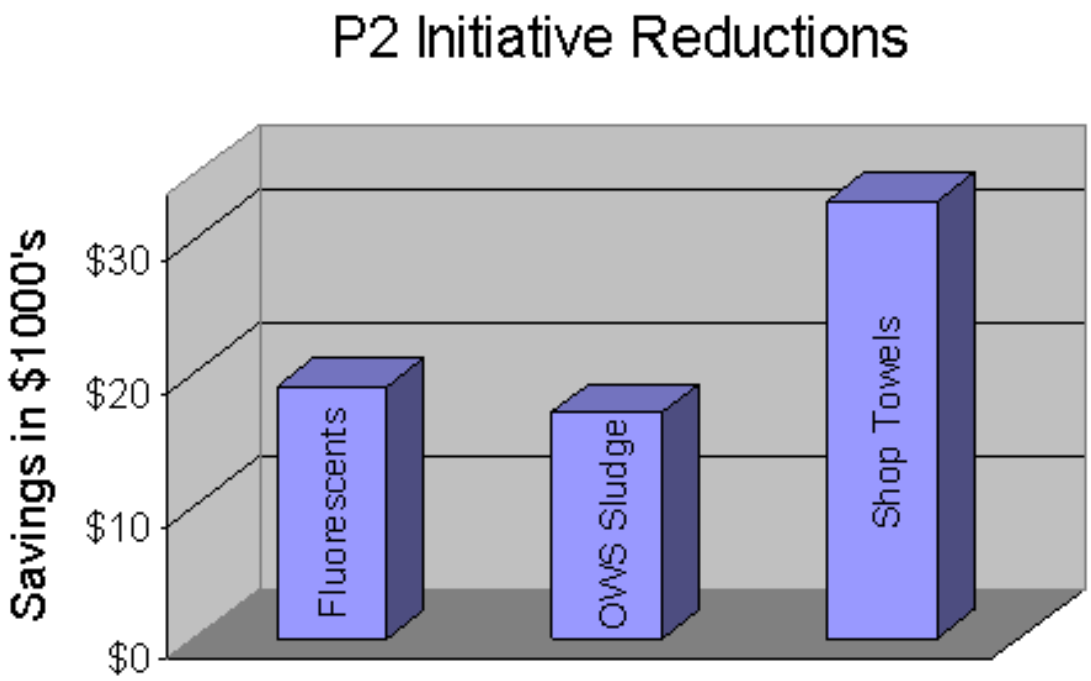
- The Hazardous Material Consolidation Program (HCP), instituted just fourteen months ago, has been extremely successful. Dramatic reductions in HM levels and HW generation have demonstrated HCP's success in supporting Marines within combat-ready conditions. Since the HCP has only been integrated into one of the major tenant organizations aboard MCBH, the following numbers will grow in the future, as more tenants adopt the program
- **Operational Reductions.** Two initiatives that have shown exceptional savings are: (1) a multi-disciplinary partnership to develop a solution which allows corrosion control to be performed on tactical vehicles at the organizational level, saving MCBH an estimated $440K per year; and (2) a weapons cleaning system utilizing a non-toxic, non-OSHA listed solvent substitute for PD-680 that has reduced the time it takes to clean a weapon in half. With over 3,000 weapons cleaned per week at MCBH, this equates to an annual savings of $4 million and allows 360,000 Marine hours per year to be redirected towards mission essential responsibilities.



Class I ODS Reductions.

- MCBH began phasing out ODS in 1994 and has successfully the met the DoD Measure of Merit goal: reduce the quantity of Class I ODS 20% by 2000 (1995 baseline). Projects leading to the elimination of Class I ODS aboard MCBH in 1999 are underway.
- **Solid Waste Diversion and Reduction.** Although recycling and solid waste diversion programs were implemented only in the past few years, they have made significant progress in reducing the amount of solid waste disposed in landfills, as shown in the following table:

Diversion Method	FY97 Cost Savings	FY98 Cost Savings	Percent Increase
Marketable Recyclables	$199,252	$232,832	16.9
C&D Aggregate and Fill	$1,579,682	$2,740,500	73.5
Mulch	$61,740	$62,475	1.2
Lead Acid Batteries	$12,250	$13,148	7.3
Wood Reuse	$9,760	$14,640	50.0
Food Waste Composting	$23,920	$25,280	5.7
Total Savings	**$1,886,604**	**$3,088,875**	**63.7**



Reduction from Other P2 Initiatives.

- The conversion from hazardous fluorescent lamps to a low-mercury non-hazardous alternative will save $17K per year in HW disposal costs and eliminate related liabilities. Sludge from oil water separators (OWS), formerly drummed and disposed of, is now dried on site, sanitized, and reused as landfill material, reducing manpower requirements and saving $15K per year in disposal costs. The shop towel recycling program cut the waste stream by 99%, eliminating 50,000 pounds of waste, saving $31K annually.

Summary

Marine Corps Base Hawaii strives to be a model steward of the naturally and culturally rich lands under its control. At the same time, MCBH provides responsive support to operating forces in order to enhance combat readiness and global power projection. To meet these challenging goals, EC&PD has worked diligently and applied innovative solutions. Although our P2 Program is little more than three years old and minimally staffed, it has been one of the best sources of innovative solutions. We have shown that the best P2 ideas not only ensure compliance with environmental laws and regulations, they also increase combat readiness through increased efficiency. In this manner, MCBH P2 efforts have resulted in millions of dollars in cost savings, as well as hundreds of thousands of hours of savings in civilian and Marine labor. Finally, by taking a comprehensive systems-approach to our P2 challenges, and by looking at issues with a long-term perspective, we expect our P2 efforts to improve the MCBH mission readiness and enhance our reputation as an environmentally responsible neighbor to the community.