

POLLUTION PREVENTION PLAN

United States Army Garrison, Hawaii



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CHAPTER 1 INTRODUCTION

1.1 INTRODUCTION AND STATEMENT OF PURPOSE

1.1.1 Purpose

This plan establishes the United States Army Garrison-Hawaii's (USAG-HI) commitment to environmental leadership in pollution prevention (P2) by outlining the concepts and practices necessary to reduce the use of hazardous materials (HMs), solid waste generation, water management, etc., and the release of pollutants to as near zero as feasible. Environmental protection and P2 are everyone's responsibility. Being a good neighbor and steward of Hawaii is part of the USAG-HI's mission.

All of USAG-HI's personnel will use this plan as a guide to develop ways to minimize the environmental impacts of their activities and achieve Federal, Presidential Executive Orders, Department of Defense (DOD), and U.S. Army P2 goals. This plan will be used as a tool to document, track, and manage installation P2 efforts in pursuit of achieving P2 goals.

1.1.2 Summary Table, References, and Abbreviations

Publications and prescribed references are listed in Appendix A. Abbreviations and special terms used in this plan are explained in the Glossary. A summary table of published or codified P2 Goals for DOD and Army installations is provided in Appendix B. The goals are listed as they apply to each environmental media area along with the regulatory citation, the implementation date, and the target date of when a particular goal is to be achieved. Also provided in Appendix B, is a summary table listing the recommended P2 initiatives of this plan and where they are located within the plan. This table may also be used to track the status of the recommended initiatives once they have been implemented. Executive Orders 13423, Strengthening Federal Environmental, Energy, and Transportation Management and 13514 Federal Leadership in Environmental, Energy, and Economic Performance, are found in Appendix E. A link to the Energy Independence and Security Act of 2007 is provided in Appendix F.

1.2 BACKGROUND AND MISSION

The U.S. Army Garrison, Hawaii traces its history to the District of Hawaii, a command formed in 1910 as a sub-element of the Department of California. In 1911, the Hawaiian Department replaced the District, reporting directly to the War Department in Washington. Initially headquartered in the Alexander Young Hotel, the Department moved to its permanent home at Fort Shafter in 1921. It was the senior headquarters for the Army in Hawaii.

After the outbreak of World War II, the Hawaiian Department was charged with a variety of logistical support and installation functions and renamed the Hawaiian Department Service

Force. In 1943, the organization was renamed again to become the Army Port and Service Command. Its Commanding General was given responsibility as Commander, U.S. Army Forces, Pacific Ocean Area in 1944 under the operational control of the Commander-in-Chief, Pacific (CINCPAC).

In the years after World War II, the old Hawaiian Department headquarters was formally abolished, and Headquarters, U.S. Army, Pacific (USARPAC) was established in 1947. Installation support functions under USARPAC were accomplished by several short-lived organizations until 1957 when a new command, the U.S. Army Hawaii/25th Infantry Division, was created. These two commands were separated once again in 1960, with the U.S. Army, Hawaii assuming the installation support role.

The U.S. Army Support Command, Hawaii (USASCH) was established on 1 January 1973 to succeed U.S. Army, Hawaii as the command responsible for installation services. It was temporarily headquartered at Schofield Barracks. When USARPAC was eliminated as a major command in 1973, USASCH returned to Fort Shafter and became the senior Army headquarters in Hawaii, once again responsible for installation and base support services and serving as the Army command element of CINCPAC, the Pacific joint command. When the U.S. Army Western Command was created from USASCH in 1979 to become the major Army element of CINCPAC, USASCH reverted to its traditional role as an installation and base support service command.

On 1 March 1992, U.S. Army, Hawaii was re-established and was comprised of the 25th Infantry Division (Light), USASCH, the 45th Corps Support Group (Forward), and the U.S. Army Law Enforcement Command (Prov). The Commander, 25th Infantry Division (Light) and U.S. Army, Hawaii replaced the Commander, USASCH as the Installation Commander. On 6 January 1994, USASCH was redesignated as U.S. Army Garrison, Hawaii (USAG-HI). With the establishment of the Installation Management Agency on 1 October 2002, USAG-HI was realigned to its Pacific Region Office. The Army activated the Installation Management Command 24 October 2007 to consolidate and strengthen installation support services to Soldiers and their families through the full authority of command.

Today, the USAG-HI provides quality services, installation facilities, training and recreational centers to nearly 90,000 Soldiers, civilians and family members stationed on the islands of Oahu and Hawaii. USAG-HI is headquartered at Wheeler Army Airfield, approximately 20 miles from the state capital of Honolulu. Hawaii's mild climate allows for year-round training and deployment operations (reference 1-1).

1.2.1 Population

The USAG-HI serves a population of over 90,000 military and civilian personnel, veterans, retirees, and their family members. This rough tally reflects almost 190,000 acres and houses an ever growing community including active and reserve units as well as other collective unit components of DOD organizations.

1.2.2 Organization

The Director of Public Works (DPW) is responsible for maintaining and repairing all of the infrastructure and facilities of the USAG-HI. The DPW is charged with ensuring the stability of installation facilities and environmental practices, directorate responsibilities include operations and maintenance, environmental, utilities, engineering, planning, and business operations.

The Environmental Division, under the DPW is responsible for developing and implementing the environmental programs through compliance with all applicable environmental laws and regulations, preventing pollution, protecting, conserving, and sustaining of natural resources for soldiers, civilians, families, and the local communities. The Environmental Division is comprised of two sections - Environmental Compliance and Environmental Conservation.

1.2.3 Tenant and Support Activities

The USAG-HI has numerous tenant and support activities. Table 1.1 presents a partial list of garrison and tenant activities.

Table 1.1 – Partial List of USAG-HI Garrison and Tenant Activities.

Garrison Activities
Directorate of Emergency Services (DES)
Directorate of Family and Morale, Welfare, and Recreation (DFMWR)
Directorate of Human Resources
Directorate of Logistics (DOL)
Directorate of Plans, Training, Mobilization & Security
Directorate of Public Works (DPW)
Education Center
Religious Services
1101st Garrison Support Unit
Plans, Analysis, and Integration Office
Directorate of Installation Safety
Public Affairs Office
Resource Management Office
Pohakuloa Training Area (PTA)
Equal Employment Opportunity
Internal Review Audit Compliance Office
Tenant Activities
Tripler Army Medical Center
Defense Commissary Agency
Army & Air Force Exchange Services (AAFES)
196th Infantry Brigade
19th MP Battalion
25th Infantry Division
311th Signal Command
500th MI Brigade
599th Transportation Brigade
8th Theater Sustainment Command
94th Army Air and Missile Command
9th Mission Support Command
Army Material Command
Island Palm Communities
Corps of Engineers - Honolulu
Corps of Engineers - Pacific
IMCOM - Pacific
U.S. Army Pacific

1.3 DEFINITION OF POLLUTION PREVENTION

Pollution prevention is the systematic effort to minimize, or eliminate altogether, process waste and other pollutants before they are generated. Preventing the environmental release of waste and pollutants after they have been generated is a function of pollution control, which is fundamentally different from P2. The P2 hierarchy, established as national policy by the Pollution Prevention Act (PPA), prioritizes P2 efforts in the following order:

- Pollution should be prevented or reduced at the source whenever feasible;
- 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 feasible;
- Disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.

Pollution prevention and its basic principles of increased efficiency and reduction of waste can be applied to almost every facet of Army operations and activities, from day-to-day installation operations, to the acquisition of weapon systems, to munitions production on industrial bases, to field training exercises, to housing and family life.

1.4 BENEFITS OF POLLUTION PREVENTION

As concern for the environment has risen in our society, increased environmental regulation and public awareness have raised the standards, costs, and potential liabilities of management practices. Programs that adopt P2 principles can realize benefits on many different fronts:

- Reduced costs associated with the procurement and storage of HM.
- Reduced costs associated with the management, treatment, and disposal of wastes.
- Decreased use of energy and natural resources.
- Enhanced relations with the public, neighboring communities, and regulators.
- Reduced costs of complying with environmental and HM regulations, and diminished risk of noncompliance.
- Reduced future compliance liability.
- Improved long-term environmental quality and prevention of environmental degradation.
- Air, water, and land conservation.
- Fuel usage reduction.
- Conservation of land, air, and water.

1.5 POLLUTION PREVENTION POLICY

1.5.1 Army P2 Policy

The Army P2 program has three major benefits: first, it helps installations reduce their environmental compliance burden by minimizing the applicability of requirements imposed by environmental laws and regulations. Second, successful P2 projects help reduce operational costs. Third, the P2 program is fundamental in reducing waste and the generation of pollution. The Army P2 program focuses on implementing changes in chemicals, equipment, and processes in order to achieve a meaningful cost-effective reduction in the generation of pollution without adversely impacting mission readiness. Army installations and activities should strive to prevent pollution from all sources to the extent practicable by:

- Reducing pollutants at the source.
- Modifying manufacturing processes, maintenance, or other industrial practices.
- Modifying product designs.
- Developing and modifying acquisition systems.
- Recycling/reuse (to include implementing water and energy conservation measures), especially in closed-loop processes.
- Preventing disposal and transfer of pollution between media.
- Meeting affirmative procurement requirements and promoting the acquisition and use of environmentally preferable products and services.
- Promoting use of nontoxic substances.
- Using P2 to complement, and where practicable, replace traditional pollution control approaches.
- Incorporating P2 planning throughout the mission, operation, or product life cycle.

1.5.2 P2 and the Army Strategy for the Environment

The Army Strategy for the Environment (ASE) defines six goals that together create a sustainable vision for the Army (Reference 1-2). P2 is relevant to each of the six goals, supporting this vision of mission sustainability by helping the Army to address its environmental issues through the implementation of proactive solutions based on the P2 principles outlined above. P2 solutions result in the more efficient use of resources, the reduction of waste, the reduction of lifecycle costs, and contribute to staff and personnel awareness on the importance of exercising sound environmental stewardship now in order to meet future mission requirements. The ASE goals are:

1. Foster a sustainability ethic

2. Strengthen Army operations
3. Meet test, Training, and mission requirements
4. Minimize impacts and total ownership costs
5. Enhance well-being
6. Drive innovation

P2 also plays an important role in administering an installation's Environmental Management System (EMS), which the ASE establishes as one of the primary mechanisms for achieving sustainability. Specifically, the principles and tools of P2 can greatly assist in the development and achievement of an organization's objectives and targets.

P2 also supports Lean Six Sigma and similar efforts that strive to maximize organizational and process efficiency and eliminate unnecessary duplication and wasteful activities. P2 is, at its core, focused on reducing and eliminating process inefficiencies because it is these inefficiencies that are ultimately expressed as pollution. Whether it's a power generation activity or an industrial coating process, any portion of the raw material or energy inputs not physically present in, or tangibly represented in, the final product is considered waste by definition. And waste costs the Army money - money that could be spent on mission essential requirements such as equipping and training soldiers. In short, P2 strives to increase efficiency, reduce waste, and thereby enable the mission.

When effectively employed and integrated, P2, EMS, and LSS form a strong, complimentary set of tools that can help an installation achieve its own sustainability goals as well as the overarching goals of the Army Strategy for the Environment.

1.5.3 Environmental Policy Memorandum USAG-HI-10, 29 Jul 2010

The mission of the USAG-HI is to support troop readiness (reference 1-3). USAG-HI performs this mission in concert with its stewardship responsibilities to protect and conserve the environment by striving to attain an environmentally sustainable garrison as defined by the USAG-HI Strategic Plan. In accomplishing this mission, all USAG-HI Directorates, active duty and reserve components, tenant activities and agencies, and off-post units and/or agencies utilizing USAG-HI facilities are directed to:

- Comply with all applicable environmental pollution abatement policy, laws and regulations in the industrial areas.
- Improve the environmental stewardship of training areas.
- Strive to fully integrate relevant environmental requirements into standard work practices and procedures so environmental awareness and compliance are a routine part of the way business is conducted. In doing so, USAG-HI shall:

- Continually assess activities, products and services to determine their effect on the environment.
- Identify significant environmental impacts and ensure that they are considered when establishing goals and objectives in short-term and long-term strategic planning.
- Identify potential sources of pollution and meet or exceed Army goals for prevention of pollution.
- Be sensitive to those unique environmental and community values that make Hawaii a special place to live, work, and train.
- Comply with the procedures outlined in the USAG-HI's Environmental Management System Manual.

CHAPTER 2

POLLUTION PREVENTION REGULATORY BACKGROUND

The DOD's P2 policies originate in legislation enacted by the U.S. Congress. Executive Orders (EOs) direct Federal agencies, including the DOD, to conform to Federal legislation and may impose non-legislated requirements as well. The DOD issues directives and instructions in response to the EOs. These DOD policy statements are interpreted and promulgated in regulations, pamphlets, and other policy documents. This chapter provides summaries of the major laws, EOs, and DOD policy statements pertaining to P2. Due to the wide-reaching nature of P2 issues and frequent changes to laws and regulations, the list is not intended to be all-inclusive.

2.1 FEDERAL LEGISLATION

2.1.1 Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) was enacted in 1976 as an amendment to the Solid Waste Disposal Act. RCRA was early legal impetus for P2 practices, requiring "...It shall be a condition of any permit issued under this section for the treatment, storage, or disposal of hazardous waste (HW) on the premises where such waste was generated that the permittee certify, no less often than annually, that the generator of the HW has a program in place to reduce the volume or quantity and toxicity of such waste to the degree determined by the generator to be economically practicable" (reference 2-1).

2.1.2 Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 and the Superfund Amendments and Reauthorization Act (1986) regulate prevention, control, and compensation of environmental pollution. This act is commonly referred to as "Superfund" and regulates the cleanup of contaminated HW sites and releases of hazardous substances into the environment. The CERCLA list of hazardous substances is published in 40 Code of Federal Regulations (CFR) Part 302 and in 49 CFR Part 172.101, Appendix A. The Defense Environmental Restoration Program is the DOD program that implements CERCLA (reference 2-2).

2.1.3 Hazardous and Solid Waste Amendments of 1984

The Hazardous and Solid Waste Amendments, enacted in 1984, reauthorized and amended RCRA and imposed new and far-reaching requirements for the management of HW. The amendments established programs to regulate small quantity generators of HW (between 100 and 1,000 kg of waste/month), restricted land disposal of HW, established minimum technology requirements for land disposal units, required corrective actions for releases of HW, regulated underground storage tanks (USTs) containing petroleum products or hazardous substances,

initiated listing of new materials as HW, and set deadlines for the Environmental Protection Agency (EPA) to issue or deny HW facility operating permits (reference 2-3).

2.1.4 Energy Policy Act of 2005

The Energy Policy Act of 2005 (EPAct 2005) consists of several major provisions to include annual energy use reduction goals, renewable energy purchase goals, reauthorization of energy performance contracts, Federal procurement requirement of Energy Star® or Federal Energy Management Program (FEMP) designated products, and updated standards of Federal green buildings (reference 2-4).

2.1.5 Energy Independence and Security Act of 2007

The Energy Independence and Security Act of 2007 (EISA 2007) in some cases reaffirms goals set in the EPAct of 2005 and in other cases expands previous goals (reference 2-5).

2.1.6 Pollution Prevention Act of 1990

Facilities required to report releases for the Toxic Release Inventory (TRI) under the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 must provide documentation of their procedures for preventing the release of or for reusing these materials. However, the P2 Act goes beyond wastes designated as hazardous. Its intent is to force industries to reduce or prevent pollution at the source. In addition to source reduction, the P2 Act also emphasizes reuse and closed-loop recycling whenever possible. The emphasis is fundamentally different from offsite recycling, treatment, and disposal as primary ways to handle waste. The P2 Act first established, as comprehensive national policy, the P2 hierarchy (reference 2-6).

2.1.7 Clean Water Act of 1972

The Clean Water Act (CWA) (reference 2-7) requires certain discharges of storm water to be permitted under either an individual or general permit. Discharges of storm water from industrial activities, construction, and municipal separate storm sewer systems (MS4s) are among those that require permit coverage.

2.2 STATE OF HAWAII REGULATIONS

2.2.1 Hawaii Water Quality Laws and Regulations

The Hawaii Water Pollution Law is the principal water quality law in the state. It incorporates portions of the federal CWA. The Hawaii Department of Health (DOH) administers the water quality law as well as other Hawaii environmental laws. Through its Environmental Management Division, the DOH administers state and federal laws pertaining to clean air, clean water, safe drinking water, waste water, and solid and hazardous waste. Through its Environmental Planning Office, DOH administers the nonpoint source pollution program as well as other programs (reference 2-8).

2.2.2 Hawaii Air Quality Laws and Regulations

The Hawaii Air Pollution Control Law charges the DOH with regulating air quality in the state. The DOH adopts and enforces air quality standards, emission control requirements, and other regulations. The Hawaii clean air program follows the federal Clean Air Act (CAA). The EPA and DOH work cooperatively to enforce these requirements (reference 2-9).

2.2.3 Hawaii Solid Waste Laws and Regulations

The principal solid waste law in Hawaii is the Hawaii Solid Waste Management Act (SWMA) administered by the DOH. Hawaii's solid waste management laws impose requirements on wastes that do not otherwise meet the definition of hazardous waste. The SWMA focuses the most attention on the regulation of public and private landfills (reference 2-10).

2.3 PRESIDENTIAL EXECUTIVE ORDERS

While many of the goals established in the following executive orders apply to the agency (DOD) level of the federal government, USAG-HI is matching the requirements in order to assist the Department of Army (DA) and DOD in meeting their goals. Each of these goals, except where noted as being revoked or superseded, is addressed in this plan.

2.3.1 Executive Order 13101, "Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition," September 1998

This EO, which superseded EO 12873 (and has subsequently been revoked by EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management, 24 January 2007), provided a renewed emphasis on waste prevention, recycling, and acquiring recycled content or environmentally preferable products and services (reference 2-11). Federal agencies were tasked with accomplishing these goals and ensuring compliance among their facilities. A strategic plan was developed to assist Federal agencies in this endeavor. This strategic plan outlined the following:

- Improve and expand diversion of solid waste (SW) through prevention, reuse, and recycling.
- Facilitate the development and expansion of markets for recycled content and environmentally preferable products through greater Federal government acquisition and use of these products and services, research and development programs, assistance programs, and other appropriate programs.
- Facilitate the development and expansion of technology for waste prevention, recycling (including design for disassembly), and manufacture of recycled content and environmentally preferable products.
- Expand waste prevention and recycling in the daily operation of the Federal government.

- Implement cost-effective procurement programs favoring the purchase of environmentally preferable products and services.

Specific strategies towards accomplishing the above goals were also developed within the strategic plan and included:

- Improving acquisition planning by (1) revising product standards and specifications to reflect RCRA section 6002 and EO 13101 requirements, (2) including consideration of waste prevention; product or materials reuse; and recycling in the acquisition process, and (3) implementing the affirmative procurement programs to increase the use and purchase of recycled content and environmentally preferable products and services.
- Developing and implementing new technologies that improve Federal recycling and waste prevention programs, or facilitate the manufacturing or remanufacturing of recycled content or environmentally preferable products.
- Developing tracking and monitoring systems to demonstrate compliance with section 6002 of RCRA.
- Establishing quantitative goals, to be achieved by the end of fiscal year (FY) 2000, 2005, and 2010, and beyond, for waste prevention, recycling or SW diversion; affirmative procurement of products made with recovered materials; and procurement of environmentally preferable products and services for which agencies have completed pilot programs.
- Identifying opportunities to establish model facilities and promote their success.
- Implementing cost-effective waste prevention and recycling programs at all Federal facilities, including retention and use of recycling revenues.
- Procuring printing and writing paper containing no less than 30% postconsumer fibers.
- Developing an internal agency-wide awards program as appropriate to reward its most innovative waste prevention, recycling, and affirmative procurement efforts.

2.3.2 Executive Order 13123, “Greening the Government through Efficient Energy Management,” June 1999

This EO established requirements intended to encourage efficient energy management in the Federal government. EO 13123 has subsequently been revoked by EO 13423, 24 January 2007. The prime objectives and specific goals of EO 13123 are outlined below according to their respective sections (reference 2-12).

Sec. 101. Federal Leadership. The Federal Government, as the Nation's largest energy consumer, shall significantly improve its energy management in order to save taxpayer dollars and reduce emissions that contribute to air pollution and global climate change. The Federal Government can lead the Nation in energy efficient building design, construction, and operation;

can promote energy efficiency, water conservation, and the use of renewable energy products; and help foster markets for emerging technologies.

Sec. 201. Greenhouse Gases Reduction Goal. Through life-cycle cost-effective energy measures, each agency shall reduce its greenhouse gas emissions attributed to facility energy use by 30% by 2010 compared to such emissions levels in 1990.

Sec. 202. Energy Efficiency Improvement Goals. Through life-cycle cost-effective measures, each agency shall reduce energy consumption per gross square foot of its facilities, excluding facilities covered in section 203 of this order, by 30% by 2005 and 35% by 2010 relative to 1985.

Sec. 203. Industrial and Laboratory Facilities. Through life-cycle cost-effective measures, each agency shall reduce energy consumption per square foot, per unit of production, or per other unit as applicable by 20% by 2005 and 25% by 2010 relative to 1990.

Sec. 204. Renewable Energy. Each agency shall strive to expand the use of renewable energy within its facilities and in its activities by implementing renewable energy projects and by purchasing electricity from renewable energy sources. In support of the Million Solar Roofs initiative, the Federal Government shall strive to install 2,000 solar energy systems at Federal facilities by the end of calendar year (CY) 2000, and 20,000 solar energy systems at Federal facilities by 2010.

Sec. 205. Petroleum. Through life-cycle cost-effective measures, each agency shall reduce the use of petroleum within its facilities. Agencies may accomplish this reduction by switching to a less greenhouse gas-intensive, nonpetroleum energy source, such as natural gas or renewable energy sources; by eliminating unnecessary fuel use; or by other appropriate methods. Where alternative fuels are not practical or life-cycle cost-effective, agencies shall strive to improve the efficiency of their facilities.

Sec. 206. Source Energy. The Federal Government shall strive to reduce total energy use and associated greenhouse gas and other air emissions as measured at the source. To that end, agencies shall undertake life-cycle cost-effective projects in which source energy decreases, even if site energy use increases. In such cases, agencies will receive credit toward energy reduction goals through guidelines developed by the Department of Energy (DOE).

Sec. 503. (f). Establish Water Conservation Goals for Federal Agencies. The FEMP considers a facility to have met the requirements for water conservation when it has a Water Management Plan and has implemented at least four (of the ten) Water Efficiency Improvement best management practices (BMP).

- Public information and education programs.
- Distribution system audits, leak detection, and repair.
- Water efficient landscape.
- Low-flow toilets and urinals.

- Low-flow faucets and showerheads.
- Reduce wasted water from boiler/steam systems.
- Eliminate single-pass cooling systems.
- Reduce wasted water from cooling tower systems.
- Reduce wasted water from miscellaneous high water-using processes.
- Water reuse and recycling.

The FEMP set the schedule for implementation at Federal facilities as follows:

- 5% of facilities by 2002.
- 10% of facilities by 2004.
- 30% of facilities by 2006.
- 50% of facilities by 2008.
- 80% of facilities by 2010.

2.3.3 Executive Order 13148, “Greening the Government Through Leadership in Environmental Management,” April 2000

By including many of the P2 elements of several previously existing EOs, EO 13148 revoked the following: EO 12843, April 1993; EO 12856, August 1993; EO 12969, August 1995; and section 1-4 “Pollution Control Plan” of EO 12088, October 1978 (reference 2-13). EO 13148 has subsequently been revoked by EO 13423, 24 January 2007. Executive Order 13148 set goals that involved establishing environmental management programs as well as goals that involved reaching measurable P2 milestones. The goals that pertained directly to P2 were:

- Each agency shall reduce TRI Form R releases 10% annually or 40% by 31 December 2006 from a baseline year of 2001.
- Each agency shall reduce the use of 15 EPA “priority chemicals” 50% by 31 December 2006. Note, to complete the list, the EO allowed the workgroup until February 2001; but because of the breadth of use issues at Federal facilities, the chemicals were not defined until March 2004, which was also the baseline year. From the original 15 priority chemical requirement the EO called for, only five substances met the final list criteria: cadmium, lead, polychlorinated biphenyl (PCB), mercury, and naphthalene.
- Each agency shall develop a plan to phase-out the procurement of Class I Ozone Depleting Substances (ODS) for all nonexcepted uses by 31 December 2010.
- Each agency shall determine the evaluation of implementing centralized procurement and distribution (e.g., “pharmacy”) programs at its facilities for tracking, distribution, and

management of toxic or hazardous materials and, where appropriate, implement such programs.

- Each agency shall institute acquisition and procurement practices pertaining to landscaping activities. These practices must be based upon the Guidance for Presidential Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds (60 Federal Register 40837).
- By 31 March 2002, each agency shall ensure that its facilities develop a written plan that sets forth the facility's contribution to the goals and requirements established in EO 13148. Agencies shall adopt a policy to preferentially use P2 projects and activities to correct and prevent noncompliance with environmental regulatory requirements.

2.3.4 Executive Order 13149, “Greening the Government Through Federal Fleet and Transportation Efficiency,” April 2000

Executive Order 13149 applied to agencies operating 20 or more motor vehicles within the U.S. (reference 2-14). It established goals to improve the average fuel economy to increase the use of alternative fuels for fleet vehicles. Note that this order exempts tactical military vehicles, law enforcement vehicles, and emergency vehicles from its requirements. This EO supersedes EO 13031 of December 1996, (and has subsequently been revoked by EO 13423, 24 January 2007). This order established the following specific goals:

- Reduce vehicle petroleum consumption 20% by the end of FY 2005 from an FY 1999 baseline.
- Increase the average EPA fuel economy rating of cars and light trucks by at least 1 mile per gallon (mpg) by the end of FY 2002 and by 3 mpg by FY 2005 from an FY 1999 baseline.
- Ensure that alternative fuels account for at least 50% of the fuels used in dual-fuel, alternative fuel vehicles.
- Ensure that at least 75% of car and light truck procurements are alternatively-fueled vehicles.

2.3.5 Executive Order 13423, “Strengthening Federal Environmental, Energy and Transportation Management,” January 2007

The EO sets goals in the areas of energy efficiency, acquisition, renewable energy, toxics reduction, recycling, sustainable buildings, electronics stewardship, fleets, and water conservation. The new EO requires Federal agencies to lead by example in advancing the nation’s energy security and environmental performance (reference 2-15).

The EO requires use of the EMS as the framework for managing and continually improving sustainable practices. The EO consolidates five prior EOs (13101, 13123, 13134, 13148, and 13149) and integrates the sustainable practices of those orders into a more cohesive approach for environmental and energy management (reference 2-16).

- *Vehicles.* Use plug-in hybrid (PIH) vehicles when commercially available at a cost reasonably comparable, on the basis of life-cycle cost, to non-PIH vehicles.
- *Petroleum Conservation.* Reduce petroleum consumption in fleet vehicles by 2% annually through the end of FY 2015, relative to the agency baseline for FY 2005. (Updates expired goals of EO 13149.)
- *Alternate Fuel Use.* Increase alternative fuel consumption (non-petroleum based) at least 10% annually, relative to the agency baseline for FY 2005.
- *Energy Efficiency.* Reduce energy intensity by 3% annually or 30% by the end of FY 2015, relative to the baseline of the agency's energy use in FY 2003. (The new 30% energy efficiency goal seeks to achieve in 10 years the same level of improvement that Federal agencies achieved in the last 20 years and is 50% more stringent than the goal in the EPO Act of 2005.) Energy intensity is the energy use per square foot of building area.
- *Greenhouse Gases.* Reduce greenhouse gas emissions through reduction of energy intensity by 3% annually or 30% by the end of FY 2015, relative to the baseline of the agency's energy use in FY 2003. (Will be realized through other EO goals that will exceed the prior 30% goal set in EO 13123.)
- *Renewable Power.* At least 50% of current renewable energy purchases must come from new renewable sources (in service after 1 January 1999); and to the extent feasible, the agency implements renewable energy generation projects on agency property for agency use. (The EPO Act of 2005 sets a renewable energy goal but does not require that any percentage come from new sources. The prior EO 13123 set a goal of 2.5% for renewable power purchases.)
- *Building Performance.* Ensure that new construction and major building renovations comply with sustainability strategies, including resource conservation, reduction, and use; siting; and indoor environmental quality, and 15% of the existing Federal capital asset building inventory of the agency as of the end of FY 2015, incorporate the referenced sustainable practices. (The order makes mandatory the elements of the High Performance Buildings Memorandum of Understanding signed by 19 agencies in January 2006.)
- *Water Conservation.* Beginning in FY 2008, reduce water consumption intensity by 2% annually through the end of FY 2015, or 16% by the end of FY 2015, relative the baseline of the agency's water consumption in FY 2007. (Prior orders did not include such a goal.) Water intensity is the water use per square foot of building area.
- *Procurement.* Expand purchases of environmentally-sound goods and services, including biobased, environmentally preferable, energy-efficient, water-efficient, and recycled-content products; and require use of paper of at least 30% post-consumer fiber content. (The new EO and guidance require agencies to integrate four existing disparate purchasing requirements into an integrated Federal purchasing effort that applies to all types of acquisitions of goods and services. Federal purchasing of energy efficient, recycled content, biobased, and environmentally preferable products will increase as a

result. The EO also continues the requirement that agencies purchase office paper containing 30% post-consumer fiber.)

- *Pollution Prevention.* Reduce the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of by the agency, increase diversion of SW as appropriate, and maintains cost-effective waste prevention and recycling programs in its facilities.
- *Electronics Management.* Annually, 95% of electronic products purchased must meet Electronic Product Environmental Assessment Tool (EPEAT) standards where applicable; enable Energy Star® features on 100% of computers and monitors; and reuse, donate, sell, or recycle 100% of electronic equipment that has reached the end of its useful life using environmentally sound management practices. (The order makes mandatory the elements of the 2004 Federal Electronics Stewardship Memorandum of Understanding signed by 12 agencies and the Executive Office of the President.)
- *Environmental Management Systems.* Implement EMS at all appropriate organizational levels to ensure use of EMS as the primary management approach for addressing environmental aspects of internal agency operations and activities. The EMS objectives shall include the goals identified in Section 2 of the EO.

2.3.6 Executive Order 13514, “Federal Leadership in Environmental, Energy, and Economic Performance,” October 2009

The goal of this executive order is "to establish an integrated strategy towards sustainability in the Federal Government and to make reduction of greenhouse gas emissions (GHG) a priority for Federal agencies." E.O. 13514 introduces new greenhouse gas (GHG) emissions management requirements, expands water reduction requirements for federal agencies, and addresses waste diversion, local planning, sustainable buildings, environmental management, and electronics stewardship (reference 2-17).

This EO does not rescind or eliminate the requirements of EO 13423. Instead, it expands on the energy reduction and environmental performance requirements for Federal agencies identified in EO 13423. All the provisions of EO 13423 remain in effect.

- Establish a percentage reduction target for agency-wide reductions of scope 1 and 2 greenhouse gas emissions in absolute terms by FY 2020, relative to a FY 2008 baseline.
- Establish a percentage reduction target for reducing agency-wide scope three greenhouse gas emissions in absolute terms by FY 2020, relative to a FY 2008 baseline.
- Reduce, if the agency operates a fleet of at least 20 motor vehicles, the agency fleet’s total consumption of petroleum products by a minimum of 2% annually through the end of FY 2020, relative to a baseline of FY 2005.
- Reduce potable water consumption intensity by 2% annually through FY 2020, or 26% by the end of FY 2020, relative to a baseline of the agency’s water consumption in FY 2007.

- Reduce agency industrial, landscaping, and agricultural water consumption by 2% annually or 20% by the end of FY 2020 relative to a baseline of the agency's industrial, landscaping, and agricultural water consumption in FY 2010.
- Consistent with State law, identify, promote, and implement water reuse strategies that reduce potable water consumption.
- Implement and achieve the objectives identified in the stormwater management guidance provided by the Environmental Protection Agency for implementation of section 438 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17094), which requires that any development or redevelopment project involving a Federal facility with a footprint that exceeds 5,000 square feet shall use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow.
- Divert at least 50% of non-hazardous solid waste, excluding construction and demolition debris, by the end of FY 2015.
- Divert at least 50% of construction and demolition materials and debris by the end of FY 2015.
- Reduce printing paper use and acquiring uncoated printing and writing paper containing at least 30% postconsumer fiber.
- Reduce and minimize the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of.
- Decrease agency use of chemicals where such decrease will assist the agency in achieving greenhouse gas emission reduction targets.
- Beginning in 2020 and thereafter, ensure that all new Federal buildings that enter the planning process are designed to achieve zero-net-energy by 2030.
- Ensure that all new construction, major renovation, or repair and alteration of Federal buildings comply with the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings*, (Guiding Principles).
- Ensure that at least 15% of the agency's existing buildings (above 5,000 gross square feet) and building leases (above 5,000 gross square feet) meet the Guiding Principles by FY 2015 and that the agency makes annual progress toward 100% conformance with the Guiding Principles for its building inventory.
- Pursue cost-effective, innovative strategies, such as highly reflective and vegetated roofs, to minimize consumption of energy, water, and materials.
- Ensure that 95% of new contract actions including task and delivery orders, for products and services with the exception of acquisition of weapon systems, are energy-efficient (Energy Star or FEMP designated), water-efficient, bio-based, environmentally

preferable (e.g., Electronic Product Environmental Assessment Tool (EPEAT) certified), non-ozone depleting, contain recycled content, or are non-toxic or less toxic alternatives, where such products and services meet agency performance requirements.

- Promote electronics stewardship, in particular by:
 - Ensuring procurement preference for EPEAT-registered electronic products.
 - Establishing and implementing policies to enable power management, double-sided printing, and other energy-efficient or environmentally preferable features on all eligible agency electronic products.
 - Employing environmentally sound practices with respect to the agency's disposition of all agency excess or surplus electronic products.
 - Ensuring the procurement of Energy Star and FEMP designated electronic equipment.
 - Implementing best management practices for energy-efficient management of servers and Federal data centers.

2.4 DOD DIRECTIVES, INSTRUCTIONS, ETC.

2.4.1 DOD Memorandum, "New DOD P2 Measure of Merit," May 1998

This memorandum established a SW measure of merit (MoM) to replace those in DOD Instruction 4715.4 (reference 2-18). The MoM was to "ensure that the diversion rate for non-hazardous SW was greater than 40% while ensuring integrated non-hazardous SW management programs provided an economic benefit when compared with disposal using landfilling and incineration alone." This goal had to be attained by the end of FY 2005 and has not been updated. As a result, the DOD issued the "Revised Pollution Prevention and Compliance Metrics," Memorandum, 12 October 2004 (reference 2-19).

2.4.2 DOD Memorandum, "Revised Pollution Prevention and Compliance Metrics," 12 October 2004

The Assistant Deputy Under Secretary of Defense for Environment, Safety, and Occupational Health issued a memorandum that revised the pollution prevention and compliance metrics in October 2004. This established DOD compliance metrics to measure progress in the P2 and compliance programs in support of the defense mission (reference 2-19). Each environmental program area has a set of broad overall goals with specific metrics to measure DOD's progress towards meeting the goals. The metrics process requires continuous review and periodic adjustments, as necessary. The P2 and compliance programs focus on enhancing and sustaining the mission by:

- Supporting the warfighter today and in the future.
- Ensuring adequate resource capability for the warfighter.
- Improving human health and the environment.
- Influencing the acquisition and weapon system life-cycle process.
- Making efficient investments in P2.
- Conducting operations in a cost-effective manner.

2.4.3 DOD Memorandum, "DOD Integrated (Non-Hazardous) Solid Waste Management Policy," 1 February 2008

The Acting Deputy Under Secretary of Defense (Installations and Environment) issued a memorandum in 2008 that implemented the solid waste and recycling requirements of EO 13423 by requiring all facilities to maintain waste prevention and recycling programs in the most cost-effective manner possible and setting solid waste diversion goals. The diversion goal for nonhazardous solid waste without construction and demolition (C&D) waste is 40% and the goal for C&D waste is 50%. The memorandum states that these goals should be achieved by 2010. The memorandum also includes some guidelines for implementing integrated solid waste management. These guidelines recommend an initial solid waste characterization study to define the basis for diversion goals and an annual review of the status of solid waste generation from all sources. The guidelines also state that complying with green procurement (GP) practices will have a positive effect on source reduction (reference 2-20). See EO 13514 (section 2.3.6) for additional reduction goals to be met by FY 2015.

2.4.4 DOD Instruction 4715.4, "Pollution Prevention," June 1996

This document provides specific guidance on P2 activities (reference 2-21). This instruction establishes the DOD requirement for installation Qualified Recycling Programs (QRPs), calls for affirmative procurement (AP), and authorizes direct sales of recyclables. It reiterates the P2 hierarchy principle and establishes the DOD P2 MoMs for TRI releases reduction, HW reduction, non-hazardous SW diversion, and alternate fuel vehicles (AFVs). Note that the TRI and HW reduction goals became obsolete on 31 December 1999. The "Revised Pollution Prevention and Compliance Metrics" was issued by DOD via a memorandum on 12 October 2004.

2.4.5 DOD Instruction 4715.6, "Environmental Compliance," 24 April 1996

This document implements policy, assigns responsibility, and prescribes procedures as established for achieving compliance with applicable EOs, Federal, state, inter-state, regional, and local statutory and regulatory environmental requirements (reference 2-22).

2.4.6 DOD Strategic Sustainability Performance Plan FY 2010, Aug 2010

This first Departmental sustainability plan lays out the goals and performance expectations for the next decade, establishing the path by which DOD will serve as a model of sustainability for the nation while enhancing their ability to achieve their mission. DOD sustainability goals include the reduced use of fossil fuels; improve water resources management; minimize and optimally manage solid waste; minimize chemicals of concern; and reduce scope 1, 2, and 3 greenhouse gas emissions (reference 2-24).

2.5 OTHER GUIDANCE

2.5.1 Assistant Chief of Staff, Installation Management (ACSIM) Memorandum, “Elimination of the Dependency of ODSs in Army Facilities,” 3 July 1997

With this memorandum, the ACSIM established a goal to completely eliminate Class I ODS from all Army installations by 31 December 2003 (reference 2-25). See Chapter 10 for information on the status of ODSs at USAG-HI.

2.5.2 ACSIM Memorandum “Change in Policy for the Elimination of Ozone Depleting Chemicals,” 7 January 2003

With this memorandum, the ACSIM established a change to the above policy (reference 2-26). Specifically, in accordance with the policy established by the Assistant Secretary of the Army for Installation and Management (Installation and Environment), 22 November 2002 Memorandum, the following changes were made:

- Chlorofluorocarbon (CFC) air conditioning and refrigeration (AC&R) equipment that needs periodic recharging may be used after CY 2003 as long as it is supported with CFC refrigerant that was recovered on-base.
- Sealed CFC AC&R equipment (i.e., AC&R equipment that doesn't need recharging) may be used until retirement.
- Halon 1301 fire suppression system may be used until discharged, but then must be retrofitted or retired.

2.5.3 The National Defense Authorization Act (NDAA) of 2007

The National Defense Authorization Act (NDAA) of 2007 codified the 25% renewable goal established by DOD memorandum in November 2005 (reference 2-27). The Army Energy Strategy for Installations adopted in July of 2005 established an objective to *“Reduce the dependency on fossil fuels by increasing the use of clean, renewable energy ...”* The NDAA language is consistent with DOD's and the Army's renewable energy plans and the renewable resource assessments and plans upon which they are based. Accordingly, the renewable resource goal for the Army shall be: *“To produce or procure energy from renewable resources equivalent to at least 25% of its electricity use by no later than 2025.”*

2.5.4 Deputy Assistant Secretary of the Army for Installations and Housing memorandum, Sustainable Design and Development Policy Update – SPiRiT to LEED Transition, 5 January 2006

This memorandum announces that the Army will transition from the Sustainable Project Rating Tool (SPiRiT) to the Leadership in Energy and Environmental Design (LEED) Green Building Rating System® effective with the FY 2008 Military Construction Program. It sets LEED Silver as the minimum sustainability rating for vertical New Construction projects. Prior year projects will continue to use SPiRiT and achieve Gold level (reference 2-28).

CHAPTER 3

USAG-HI's POLLUTION PREVENTION PROGRAM

3.1 POLICY

The USAG-HI is committed to a policy of sustaining and protecting the environment through an active P2 program. To accomplish this objective, the USAG-HI continuously identifies opportunities to reduce or eliminate pollution through source reduction and other prevention methods. This policy extends to all environmental media including HW, SW, air, water, and wastewater.

The long-term goal of the USAG-HI is to reduce and minimize the use of HMs, the generation of wastes, and emission of pollutants to the environment. The USAG-HI's strategy to reduce pollution will concentrate on three areas:

1. Reducing the amount of HW generated as a direct by-product of activities at the USAG-HI. These wastes are considered "annual HWs generated." Some examples of waste streams that fall into this category are lead based paint debris from facility maintenance and chromium/cadmium debris generated from aircraft/vehicle maintenance.
2. Reducing the amount of "one-time" HW disposals. One-time HW disposals are waste generated because the item is outdated, no longer within military specifications, or part of a remediation project. Some one-time HW disposal cannot be avoided, such as the disposal of polychlorinated biphenyl (PCB) containing insulation oil during electrical transformer renovation/replacement projects. Others, such as gasoline-contaminated absorbent used for spill cleanup, can be minimized by good housekeeping procedures and a continued emphasis on waste minimization training. The USAG-HI plans to minimize one-time HW disposal through education, good housekeeping practices, and improved tracking of HMs.
3. Reducing the amount of SW generated. The USAG-HI already has in place many excellent programs to recycle SW, such as recycling oil, office paper, selected residential wastes, cardboard, newspaper and metals. In addition to recycling, the USAG-HI shall concentrate on the source reduction of SW. Source reduction of SW is the most cost-effective method of SW reduction.

3.2 P2 MANAGEMENT STRUCTURE

3.2.1 Primary Level

The USAG-HI manages its overall environmental program through the DPW's Environmental Division who maintains the principle responsibility for environmental oversight and management. The environmental office consists of personnel who are each responsible for managing various environmental programs such as P2, HW, SW, air emissions, above ground and underground storage tanks, restoration, etc.

3.2.2 Environmental Quality Control Committee (EQCC)

The USAG-HI EQCC is chaired by the Garrison Commander (GC) and meets quarterly. All directors and major subordinate commanders are EQCC members. The EQCC helps to plan, execute, and monitor actions and programs with environmental implications. The committee identifies issues, makes recommendations, and advises the GC.

The EQCC also conducts an annual management review of the USAG-HI Sustainable Environmental Management system (SEM). The management review addresses the possible need for changes to policy, objectives, and other elements of the SEM in light of SEM audit results, changing circumstances, and the commitment to continuous improvement.

3.2.3 Pollution Prevention Coordinator

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

- Preparing and updating baselines for HM use and waste generation.
- Coordinating the performance of pollution prevention opportunity assessments (P2OAs) to identify and evaluate P2 procedural changes, projects, and equipment.
- Recommending priorities for funding P2 projects and equipment.
- Establishing policies for identifying, procuring, and tracking HMs.
- Developing the USAG-HI's P2 training program.

3.2.4 Pollution Prevention Assessment Team

A P2 Assessment Team is formed as needed to perform P2OAs. The team is temporary, having a specific charter to evaluate a particular waste generating activity, HM use, or pollution emission from the USAG-HI. The primary responsibilities for the team are:

- Perform a P2OA.
- Present the finding of the assessment to the EQCC for approval.
- Implement projects approved by the EQCC.
- Monitor the performance of P2 projects.

The teams include personnel representing key USAG-HI 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 are also represented. The team includes

members who have direct knowledge of the processes that produce waste or other harmful emissions and technical advisors.

3.2.5 Support Level

Organizations and personnel at this level have the responsibility of furnishing the Environmental Division with the resources and/or data required to manage various environmental programs. Participants at this level include the USAG-HI Command Staff and its Directorates. Some specific examples of support level activities include: the Command Judge Advocate providing legal advice for permit registration and the Logistics Division overseeing HM supply operations.

3.2.6 Task Level

This level consists mostly of contracted organizations that provide the USAG-HI with a specific work product. Some examples may include the various contractors that: develop the USAG-HI Master Plan, support the Hazardous Material Management Program, support the P2 Program, and generate annual TRI reports.

3.2.7 Resource Level

Resources are typically regarded as various personnel on post who have environmental training, experience, or knowledge and can contribute to specific aspects of environmental program management. Resources include those with extensive environmental knowledge such as environmental office personnel who are not directly responsible for a specific program but who may lend advice and assistance to that program's manager. Resources may also include personnel who serve in a limited environmental capacity such as those responsible for managing HW at industrial activities or knowledge of waste generation in the organization.

3.3 BASELINE DEVELOPMENT

The metrics and baselines for the USAG-HI's P2 objectives are primarily derived from the pollution reduction goals established by the "Greening of the Government" EOs. Baselines for the various environmental media are based on the following metrics and are quantitatively identified in Chapters 4-12 of this plan.

- Hazardous Waste: total disposed (pounds)
- Solid Waste: percent of total generated diverted to recycling
- Air Emissions: amount emitted (tons)
- Water: water intensity - amount used (gallons) per square foot of installation facilities
- Wastewater: amount discharged (gallons)
- TRI Form R Chemical Releases: releases and off-site transfers (pounds)
- Ozone Depleting Substances: total inventory (pounds)

- Vehicle Fuel Use: amount of petroleum and alternative fuel consumed (gallons)
- Fleet Fuel Efficiency (acquired vehicles): miles per gallon
- Alternately-Fueled Vehicles: percentage index of non-exempt vehicles leased/procured that are AFVs

3.4 OPPORTUNITY ASSESSMENTS

When reduction requirements are determined, options for meeting the requirements must be identified. These options are identified through the P2OAs, which examine current processes and identify and evaluate alternatives for P2.

Opportunity Assessments are the method of identifying process improvements or options. Conducting an opportunity assessment involves examining all input sources, material usage, and waste generation by type and weight, and determining practical and economical options for reduction. This generally involves examining each process involving a targeted substance to determine ways to avoid use or minimize generation of that substance. Detailed baseline information characterizing material use and waste streams for each process may be gathered concurrently with the assessment process. Projects identified by P2OAs must have complete data to show the cost benefit of the project.

3.5 P2 GOALS

Each environmental program chapter describes each of the USAG-HI's P2 goals as well as SEM objectives and targets. USAG-HI developed these goals based on its significant environmental aspects, applicable environmental laws, EOs, and DOD/DA policies. Chapters 4-12 of this plan outline in detail these goals and how they will be accomplished.

3.6 IMPLEMENTATION AND EVALUATION

3.6.1 The Army Environmental Database - Environmental Quality (AEDB-EQ)

This report is part of an automated system used to collect a wide variety of installation environmental information, including compliance, conservation, program management, and P2 programs. The primary goal of AEDB-EQ is to provide DOD with the information it requires as well as providing Headquarters, Department of the Army (HQDA), Major Army Command (MACOMs), Major Subordinate Command (MSCs), and installations with critical management information while minimizing short suspense tasking to installation personnel. The AEDB-EQ provides users and policy makers with periodic updates on critical data within the Army's environmental program.

3.6.2 Environmental Performance Assessment System

The Environmental Performance Assessment System (EPAS) is an Army-wide program that documents an installation's environmental management performance and compliance status with Federal, State, and DOD regulations on a regular basis. As a component of the EPAS, assessors evaluate the installation's P2 program in terms of its compliance with many of the directives and EOs described in Chapter 2. Each time the installation undergoes an EPAS, the assessors write findings and provide copies to the installation and its managing command organization. The installation then develops an Installation Corrective Action Plan that serves as an opportunity to consider and plan for P2 projects that can help achieve and maintain compliance/conformance.

3.7 REPORTING REQUIREMENTS

The USAG-HI Environmental Compliance Branch has the following reporting requirements:

- HW generator biennial or annual report, from RCRA
- AEDB-EQ hazardous waste disposal and recycling roll-ups
- Solid Waste Annual Report (SWAR)
- Installation Status Report (Natural Infrastructure)
- EPCRA Tier II Reports
- ODS procurement approvals and determinations, from section 326 of the National Defense Authorization Act for 1993
- Annual Asbestos Report Notifications of Demolition or Renovation
- EPA Form R, Section 313 of EPCRA (also known as Title II of the Superfund Amendments and Reauthorization Act)
- Annual and semi-annual Title V covered source and non-covered source reporting based on permit stipulations
- Annual MS4 Permit reporting requirements
- Annual roll-ups of material recycled at the installation permitted recycling center
- Annual roll-ups of material accepted/recycled at the installation permitted salvage yard
- Drinking Water Consumer Confidence Report
- Annual underground Injection Control (UIC) permits reporting requirements
- Spill reporting as applicable

3.8 P2 PROGRAM FUNDING

Pollution prevention projects are funded from the appropriate account of the USAG-HI operating budget.

CHAPTER 4 HAZARDOUS AND NON-REGULATED WASTE REDUCTION

4.1 HAZARDOUS AND NON-REGULATED WASTE REDUCTION GOALS

The HW program at USAG-HI is managed by the DPW Environmental Division, Compliance Branch. Activities generating HW are required to comply with established USAG-HI regulations. USAG-HI maintains large quantity generator status at Schofield Barracks and Wheeler Army Airfield (WAAF), small quantity generator status at Fort Shafter, and conditionally exempt small quantity generator status at the Pohakuloa Training Area (PTA) under RCRA and the Hawaii Codes, Rules and Regulations. The USAG-HI is committed to implementing the following goal:

- Reduce the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of (references 2-15, 2-17, and 2-19).

4.2 SEM PROGRAM OBJECTIVES AND TARGETS

USAG-HI has a SEM system in place and one of the significant aspects identified is HW generation. Table 4.1 shows the SEM objective and targets to reduce HW. Tables 4.2 and 4.3 show the current and proposed P2 initiatives that will help USAG-HI achieve these objective and targets.

Table 4.1 – SEM Objectives and Targets to Reduce HW.

Objective	Target
Achieve a sustainable HW program for USAG-HI.	Provide new HW management awareness tools.
	Provide revised HW management procedure documents.

Table 4.2 – Current P2 Initiatives, SEM Objectives, and Targets to Reduce HW.

Initiative	Objective	Target	Section
Green Book "Sustainability & Environmental Topics from A to Z".	Achieve a sustainable HW program for USAG-HI.	Provide revised HW management procedures documents.	4.6.12
Newspaper articles.		Provide new HW management awareness tools.	4.6.13
Training classes.		Provide new HW management awareness tools.	4.6.14

Table 4.3 – Proposed P2 Initiatives, SEM Objectives, and Targets to Reduce HW.

Initiative	Objective	Target	Section
Fully implement the Hazardous Material Control Point.	Achieve a sustainable HW program for USAG-HI.	Provide new HW management awareness tools.	4.7.2
Hazardous material management.	Achieve a sustainable HW program for USAG-HI.	Provide new HW management awareness tools.	4.7.7

4.3 PREVIOUS, EXPIRED, OR REVOKED GOALS

There were no EO or DOD established HW reduction goals at the time of the previous P2 opportunity assessment in 2001. For this reason, USAG-HI continues to implement the 50% HW reduction goal by HQDA using 1992 as the baseline. The USAG-HI has more than met this goal several years ago. Hazardous waste generation increased greatly in 2008 resulting from a major aircraft reset and refurbishment project. Hazardous waste generation can greatly fluctuate based on unit deployment, tempo, and aircraft rest activities.

4.4 BASELINE AND PROGRESS

Table 4.4 shows the combined annual HW generation rates for Schofield Barracks, WAAF, Fort Shafter, and the PTA.

Table 4.4 – HW Generation Data and Cost (Tons Disposed per CY)¹.

Description	1992	2006	2007	2008	2009	2010 Jan - Oct
Tons	43.9	12.1	15.3	2.08	8.9	9.5
Cost	ND ²	ND	\$120,549	\$67,157	\$132,441	pending

¹ Data provided by the DPW Environmental Division.

² ND = no data.

4.5 DIVERSION OF NON-REGULATED WASTE

Chapter 5, Solid Waste, discusses non-RCRA regulated wastes generated at the USAG-HI. Non-RCRA wastes are not considered hazardous under 40 CFR and do not count towards a generator's HW generation totals, but must be managed separately from municipal solid waste. The installation sends these wastes off-site for recycling instead of for treatment and disposal. Examples include lead-acid batteries, antifreeze, and used oil.

4.6 CURRENT P2 INITIATIVES

The following are P2 initiatives implemented by the USAG-HI to reduce the amount of HW and non-RCRA waste generated and/or manage in an environmentally preferable manner.

4.6.1 Lead-Acid Battery Recycling

Vehicular lead-acid batteries are managed under the less stringent requirements of 40 CFR 266 for lead-acid batteries being reclaimed. The batteries are exchanged on a one-for-one basis with a battery supplier, who in turn recycles the lead contained in the old batteries for use in manufacturing new ones. Because the batteries are reclaimed, they do not count towards USAG-HI's HW generation but are reportable under EPCRA for lead content. The Garrison should attempt to reduce this waste stream to as low as possible by substituting lead-acid batteries with absorbed glass mat batteries (see initiative 4.7.3 Absorbed Glass Mat Batteries).

4.6.2 Used Antifreeze Recycling

Used antifreeze generated by the vehicle maintenance facilities is collected and sent off-site for recycling. Although the installation is not reusing the recycled antifreeze, it has avoided disposal of this waste stream by giving it to a recycler.

4.6.3 Used Oil Recycling

Used oil is collected and picked up by an off-site contractor for recycling, thereby eliminating the need for disposal of this renewable resource.

4.6.4 Low-Mercury Fluorescent Lamps

According to EPA studies, many fluorescent lamps exhibit the toxicity characteristic for mercury and are therefore classified as an HW and must be managed accordingly. Regular fluorescent bulbs contain mercury vapor at levels above the RCRA toxic characteristic leaching procedure (TCLP) limit of 0.2 ppm. USAG-HI purchases low-mercury containing fluorescent lamps and is replacing regular fluorescent lamps as they burn out. The low-mercury fluorescent lamps do not have to be managed as a HW and are discarded as solid waste. Regular mercury containing fluorescent lamps are managed as universal waste and recycled through the Defense Reutilization and Marketing Office (DRMO).

4.6.5 Oil Filter Crusher

The DPW and Shop 7 crush oil filters to remove all oil from the used oil filters and to reduce their volume by as much as 75%. The crushed filters are collected and recycled by a contractor as scrap metal. The oil removed from the filters is added to the used oil sent out for recycling. All units without oil filter crushers must completely hot drain the used filters for 72 hours prior to being collected for metal recycling.

4.6.6 Mercury Thermostats Replacement

The DPW removed mercury thermostats and replaced them with electronic thermostats thereby eliminating this HW stream.

4.6.7 Parts Washer Solvent Recycling

Parts washer solvent is provided and collected by an off-site contractor for recycling eliminating the need to dispose of the solvent as a HW.

4.6.8 DPW Industrial Store - Science Applications International Corporation (SAIC)

The DPW Industrial Store is operated by a contractor (SAIC) that supports DPW at Schofield Barracks and Fort Shafter. SAIC establishes its store stock levels with a goal of meeting continuous on-the-shelf supply of regularly demanded items. Materials are issued based on a specific work order and are ordered in advance of any projects. All HM purchases are sent to the DPW Environmental. All new items must be approved by the DPW Environmental before they are purchased to ensure restricted items are not brought onto the installation.

SAIC operates a "Pharmacy" or "HAZMART" issuing HM to DPW shops from a centralized location instead of allowing individual shops and users to maintain excessive inventories which are sometimes allowed to expire and thereby become a waste. This significantly reduces the amount of waste generated from expired shelf life products or excess material being stored.

DPW also operates a free issue program for paint. Units/shops receive paint for short term projects and return the unused material for use at a later date or the paint can be used by other customers.

4.6.9 DOL Hazardous Material Control Point

The Directorate of Logistics (DOL) has implemented a Hazardous Material Control Point (HMCP) as part of its overall Hazardous Material Management Program (HMMP). The HMCP supports the HMMP by providing a centralized point of material management. A HMCP is an effective means for the USAG-HI DOL to control the amounts and types of HM being used in its operations.

The HMCP issues HM to participating organizations from a centralized and benefits the installation by significantly reducing the amount of waste generated.

4.6.10 Aerosol Can Puncturing

While spent aerosol cans may no longer contain material, they are still pressurized and may vent or explode when exposed to heat or pressure. Personnel at the Transfer Accumulation Point (TAP) use an aerosol puncturing device to safely puncture used aerosol cans, drain any remaining liquid, and filter escaping propellant. The empty aerosol cans are no longer considered to be a potential HW and are then recycled as scrap metal. This aids the installation

in reducing the amount of solid waste being sent to a landfill. The collected residual liquids and spent carbon filters are managed as HW and disposed of accordingly.

4.6.11 Plastic Paint Stripping Media

Plastic paint blasting media is used for stripping aircraft paint; this eliminates using hazardous chemicals. The plastic media is supplied by a contractor who also removes the spent media at no cost and recycles it as an ingredient for brick manufacturing.

4.6.12 Soda Blasting Media

Sodium bicarbonate (baking soda) is used to strip aircraft blades, eliminating the use of hazardous chemicals for this process. A soda blaster uses compressed air to deliver sodium bicarbonate media onto the surfaces to be cleaned. Soda blasting does not harm the material to be stripped. It does not cause metal to be warped or flash rust and is environmentally friendly. The spent sodium bicarbonate is disposed of as non-regulated waste through the DRMO.

4.6.13 Green Book "Sustainability & Environmental Topics from A to Z"

The DPW Environmental Division developed a Green Book, "Sustainability & Environmental Topics from A to Z," containing individual fact sheets for many of the commonly generated waste streams. These fact sheets are posted on the garrison public web page and are easily located. The fact sheets are clear, precise, and to the point allowing individuals to quickly determine how to manage specific wastes.

4.6.14 Newspaper Articles

The Environmental Division publishes articles in the Hawaii Army Weekly newspaper. Articles range from good news stories of current P2 and Sustainability initiatives, recycling tips, car pooling, energy conservation tips, community efforts, etc. The articles keep the community informed of ongoing environmental efforts and are beneficial in building a relationship of trust between the Environmental Division and various USAG-HI organizations.

4.6.15 Training Classes

The Environmental Compliance Officer (ECO) course is designed to train selected personnel for ECO duties. In accordance with AR 200-1, each unit commander, directorate, and tenant civilian activity is required to have a minimum of one primary and one alternate ECO at all levels of command down to company/battery size or equivalent.

The ECO training ranges from the environmental management of industrial maintenance processes in motorpools and hangars, inventory control of HM, spill prevention, pollution prevention, and waste minimization. This multi-media approach is designed to ensure each unit/organization controls the impact of its activities and services on the natural environment, allowing it to not only achieve and maintain compliance with current environmental standards, but to recognize and proactively manage future issues that might impact mission sustainability.

4.7 POTENTIAL P2 INITIATIVES

4.7.1 Can, Pail, and Aerosol Can Crusher

Description. Certain drum crushing machines can puncture, drain, and compact small drums, pails, paint and aerosol cans prior to recycling, thus reducing manual labor, storage space, and transportation requirements. Volume reduction for these crushers ranges from 6:1 to 10:1. A mid-sized crusher can reduce 5-gal metal pails and paint/aerosol cans by 90%. The crushed containers can be recycled as scrap metal or plastic.

Technical Evaluation. Units such as this are pneumatically operated, a source of clean, dry air must be provided. This technology facilitates the recycling of metal and plastic containers still holding liquids while producing no new waste streams. It also reduces the liability of having small drums and aerosol cans containing residual liquids that are possibly a HW found in landfills.

The TeeMark Can, Pail, and Aerosol Crusher Super 6PJ-VC is one of the few mid-sized crushers able to perform all these functions. It crushes up to 6-gal pails as well as aerosol cans, oil filters, and paint cans. The crusher punctures closed containers and empties the contents before crushing them flat. Note, by nature, plastic containers will "spring" somewhat back to their original shape after crushing.

Environmental Evaluation. A blower pulls volatile organic compounds (VOCs), propellants, and vapors from the crushing compartments and vents it to an outside area. The unit is safe as it will not operate with the door open and has self-contained explosion proof controls and power supplies. The unit is suitable for use with solvent based paints, aerosol propellants, and other flammable liquids.

Compliance Benefit. The TeeMark 6PJ-VC empties and crushes containers and facilitates plastic and metal recycling. After draining and crushing containers are qualified RCRA empty and may be recycled (or safely discarded into a landfill). It helps reduce a facility's HW generator status by reducing a waste stream's total weight if containers holding HW liquids are otherwise not drained. See Table 4.6 below for how much waste paint was generated at the USAG-HI for each of the last three calendar years, most of which was manually drained by TAP personnel.

Table 4.6 – Pounds of Waste Paints Generated per CY.

Itemization	2008	2009	2010
HW paint	10,216	3,160	577
Non-HW paint	11,032	8,858	1,248
Total	21,248	12,018	1,825

Materials Compatibility. No material compatibility issues were identified.

Safety and Health. Safety issues associated with using a crusher are related to the operation of power equipment. Operators must be trained to use the crusher and exercise caution to keep limbs, clothing, and hair from being caught in the equipment. The manufacturer recommends using personal protective equipment (PPE), including hearing protection. Personnel operating this equipment are protected from VOCs and hazardous air pollutants from propellant.

Advantages.

- Increases metal and plastic recycling capability.
- Decreases storage and transport requirements.
- Keeps waste paint containers out of landfill.
- Protects personnel from VOCs and vapor exposure.

Disadvantages.

- High capital cost.
- May not meet local air emission requirements without additional filtration system.

Economic Evaluation. Capital costs include the price of the crusher and recommended additional carbon filtration system. The TeeMark pulls VOCs and propellants from the crushing chamber and vents it to an outside location (depending on where the vent is installed) but does not filter the air. Local regulatory ordinance may require a filtration system. According to the manufacturer, the carbon filter will last for 25,000 - 30,000 crushed cans. Operating costs include maintenance requirements such as oil changes and repairs, and electricity requirements. Labor requirements to operate the equipment are not considered as the USAG-HI is currently manually draining paint cans as well as puncturing and draining aerosol cans. In this case, operational labor costs should be similar. Note, this equipment runs on 220 volts and may require electrical work during installation.

Assumptions.

- Installation Labor Cost: \$35/hr.
- Energy Cost: cannot be determined, depends on frequency and duration of equipment usage.
- Cost 55 gal steel drum: \$45 each, using 6 drums/yr = \$270.
- Estimate carbon filter has to be replaced every two years: $\$2,129/2 \text{ yr} = \$1,065/\text{yr}$.
- Disposal cost remains the same.
- Miscellaneous expenses for equipment maintenance and repair.

Table 4.7 – Estimated Implementation Cost.

Itemization	TeeMark 6PJ-VC	Manual Operations
Cost equipment	\$28,800	NA
Cost carbon filter	\$2,129	NA
Cost shipping ¹	\$2,500	NA
Cost installation	\$280	NA
Total Implementation Cost	\$33,709	NA
Recurring cost - maintenance	\$500/yr	NA
Recurring cost - carbon filter	\$1,065/yr	NA
Recurring cost - 55 gal steel drums	\$270/yr	\$270/yr
Total Recurring Cost	\$1,835/yr	\$270/yr
Payback Period: None		

¹ Estimated shipping cost provided by manufacturer.

Economic Evaluation Summary. The payback period is calculated by dividing the implementation cost by the difference between the recurring cost of the current method and the recurring cost of the new method.

$$\$33,709 / (\$270 - \$1,835) = \text{no payback}$$

This initiative does not have a payback period. However, the benefit of the crusher is a significant volume reduction of containers and protection of personnel from VOCs, vapors, and propellant exposure. See Appendix C for vendor information.

4.7.2 Fully Implement the HMCP

Description. Presently, the HMCP is co-located at the installation Transfer and Accumulation Point (TAP), Bldg. 6040, and has limited services. The HMCP does not stock HM for installation customers. Instead, customers place orders of HM items they need and wait for them to arrive and get bar-coded before they can be picked up. One of the biggest problems USAG-HI is having under the HMCP program is the frequent and uncontrolled use of government purchase cards (GPC) to buy HMs on the local market due to the lag time for shipments from the Continental United States (CONUS). The HMCP also does not have the capability to deliver HM to customers. Having a fully functioning “one-stop” HMCP and requiring all tenants/units to use this service for purchasing HM would reduce the unnecessary purchase of HM and reduce the generation of waste HM as well as HW. Making the HMCP more service oriented by

delivering the products customers order will assist in getting the various units and organizations to participate in this program.

Technical Evaluation. The HMMP is a commander's program and requires a strong commitment to integrate it across the functional HM management activities of the USAG-HI. Centralized management of HM has proven to be effective management at other Army installations. A HMCP is an effective means to control the amount and types of HMs being used at various organizations. The HMCP is also known as a "Pharmacy" or HAZMART at some Army installations. The concept of an HMCP is simple in nature; a facility or installation uses a centralized location to issue HMs instead of allowing individual operators and users to maintain excessive inventories, which are sometimes allowed to expire and become wastes and possibly HW. The significant program components of a HMCP include:

- Centralized HM Management cell at Bldg. 6040
- Authorized User/Use List
- Centralized issue and storage of HM
- Hazardous Material Tracking System
- Re-use of materials
- Minimize inventory levels at user/operator level
- Order/issue by unit of use
- Training and awareness program

A well functioning HMMP program requires joint efforts between the logistics and environmental community to minimize pollution through the implementation of best management practices. This results in HM and waste minimization, improved controls, and more accurate reporting. The management and control of the overall process for HM and HW requires that HW disposal be tracked as an integral part of the program. The planning for and implementation of good HM and waste management business practices is determined by each individual installation.

A fully implemented HMCP program benefits USAG-HI by significantly reducing the amount of waste generated from expired shelf lives and degradation associated with lengthy times between uses while in a local inventory, thus decreasing the installation's overall HW generation. The economic payback for implementing a measure such as this can be almost immediate. DA Pam 710-1 indicates on U.S. Army Installation Management Command (IMCOM) garrisons the HMCP is established and controlled by the DOL (reference 4-1). However, it is absolutely essential that HMCP employees work closely and communicate frequently with the DPW Environmental Division HW and P2 managers, as these operations are tightly linked.

For the success in this program it is necessary that commanders support this initiative and all organizations participate. An authorized use list (AUL) is a list of HM that an organization is authorized to order and store in a 30-day period. If the supply system does not have the material

that is needed by the customer or the wait time is longer than anticipated, the customer may be authorized to purchase the material locally with a GPC. The HMCP will check its stock and free issue to ensure that the materials are not on hand will then authorize the customer to purchase the material. The customer has 5 working days to return to the HMCP to have the materials entered into the Hazardous Material Management System (HMMS) and bar-coded. If the customer does not follow this process, the organization's compliance inspector is notified of the deficiency and the customer will be directed back to the HMCP to complete the transaction.

A fully functioning HMCP can track all HM by using the HMMP to its full extent. Implementation steps include the development of a garrison policy, identifying HM needs and quantities for the various organizations, stocking the HMCP with HM that the customer will require in a 30-day period, giving the HMCP the responsibility to locally purchase HM if the material is not available when needed, and aggressively pursuing ways to reuse or issue material to other agencies when it is no longer needed at USAG-HI installations.

In order for the HMCP to be fully operational, it is estimated that a warehouse specialist, an accounting clerk, and a qualified hazardous material (HAZMAT) driver will be needed in addition to the staff already employed. As a minimum, these employees would need the following training as applicable to their position: defensive driving, customer relations, HM handling and transport. These employees must also be familiar with HM compatibility and the basic use of a personal computer. In addition to delivering HM to customers, HMCP employees could also pick up empty containers and record actual usage in HMMS. A flat-bed truck would need to be purchased for these services. The current HMCP warehouse and available storage shelving is more than adequate and additional space does not need to be purchased. A climate controlled HAZMAT storage building is needed for HMs that have to be stored at lower temperatures. Shelf life of these temperature sensitive products will be maximized, reducing HW generated by improper storage of HM. The facility also has a forklift, additional office furniture, and three computers to further reduce the implementation cost for this initiative. Throughout the military services, HMCPs perform various customer oriented services and each location differs somewhat in what services are provided. Services provided by the HMCP could include monthly inspections of flammable lockers and HM storage areas at unit levels; issuing of pre-labeled waste containers to ensure proper containers and nomenclature is used; on-the-spot corrections and assistance with non-compliance issues evident during monthly inspections; etc.

For the HMCP to work properly, an aggressive and constant marketing plan must be developed and executed. Customers must be informed initially, and frequently reminded thereafter, of the services the HMCP can provide to them. This may be accomplished by the use of a newsletter, articles in other installation publications, memoranda from the commander, signs and flyers around the installation, and by posting basic information outside of the HMCP building, and on the USAG-HI's web page. A representative from the DOL should meet with the department chiefs of those organizations that have not yet joined the program and assist them in setting up procedures for using the HMCP. Lastly, command emphasis at all levels is essential for successful operation.

Environmental Evaluation. Implementation of a HMCP is perhaps one of the single most effective means to reduce the amount of waste generated by an installation. At the customer

level, waste generated from expired materials will be significantly reduced and excess materials are not kept in stock until they expire. A HMCP also allows DPW Environmental a much higher degree of control over what materials are used and how much is kept on-hand. This initiative can also be a perfect means to test “environmentally friendly” substitutes or eliminate possible waste streams by replacing them with these substitutes. The HMCP can have the greatest impact upon the following waste streams: paints and paint thinners, solvents, cleaning agents, and degreasers.

Economic Evaluation. The following analysis is based on several cost savings estimates from successes at other installations and on information provided by the DPW Environmental Division. Implementation costs may vary depending upon the availability of capital and equipment. Table 4.8 shows the combined annual HW generation rates for Schofield Barracks, WAAF, Fort Shafter, and the PTA. The estimated excess cost consist of materials the USAG-HI disposed of as HW due to excess and/or expired materials that were purchased by the various organizations. Note, HW generated in 2008 increased dramatically due to a major reset operation.

Table 4.8 – Tons of HW Generated, Disposal Cost, and Estimate Excess Materials¹.

Year	2007	2008	2009	Averages
Tons	15.3	2.08	8.9	8.76
Cost	\$120,549	\$67,157	\$132,441	\$106,716
Cost/ton	\$7,879	\$32,287	\$14,881	\$12,183
Estimate excess % of materials¹	31%	48%	50%	43%
Estimate excess disposal cost	\$37,370	\$32,235	\$66,221	\$45,275

¹ All data provided by DPW Environmental Office. Estimated excess cost is the cost of expired or unneeded materials disposed of.

Implementation costs (Table 4.9) include leasing a flat-bed truck from the General Services Administration (GSA) for delivering and removing HM/HW, a temperature controlled HAZMAT storage building, additional spill kits, additional fire extinguishers, PPE, signs and materials for marketing, and employee training. See Appendix C for a detailed cost estimate of the HAZMAT building including shipping costs. Office furniture, a forklift, shelving, warehouse space, and necessary computers are already on-site. Note, the HMCP is currently operated by a contractor. Expanding the services currently performed by contract personnel may require a contract modification. The cost of this is not included in this estimate.

Table 4.9 – Estimated Implementation Cost.

Item	Estimated Cost
HAZMAT storage building*	\$20,434
Spill kits (truck and warehouse)	\$1,000
PPE	\$300
Fire extinguishers (truck and warehouse)	\$200
Employee training (3)	\$6,000
Warning signs and marketing	\$1,000
Total Implementation Cost	\$28,934

*See Appendix C for a detailed cost estimate.

Annual recurring costs (Table 4.10) include lease of a flatbed truck, labels and containers for HM, emergency equipment, labor, and continued training.

Assumptions.

- Implementation Cost: \$28,934
- Average HW disposal 2007-2009: \$106,716 (Table 4.8)
- Average excess disposal cost 2007-2009: \$45,275 (Table 4.8)
- Projected HW disposal cost with fully functioning HMCP: \$106,716 - \$45,275 = \$61,441
- Estimated annual fuel cost: $(\$4/\text{gal} \times 8,000 \text{ miles}/\text{yr}) / 17 \text{ mpg} = \$1,882/\text{yr}$
- Average annual HM purchase cost is double of average disposal cost:
 - Before implementation of HMCP: \$213,432
 - After implementation of HMCP: \$122,882

Table 4.10 – Annual Estimated Recurring Costs.

Item	Recurring Costs Before Implementation	Recurring Costs After Implementation
Flatbed truck	NA	\$4,800 (\$400/month GSA lease)
Annual fuel cost	NA	\$1,882
Refresher training	NA	\$2,000
HM containers and labels	NA	\$750
Spill equipment	NA	\$1,000
PPE	NA	\$200
Additional labor cost (warehouse \$21/hr, driver \$20/hr, clerk \$16/hr) ¹	NA	\$118,560
HW Disposal Cost	\$104,400	\$60,283
HM Purchase Cost	\$208,800	\$120,566
Total Recurring Cost	\$313,200	\$310,041

¹ Data provided by HMCP supervisor.

Recurring Cost Savings. The costs and benefits of a properly established HMCP vary depending on the size and mission of each installation. The average annual HW disposal cost for USAG-HI from 2007 - 2009 was \$106,716. Recurring cost savings result from the reduction of purchasing as well as disposing of waste HM and HW.

Other intangible cost savings exist by the very existence of a functioning HMCP. Such costs include the cost of compliance, a reduced potential for spills, and regulatory fines for improper waste and material storage and labeling.

Economic Evaluation Summary. The payback period is calculated by dividing the implementation cost by the difference between the recurring costs of the current method and the recurring costs of the new method. Based on the calculations, the recurring costs before and after implementation of this initiative are very similar. This may be due to error in assumptions, variations in HW disposal costs, or other factors. This is also an indicator that this initiative may not pay for itself if any of the variables change significantly.

$$\$28,934 / (\$313,200 - \$310,041) = 9 \text{ years}$$

4.7.3 Absorbed Glass Mat Batteries

Description. Many types of vehicle batteries exist in the Army's inventory, two of which are the typical “wet” lead acid or flooded cell lead acid batteries and valve regulated lead acid (VRLA) batteries. VRLA batteries come in two types, gel and absorbed glass mat (AGM).

There are a number of AGM batteries available such as the Hawker Armasafe Plus and the Optima batteries. All perform the same from a chemical perspective, but they are not made the same and do not have the same capacity. In the Aug 18, 2005 Memorandum “AFSC Battery Maintenance Management Plan”, the Army Field Support Command endorsed the Hawker Armasafe Plus as the AGM battery of choice (reference 4-2). One of the biggest benefits of AGM batteries is that they are virtually maintenance free. There is no requirement to add water, they cannot leak, and are highly impact resistant. AGM batteries are formed with an absorbent fiberglass mat plate separator between each battery plate. The AGM holds the electrolyte in place against these plates. These batteries are not “sealed batteries”. Instead, VRLA technology allows hydrogen gas emission through a one-way safety valve if they are charged improperly with excessive voltage.

Technical Evaluation. Unlike traditional flooded cell lead acid batteries which are shipped dry and have to be manually filled with acid on site, Hawker batteries are rated as non-hazardous material in storage and for transportation purposes under Department of Transportation (DOT) regulations. However, Hawker batteries are still a lead-acid battery and must be disposed of as HW or sent to a recycling facility. AGM batteries are approximately two and a half times the cost of the flooded lead acid batteries and require the use of PulseTech smart battery chargers and analyzers to operate properly. These battery chargers are, however, issued to military units as part of the Standard Automotive Tool Set (SATS) or the Forward Repair System (FRS).

In 2005, the 2nd Infantry Division in Korea converted critical combat fleets to the Hawker AGM technology and found, after properly training personnel and implementing a battery maintenance program, that this battery has a shelf life of approximately 30 months (reference 4-3). If taken off the shelf before the 30-month period and properly charged before installation, the battery will fully recover from hibernation and provides approximately 54 months of use. In comparison, the shelf life of a flooded cell lead acid battery is approximately 6 months. Another study conducted at the Joint Base Lewis-McChord, WA, and Fort Hood, TX, showed similar results when the Hawker Armasafe Plus batteries were maintained as outlined in US Army Technical Bulletin 9-6140-252-13 (references 4-2 and 4-4).

Environmental Evaluation. Replacing traditional flooded lead acid batteries with the Hawker AGM technology batteries can reduce the generation of HW batteries or batteries sent out for recycling by up to 50%. AGM batteries contain no free liquids and are completely spill proof, protecting the environment as well as personnel.

Applications. The Hawker Armasafe Plus 6TAGM battery (NSN 6140-01-485-1472) exceeds all the specifications of the 6T series batteries and replaces 6TL, 6TN and 6TMF batteries in combat and wheeled vehicles. Hawker is approved for use in M1-series tanks, the Stryker family of vehicles (FOV) and M915 FOV trucks (references 4-2 and 4-6).

Materials Compatibility. No material compatibility issues were identified.

Safety and Health. Battery electrolyte is absorbed in the separator material. If the battery case is punctured and the separator compromised, completely flush any released material from skin or eyes with water. The batteries are heavy and hard to lift, safe work practices and proper PPE are a must.

Advantages.

- Shelf life is five times longer.
- Sealed design reduces battery case erosion.
- No need to fill with solution, immediate ready to use upon receipt.
- No need to check electrolyte level or replace solution.
- Approved for aircraft use.
- Safer to handle.
- Less than 1% discharge rate/month vs. 3% discharge rate/month of flooded cells.
- Tolerates extreme temperatures.
- Higher level of performance for same size flooded cell battery.
- Classified as non-spillable and exempt from HM transportation requirements when securely packaged.
- May be shipped by air.
- Reduced explosion hazard.
- Faster recharge time.
- More usable reserve capacity.
- Higher cranking power.
- Less maintenance intensive saves valuable man-hours.
- Batteries will work temporarily if cracked open.

Disadvantages.

- Up to two and a half times more costly than flooded cell batteries.
- Requires purchase of special charging equipment and analyzers.

Table 4.11 compares the 6TMF wet and dry lead-acid batteries to the Hawker 6T AGM.

Table 4.11 – Battery Comparison Data.

Description	6TMF	Hawker 6T AGM
NSN	6140-01-446-9498 wet 6140-01-446-9506 dry	6140-01-485-1472
Cost Batteries (as of 16 Nov 10)	\$168.33 wet \$92.88 dry	\$402.40
Cost Battery Acid (16 Nov 10)	\$24.83/6 quarts *	NA
Weight	75 lb	86 lb
Voltage	12 volts	12 volts
Cold Cranking Amps	725 amps (minimum)	1225 amps
Reserve Capacity	200 min	240 min
Usable Reserve Capacity	1 hr	11-12 hrs
Charging Voltage	14.2-15.5 volts	14.25-14.75 volts
Voltage Fully Charged	12.65 volts	12.9 volts
Voltage Fully Discharged	10.5 volts	10.5 volts
Charging	hydrogen off-gas	no off-gas
Shelf Life	6 months	30 months
Service Life	2 yrs	4.5 yrs
Transport Class	surface only	transport by air
Maintenance Issues	corrosion, need to add fluids	no corrosion, no fluid requirement

Note: see references 4-2 and 4-5 through 4-8 for pricing and battery specification source information.

* Battery acid is used for filling the dry batteries and for occasionally topping batteries in use.

Maintaining Hawker Batteries. Hawker batteries are practically maintenance free. However, certain procedures must still be followed for maximum usage benefit. According to the Hawker Part No. 9750N7025 Maintenance Guide manual, the batteries may be stored for up to 5 years without degradation of performance provided that an open circuit voltage check (OCV) is conducted every 12 months. When stored in temperatures in excess of 95°F, the batteries should be inspected every 6 months. If the OCV falls below 12.6V, batteries should be charged in accordance with this manual.

Properly maintaining the Hawker batteries is of great importance. A January 2010 Hawker Battery Recovery Assessment Survey Study at the Joint Base Lewis-McChord showed that these batteries are frequently unnecessarily declared unusable. If a battery is heavily discharged it is said to be in a deeply discharged state. This becomes apparent when the OCV is less than 10 volts. Batteries in this state can still be fully recovered if properly charged for up to 36 hours. The importance of having an Army Field Support Command Battery Maintenance/Management Plan in place was also demonstrated at Fort Hood's III Corps. After a two-year pilot study program was completed, III Corps saved a significant amount of money. The majority of savings was accomplished at the Corps' battery shops by performing corrective maintenance and the implementation of a preventive maintenance battery program (reference 4-2).

Considering the climate in Hawaii, units located at the USAG-HI should implement solar panels to maintain vehicle batteries, generator batteries, or batteries left in motorpools' long-term storage areas as left-behind equipment, allowing the batteries to start when needed. Table 4.12 is a listing of various products and costs as of Dec 2010.

Table 4.12 – Product Information.

Item	Part Number	NSN	Price FedLog
HD Battery Pallet Charger	746x820	6130-01-532-7711	\$2,722
Pro-4 HD Charger	746x800	6130-01-500-3401	\$4,414.66
Solar Charging System	735x687	6130-01-558-5371	\$516.25
490PT Digital Battery Analyzer	741x490	6130-01-510-9594	\$959.34
MBT-1 Battery Testers	741x800	6130-01-463-8499	\$55.82
Redi-Pulse Pro-12	746x912	6130-01-535-2718	\$286.00
Hawker 6T AGM	9750N7025	6140-01-485-1472	\$402.40

Economic Evaluation Summary. An economic evaluation cannot be performed as it is not known how many Hawkers would need to be purchased to replace the lead-acid batteries. However, despite the high implementation cost of Hawker batteries, several military units at USAG-HI have purchased them as prescribed in their Technical Manuals (e.g. Stryker Vehicle) or because a unit has determined that it is a more durable battery. It was however, observed that while most units have the required Pulse Tech Pro 4HD battery charger as part of their SATS or FRS, they do not always recover/recharge the AGM batteries resulting in premature turn-ins of serviceable batteries to the Unit Supply Support Activity (SSA). Because the procurement cost of Hawker batteries to each unit is considerable, emphasis to implement an effective battery management program should be placed at the command level.

The DPW Environmental Division has organized a number of battery management classes for the military units in the past three years but the turnover of personnel has greatly impeded the effectiveness of this program at unit levels.

It is recommended that USAG-HI explore the possibility of establishing a centralized battery charging station and require each unit SSAs to turn-in potentially serviceable AGM batteries to that central location for servicing.

4.7.4 Waste Paint Management

Description. Waste paint is generated by paint shops and organizations by ordering too much material or completing projects before excess is used. The USAG-HI TAP collects and segregates HW paints from non-HW paints and consolidates them in 55-gal drums for DRMO disposal. Table 4.12 depicts the combined pounds of waste paint generated by WAAF and Schofield Barracks from 2008 through October 2010.

Table 4.12 – Pounds and Disposal Cost of Paint Waste per CY.

Itemization	2008	2009	2010 (Jan - Oct)
HW paint ¹	10,216	3,160	577
Non-HW paint ²	11,032	8,858	1,248
Total Weight	21,248	12,018	1,825
Total Cost	\$17,035.60	\$7,828.86	\$1,255.88

¹ Disposal cost of HW paint = \$1.16/lb.

² Disposal cost of non-HW paint = \$0.46/lb.

Environmental Evaluation. There are several reuse options for paints that are still usable:

- List the products on the post electronic bulletin board for free issue.
- Use the various paints for undercoating in other paint applications.
- Donate the products to a local recycler at no cost (see www.recyclehawaii.org for a list of local recyclers).
- Recycle the paint at a commercial recycling center for reuse (see initiative 4.7.5).

Materials Compatibility. No compatibility issues were identified for this initiative.

Advantages.

- Reissuing or donating the paint for reuse will reduce and/or eliminate this waste stream.

- Saves on disposal costs.
- Valid reuse/recycling reduces annual HW generation.

Disadvantages.

- Requires storage space and coordination to find other users.
- Should verify that HW paint will be reused if donating it to a local recycling center to avoid possible RCRA compliance issues.

Economic Evaluation Summary. A payback calculation does not need to be performed for this initiative. Any avoided disposal costs by donating or reissuing paints would be an immediate payback. Donating or reusing paints is free, economically feasible, and preferred over disposal.

4.7.5 Recycle Non-Hazardous Waste Paint

Description. As discussed in initiative 4.7.4, the USAG-HI generates non-HW, i.e. latex based, paints for various reasons, see Table 4.12 for pounds generated. Reuse and recycle are the preferred management methods for any wastes over disposal. There are no companies located in the State of Hawaiian capable of reprocessing paint for reuse. At the time of the assessment, only one company, located on the mainland, could be located that accepts waste latex paints from the general public.

Amazon Environmental, Inc. in Riverside, CA accepts "donated" paints, for a fee, and recycles latex paints for reuse. Upon customer request, the company will ship back the recycled paint for no cost for the paint. However, return shipping must be paid by the customer. The recycled paint consists of waste paint that has been strained, filtered and mixed, in non-specific colors (color is a result of the various paints that were mixed together).

Environmental Evaluation. Amazon Environmental, Inc. uses leftover latex paint to manufacture recycled content paint that is comparable in quality to virgin paint sold by national manufacturers. Amazon Select recycled content paint is environmentally preferable to virgin paints, and carries both the Green Seal and Master Painters Institute stamp of approval. Any leftover paint the company cannot use is manufactured into an alternative raw material used in the manufacture of cement. Using this process, Amazon Environmental recycles virtually 100% of the leftover paint it receives.

Materials Compatibility. No material compatibility issues were identified for this initiative.

Advantages.

- Recycling waste paint for reuse is an environmentally responsible P2 initiative.
- Saves on disposal costs.
- The company recycles paint for reuse and provides it back to the customer for free.

Disadvantages.

- Shipping costs to and from the company are paid by the customer.
- Recycled paint is of a non-specific color.

Economic Evaluation. The company charges a fee for accepting "donated" paint and does not pay for shipping. The recycled paint can be shipped back to the customer, upon request, with shipping paid by the customer. The recycled paint itself is free, colors are non-specific (generally a shade of gray).

Assumptions.

- Implementation cost: none
- Total cost new paint: \$12/gal
- 1 gal paint = ~ 10 lbs
- 55 gal paint drum = ~ 550 lbs
- Cost DRMO disposal CY 09: \$4,163
- Quantity DRMO disposal 2009: 8,858 lb = ~ 886 gal = ~ 16 (55 gal) drums
- Total cost new paint purchase: \$12/gal x 16 drums x 55 gal = \$10,560
- Cost Amazon Environmental to accept latex paint: \$95/55 gal
- Cost Amazon Environmental to accept latex paint containing > 80% water: \$140/55 gal
- Shipping cost 55 gal drum FedEx Freight Off-Shore from Schofield Barracks to

Riverside, CA:

100 lb - \$276.57 (includes all fees and charges)

500 lb - \$318.59 (includes all fees and charges)

FedEx shipping fees decrease per lb if greater quantities are shipped. Price quote provided by FedEx on 6 Dec 2010. Table 4.13 shows the FedEx shipping cost and Amazon Inc. recycling fee.

Table 4.13 – Estimated Paint Recycling Cost¹.

Itemization	Current Method	New Method
Cost new paint purchase	\$10,560	NA
Cost shipping 16 drums via FedEx to Amazon Env.	NA	\$5,097
Cost shipping 16 drums via FedEx to Schofield Barracks	NA	\$5,097
Cost Amazon Inc. to accept 16 drums @ \$95/drum	NA	\$1,520
Cost disposal	\$4,163	NA
Recurring Costs	\$14,723	\$11,714

¹ Because CY 10 data was not available yet at the time of the assessment, CY 09 data is used.

Payback Period. The payback period is calculated by dividing the implementation cost by the difference between the recurring costs of the current method and the recurring costs of the new method.

$$\$0 / (\$14,723 - \$11,714) = \text{Immediate}$$

Economic Evaluation Summary. This initiative would pay for itself given that the USAG-HI paid \$4,163.26 in CY 09 to dispose of latex paint through the DRMO. At the quoted estimated FedEx shipping prices USAG-HI would have paid approximately \$11,714 to recycle the paint and have it shipped back. The company states that paints will be returned in non-specific colors, meaning the color of the recycled material is a result of the paints turned in to the company. This implies that upon receipt of the recycled color additional color would need to be added, by the USAG-HI, to the final product.

FedEx shipping charges depend on the quantity being shipped. This initiative would not be cost effective for recycling smaller quantities of paints. Care should be taken with this economic analysis as an entire year's worth of waste paint was used for the calculation. Realistically, the USAG-HI would not have 16 drums of waste latex paint at any given time and may not be able to use such a large amount of new paint before it expires. The cost of blending the recycled paint to a desired shade on-site was not included. Industrial sized equipment would be needed for this.

4.7.6 Antifreeze Recycling

Description. On and off-site recycling of spent antifreeze is a viable alternative to disposal. Waste antifreeze may be considered a HW, in some instances, due to the toxicity of the ethylene glycol component, the toxicity of the products of degradation/oxidation of ethylene glycol, and/or the heavy metals content. USAG-HI is currently using a contractor for off-site recycling. Used antifreeze generated by the maintenance facilities is collected by the contractor and sent

off-site for recycling, avoiding the need to dispose of it as a potential hazardous waste. See Table 4.14 for a listing of new antifreeze purchased by Schofield Barracks organizations.

Table 4.14 – Schofield Barracks New Antifreeze Purchased.

Itemization	2008	2009	2010 (Jan - Nov)	Average
Gallons purchased	4,428	2,982	5,392	4,267
Cost	\$65,877	\$26,088	\$51,237	\$47,734
Cost/gal	\$14.88	\$8.75	\$9.50	\$11.04

Data provided by the DPW Environmental Division.

Several reclamation systems are available on the market for on-site recycling of waste antifreeze. Currently, there are two DOD-approved recycling systems for waste antifreeze originally procured under MIL-A-46153 (reference 4-11). In February 1997, MIL-A-46153 was replaced with Commercial Item Description (CID) A-A-52624 “Antifreeze, Multi Engine Type” which in turn was replaced in 2001 by CID A-A-52624A “Antifreeze, Multi Engine Type”. CID A-A-52624A covers two types of fully formulated coolants: Type I is an ethylene glycol based antifreeze concentrate and Type II is a propylene glycol based antifreeze concentrate. Antifreeze must be of the following concentrations; A – 100% glycol, B - 60% glycol, C – 50% glycol. CID A-A-52624A is based on American Society for Testing and Materials (ASTM) performance specifications ASTM D 6130 (references 4-12 and 4-13).

The DOD-approved antifreeze recycling systems use ion exchange and vacuum distillation as the primary separation/purification process. These systems filter solids from spent antifreeze, as well as remove the metal ion contaminants from the solution. The recovered coolant solution requires blending with an inhibitor package to restore it to its initial state. The two DOD-approved recycling systems can work with either ethylene glycol or propylene glycol, although each coolant must be processed separately. These systems are relatively simple to operate, compact (~4’ x 4’), portable (on wheels or can be mounted on a trailer or truck), and easy to maintain (reference 4-14).

The approved distillation system by Finish Thompson, Inc. processes the spent antifreeze resulting in pure ethylene glycol, water and a residual sludge. Measured amounts of corrosion inhibitors must be added on a per gallon basis. Distillation units require little maintenance; however, they tend to be a slower operating system when compared to ion exchange units. The Finish Thompson unit also produces the larger quantity of waste residue of the two systems. Residue production is approximately 3 gal of residue per 75 gal of spent antifreeze. This residue is more than likely a HW for lead contamination. A TCLP analysis should be conducted to determine whether the waste has this hazardous characteristic. The manufacturer of this unit claims that a batch of accumulated residue can itself be reprocessed to further reduce the total volume of waste produced.

The approved ion exchange unit is manufactured by KFM, LLC. This system processes the antifreeze resulting in a product that is a recycled antifreeze/water mix. Specific amounts of

corrosion inhibitors are added on a per gallon basis. Ensuring proper maintenance of the equipment is important to achieve proper results. This unit does not produce any liquid HW residue; however, it does require filter replacement. The deionization tanks accumulate metals and may be considered HW if disposed. Once the tanks are spent they should be shipped back to the manufacturer for regeneration by a DOD approved carrier. The 1 micron and 20 micron filters may possibly be a HW and must be disposed of accordingly.

An antifreeze recycling program's success is dependent upon minimizing the oil contamination that enters the recycling unit. Oily material will hinder filters and reduce the effectiveness of distillation units. Bulk batches of antifreeze should be allowed to settle before recycling and any oily layer should be skimmed off with an oil-absorbing pad. Absorbents specifically designed to remove oil from antifreeze are available, although other oil absorbing pads will suffice.

Compliance Benefit. The use of on-site site antifreeze recycling may help facilities meet the requirements of waste reduction under 40 CFR 262. Actual compliance benefits will vary depending on the factors involved, e.g. the amount of workload involved and material recovered. Recycling is also more preferable than purchasing new material.

Materials Compatibility. Ethylene and propylene glycols are formulated so that they are compatible with most engine cooling systems. Additives are included in the formulations to minimize metal corrosion and to inhibit formation of acidic compounds generated by the high-heat of combustion engines. Some old formulations may not be suitable for use in systems containing aluminum. Glycol recycling equipment is designed to withstand the most severe chemical state or wear imposed by spent anti-freeze. However, special concerns or cases may require consultation with the manufacturer. The manufacturer's instructions for use directions should be followed carefully when combining additives to bring recycled glycol into reconstituted conformance with military specifications.

Safety and Health. Heavy metal contaminants can be dangerous to human health. These contaminants are potential carcinogens and teratogens, and skin absorption or ingestion is a major health concern. Ethylene glycol can be irritating to the skin, eyes, and mucous membranes, and may be toxic if inhaled. Proper personal protection equipment is a must.

Advantages.

- Reduces coolant storage, transportation, and purchasing requirements.
- Minimizes production and storage of potentially HW.
- Protects the environment by reducing the amount of waste generated.
- Saves generators potential HW disposal costs.
- Reduces hazardous material cleanup costs or soil and groundwater contamination associated with spills and leaks from stored hazardous waste.
- Will reduce the purchase of antifreeze, resulting in monetary savings.
- Reduces liability for untracked disposal.

Disadvantages.

- Controlled blending of additives is required for recycled antifreeze to meet military specifications.
- Requires space and trained personnel to operate the equipment.
- May be time consuming.
- Necessary chemicals for recycling and adequate amounts of recycled antifreeze must be on-hand in sufficient quantities.

Economic Analysis. Recycling economics vary depending on the amount of spent antifreeze generated. The following analysis compares the current practice of off-site recycling to the two DOD approved recycling systems. All material cost data was derived from the GSA (reference 4-15). Table 4.15 compares the ion exchange unit to the distillation system. Table 4.16 shows the expected implementation costs and Table 4.17 the expected annual recurring costs. See Appendix C for vendor information.

Table 4.15 – Systems Comparison.

Item Description	2 Tank Purification System¹	Distillation System¹
Company	KFM, LLC	Finish Thompson Inc.
Unit designation	Coolant Purification System	BE 55C
Process	Ion Exchange	Vacuum Distillation
Vendor part #	CC2	PBER005
Weight	448 lb	600 lb
GSA contract	GS-07F-0075J	GS-07F-9999H
Shipping cost	None under GSA contract to Tracy, CA	None under GSA contract to Tracy, CA
Warranty	1 year	1 year
HW generated	Spent filters	Distillation residue
Capacity	up to 150 gal/hr	up to 3.2 gal/hr
Electrical Requirement	110 V	240V/3/60 Hz, 40 amps
Replacement filters	1 and 5 microns, and carbon	N/A
Portable	Yes	No
Filter replacement	Every 200-250 hrs	N/A
Recovery rate	up to 85%	up to 90%

¹ Data provided by vendors.

Table 4.16 – Implementation Cost.

Item Description	2 Tank Purification System ¹	Distillation System ¹
Cost GSA	\$8,350	\$12,767.11
Pump primer	N/A	\$135.78 Part # J101101
Initial treatment kit, treats 318 gal (includes corrosion inhibitor, filters, pH adjuster)	\$399, part # CCK6	N/A
Refractometer	\$186.75, part #998	+/- \$150 GSA price
Drum mixer	\$690 1/3 HP, part # NDM 2.0	\$650.85 GSA price 1/2 HP, part F30_6W067 by WECSYS LLC
Cost pH adjuster	N/A	\$9.12 (use 2 oz for 53 gal) GSA
Inhibitor	N/A	\$63.38, part 570P (treats 53 gal) GSA

¹ All costs/information provided by vendors unless otherwise noted.

Table 4.17 – Annual Recurring Costs.

Item Description	2 Tank Purification System ¹	Distillation System ¹
Cost maintenance & repair ²	+/- \$1,200/yr	+/- \$1,200/yr
Annual resin replacement fee	\$400 for 2 tanks/yr	N/A
Cost freight shipping from HI to SC to refurbish tanks	+/- \$500 for 2-4 tanks/yr	N/A
Annual cost filters, replace every 200-500 gal (1 micron, 20 micro, and charcoal)	1 micron box of 6 = \$69.30 (need 2 each per tank) 20 micron box of 6 -\$60.00 (need 2 each per tank) 1 Charcoal filter = \$28.50	N/A
Cost corrosion inhibitor	\$63.38, part 570P (treats 53 gal)	\$63.38, part 570P (treats 53 gal) GSA
Cost pH adjuster	\$9.12 (use 2 oz for 53 gal)	\$9.12 (use 2 oz for 53 gal) GSA
Cost HW disposal	spent filters - cost depends on weight	sludge - cost depends on weight

¹ All costs/information provided by vendors unless otherwise noted.

² Estimate provided by Mr. George Hartman, Fort Campbell, KY, Antifreeze Recycling Center.

Assumptions.

- Even though 2010 data is incomplete, assume it is representative for the entire year
- GSA price new antifreeze: $\$532.32/55 \text{ gal} = \$9.67/\text{gal}$.
- Disposal cost antifreeze: $\$4.25/\text{gal}$
- Gallons antifreeze purchased = gallons antifreeze disposed
- HW disposal costs (filter and sludge) = $\$1.50/\text{lb}$
- Weight 1 HW filter = $\sim 1 \text{ lb}$
- Weight 1 gal HW sludge = $\sim 10 \text{ lb}$
- Quantity HW sludge = 3 gal sludge per 75 gal spent antifreeze

Payback Period. The payback period is calculated by dividing the implementation cost by the difference between the recurring costs of the current method and the recurring costs of the new method.

2 Tank Purification System: $\$9,626 / (\$59,438 - \$15,913) = 0.2 \text{ years}$

Distillation System: $\$13,776 / (\$59,438 - \$24,757) = 0.4 \text{ years}$

Economic Evaluation Summary. Table 4.18, on the following page, compares the current cost of disposing spent antifreeze to the cost of recycling the spent antifreeze using the 2 tank purification system as well as the distillation system. Based on the assumptions indicated in Table 4.18, this initiative would be cost effective.

Note, it is estimated that 1,333 man hours per year would be spent operating a distillation system. Implementing either system may require hiring additional personnel (not considered in the calculations) if current personnel are not able to perform the additional workload.

Table 4.18 – Estimated Recycling Costs.

		Current Method	2 Tank Purification System	Distillation System
Implementation Cost		NA	\$9,625.75	\$13,776.24
Gal purchased	4,267			
Purchase Cost		\$41,301.58		
Disposal Cost		\$18,136.17		
Capacity			150 gal/hr	3.2 gal/hr
Labor			Labor	Labor
# batches			28.45/yr	1,333.44/yr
# hours			28.45/yr	1,333.44/yr
Labor rate	\$20/hr		1 hr labor per batch	0.5 hr labor per batch
Annual labor cost			\$568.93/yr	\$13,334/yr
To Purchase				
	Filters		Filters	Filters
Times to replace	every 450 gal		9/yr	NA
Cost to replace	1 micron \$69.30 for 6 (need 2)		\$207.90/yr	NA
	20 micron \$60 for 6 (need 2)		180.00/yr	NA
	charcoal \$28.50		\$256.50/yr	NA
	Additional Antifreeze		Additional Antifreeze	Additional Antifreeze
Efficiency			85%	90%
Amount lost/yr			640.05 gal	426.7 gal
Purchase Cost			\$6,194.75/yr	\$4,129.84/yr
	Corrosion Inhibitor		Corrosion Inhibitor	Corrosion Inhibitor
Cost	\$63.38/53 gal		\$5,102.69/yr	\$5,102.69/yr
	pH Adjustor		pH Adjustor	pH Adjustor
Cost	\$9.12/53 gal		\$734.25/yr	\$734.25/yr
	Resin Tanks		Resin Tanks	Resin Tanks
2 tanks/yr	\$400		\$400/yr	NA
Shipping round trip	\$1,000		\$1,000/yr	NA
Waste Disposal				
	1 micron filter (18/yr)	18 lbs	\$27/yr	NA
	20 micron filter (18/yr)	18 lbs	\$27/yr	NA
	Charcoal filter (9/yr)	9 lbs	\$14/yr	NA
	Sludge		Sludge	Sludge
	171 gal/yr		NA	\$256.02/yr
Maintenance/Repair				
			\$1,200/yr	\$1,200/yr
Total Recurring Cost		\$59,438	\$15,913	\$24,757
Payback Period		NA	0.2 years	0.4 years

4.7.7 Hazardous Material Management

The following initiatives relate to the management of HM as a proactive approach to limiting the preventable situation of becoming HW. As these initiatives are administrative in nature and cannot be accurately quantified, no economic analysis was performed.

In-House Research for HM Alternatives. A fully functioning HMCP along with the Environmental Division and supervisors at all levels should seek less hazardous, safer, and more environmentally friendly alternatives to HMs currently in the inventories. This effort should be on-going, as new products are constantly being developed and arriving on the market that may be a viable alternative to current HMs.

Credit Card Purchases. A common problem is the possibility that a user may purchase a chemical that is a listed or characteristic RCRA HW when it is no longer needed. Such instances frequently include purchasing RCRA listed spray solvents that, when applied to rags or other material and placed into collection drums, contaminate the entire contents and must be disposed of at a more costly rate. Care should be taken by personnel who perform credit card purchases of HM to ensure that these purchases meet the approval of the AUL. Following an established procedure for purchases of new items (items not routinely purchased by the unit), where the material is reviewed by a responsible authority would aid in eliminating unnecessary HM entering the HW stream when they expire or otherwise become unusable or no longer needed.

Conduct Inspections. Frequent and random inspections of flammable material lockers at various organizations will greatly reduce the likelihood of materials being allowed to degrade to the point where they become wastes. These inspections should be done by a trained unit representative such as the ECO.

4.7.8 Substitute Conversion Coating Application Product

Description. Repainting of an aircraft requires application of an acid alodine coating to enable surface coating adherence. The Henkel Alodine 1201 product used at USAG-HI aircraft maintenance facilities is a hexavalent chromium coating (reference 4-16). Alodine is a HM resulting in HW, which must be properly managed and disposed of. Following the application of alodine to an aircraft surface, water is used to rinse the product off surfaces, generating several gallons of hazardous wastewater that must be collected and disposed of. See Table 4-18 for quantities generated by USAG-HI aircraft maintenance facilities of hazardous wastewater.

Table 4.18 – HW Alodine Wastewater Generation and Disposal Cost.

Itemization	2007	2008	2009	2010 (Jan - Oct)
Weight (lb)	10,089	41,720	1,706	1,516
Approx. volume (gal)	1,208	4,996	204	182
Disposal cost	\$14,630	\$60,492	\$2,047	\$1,910
Total	\$79,079/6,590 gal			

Hexavalent chromium is also a known health hazard. According to the Occupational Safety and Health Administration (OSHA), workers exposed to this toxic chemical are at greater risk for lung cancer and damage to the nose, throat and respiratory tract. On 15 June 2011, OSHA's final rule came into effect requiring employers to notify their workers of all hexavalent chromium exposures (reference 4-17). The rule revises a provision in OSHA's Hexavalent Chromium standard that required workers be notified only when they experienced exposures exceeding the permissible exposure limit. The National Institute for Occupational Safety and Health considers all hexavalent chromium compounds to be potential occupational carcinogens and it is on the DOD's emerging contaminants action list, see Chapter 9, Emerging Contaminants for additional information (references 4-18 through 4-20).

Technical Evaluation. Non-hexavalent chromium coating products such as the Henkel Alodine T 5900 RTU are now available (reference 4-21). The Aviation Engineering Directorate, Structures and Materials Division (AMSRD) Memorandum TTS Tasker # 61144 approves the use of non-hexavalent chromium coating systems and primers for aluminum alloy and composite *exterior* surfaces on all Army aviation platforms and Class N (non-hexavalent chrome) primers are authorized for use on aircraft *exteriors* (reference 4-22). See attachment Appendix D for copies of the following: (1) AMSRD Memorandum TTS Tasker #61144; (2) Aviation Maintenance Information Message, GEN-MIM-08-010, New Aviation System Coating Material Procurement Information and Application Guidelines; (3) a lessons learned document for using a non-hexavalent chromium product by the 1109th AVCRAD, Groton CT with a spreadsheet containing information on the equipment used to apply the Alodine T 5900 coatings; and (4) Technical Process Bulletin Henkel Alodine ® T 5900 RTU; and (5) MSDS for the Henkel Alodine T 5900 RTU (references 4-23 and 4-24).

Hexavalent chromium coating products are classified as Type I products, non-hexavalent i.e., trivalent chromium coating products are classified as Type II products. A contractor performs all conversion coating procedures at the USAG-HI. MIL-C-5541F, Detail Specification Chemical Conversion Coatings on Aluminum and Aluminum Alloys, section 3.1 specifies "If no material type is specified type I shall be used. Unless otherwise specified in the contract or order, substitutions of either type I for type II, or type II for type I coatings are not permitted" (reference 4-25). A contract modification may be required to ensure product substitution is permitted.

Note, wastewater and other generated waste streams should initially be evaluated for HW constituents with the implementation of any new product to determine proper disposal methods.

For additional technical information and the most up-to-date information on product approvals contact the U.S. Army Aviation and Missile Life Cycle Management Command (AMCOM) Technology Integration Branch. See Appendix C for contact information.

Compliance Benefit. This initiative will reduce USAG-HI's annual HW generation totals and meets the requirements of EO 13423 and DOD Revised P2 Compliance Metrics goals.

Materials Compatibility. No materials compatibility issues were identified. However, AMCOM recommends personnel are properly trained by the product manufacturer as there may be some variations with the application process.

Safety and Health. Follow the manufacturer's directions for proper PPE use.

Advantages.

- Decreases HW generation.
- Decreases HW disposal costs.
- Safer for employees.

Disadvantages.

- May require a change in current application procedures.
- Requires initial training for possible new application procedures.

Economic Evaluation. Generally, manufacturers provide training at no cost to customers. A training expense is therefore not expected. The cost of any new products, coating and primer, is expected to be similar to products currently used. Based on these assumptions, this initiative would pay for itself immediately.

4.7.9 Management of Bullet Traps

Description. There are many different types of bullet traps on the market designed to capture expended lead shot at indoor and outdoor firing ranges. The USAG-HI's shoot house uses a bullet trap composed of AR 500 ballistic steel, ¾ plywood boards, and Dura Bloc™. Dura Bloc, made of recycled plastics, is encased by the plywood which in turn is supported with the steel backing. Practice targets are mounted directly on the trap. The Dura Bloc is designed to stop and capture the lead once it passes through the target and plywood. The lead remains intact, thus greatly reducing lead dust and preventing back splatter. The plywood is shredded during use and has to be replaced periodically. Recycling the lead shot would reduce USAG-HI's annual HW generation totals.

Compliance Benefit. Spent lead shot is a solid waste and a HW under RCRA. Capturing the lead in the Dura Bloc allows it to be removed for recycling thereby reducing USAG-HI's annual HW generation.

Materials Compatibility. No materials compatibility issues were identified.

Safety and Health. The Dura Bloc is not capable of capturing nearly 100% of the fugitive lead dust generated by the lead as it enters the plywood. Proper PPE should be worn when conducting maintenance on the traps.

Advantages.

- Captures the lead shot.
- Reduces dust emissions.
- Prevents the lead shot from splattering.

Disadvantages.

- Dura Bloc™ is heavy as it becomes saturated with lead.
- Some dust emissions.
- Maintenance of traps.
- Few metal recyclers are capable of removing the lead from the rubber.

Economic Evaluation. An economic evaluation for disposal or recycling of the Dura Blocs cannot be conducted because the weight of a saturated trap is unknown at this time as well as the exact quantities of the used rubber blocks to be replaced. To date, the range has not taken any Dura Bloc out of service for DRMO turn-in.

In order to assist the DPW Environmental Division for future disposal/recycling of the bullet traps four vendors of Dura Bloc (or equivalent material), located CONUS, were researched and/or contacted, none of which are accepting the product for recycling at this time. Tim Lindell, Vice President of Range Systems, indicated smelters have accepted lead saturated Dura Bloc in the past but are presently not doing so. Once the difficulties of recycling this material were realized, metal recyclers located on the main-land were not contacted as the expected weight of the saturated blocks, shipping fees, and difficulty of transporting the material to Honolulu harbor would outweigh any monies realized from recycling this product. The DRMO in Honolulu stated that they do not currently have a contract with have a recycler capable of accepting this material. However, if the USAG-HI can provide the DRMO with the information of a qualified recycler, DRMO will work with the USAG-HI on creating a contract.

In order to find a recycler located on Oahu for the DRMO, the Honolulu, HI City Recycling Office and EPA Region 9, Office of Recycling and Solid Waste Management, were contacted, neither of which were able to assist. All communications were non-specific and customer identification information was not disclosed.

Each recycling company, located on Oahu, was also researched, only four of which accept non-ferrous metals. Han's Metals, Island Recycling, and Schnitzer Steel Hawaii Corp. will not accept lead shot encased in Dura Bloc. The recycler who agreed to accept the material is C.M. Recycling with a pay-back to USAG-HI of \$0.05/lb. Note, C.M. Recycling does not have the capacity to pick-up the material from the installation, instead, the USAG-HI will have to transport the material to the company.

Economic Evaluation Summary. An economic evaluation for recycling or disposing of the bullet traps cannot be conducted due to a lack of data. Research conducted to assist the DPW Environmental Division in finding a recycler for this material showed there are few recycling opportunities for this waste stream. Only one company located on Oahu has agreed to accept this material as a recyclable product with a payback of \$0.05/lb. The other option available to the USAG-HI is HW disposal through the DRMO at \$0.80/lb.

It is suggested to establish a contract with C.M. Recycling through the DRMO to ensure materials will be managed appropriately. The material will eventually be taken off the Island of Hawaii and the DPW Environmental Division will not be able to verify the final disposition of this waste stream. C.M. Recycling information and other points of contact are provided in Appendix C.

CHAPTER 5 SOLID WASTE REDUCTION

5.1 SOLID WASTE REDUCTION GOALS

5.1.1 Executive Order 13423

Executive Order 13423, Strengthening Federal Environmental, Energy, and Transportation Management (reference 2-15), and the Instructions for Implementing Executive Order 13423 (reference 5-1) implement sustainable practices for a number of environmental areas, including SW management. These documents require Federal agencies to:

- Increase the diversion of SW as appropriate and requires each agency, at a minimum, to strive to meet the national 35% recycling goal established by the EPA (the 2008 DOD Solid Waste Management Policy requires its installations to exceed the EPA's goal and achieve a 40% diversion rate).
- Maintain cost-effective waste prevention and recycling programs.

5.1.2 Executive Order 13514

Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance (reference 2-17) was signed in October 2009. This order mandates the DOD to reduce waste generation and increase diversion, with the following specific goals:

- Divert 50% of nonhazardous SW, excluding construction and demolition (C&D) waste, by the end of FY 2015.
- Divert 50% of C&D waste by the end of FY 2015.

General goals also include reducing use of paper and increasing diversion of compostable and organic material from the waste stream.

5.1.3 2008 Office of the Under Secretary of Defense Memorandum

The 2008 DOD Integrated (Non-Hazardous) Solid Waste Management Policy memorandum (reference 2-20) implements the SW and recycling requirements of EO 13423 by requiring installations to achieve the following goals:

- Divert 40% of non-hazardous SW without C&D waste by 2010.
- Divert 50% of C&D waste by 2010.

This memorandum further requires all facilities to maintain waste prevention and recycling programs in the most cost-effective manner possible. The memorandum also includes some

guidelines for implementing integrated SW management. These guidelines recommend an initial SW characterization study to define the basis for diversion goals and an annual review of the status of SW generation from all sources. The guidelines also state that complying with green procurement practices will have a positive effect on source reduction.

5.2 SEM PROGRAM OBJECTIVES AND TARGETS

The USAG-HI SEM is part of the USAG-HI Strategic Sustainability Action Plan (SSAP). Solid waste management is identified in the USAG-HI 2008-2010 SSAP as a sustainable environmental management (SEM) objective. Goal 1 of the SSAP is to provide quality facility, infrastructure and information technology, safety, and emergency services to support the Garrison’s mission. One of the targets of this goal is to decrease the rate of SW generation to meet the former goal of 40% diversion of non-hazardous waste excluding C&D materials and debris. The next update of the SSAP will require this target to be increased to 50% by FY 2015 to meet the requirements of EO 13514. Two additional targets of the SW goal are to increase recycling program revenue generation and to increase awareness of participants in the recycling program. Table 5.1 states the SEM objectives and targets for 2010 and 2011.

Table 5.1 – Objectives and Targets Related to Solid Waste for 2010 - 2011.

SEM Objective	SEM Targets
Achieve a Sustainable SW Recycling Program for USAG-HI.	Decrease the rate of SW generation to meet the DOD 40% diversion goal.*
	Increase the recycling program revenue generation to cover operating expenses and support installation projects.
	Increase the awareness of participants in the recycling program.

*Current DOD policy requires 50% diversion of non-hazardous SW.

The USAG-HI SSAP has identified specific tasks (i.e., initiatives) to be implemented during 2010 and 2011. These tasks are intended to:

- Improve reporting of recycling.
- Expand recycling program capabilities through facility upgrades and equipment acquisition.
- Develop lines of communication with USAG-HI organizations to improve recycling and reporting.
- Evaluate and modify scope of work for recycling contract to expand/improve service.
- Improve awareness of recycling through newspaper articles, factsheets, briefings and the USAG-HI website.

- Incorporate recycling-related slides into training and in-brief presentations for military unit environmental compliance officers and senior leaders.

Table 5.2 lists the SEM tasks (i.e., P2 initiatives) with their associated SEM objectives and targets. Table 5.3 lists a proposed P2 initiative.

Table 5.2 – Current P2 Initiatives, SEM Objectives, and Targets to Reduce SW.

Initiative	SEM Objective	SEM Target	Section
Develop the reporting system whereby all materials recycled are ultimately reported to the SW Program Manager.	Achieve a Sustainable SW Recycling Program for USAG-HI.	Decrease the rate of SW generation to meet the DOD 40% diversion goal.*	5.6
Require C&D Contractors to recover/recycle C&D waste.	Achieve a Sustainable SW Recycling Program for USAG-HI.	Decrease the rate of SW generation to meet the DOD 40% diversion goal.*	5.6
Implement a functional Qualified Recycling Program (QRP) and develop lines of communication with organizations (DRMO, DFMWR, AAFES) to ensure proceeds from sale of recyclable materials are credited.	Achieve a Sustainable SW Recycling Program for USAG-HI.	Increase the recycling program revenue generation to cover operating expenses and support installation projects.	5.6
Evaluate Statement of Work of current recycling contract to ascertain adequacy. Implement modifications to improve services.	Achieve a Sustainable SW Recycling Program for USAG-HI.	Increase the recycling program revenue generation to cover operating expenses and support installation projects.	5.6
Increase awareness level of installation personnel thru publication of newspaper articles, factsheets, materials, briefings, and website.	Achieve a Sustainable SW Recycling Program for USAG-HI.	Increase the awareness of participants in the recycling program.	5.6
Incorporate recycling slides as part of the ECO training and GC senior leaders in-brief.	Achieve a Sustainable Solid Waste Recycling Program for USAG-HI.	Increase the awareness of participants in the recycling program.	5.6

*Current DOD policy requires 50% diversion of non-hazardous SW.

Table 5.3 – Proposed P2 Initiatives, SEM Objectives, and Targets to Reduce SW.

Initiative	SEM Objective	SEM Target	Section
Require C&D waste management plans.	Achieve a Sustainable SW Recycling Program for USAG-HI.	Decrease the rate of SW generation to meet the DOD 40% diversion goal.*	5.7

*Current DOD policy requires 50% diversion of C&D waste.

5.3 PREVIOUS, EXPIRED, OR REVOKED GOALS

5.3.1 1998 DOD Measure of Merit

The 1998 DOD MoM required installations to achieve a diversion rate greater than 40% for nonhazardous SW by the end of FY 2005 (reference 2-18). The USAG-HI did not achieve this goal. The USAG-HI has had a SW diversion rate of approximately 27% in both FY 2009 and FY 2010.

5.3.2 2001 USAG-HI Pollution Prevention Plan

The 2001 USAG-HI P2 plan stated a goal of 40% for the diversion rate of non-hazardous waste excluding C&D waste. As noted above, this diversion rate was not met. The primary factor adversely impacting waste diversion is the limited capacity of the recycling program. The USAG-HI recognizes this and is addressing this issue, see the current P2 initiatives presented in section 5.6. The 2001 P2 Plan proposed several SW P2 initiatives:

- Increase participation in the QRP.
- Coordinate with Commissaries and AAFES facilities on participating in the QRP.
- Sell Directorate of Logistics (DOL) scrap metals through QRP rather than DRMO.

The web-based Solid Waste Annual Report (SWARWeb) data show that while USAG-HI solid waste diversion rates are relatively low, diversion has increased since 2001. The commissary and AAFES facilities have very good recycling programs. Sale of scrap metal is still through both the QRP and the DRMO.

5.4 BASELINE AND PROGRESS

Tenant activities at USAG-HI produce SW typical of commercial and administrative sectors. The Garrison primarily generates three types of waste: municipal solid waste (MSW), C&D waste, and yard waste. Municipal solid waste consists of waste generated from commercial, administrative, and residential sources and typically includes food scraps, packaging waste, paper, plastics, textiles, and yard waste. Generally excluded from the definition of MSW is HW, as defined by RCRA and non-RCRA wastes that cannot be managed as SW such as medical

waste or other special wastes. C&D wastes are generated during construction, demolition, and renovation projects and may include concrete, lumber, roofing, asphalt, insulation, and metals. The DOD requires installations to maintain records regarding diversion rates, per capita waste disposal rates, and cost data. USAG-HI maintains these metrics in the SWARWeb, which is a DOD reporting system that captures installation SW generation, recycling, and diversion data for each FY. Recycling and reuse are the primary forms of diversion at USAG-HI. The diversion rates reported in Table 5.4 include data for only FY 2009 and FY 2010. Quantities reported for years prior to FY 2009 varied widely from year to year due to poor data capture, and therefore have not been presented in this document.

Table 5.4 – U.S. Army Garrison - Hawaii Diversion Rates (% by Weight).

FY	SW Generated (tons)	SW Diverted (tons)	SW Disposed (tons)	Diversion Rate
2009	10,385	2,302	8,084	22.2%
2010	11,171	2,680	8,491	24.0%

5.5 SOLID WASTE COLLECTION, RECYCLING AND DISPOSAL

5.5.1 Municipal Solid Waste

The USAG-HI has a contract to collect waste from the dumpsters located at the various administrative, commercial, and institutional buildings throughout all Army installations, sub-installations, and the Island of O'ahu. This contract does not provide SW collection services for family housing. Family housing at USAG-HI has been privatized and is not managed by the USAG-HI. Solid waste is collected on a regular schedule and transported for disposal. The contract provider transports the waste to either the H-Power waste to energy (WTE) facility or to the Waimanalo Gulch Landfill, which is the only landfill on the island. The tipping fee for municipal solid waste is \$79.65 per ton. H-Power can process approximately 2,000 tons of waste per day. Excess waste, as well as ash from the WTE facility, is disposed of in the Waimanalo Gulch Landfill. During FY 2009, 87% of the USAG-HI MSW was incinerated at the WTE facility. In FY 2010, the quantity of USAG-HI MSW increased 24% from 5,532 to 6,852 tons, with a smaller quantity and low percentage (55%) being processed at the WTE facility. The contractor provides waste quantity data to the Contract Officer's Representative, who provides the data to the environmental office.

5.5.2 Recyclable Materials

The USAG-HI operates a QRP as defined in Army Regulation 420-1. Nine of the USAG-HI installations participate in the USAG-HI recycling program including: Aliamanu Military Reservation, Fort Shafter, Helemano Military Reservation, Kilauea Military Camp, Pohakuloa Training Area, Schofield Barracks, Tripler Army Medical Center, WAAF, and Waianae

Recreation Center. In the preparation of this P2 Plan, recycling activities at Schofield Barracks and WAAF were evaluated.

The USAG-HI Recycling Program for Schofield Barracks, WAAF, and other facilities on Oahu is operated through a contract with Goodwill Industries. Goodwill Industries collects recyclable materials from seven of the USAG-HI installations including Aliamanu Military Reservation, Fort Shafter, Helemano Military Reservation, Schofield Barracks, Tripler Army Medical Center, WAAF, and Waianae Recreation Center and transports the recyclable materials to the Army Recycling Center (ARC) located on Schofield Barracks. Examples of the recyclable material ARC accepts include: aluminum cans, glass, plastics, office paper, cardboard, paperboard, steel, metals, green waste, and limited quantities of C&D waste. Although the ARC accepts aluminum cans, glass, and plastics, many of the beverage containers generated on USAG-HI are not recycled at the ARC. To encourage recycling, Hawaii has a Deposit Beverage Container Program, referred to as the HI-5 program that places a 5¢ redeemable deposit on each beverage container. Most beverage containers separated for recycling are redeemed through the HI-5 program rather than being processed through the QRP. There are two beverage container redemption centers located on USAG-HI installations, one on Schofield Barracks and one on Fort Shafter.

The USAG-HI also recycles vehicle maintenance wastes and universal waste through contracts and programs that do not process the material through the ARC. These materials include antifreeze, range materials including brass, cooking oil, fluorescent light fixtures, lead-acid batteries, parts washing solvents, tires, and used oil.

The USAG-HI together with Joint Base Pearl Harbor-Hickam, the Marine Corps Base Hawaii, and the 14th Coast Guard District have established a memorandum of understanding for a collaborative QRP partnership. The goal of the memorandum of understanding is to achieve benefits through cooperative efforts and economies of scale.

The USAG-HI recycling totals were 2,302 tons in FY 2009 and 2,680 tons in FY 2010. Approximately 45% of the recycled material is processed through the QRP. In FY 2010 the categories of materials with highest percentage of total recycling tonnage are cardboard (24%), metals other than brass and steel (14%), sewage sludge (13%), green waste (10%), C&D waste (8%), used motor oil (6%), used tires (5%), white paper (4%), food/garbage (2.4%), and expended brass (2.2%). Table 5.5 shows the quantities of materials recycled at USAG-HI in FY 2009 and FY 2010.

Participation. All facilities visited at Schofield Barracks and WAAF participate in the recycling program. The level of participation varies between facilities/buildings. Some facilities have very good recycling programs with good participation; examples that were visited include the commissary, Post Exchange and the Building 110 aviation maintenance hangar. Most facilities do not recycle to the maximum extent possible.

In many instances, recycling is limited by lack of recycling containers at appropriate locations. For example at the Building 2623/2626 shops, there is a roll-off for metals recycling, but no

separate container for segregation of metals other than steel at the electrical shop. The recycling program is also limited by inadequate capacity under the recycling contract. The capacity of the

Table 5.5 – Tons of Materials Recycled from FY 2009 Through FY 2008.

Recyclable Material	FY 09	FY 10
Green Waste	1,023.175	274.99
Cardboard	210.9625	651.635
White Paper	60.4789	97.4407
Newspaper	47.58	16.63
Phone Book	0.525	1.300
Other (Paper)	.6175	15.2525
Aluminum Cans	.6498	.5885
Expended Brass	24.087	58.6665
Brass	24.087	ND
Metal – Copper	1.282	ND
Metal – Steel	9.835	12.96
Metal – Mixed Metal	17.61	17.185
Other (Metals)	238.1605	364.50
Pallets – Scrap	0.9900	37.1475
Timber/Wood Waste	53.46	2.63
Other (Wood)	ND	6.75
Tires	24.11	134.1575
Used Motor Oil	106.435	166.5215
Antifreeze	20.559	22.7655
Diesel/MOGAS/JP-8	9.401	11.3365
Solvents	16.0685	23.439
Lead-Acid Batteries	83.947	67.093
Food Waste / Garbage	0.7645	63.5565
Used Cooking Oil	1.65	16.5026
C&D Material	149.82	197.98
STP (Sewage) Sludge	152.38	349.69
Toner	0.0803	0.2549
PETE #1	0.0425	0.1215
Other (Plastic)	4.9149	1.6225
Other Misc Material	20.2945	67.6375
Total	2,301.6819	2,680.1742

contract does not provide for sufficient of number of personnel and adequate equipment to allow timely collection of recyclable material at all pickup locations. Recyclable materials were observed piled on pavement alongside refuse or recycle containers at multiple locations, both as a means of segregating materials, and also because recycle containers were either full or not present at a location where they were needed. The recycling program was also limited by the

existing facilities and operational capacity of the ARC. Roofed storage is insufficient to provide for covered storage of all cardboard, and contract capacity was not sufficient to provide adequate manpower.

5.5.3 C&D Waste

Construction and demolition waste is generated through construction, renovation, and demolition activities at USAG-HI. C&D waste accounts for a large percentage of the waste stream at Army installations. According to Army-wide SWARWeb data, 60% of the Army's nonhazardous SW stream consisted of C&D debris in 2004. Typical wastes from C&D activities include lumber, reinforcing steel and other metals, piping and wiring, concrete, brick, plaster, wall board, roofing material, insulation, plumbing fixtures, doors, windows, and asphalt.

C&D material that is not recycled is disposed at the Nanakuli Landfill. The diversion rate for C&D waste at USAG-HI, as indicated by SWARWeb data, was 6.4% in FY 2009 and 11.6% in FY 2010. Diversion rates for C&D waste often exceed 50%, and the rates for USAG-HI are low. It is uncertain whether the actual diversion rate is low, or if recycling of C&D waste is under-reported by construction, renovation and demolition projects.

5.5.4 Green Waste

The SW contract provider collects and disposes of roll-off containers used for green waste. The State of Hawaii prohibits green waste from being disposed of in landfills so the green waste is transported to a local composting facility. An average of roughly 50 tons of green waste is diverted from landfills each month at USAG-HI. USAG-HI does include green waste in SWARWeb reporting and estimation of the installation diversion rate.

5.6 CURRENT P2 INITIATIVES

The current P2 initiatives at USAG-HI are the tasks related to solid waste that are identified in the Garrison SSAP.

- Improve reporting of recycling. The USAG-HI recognizes that one of the keys to minimizing waste production and increasing recycling is to first understand the current waste generation and level of recycling. The better quality of SWARWeb data for USAG-HI for fiscal years 2009 and 2010 indicate that significant progress has been made in the reporting of both waste disposal and recycling. However, there is still room for improvement in the quality of data, with the recycling and disposal of C&D waste as an example.
- Expand recycling program capabilities through facility upgrades and equipment acquisition. The USAG-HI is implementing projects to improve the ARC to provide for improved handling and holding of recyclable material. This will include increasing roofed storage to keep cardboard dry. Additional equipment is also being made available to expand capability.

- Develop lines of communication with USAG-HI organizations to improve recycling and reporting. The identification of responsibilities within organizations will improve both participation in recycling and the reporting of recycling data.
- Evaluate and modify scope of work for recycling contract to expand/improve service. The recycling contract is being modified to expand capacity and provide better recycle collection service.
- Improve awareness of recycling through newspaper articles, factsheets, briefings and the USAG-HI website. Development of the Environmental Compliance Guide is an example of work under this initiative.
- Incorporate recycling-related slides into training and in-brief presentations for military unit environmental compliance officers and senior leaders.

In addition to the tasks identified in the USAG-HI SSAP, both the Garrison and individual facility managers are implementing the following initiatives to increase recycling and reduce waste generation.

- The USAG-HI is working to improve recycling of e-waste.
- The USAG-HI Environmental Office is informing organizations that confetti-shredded paper cannot be recycled, and that if not necessary, confetti-shredding should not be done.
- The Post Exchange has implemented a number of initiatives, including recycling of dry cell batteries, better separation of plastic film and cardboard when bailing, and improved reuse of pallets.
- The Plans, Analysis, and Integration Office (PAIO) has been actively implementing sustainability efforts at the USAG-HI, and some of these efforts relate directly to waste reduction. For example, information on how to set computers to print double sided has been distributed to Garrison personnel.

5.7 POTENTIAL P2 INITIATIVES

5.7.1 Require C&D Waste Management Plans

Description. Unified Facilities Guide Specification 017419 (reference 5-2) details the requirements of developing and implementing the C&D Waste Management Plan and should be referenced in all of the USAG-HI contract performance specifications for work producing C&D waste (i.e., construction and renovation). The C&D Waste Management Plan must be provided for government approval within 15 days of contract award and prior to any site clearance activities. The contractor's conformance with the C&D Waste Management Plan must also be monitored and verified throughout the course of the project. Verification of the waste diversion rate can only be accomplished if the generation, salvage, reuse, recycling, and disposal amounts are recorded and reported for all applicable waste streams. The plan must therefore address the

measurement, compilation, and reporting of these elements. Reports must be provided to the SW manager and the project's contracting officer's representative or technical representative. The data can then be used to verify contractor fulfillment of requirements, to confirm compliance with the Army diversion requirement, and to populate the C&D data fields in the SWARWeb.

Compliance Benefit. This initiative will help USAG-HI fully meet the requirements of the 2008 DOD Integrated (Non-Hazardous) Solid Waste Management Policy and the 2006 Army Memorandum by increasing the diversion rate for C&D waste.

Materials Compatibility. No materials compatibility issues were identified.

Safety and Health. No additional safety and health concerns are associated with this initiative. All C&D contractors' site plans must already include a site safety and health plan in which these issues are addressed.

Advantages.

- Increases SW diversion rate through reuse and recycling.
- Provides C&D waste generation data for inclusion in the SWARWeb.
- Provides usable materials for future projects.
- Provides potential cost savings from reduced disposal fees.

Disadvantages.

- May increase duration of demolition projects.
- Contractors may charge additional cost for plan development and implementation.

Economic Evaluation. An economic analysis cannot be done for this initiative, since additional costs and economic benefits will vary with each C&D project.

Economic Evaluation Summary. There may be no economic benefit for the installation with this initiative, since both C&D disposal costs and revenue generated from C&D material sales are typically the responsibility of the contractor. The requirement for diversion and submittal of a C&D Waste Management Plan may result in contract prices being slightly higher.

CHAPTER 6 AIR EMISSIONS

6.1 AIR EMISSIONS REDUCTION GOALS

- Establish Scope 1 and 2 Green House Gases (GHG) emission reduction targets (reference 2-17). DOD established a 34% reduction target by 2020 (reference 2-24).
- Establish Scope 3 GHG emission reduction targets. (reference 2-17). DOD established a 13.5% reduction target by year 2020 (reference 2-24).
- Decrease use of chemicals that will assist in achieving GHG emission reduction targets (reference 2-19).

6.2 SEM PROGRAM OBJECTIVES AND TARGETS

There is currently no SEM objectives and targets that directly relate to this media area. Table 6.1 shows a proposed "draft" objective and targets for air emissions USAG-HI may want to consider implementing. As the SEM is modified and updated, additional objectives and targets relating to initiatives for the reduction of air emissions in this section will be included.

Table 6.1 – SEM Draft Objective and Targets to Reduce Air Emissions.

Draft Objective	Draft Target
Investigate opportunities to reduce or minimize air emissions with environmentally preferable solutions.	Seek to reduce or minimize Criteria Pollutants, VOCs, Hazardous Air Pollutants (HAPs), and GHGs.
	Meet DOD requirement to reduce GHG emissions by 13.5% in year 2020.

Table 6.2 – Current P2 Initiatives, SEM Objective and Target to Reduce Air Emissions.

Initiative	Draft Objective	Draft Target	Section
Removal of the Waukesha Generator from Source Permit No. 0226-01-C.	Investigate opportunities to reduce or minimize air emissions with environmentally preferable solutions.	Seek to reduce or minimize Criteria Pollutants, VOCs, HAPs, and GHGs.	6.5.1

Table 6.3 – Potential P2 Initiatives, SEM Objective, and Targets to Reduce Air Emissions.

Initiative	Draft Objective	Draft Target	Section
Replacement of Laundry Facility Boilers.	Investigate opportunities to reduce or minimize air emissions with environmentally preferable solutions.	Seek to reduce or minimize Criteria Pollutants, VOCs, HAPs, and GHGs.	6.6.1
Update the Air Emissions Inventory (EI).	Investigate opportunities to reduce or minimize air emissions with environmentally preferable solutions.	Seek to reduce or minimize Criteria Pollutants, VOCs, HAPs, and GHGs.	6.6.2
Telecommuting.	Investigate opportunities to reduce or minimize air emissions with environmentally preferable solutions.	Meet DOD requirement to reduce GHG emissions by 13.5% in year 2020.	6.6.3
Carpooling.	Investigate opportunities to reduce or minimize air emissions with environmentally preferable solutions.	Meet DOD requirement to reduce GHG emissions by 13.5% in year 2020.	6.6.4

6.3 BACKGROUND

The Schofield Barracks/Wheeler Army Airfield's (SB/WAAF) annual criteria air emissions are the result of diesel fired boilers and flexible emissions diagnostic system (FEDS) test stands. Annual emissions from other major sources, for example fuel storage/dispensing, painting, and herbicide/pesticide applications, are currently not available because of the lack of a current Air Emissions Inventory. Table 6.4 provides air emissions data for SB/WAAF obtained from the Annual Emission and Fee Summary for Covered Sources reports. These reports contain estimated emissions for the boilers and the FEDSs only (references 6-1 through 6-5).

The Army is currently identifying and developing the GHG emissions policy. Executive Order 13514 (reference 2-17) states that a baseline GHG emission should have been conducted for FY 2008 but with policy still being developed this was not obtainable. It is recommended that GHG emissions be quantified as soon as possible to establish a baseline. The GHG emissions from vehicles are presented in Chapter 11 of this plan.

Table 6.4 – SB/WAAF Air Emissions Summary (Tons per CY).

Pollutant	2005	2006	2007	2008	2009
NO _x	1.4	1.3	1.1	1.0	1.9 ¹
SO ₂	0.5	0.5	0.0	0.4	0.2
CO	1.4	0.3	0.3	0.3	0.3
VOCs	0.0	0.0	0.0	0.0	0.0
HAPs	ND	ND	ND	0.0	0.0
PM-2.5	ND	ND	ND	0.1	0.1
PM-10	0.1	0.1	0.1	0.1	0.1
TSP	0.1	0.1	0.1	0.1	0.1
GHG	ND	ND	ND	ND	ND

¹ NO_x increased in 2009 due to increased usage of the FEDS.

6.4 DESCRIPTION OF MAJOR EMISSION SOURCES

6.4.1 Boilers

The boilers are located at the laundry facility on Schofield Barracks, building 2802. These boilers are rated at 14.6 million BTU per hour and burn diesel fuel.

6.4.2 FEDS Test Stands

The FEDS Test Stands are engine test stands used to test Chinook and Blackhawk helicopter engines. Various tests are performed to determine whether they are suitable for use prior to installing them in a helicopter.

6.5 CURRENT P2 INITIATIVES

6.5.1 Removal of the Waukesha Generator from Source Permit

The Waukesha emergency generator was replaced in 2009 with a lower air emissions Caterpillar Model C-32 emergency diesel engine generator. The State of Hawaii's Department of Health determined that the new Caterpillar emergency generator is exempt from air permitting requirements. The USAG-HI Environmental Division is in the process of removing the Waukesha emergency generator from Source Permit No .0226-01-C.

6.6 POTENTIAL P2 INITIATIVES

6.6.1 Replacement of Laundry Facility Boilers

Description. Boiler personnel estimate that the current boilers for the laundry facility are larger than required. Replacing these boilers with smaller and newer models would greatly reduce air emissions such as criteria pollutants, VOCs, HAPs, GHGs, and require less fuel usage. For such a major change, detailed investigations and cost analogies would be required by qualified engineers and estimators.

Materials Compatibility. No material compatibility issues were identified.

Safety and Health. No safety and health issues were identified.

Advantages.

- Reduction of air emissions.
- Less fuel required to run boiler.

Disadvantages.

- Cost to replace current boiler.
- Facility downtime.

Economic Evaluation. A detailed investigation and cost analogy is outside the scope of this Pollution Prevention Plan.

6.6.2 Update Air Emissions Inventory

Although SB/WAAF is only required to report emissions for items found on their Covered Source Permit, it would be beneficial to update the Air Emissions Inventory and use it as a tool to investigate all air emissions sources, to include GHGs which is now a requirement with policy currently being developed, on the installation.

Materials Compatibility. No material compatibility issues were identified.

Safety and Health. No safety and health issues were identified.

Advantages.

- The EI can be used as a tool to help meet goals required in section 6.1.
- Familiarity with emission sources on the installation.

Disadvantages.

- Cost to have an EI conducted.

Economic Evaluation. To conduct an Air Emissions Inventory for the USAG-HI, it is estimated it will take three personnel two weeks at a cost of approximately \$95,000.

6.6.3 Telecommuting

Description. Telecommuting is an effective program in which an employer permits an employee to work either from home or from a designated telework center. The DOD offers two types of telework arrangements, “regular and recurring” and “ad hoc”, recognizing that organizational and employee needs may vary considerably and should be considered on a case-by-case basis. Regular and recurring telework is defined as an approved work schedule where eligible employees regularly work at least 1 day per biweekly pay period at an alternative worksite. Ad hoc telework is defined as approved telework performed at an alternative worksite on an occasional, one-time, or irregular basis.

Section 359 of Public Law No. 106-346 (2001) requires that 25% of the eligible Federal workforce must be offered the opportunity to telework (reference 6-6). An additional 25% of the eligible Federal workforce must be offered the opportunity to telework each successive year, thus permitting every eligible employee the opportunity to telework by the end of FY 04.

Environmental Evaluation. Depending on the size of the participating workforce, a telecommuting program will result in energy and utility savings. Reduced demand of SB/WAAF resources will also reduce the air emissions generated from boilers, the power plant, SW incinerator, water and wastewater treatment, and fuel use by commuters.

Materials Compatibility. No materials compatibility issues were identified.

Safety and Health. Since commuters would spend less time traveling to their worksite at SB/WAAF, a reduction in accidents could be the direct result of this program.

Advantages.

- Savings in commuting cost such as wear and tear of vehicles and fuel use.
- Savings in energy and water consumption.
- Employees can work from home in the event of a natural disaster or other crisis situation.
- Raises job satisfaction resulting in employee retention.
- Reduces training costs of new employees due to longer staff retention.
- Sick employees working at home will not infect co-workers.

Disadvantage.

- Reduced oversight of how much time employees spend working while away from the office.

Economic Evaluation. The economic benefits are dependent on the type of telecommuting initiated and the number of personnel involved in the program. An economic evaluation can therefore not be performed at this time.

Once SB/WAAF is able to estimate how many commuters would participate in this program, the tons of vehicle CO₂ saved can be calculated.

Air Emissions Reduction. Estimates for air emission reductions can be determined by calculating the air emissions per participating vehicle.

6.6.4 Carpooling

Description. One of the easiest ways to reduce GHG emissions is to carpool to and from work or, even better, work from home which is called teleworking. According to Sightline Institute, the average car with a single driver emits 1.10 lbs of carbon dioxide per mile (reference 6-7). When you carpool, an average car with three passengers naturally decreases that number by one third to only 0.37 lbs of carbon dioxide per mile.

Advantages.

- Less criteria pollutants, VOCs, HAPs, and GHGs emissions.
- Less fuel usage.
- Less wear and tear on vehicles.
- Participants can take advantage of carpool lanes on local highways.

Disadvantages.

- Drivers carry the additional burden of potential legal action from passengers in case of an accident.
- Carpooling combines many of the disadvantages of public transportation (lack of privacy, coordinating travel schedules, etc.).

Economic Evaluation. The economic benefits are dependent on how many personnel participate in the program and the miles commuted. An economic evaluation can therefore not be performed at this time; however, payback would be immediate for all participants.

CHAPTER 7 WATER AND WASTEWATER

7.1 WATER AND WASTEWATER REDUCTION GOALS

- Reduce water consumption intensity by 2% annually, or 26% total (per square foot) by FY 2020, using a FY 2007 baseline (reference 2-17).
- Reduce industrial, landscaping, and agricultural water consumption by 2% annually, or 20% total by 2020, using a FY 2010 baseline (reference 2-17).
- Identify, promote, and implement water reuse strategies that reduce potable water consumption (reference 2-17).
- Require that any development or redevelopment project involving a Federal facility with a footprint that exceeds 5,000 square feet shall use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow (reference 2-5 and 2-17).
- Conduct water and energy evaluations for 24% of facilities annually, each facility must be evaluated once in a 4 year cycle (reference 2-5).

7.2 SEM PROGRAM OBJECTIVES AND TARGETS

The USAG-HI has an SEM in place but the significant aspects identified do not include water conservation. As the SEM is modified and updated, applicable objective and targets relating to initiatives for the reduction of water consumption and water discharge will be included in Table 7.1.

Table 7.1 – SEM Objectives and Targets for Water and Waste Water.

Objective	Target
NA	NA

7.3 PREVIOUS, EXPIRED, OR REVOKED GOALS

Section 503 (f) of Executive Order 13123, Greening the Government through Efficient Energy Management, June 1999, established water conservation goals for Federal agencies. The FEMP considers a facility to have met the requirements for water conservation when it has a Water Management Plan and has implemented at least four (of the fourteen) Water Efficiency Improvement BMPs:

- Water management planning.
- Public information and education programs.
- Distribution system audits, leak detection and repair.
- Water efficient landscaping.
- Water efficient irrigation.
- Low-flow toilets and urinals.
- Low-flow faucets and showerheads.
- Reduce waste water from boiler/steam systems.
- Eliminate single-pass cooling systems.
- Reduce waste water from cooling tower systems.
- Reduce waste water from commercial kitchen equipment.
- Reduce waste water from laboratory/medical equipment.
- Other water use.
- Water reuse and recycling.

The FEMP set the schedule for implementation at Federal facilities as follows:

- 5% of facilities by 2002
- 10% of facilities by 2004
- 30% of facilities by 2006
- 50% of facilities by 2008
- 80% of facilities by 2010

By the end of FY 2006, USAG-HI had partially implemented four of the BMPs (low flow toilets, low flow faucets, public information and education program, distribution system audit). This EO was revoked by EO 13423 in January 2007 and replaced by EO 13423. The FEMP is a DOE program of recommendations and still applicable regardless of whether it is referenced as a requirement by a revoked EO.

7.4 BASELINES AND PROGRESS

Table 7.2 – USAG-HI Water Consumption Summary (Millions of Gallons per FY).

Fiscal Year	Water Consumption (million gal)	Building Square Footage (million ft²)	Goal Water Consumption Intensity (gal/ft²)	Actual Water Consumption Intensity (gal/ft²)	Cumulative Intensity Reduction (%)
2002					
2003					
2004					
2005					
2006	1,503	14.06	NA	106.90	NA
2007 Baseline	1,114	14.31	NA	77.85	NA
2008 Target: 2% Annual Intensity Reduction from Baseline	1,110	13.44	76.29	82.59	-6.1
2009	999	14.49	74.74	68.94	11.5
2010	1,072	14.78	73.18	72.53	6.8
2011			71.62		
2012			70.07		
2013			68.51		
2014			66.95		
2020 Target: Overall 26% Intensity Reduction from Baseline			57.61		

Note: A negative number for the last column (Cumulative Intensity Reduction) means that water consumption intensity rose, a positive number means that water consumption intensity fell.

The total square footage of buildings was used to calculate water use intensity (USAG Hawaii Real Property Inventory, updated annually). Water usage is not monitored on a building-by-building basis, therefore, a further differentiation of water intensity between building types (comparing administrative versus maintenance buildings for instance) is not possible.

Table 7.3 – USAG-HI Wastewater Discharge Summary (Millions of Gallons per FY).

Fiscal Year	Wastewater Discharge (million gal)	Building Square Footage (million ft²)	Wastewater Discharge Intensity (gal/ft²)	Cumulative Intensity Reduction (%)
2000				
2001				
2002				
2003				
2004				
2005				
2006	786	14.06	55.9	NA
2007 Baseline	613	14.31	42.8	NA
2008	670	13.44	49.9	-16.6
2009	688	14.49	47.5	-11.0
2010	717	14.78	48.5	-13.3
2011				
2012				
2013				
2014				
2015				

Note: A negative number for the last column (Cumulative Intensity Reduction) means that water consumption intensity rose, a positive number means that water consumption intensity fell.

The total square footage of buildings was used to calculate water use intensity. Water usage is not monitored on a building-by-building basis, therefore, a further differentiation of water intensity between building types (comparing administrative versus maintenance buildings for instance) is not possible.

7.5 DESCRIPTION OF WATER AND WASTEWATER RESOURCES

The East Range water treatment facility is a community water system that serves Schofield Barracks and WAAF. The drinking water is obtained from four deep groundwater wells. The groundwater source is contaminated with trichloroethylene (TCE) and perchloroethylene (PCE), which are removed at the surface by an air-stripping treatment process.

The privatized Wastewater Treatment Plant (WWTP) on WAAF uses a membrane bioreactor treatment train to produce R-1 quality water for reuse. Capacity is 4.2 million gallons per day (MGD) but average flow for the previous 5 years was approximately 1.9 MGD.

7.6 CURRENT P2 INITIATIVES

7.6.1 Low-Flow Water Fixtures

Low-flow water fixtures are being installed at all locations. The low flow fixtures are used as replacements for traditional fixtures and are installed in all new construction and any repairs or upgrades to existing fixtures.

7.6.2 Golf Course Water Management

The golf course employs various technologies to manage water usage (moisture sensors, rain gauges, thermometers, etc). A computer calculates evapotranspiration rates and recommends irrigation amounts. The active management probably helps to reduce water use.

7.6.3 Wastewater Treatment

The WWTP is treating wastewater to the R-1 standard for reuse from the “Guidelines for Treatment and Use of Recycled Wastewater (May 2002),” by the Hawaii State Department of Health, Wastewater Branch. The R-1 standard requires advanced treatment for oxidation and solids removal, plus thorough disinfection. Construction is underway to use this water for irrigation at the Watts/Ralston Field (see 7.7.1 for expansion of R-1 water reuse).

7.6.4 Water Meters

Water meters are installed on new athletic fields as well as all new buildings and major renovations of existing structures. “Smart” water meters are also piggybacked onto “smart” electrical meters. When the system is complete, these smart meters will communicate back to a central computer and allow real time monitoring of water usage. Mock billing has begun for electrical customers.

7.6.5 Water Audits

Personnel from the DPW energy conservation branch conduct weekly energy and water audits. These audits consist of touring the installation by car and noting lights or machinery that are on but not serving any purpose (ex. street lights during daylight). Water misuse is also noted (ex. leaking sprinkler heads, water running in the streets). Repair orders are submitted for the noted instances. The DPW plumbing shop also inspects sprinklers to find those with leaks or that are aimed incorrectly. Each week the plumbers inspect one irrigation zone, over the course of a year all the zones are checked (see 7.7.3 for expansion of water audits).

7.6.6 Rainwater Harvesting Project

This demonstration project includes collecting the runoff from the Natural Resources office, building 1123, and piping the water to a storage basin, which was converted from an abandoned washrack. The water is then pumped back up for irrigation of the landscaping around the building. The first phase of the demonstration irrigates just a small portion of vegetation around the building, but it could be expanded to include the entire area. Rainwater harvesting addresses three pollution prevention goals, it reduces the use of potable water for irrigation purposes, reduces the water use intensity versus potable irrigation, and because the rainwater is kept from running off, maintains a site hydrologic profile similar to the predevelopment state.

7.6.7 Closed Loop Car Wash

A new AAFES car wash is being constructed that will be a closed loop system. The wash water will be collected, treated by filtration and ozone, and then returned to the nozzles for reuse. Water would only be added to the system to account for evaporation and drag out (the water that is still clinging to cars when they exit).

7.7 POTENTIAL P2 INITIATIVES

7.7.1 Expansion of R-1 Water Reuse

Description. Expansion of the R-1 irrigation system could potentially include the entire effluent from the WWTP which has averaged about 1.9 MGD from 2006 to 2010 (see 7.6.3). The design and groundwater monitoring plans required for expansion are already complete but the project is awaiting funding approval. The large amount of R-1 water is estimated to be used by the 18-hole Leilehua golf course, parade fields, and smaller irrigation areas (reference 7-3).

Environmental Evaluation. The concerns associated with water reuse are human health based. There are no anticipated adverse affects on the environment.

Materials Compatibility. The piping used to transport R-1 water would be the same as piping for other water.

Safety and Health. There is an extensive evaluation of potential environmental health effects and associated management practices and pilot scale data that determined there would not be a negative impact from extensive use of R-1 water for irrigation (reference 7-3). Briefly, the concerns are disease causing microorganisms, nutrients (nitrogen and phosphorus), and dissolved solids (various salts). The pathogenic microorganisms will be killed by disinfection, the nutrients will not penetrate deeply and will be used by plants, and the dissolved solids will be controlled by groundwater sampling and target groundwater quality criteria. The dissolved solids represent the largest potential long term issue. If monitoring shows that groundwater solids levels are rising due to R-1 water, then diluting the R-1 water with fresh water may be used to control the negative impacts.

Advantages. Using R-1 water for irrigation could reduce the use of potable groundwater by millions of gallons per day.

Disadvantages. There are health concerns, but with proper management, they should be adequately controlled.

Economic Evaluation.

Assumptions.

- Implementation cost was estimated using required construction in the Engineering Design Report (adjusted for inflation to 2010) (reference 7-3)
- Cost of drinking water \$3.66/1,000 gal.
- All of the average WWTP effluent flow is treated to the R-1 standard and is used for irrigation.
- Cost of maintaining water distribution lines \$1 per linear foot (DOD Facilities Pricing Guide, FY 10)

Table 7.4 – Expansion of R-1 Water Reuse.

Itemization	Current	Proposed R-1 Water Reuse
Estimated Implementation Cost	NA	\$5,500,000
Annual Water Consumption	693,500,000 gal	0 gal
Annual Wastewater Discharge	NA	NA
Annual Cost Potable Water	\$2,538,210	\$0
Annual Cost Wastewater	NA	NA
Total Recurring Costs	NA	\$18,500
Payback Period	2 years, 3 months	

Economic Evaluation Summary. The payback period is calculated by dividing the implementation cost by the difference between the recurring cost savings and the recurring costs.

$$\$5,500,000 / (\$2,538,210 - \$18,500) = 2.18 \text{ years}$$

7.7.2 Increase Water Metering and Charge for Usage

Description. Currently, water usage is only monitored at the groundwater well pumps and at the golf course. There are some locations with water meters that are not monitored so they provide no useable data. All other usage is estimated. This makes it difficult to determine which activities are using water most efficiently. If smart meters were installed and data sent to DPW, then activities with high water use could be targeted as areas to inspect for leaks and to examine water use patterns to identify water conservation opportunities. If individual activities were charged for water use from their operating budgets there would be a cost incentive to reduce water waste.

The overall reduction scheme for water metering starts by first simply collecting data for a year. Next, an average or appropriate amount of water use would be determined for each size/type of residence (for example, a 2 bedroom townhome with no lawn is likely to use less water than a 4 bedroom single family home with a yard). Once an appropriate goal range is determined, mock billing would begin so that customers could see whether they are within, above, or below the acceptable range. Billing (both mock and real) could be based on a charge for volume used above the acceptable range, so customers would have an economic incentive to conserve water at home.

Metering for all industrial and landscaping uses would be required to meet the goal for a 2% annual reduction of industrial, landscaping, and agricultural uses as required by EO 13514 Oct 09. 2010 is the baseline year for the reduction so data on these non-domestic water uses should be collected immediately. It is more likely that 2011 or 2012 will be the year used as a baseline or at least partial data from 2010 could be used.

Smart water meters are available from a variety of vendors for many purposes. Metering on a building-by-building basis would provide the most information.

Environmental Evaluation. Metering and charging for water usage would provide an incentive to conserve water in all activities including on-post housing. Even if only a 2% reduction in usage could be found, it would reduce water usage by about 20 million gallons of water per year. There would be no adverse environmental effects.

Materials Compatibility. Commercially available water meters are compatible with the water system.

Safety and Health. There are no anticipated adverse safety and health issues.

Advantages. Reduction of potable water use and reduction of wastewater discharge.

Disadvantages. None identified.

Economic Evaluation. Figures for cost of potable water and wastewater were calculated by DPW Engineering, Plans, and Services. Costs from operations and maintenance are included in the calculations; however, other costs (capital and administrative overhead) are not included because a reduction in water usage would not directly relate to a reduction in capital or administrative overhead.

Assumptions. Assume that metering could lower potable water usage equal to 2% of total potable water production or 20 million gal per year (FY 2007 production data). Also assume that half of the water saved, or 10 million gal, would have otherwise discharged to the WWTP (leaking toilets, discharges to drains, etc.). Other leaks would be outdoors (underground piping, garden hoses, etc.).

- 4,000 water meters (approximate number of meters for separate activities).
- Cost of water meters \$300 each (reference 7-4).
- Cost of drinking water \$3.66/1,000 gal.
- Cost of wastewater \$11.18/1,000 gal.
- 10 million gal potable water use reduction.
- 5 million gal wastewater discharge reduction.

Table 7.5 – Increase Water Metering Frequency.

Itemization	Current	Water Meters
Estimated Implementation Cost	NA	\$1,200,000
Annual Water Consumption	1,000,000,000 gal	20,000,000 gal
Annual Wastewater Discharge	10,000,000 gal	0
Annual Cost Potable Water	\$3,660,000	\$3,660,000 - \$73,200 = \$3,586,800
Annual Cost Wastewater	\$111,800	0
Total Recurring Costs	NA	\$0
Payback Period	6 years, 6 months	

Economic Evaluation Summary. The payback period is calculated by dividing the implementation cost by the difference between the recurring cost savings and the recurring costs.

$$\$1,200,000 / (\$73,200 + \$111,800) - \$0 = 6.48 \text{ years}$$

7.7.3 Acoustic Leak Detection Survey

Description. Leak detection should be an ongoing process. Existing water audits are valuable and should continue, but a leak survey to detect leaks in buried water piping would be able to detect and guide repair of potentially much larger leaks. Acoustic measurement instruments are used to “hear” the rushing water from leaks in buried piping. Once leaks have been identified they are excavated and repaired. Kirtland Air Force Base in New Mexico (Federal Energy Management Program, Best Management Practice Case Study #3, Jan 2009) performed an acoustic leak detection program that identified and repaired leaks totaling more than 16% of total potable water use.

An acoustic leak detection survey would allow a new baseline to be set, by detecting virtually all current leaks. It should be repeated about every 5 to 10 years. The expectation would be that the first survey would find the most leaks since those leaks could have occurred at any time since installation of the piping, which could be 50 years or more. Subsequent surveys would only find leaks that were missed previously or that had developed since the previous survey (5-10 years).

Environmental Evaluation. Detecting leaks would reduce waste of potable water. There are no adverse environmental effects.

Materials Compatibility. The acoustic detection equipment does not adversely affect the piping.

Safety and Health. Safety and health are major concerns when dealing with excavations and doing repairs on drinking water lines. These concerns should be addressed by standard protocols for safety and public health such as confined space entry permits, proper bracing of trenches, and checking chlorine residual after repairs. There are no anticipated additional adverse safety and health issues.

Advantages. Reduction of potable water waste.

Disadvantages. None identified.

Economic Evaluation.

Assumptions. Assume the costs and results for Schofield and WAAF are similar to those at Kirtland AFB since the water distribution systems are very similar in size (about 100 miles) and each is over 50 years old. Conservatively assume that leaks detected are 10% of total potable water use versus of Kirtland AFB 16%.

- 100 miles of piping to be inspected (approximate).
- \$850 per mile (Kirtland Air Force Base cost multiplied by Hawaii cost factor from R.S. Means Building Construction Cost Data 2007).
- \$600,000 for repairs (Kirtland Air Force Base cost multiplied by Hawaii cost factor from R.S. Means Building Construction Cost Data 2007).
- Cost of drinking water \$3.66/1,000 gal.

Table 7.6 – Acoustic Leak Detection Survey.

Itemization	Current	Leak Detection
Implementation Cost	NA	\$685,000
Annual Water Conservation	1,000,000,000 gal	100,000,000 gal
Annual Wastewater Discharge Reduction	NA	NA
Annual Savings Potable Water	NA	\$366,000
Annual Cost Wastewater	NA	NA
Total Recurring Costs	NA	\$0
Payback Period	1 year, 11 months	

Economic Evaluation Summary. The payback period is calculated by dividing the implementation cost by the difference between the recurring cost savings and the recurring costs.

$$\$685,000 / (\$366,000 - \$0) = 1.87 \text{ years}$$

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CHAPTER 8 TRI FORM R CHEMICAL RELEASE REDUCTION

8.1 TOXIC RELEASE INVENTORY FORM R CHEMICAL RELEASE REDUCTION GOALS

- Ensure the agency (DOD) reduces the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of by the agency (reference 2-15).
- Ensure each agency continues to comply with Sections 301 through 313 of EPCRA and future amendments using Internet reporting (reference 8-1).

8.2 SEM PROGRAM TARGETS AND OBJECTIVES

There is currently no SEM objectives and targets that directly relate to this media area. As the SEM is modified and updated, applicable objectives and targets relating to initiatives for the reduction of TRI Chemical Releases will be included in this section (see Table 8.1).

Table 8.1 – SEM Objectives and Targets for TRI Chemical Release Reductions.

Objective	Target
NA	NA

8.3 PREVIOUS, EXPIRED, OR REVOKED GOALS

- Through timely planning and reporting under EPCRA, Federal facilities shall be leaders by informing the public and their workers of sources of pollution resulting from facility operations (reference 8-3).
- Strive to reduce or eliminate harm to human health and the environment from releases of toxic chemical pollutants (reference 8-3).
- Through innovative P2, effective facility management, and sound acquisition and procurement practices, each agency shall reduce its reported TRI releases and off-site transfers of toxic chemicals for treatment and disposal by 10% annually, or 40% overall by 31 December 2006 from a baseline of CY 2001 (reference 8-4).

Executive Order 13148, Greening the Government through Federal Fleet and Transportation Efficiency, was signed 21 April 2000, amending EO 12856, Federal Compliance with Right-To-Know Laws and Pollution Prevention Requirements, toxic chemical reduction goals by adding specific percentage reduction goals. Sections 204 and 502 require percentage reductions for the quantities of reported toxic chemical releases on the Form R, which amount to 10% annually, or 40% overall by 31 December 2006 from a baseline of CY 2001. The EO further encouraged the

implementation of P2 programs designed to replace and/or reduce the uses of toxic chemicals, where economically and operationally feasible. The EO 13148 was revoked by EO 13423 on 26 January 2007 and replaced by EO 13432, Strengthening Federal Environmental, Energy, and Transportation Management. Data was not available to verify if this requirement was met.

8.4 BASELINE AND PROGRESS

Table 8-2 shows the TRI chemicals reported for SB and WAAF (references 8-3 to 8-5). The TRI report indicates Section 313 chemicals were reportable because of “Otherwise Use” for lead compounds, lead, and copper.

Table 8.2 – The USAG-HI Reported TRI Chemicals and Quantities (lb per CY).

TRI Chemical	Quantities of Chemicals Reported on TRI Form R			
	2007	2008	2009	2010
Lead Compounds	553	315	158	ND
Lead	45,935	45,617	30,059	ND
Copper	38,155	35,253	20,057	ND

In 2001 reportable lead and lead compounds thresholds were reduced to 100 lbs. Because of this change, lead compounds have since been reportable for SB and WAAF. Lead compounds, along with copper, are mainly found in munitions used at firing ranges for training purposes. It is unlikely that the composition of munitions will be changing anytime soon, such that the amount of munitions usage during training events will be the deciding factor on whether lead compounds and copper will meet TRI reporting requirements.

8.5 CURRENT P2 INITIATIVES

No current P2 initiatives were identified.

8.6 POTENTIAL P2 INITIATIVES

No potential P2 initiatives were identified at this time.

CHAPTER 9 EMERGING CONTAMINANTS

9.1 EMERGING CONTAMINANTS REDUCTION GOAL

Emerging contaminants (ECs) are chemicals or materials that are characterized by:

- A perceived or real threat to human health or environment.
- A lack of published health standards or a standard that is evolving or being reevaluated.

A contaminant may also be “emerging” because of the discovery of a new source, a new pathway to humans, or a new detection method. This means that contaminants that are already known, have toxicity values, or are already regulated may still be considered emerging because the science has evolved to the point where the regulatory climate can be expected to change.

The DOD is proactively approaching emerging contaminants in order to enable fully informed, risk-based investment decisions that protect human health and the DOD’s operational capabilities. Emerging contaminants can have a significant impact on human health, the environment, management of the Department’s land assets, the development of weapon systems, military training and readiness, logistics, and industrial base operations.

There are currently no reduction goals for the ECs (reference 9-1). The DOD is putting in place a process to constantly identify and assess the impacts of ECs on personnel, the environment, and on the DOD mission. Risk management options will be developed by the DOD for all ECs on the DOD EC Action List (e.g., those with significant potential impacts on people or the DOD mission). Program managers throughout the DOD will be presented with the risk management options for funding and implementation, as appropriate. Risk management options include:

- Research and development of material substitutes.
- Redesign of systems and processes to eliminate hazardous materials.
- Research and development of treatment or cleanup technologies.
- Improved personal protective clothing, equipment and procedures.
- Special handling and storage.

Once the DOD and the DA have determined what the risk management options are and have issued guidance, USAG-HI will implement the options where feasible and capture our efforts in this chapter of the P2 Plan.

9.2 SEM PROGRAM OBJECTIVES AND TARGETS

There is currently no SEM objectives or targets that directly relate to this media area. As the SEM is modified and updated, applicable objectives and targets relating to initiatives for emerging contaminants will be included in this section (see Table 9.1).

Table 9.1 – SEM Objectives and Targets for Emerging Contaminants.

Objective	Target
NA	NA

9.3 BASELINE AND PROGRESS

The DOD's EC Action List contains those materials that have been assessed and judged to have a significant potential impact on people or the DOD mission. To be placed on the Action List, the impacts will, generally, have been assessed in the following five functional areas:

- Environment, safety, and health (including occupational and public health)
- Cleanup efforts
- Readiness and training
- Acquisition
- Operation and maintenance activities

After a thorough assessment of the effects in each functional area, the Office of Deputy Under Secretary of Defense (Installations and Environment) [ODUSD (I&E)] Chemical and Material Risk Management (CMRM) Directorate will develop a material-specific Integrated Risk Management Plan for those ECs on the DOD Action List. The Risk Management Plan will identify short- and long-term risk management options for DOD program managers. Risk management options are actions that the DOD can initiate to mitigate the impact on the environment, human health, and the DOD's mission and operations. The ODUSD (I&E) CMRM Directorate will assess risk management options for applicability, estimate the costs of applicable options, identify the responsible authority for implementing the option(s) selected, and determine potential feedback mechanisms to monitor the progress of the options selected.

The current ECs on the DOD Action List are:

- Beryllium
- Perchlorate
- Trichloroethylene
- Cyclotrimethylenetrinitramine (RDX)

- Naphthalene
- Hexavalent Chromium (Chromium VI)
- Sulfur Hexafluoride (SF6)
- Lead Compounds

A description of the ECs on the Action List, and how they are used by the DOD and the DA, follows. As risk management options are identified and implemented for each EC, they will be documented in this chapter, as applicable to the use and operations of the EC at the USAG-HI.

9.3.1 Beryllium

Beryllium is a light-weight, hard, grayish metal naturally found in mineral rocks, coal, soil, and volcanic dust. Beryllium is used principally in aerospace and defense applications because of its stiffness, lightweight and ability to hold its shape across a range of temperatures. The United States, one of only three countries that process beryllium ores and concentrates into beryllium products, supplies most of the rest of the world with these products.

Due to its lightweight nature and unique heat-resistant properties, beryllium is an important material for DOD with uses in aircraft and space vehicle structures, missile guidance systems, heat shields, nuclear weapons and reactors, specialty instruments, x-ray machines, and mirrors.

Emerging science and information about beryllium may lead to increased material cost and unavailability in the marketplace. In addition, this may lead to increased controls and protections for occupational and environmental health for the small number of sites where DOD workers may be exposed to beryllium dust, fumes and soluble salts.

There has been at least one recent reduction in the occupational exposure limit for the Threshold Limit Value established by the American Conference of Governmental Industrial Hygienists. This change may result in lowering exposure limits for workers.

Beryllium has been safely used for many years in DOD operations. As new information becomes available, DOD will adjust its risk assessment and safety guidelines to continue to protect its workforce and the environment while completing its mission.

9.3.2 Perchlorate

Perchlorate is both a man-made and naturally occurring compound. Perchlorate salts dissolves easily and moves quickly in groundwater and surface water. Once dissolved, it remains in the water for a very long time. Perchlorate can affect human thyroid functions at relatively low levels.

Perchlorate has a number of critical DOD applications in missiles, rockets, and munitions. While DOD is working to reduce the use of perchlorate, some of DOD's uses result in releases to the environment. Since the 1940's, the DOD has used perchlorate as an oxidizer in explosives,

pyrotechnics, rockets, and missiles. The two types of perchlorate most frequently used by the DOD are ammonium perchlorate and potassium perchlorate. Perchlorate is the most safe, efficient and reliable propellant available today and is a critical compound needed to support the DOD's trainings, weapon systems and missions. Perchlorate releases at DOD sites have occurred in the past due to prior removal, recovery and disposal practices of propellant from missiles and explosives.

DOD is addressing perchlorate releases at installations and formerly used defense sites as part of its overall environmental restoration program. Response actions are taken, if necessary, as indicated by site-specific risk assessments performed in coordination with federal and state regulators. Table 9.2 shows USAG-HI drinking water sampling results for perchlorate which were below 15 ppb.

Table 9.2 – Perchlorate Sampling Results.

Location	2009	2010
Fort Shafter	150 ng/L (0.15 ppb)	180 ng/L (0.18 ppb)
TAMC	200 ng/L (0.20 ppb)	250 ng/L (0.25 ppb)
Schofield Barracks	200 ng/L (0.20 ppb)	250 ng/L (0.25 ppb)
Dillingham	300 ng/L (0.30 ppb)	360 ng/L (0.36 ppb)

The DOD recently began using more environmentally-friendly substitute materials in training flares and munitions on Army training ranges. They account for an average of about 70% of the perchlorate used on ranges. For example, production for M115A2/M116A1 artillery and hand grenade simulators using perchlorate substitutes has been implemented.

Additionally, the ODUSD (I&E) developed a series of best management practices to be used on DOD-owned properties, as appropriate, to minimize the potential impacts of perchlorate from fireworks displays (reference 9.2), to include using low or no-perchlorate containing fireworks, post event cleanup, and management of duds and misfires.

9.3.3 Trichloroethylene

Trichloroethylene is a nonflammable, colorless liquid at room temperature. Trichloroethylene is a man-made chemical that does not occur naturally in the environment. It is mainly used as a solvent to remove grease from metal parts. It is also used to make other chemicals and can be found in products such as paint removers, adhesives, and spot removers.

The DOD uses TCE in large quantities as a degreaser or solvent for parts cleaning for maintenance of multiple weapons systems. Historic DOD uses include metal degreasing but substitutes are now widely used. Some specialized applications such as testing aircraft

propulsion systems and weapons systems remain. It is also used by DOD suppliers to clean sensitive computer circuit boards and during the munitions manufacturing process.

The EPA and state agencies are reassessing the health effects of low levels of exposure to TCE. This may result in revised toxicity benchmarks which are used to assess environmental, safety and health risks. TCE is considered a hazardous substance under a number of different environmental, health, and safety laws.

DOD currently follows strict handling procedures to prevent releases of TCE into the environment and exposure by workers. Using pollution prevention principles, DOD has replaced many products containing TCE with less-hazardous cleaning agents (e.g., citrus-based agents, mineral oils, and other non-toxic solutions) and continues to explore other, safer substitutes.

9.3.4 Cyclotrimethylenetrinitramine

Royal Demolition eXplosive is the common name for 1,3,5-trinitro-1,3,5-triazine and cyclotrimethylenetrinitramine. It is also known as cyclonite, hexogen or T4. RDX is a white crystalline solid and is considered one of the most powerful explosives. RDX is widely used in the military and industrial applications. It was used during World War II as an explosive, usually in mixtures with other explosives (TNT), oils, or waxes. Based on performance and cost, RDX is not likely to be replaced as a military explosive of choice. There are currently no acceptable alternatives available for RDX in military munitions.

It is highly stable in storage and is considered the most powerful of the military high explosives. It is present in over 4,000 military items, from large bombs to very small igniters and forms the base for many common military explosives, to include Composition A, Composition B, Composition C, HBX, H-6, and Cyclotol. It is also used in its pure form in press loaded projectiles and as a base charge in detonators and blasting caps.

RDX is on the EPA's Drinking Water Contaminant Candidate List (CCL). The CCL is a list of unregulated contaminants that may require the development of a national drinking water regulation in the future. Some states such as Massachusetts and Tennessee are developing new regulatory standards for RDX.

9.3.5 Naphthalene

Naphthalene, a white solid or a liquid with a strong odor, occurs naturally in coal, crude oil and other fossil fuels, and is extracted from these sources for further use. Naphthalene is released when fossil fuels and organic materials such as wood and tobacco are burned. It is not particularly persistent in the environment, as it evaporates quickly into the air when it is in liquid form or placed into another liquid. It is toxic in large doses.

DOD does not use significant amounts of naphthalene as a stand-alone product. It is a component of other products such as fuels and some pesticides.

Naphthalene is a natural constituent (< 1-3%) in all petroleum-based fuels (e.g., JP-8) used by all DOD services. Exposure to DOD personnel may occur during fueling, transport, and storage of fuels for all vehicles and weapons systems that use combustion engines.

DOD uses billions of gallons of petroleum-based fuels annually in a variety of mobile applications such as aircraft, tanks, trucks and ships. In addition, fixed applications such as generators, stoves, and heaters rely on these fuels. Thus, the storage, handling, and transport of naphthalene-containing fuels could present opportunities for exposure among DOD personnel.

Recent research studies have found that naphthalene may be carcinogenic via the inhalation route of exposure leading DOD to invest in more health risk research and fuel sampling efforts. EPA is looking to establish a toxicity benchmark for naphthalene in its database of chemical risk values, the Integrated Risk Information System (IRIS). The classification of naphthalene as a carcinogen could significantly alter environmental/occupational health and safety regulations, likely affecting the majority of DOD operations related to fuel.

DOD adheres to all Occupational Safety and Health Administration requirements to protect its workers who come in contact with naphthalene. The DOD provides personnel training, engineering controls, personal protective equipment, air monitoring, and medical surveillance.

The increased use of alternate (non-petroleum based and electric) fuel vehicles, discussed in Chapter 11, will reduce petroleum-based fuel usage on USAG-HI, but will not eliminate it.

9.3.6 Hexavalent Chromium

Chromium is a naturally occurring metal found in rocks, animals, plants, soil and in volcanic dust and gases. It is present in the environment in several different forms. Hexavalent Chromium (Chromium VI) is one of the most common forms of chromium and is generally produced by industrial processes.

Chromium (VI) is extensively used in the military, and its functions are critical to the DOD's weapons systems, platforms and operations. It is used in hard chrome surface treatments, chromate conversion coating (CCC), some anodizing processes, and primer paint for painted metal surfaces. For example, parts with these surface treatments are used in aircraft landing gear such as those exposed to highly corrosive salt atmospheres on aircraft carriers. Hard chrome has excellent wear resistance and the DOD uses it extensively for rebuilding worn and corroded components. The CCC is a corrosion protective coating system used on aluminum aircraft alloys, which is self-healing so that it continues to protect even when scratched. In addition, chromium (VI) is used in anodizing, which is an electrochemical process that thickens and toughens the naturally occurring protective oxide on aluminum parts.

Hexavalent chromium has many applications by both DOD and private industry, many that have no suitable alternatives for hexavalent chromium. See section 4.7.8 for a potential P2 initiative to substitute of an alodine product containing chromium VI.

The DOD strives to continuously reduce environmental, safety and health risks. DOD starts by complying with regulations, and then takes additional protective measures when it has determined risks are still unacceptable.

The DOD has invested over \$70 million to find substitute materials and processes and to evaluate control technologies to further protect workers and reduce the costs of asset maintenance. These new processes and materials are beginning to be integrated into new weapons platforms such as ships, aircraft, and other military equipment.

9.3.7 Sulfur Hexafluoride

Sulfur hexafluoride (SF₆) is a non-toxic, colorless gas that traps solar radiation, warming the atmosphere. The primary environmental concern with SF₆ is its potential to contribute to global warming. It warms the atmosphere at 23,900 times the impact of carbon dioxide (CO₂) and is estimated to persist for 3,200 years.

SF₆ is commonly used in various electronic components and in the production of the metals magnesium and aluminum. Its primary use is in electrical transmission equipment and in electric power facilities owned and operated by the private sector. The DOD operates some power facilities on military bases. SF₆ is used in specialized applications in key weapons systems and platforms where there are no known substitutes.

SF₆ has a number of DOD applications in electric power plant operations; command, control, and communications equipment; and weapons systems. Efforts to explore substitutes have begun but there are no known, equally effective substitutes at this time.

The DOD is currently refining its information on where, how, and how much SF₆ is used. New procedures have been implemented for loading and tracking the gas that have reduced use of the chemical by 52,000 pounds a year - the equivalent of retiring 572,000 tons of carbon dioxide annually.

9.3.8 Lead Compounds

Lead was added to the emerging contaminants program's Action List on 13 October 2009. Lead is a heavy, soft, silvery-gray metal. Lead has many different uses. It is used in the production of batteries, over 6,000 munitions items, metal products (solder and pipes), and devices to shield X-rays. Because of health concerns, lead from gasoline, paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years. For many years lead paint has been used on bridges, water tanks, ships and other steel and iron structures.

Lead or lead compounds are contained in thousands of items that DOD purchases and uses. Additional uses for the other compounds included: blasting caps, extinguishers, arming cartridges, aircraft fire extinguishers, aircraft flares, detonating cord assemblies, escape system parts kits, electric squibs, compressed gas for firefighting systems, mode selectors, delay cartridges, explosive linear actuator, propellant actuated initiator, explosive bolt, powder

actuated tool cartridge, safety booster, boosters, surface flares, cartridge actuated initiators, and illumination signals.

Lead Compounds are currently reportable under the TRI, annually, due to munitions usage on the training ranges. Should any initiatives be implemented, they will more than likely be captured under that chapter of this P2 plan.

9.4 CURRENT P2 INITIATIVES

The DOD decides how to respond to emerging contaminants based on the level of risk each pose to DOD personnel, public health, the environment, and the DOD mission. Once the DOD develops risk management options to address the ECs, then USAG-HI will be able to identify any corresponding initiatives previously implemented, as applicable.

9.5 POTENTIAL P2 INITIATIVES

The DOD decides how to respond to emerging contaminants based on the level of risk each pose to DOD personnel, public health, the environment, and the DOD mission. Once the DOD develops risk management options to address the ECs, then USAG-HI will be able to identify and implement any corresponding initiatives, as applicable. In the mean time, see section 4.7.8 for a potential P2 to substitute of an alodine product containing chromium VI.

CHAPTER 10 OZONE DEPLETING SUBSTANCES REDUCTION

10.1 OZONE DEPLETING SUBSTANCES GOALS

- Through evaluating present and future uses of ODSs and maximizing the purchase and the use of safe, cost effective, and environmentally preferable alternatives, each agency shall develop a plan to phase out the procurement of Class I ODSs for all nonexcepted uses by 31 December 2010 (reference 10-1).
- Maximize the use of alternative refrigerant and fire suppressant ODSs, as approved by the EPA's Significant New Alternatives Policy (SNAP) program (reference 10-1).

10.2 SEM PROGRAM OBJECTIVES AND TARGETS

Table 10.1 shows the USAG-HI SEM objective and targets for ODSs reduction. Tables 10.2 and 10.3 show the current and proposed P2 initiatives and their associated SEM objectives and targets to reduce ODSs.

Table 10.1 – SEM Objectives and Targets to Reduce ODSs.

Objective	Target
Achieve a Sustainable Clean Air Program for the USAG-HI.	Increase the education of shop personnel working with ODSs.
	Increase the operational controls for the usage and disposal of ODSs.
	Reduce the use of ODS equipment.

Table 10.2 – Current P2 Initiatives, SEM Objectives, and Targets to Reduce ODSs.

Initiative	Objective	Target	Section
Replacement of Class I ODS.	Achieve a Sustainable Clean Air Program for the USAG-HI.	Reduce the use of ODS equipment.	10.7.1
Certified Technicians.	Achieve a Sustainable Clean Air Program for USAG-HI.	Increase the education of shop personnel working with ODSs.	10.7.2

Table 10.3 – Proposed P2 Initiatives, SEM Objectives, and Targets to Reduce ODSs.

Initiative	Objective	Target	Section
Replacement of Class II ODS Equipment.	Achieve a Sustainable Clean Air Program for the USAG-HI.	Reduce the use of ODS equipment.	10.8.1

10.3 PREVIOUS, EXPIRED, OR REVOKED GOALS

10.3.1 Memorandum, Assistant Secretary of the Army, 13 February 1996

This memorandum stated “Army Installation/Regional Support Commanders are responsible for ensuring that Class I ODCs, as defined by section 602(a) of Title VI of the Clean Air Act, are eliminated in all facilities on their installations by the end of FY 2003.” More information regarding this memorandum is provided in section 10.4.

10.3.2 Executive Order 13148

For ODS management, the two goals listed in Executive Order 13148 were adopted by the Army first in a 22 November 2002 Memorandum for Assistant Chief of Staff for Installation Management, Department of the Army, Office of the Assistant Secretary, Installations and Environment (reference 10-3), and later reiterated and strengthened in a 7 January 2003 Memorandum for Installation Management Agency and U.S. Army National Guard, from Department of the Army, Assistant Chief of Staff for Installation Management (reference 10-2). While EO 13148 has subsequently been revoked by EO 13423, the requirements of the Memorandums listed above remain in effect.

10.4 BACKGROUND

Ozone depleting substances are manmade compounds that represent a serious threat to the earth’s ozone layer located in the stratosphere. All ODSs are grouped into two classes: Class I and Class II. Class I ODSs are more destructive to the ozone layer than Class II ODSs. Chlorofluorocarbon refrigerants and halons are examples of a Class I ODS. The most common ODS refrigerant is R-12 (i.e., Freon[®]), which is used in air conditioners and refrigerators on most facilities (Freon is a registered trademark of E.I. du Pont de Nemours and Company, Wilmington, Delaware.). Halons are used exclusively as fire-fighting agents. ODSs are stable, and when released they do not break down until exposed to radiation in the upper atmosphere. When this occurs, chlorine or bromine is released and reacts with ozone by destroying it. Over time, this cycle depletes the ozone layer, which shields humans from harmful ultraviolet-B radiation.

The Montréal Protocol signed by the U.S. in 1988 phased out production of Class I ODSs by 1 January 2000. This phase-out prompted the DOD to direct the elimination of Class I ODSs in nonmilitary-related equipment such as installation air conditioning and fire suppression systems

for non-essential equipment by 2003. In the process, DOD set up an ODS Reserve at the Defense Supply Center Richmond to ensure Class I ODSs were recovered and available for military related equipment for which no replacement chemicals had been identified. Current DOD policy permits the use of, but prohibits the purchase of Class I ODSs without proper approval. The protocol further bans production and importation of the Class II ODS hydrochlorofluorocarbon-141b (HCFC-141b) beginning 1 January 2003. Production of the widely used HCFC-22 (R-22) was capped at 15 million tons from 1996 - 2003 and reduced to 10 million tons in 2004. Future production of R-22 will continue to be reduced until finally banned in 2020. All Class II ODSs production will be banned by 2030. Hydrofluorocarbons (HFCs) are currently recommended as Class II ODS replacement chemicals by the EPA. Though HFCs do not destroy stratospheric ozone, they pose a risk to the earth because of their high global warming potential. Therefore, releases and recovery requirements specified in 40 CFR 82 apply to HFCs.

Previous Army policies directed installations to eliminate all Class I ODSs by the end of FY 2003 (reference 10-5). This was because Halon 1301 was needed to support mission critical weapon system requirements and it was predicted that after 2003 the price of Halon 1301 and other CFCs would make it economically prohibitive to replace them. Due to configuration changes, ground combat vehicles have reduced Halon 1301 requirements to where the installation's Halon is no longer needed for weapon system support. Reuse of CFCs recovered from equipment on an installation (referred to as "cascading") can eliminate the need to purchase additional supplies of CFCs. Through reuse of recovered refrigerants, the service life of equipment can be extended beyond the commercial availability of the CFCs. Consequently, there was no compelling need for Army installations to eliminate all Class I ODSs by the end of FY 2003 (reference 10-3).

New Army policy specifically states that CFC equipment needing periodic recharging may be used after CY 2003 as long as it is supported with CFC refrigerant that was recovered from on-post equipment through "cascading" supplies. Sealed CFC equipment may be used until retirement, and Halon 1301 fire suppression systems may be used until discharged. However, all Halon recovered from retired fire suppression systems, as well as any excess CFCs, may not be sold or traded, but must be turned in to the Army ODS Reserve at Defense Supply Center Richmond (DSCR).

10.5 BASELINE AND PROGRESS

Table 10.4 shows the pounds of Class I ODSs inventory during 2009 for the USAG-HI (reference 10-4).

Table 10.4 – USAG-HI Class I ODS Summary (Total Pounds in Inventory).

Type of ODC	2009	2010	2011	2012	2013	2014
R-502	3	TBD				
R-12	7	TBD				

TBD = to be determined.

Table 10.5 shows the pounds of Class II ODSs inventory during 2009 for the USAG-HI (reference 10-4).

Table 10.5 – USAG-HI Class II ODS Summary (Total Pounds in Inventory).

Type of ODC	2009	2010	2011	2012	2013	2014
R-22	6570	TBD				

10.6 DESCRIPTION OF ODS CONTAINING EQUIPMENT

The USAG-HI ODS Management Plan Update identifies the ODS-containing equipment as walk-in freezers/refrigeration, ice machines, and various small refrigeration units (1-5 pounds of ODSs). There are no Halon systems on the USAG-HI.

10.7 CURRENT P2 INITIATIVES

10.7.1 Replacement of Class I ODS

The USAG-HI is currently in the process of replacing Class I ODC equipment to meet the second goal listed in section 10.1. The installation has been purchasing only Class II (R-22) and non-ODS refrigerants. However, production of R-22 has begun to be phased out just like the Class I ODSs. This will eventually result in the USAG-HI only being able to purchase non-ODS containing equipment.

10.7.2 Certified Technicians

All DPW and contractor technicians are EPA certified and trained to comply with 40 CFR 82 requirements for preventing releases of ODS and non-ODS refrigerants to the atmosphere. Equipment used to recover refrigerants is modern and EPA approved.

10.8 POTENTIAL P2 INITIATIVES

10.8.1 Replacement of Class II ODS Equipment

Description. Current Army policy is to phase out Class II ODSs by attrition but if funding is available, the USAG-HI could start replacing older existing Class II ODS equipment with non-ODS equipment because of the production of R-22 being phased out by 2020.

Costs associated with changing out refrigerant equipment could vary greatly depending on the size of each of the units. The USAG-HI has hundreds of Class II units ranging in size from small house sized units to very large industrial sized units.

Compliance Benefit. There is currently no policy or requirement to replace equipment containing Class II ODSs.

Materials Compatibility. No material compatibility issues were identified.

Safety and Health. No additional safety and health concerns are associated with this potential initiative.

Advantages.

- Reduction of Class II ODS.
- Lower potential of accidental Class II emission release.
- A proactive approach to replacing Class II equipment.

Disadvantage. Cost to replace existing units.

Economic Evaluation. Obtaining funding to replace existing and functional ODS units will be a challenge considering the budget cuts across the federal government but replacing units now will cost less than replacing units later because of future increasing costs.

10.8.2 New Refrigerant Purchase Procedures

Description. It is recommended the US Army Hawaii Environmental Office be involved in all new refrigerant purchases to ensure the SNAP program is being utilized. The SNAP program was put in place to maximize the use of alternative refrigerant and fire suppressant ODSs approved by the EPA.

Compliance Benefit. Although there is no current official Army requirement, the Army is strongly encouraging not to purchase units containing Class II ODSs. Although R-22 may not be used in new equipment and in 2020 the production of R-22 will be stopped, units containing R-22 are still available for purchase.

Advantages.

- Purchasing non-Class II ODS equipment.
- Becoming more familiar with ODS equipment.

Disadvantages. None identified.

Economic Evaluation. Other than an investment of time, this initiative does not have any costs associated with it.

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CHAPTER 11

VEHICLE FUEL CONSERVATION AND ALTERNATE FUEL VEHICLES

11.1 VEHICLE FUEL CONSERVATION AND ALTERNATIVE FUEL VEHICLES GOALS

- Reduce the fleet’s total consumption of petroleum products by 2% annually FY 2005 through FY 2020. This is the same goal as in EO 13423 but extends it from 2015 to 2020 (references 2-15 and 2-17).
- Increase non-petroleum based fleet fuel consumption by 10% annually starting in FY 2005 (reference 2-15).
- Increase the purchase of plug-in hybrid (PIH) vehicles when commercially available (reference 2-17).
- Use alternate fuels in dual-fuel vehicles unless the Secretary of Energy determines an agency qualifies for a waiver. Grounds for a waiver are: alternate fuel is not reasonably available to the fleet and the cost of alternate fuel is unreasonably more expensive than conventional fuel (reference 2-4).
- Use plug-in hybrid vehicles when commercially available at a cost reasonably comparable, on the basis of life-cycle cost, to non-PIH vehicles (reference 2-15).

11.2 SEM PROGRAM OBJECTIVES AND TARGETS

There is currently no SEM objectives and targets for this media area. As the SEM is modified and updated, applicable objectives and targets relating to initiatives for the conservation of vehicle fuel and use of alternate fuel vehicles will be included in this section (see Table 11.1).

The table does show some recommended draft SEM objective and targets for vehicle fuel conservation and alternate fuel vehicles (AFVs) USAG-HI may consider implementing. Tables 11.2 shows current P2 initiatives that will help the SB/WAAF achieve goals listed above in section 11.1. Potential P2 initiatives are shown in Table 11.3.

Table 11.1 – SEM Objectives and Targets for Vehicle Fuel Conservation and AFVs.

Draft Objective	Draft Target
Investigate opportunities to reduce or minimize the fleet’s air emissions and fuel usage with environmentally preferable solutions.	Seek to reduce or minimize Criteria Pollutants, VOCs, HAPs, and GHGs.
	Meet the goals in section 11.1 of this chapter.

Table 11.2 – Current P2 Initiatives, Draft Objective, and Targets for Vehicle Fuel Conservation and AFVs.

Initiative	Draft Objective	Draft Target	Section
Increase the number of AFVs in the fleet.	Investigate opportunities to reduce or minimize the fleet’s air emissions and fuel usage with environmentally preferable solutions.	Reduce the fleet’s total consumption of petroleum products by 2% annually. Require the acquisition of AFV and hybrids yearly. Increase non-petroleum based fleet fuel consumption by 10% annually starting in FY 2005.	11.5.1

Table 11.3 – Potential P2 Initiatives, Draft Objective, and Targets to Conserve Vehicle Fuel and Purchase AFVs.

Initiative	Draft Objective	Draft Target	Section
Purchase gasoline/compressed natural gas (CNG) dual fuel vehicles.	Investigate opportunities to reduce or minimize the fleet’s air emissions and fuel usage with environmentally preferable solutions.	Reduce the fleet’s total consumption of petroleum products by 2% annually. Increase non-petroleum based fleet fuel consumption by 10% annually starting in FY 2005.	11.6.1
Increase fleet fuel efficiency.	Investigate opportunities to reduce or minimize the fleet’s air emissions and fuel usage with environmentally preferable solutions.	Reduce the fleet’s total consumption of petroleum products by 2% annually. Increase non-petroleum based fleet fuel consumption by 10% annually starting in FY 2005.	11.6.2
Purchase gasoline/hybrid electric vehicles (HEV).	Investigate opportunities to reduce or minimize the fleet’s air emissions and fuel usage with environmentally preferable solutions.	Reduce the fleet’s total consumption of petroleum products by 2% annually. Increase non-petroleum based fleet fuel consumption by 10% annually starting in FY 2005.	11.6.3

11.3 PREVIOUS, EXPIRED, OR REVOKED GOALS

- Increase the average EPA fuel economy of acquired cars and light trucks by at least 1 mpg by the end of FY 2002, and by 3 mpg by the end of FY 2005 from a FY 1999 baseline (EO 13149).
- Reduce vehicle petroleum consumption 20% by the end of FY 2005 from a FY 1999 baseline (EO 13149).
- Use alternate fuels a majority of the time in alternative fueled vehicles by the end of FY 2005 (EO 13149).
- Ensure that 75% of acquisitions of new, non-tactical vehicles (car and light truck) are alternatively fueled vehicles (EO 13149, Energy Policy Act of 1992).

Because of a lack of data, it is impossible to verify if SB/WAAF met any of these goals.

11.4 BASELINES AND PROGRESS

11.4.1 The EPAct of 2005

The EPAct of 2005 was signed on 8 August 2005 and was intended to update the provisions of EPAct 1992 (reference 2-4). The SB/WAAF fleet is located within a covered Metropolitan Statistical Area (MSA) and is subject to the AFV acquisition requirements. Section 701 of EPAct 2005 requires alternative fuels be used in AFVs that are in inventory, unless the fuel source is greater than 5 miles from the vehicle's address one way or is greater than a 15 minute one way commute.

11.4.2 Executive Order 13423

The EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management, was signed 24 January 2007, and was intended to build on the Federal government's environmental management improvements implemented by previous EOs and guidance documents (reference 2-15). Provisions of EO 13423 Section 2(g) require fleets of 20 or more vehicles to reduce petroleum consumption by 2% annually from FY 2005 through FY 2015, increase nonpetroleum fuel use by a compounded 10% annually, and use PIHs when commercially available and cost effective. The provisions concerning petroleum consumption apply to all duty classes of vehicles (light, medium, and heavy), but do not apply to military tactical vehicles, law enforcement, or other emergency vehicles. Strategies for meeting the goals of EO 13423 include reducing vehicle miles traveled, use of mass transportation, increasing the overall fleet economy through acquisitions of higher fuel economy vehicles, and ensuring tires are properly inflated.

11.4.3 Executive Order 13514

The EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance, was signed on 5 October 2009 establishes “an integrated strategy towards sustainability in the Federal Government and makes reduction of GHG emissions a priority for Federal agencies.” The EO 13514 sets the vision for Federal fleet management to lead by example to help “create a clean energy economy that will increase our Nation’s prosperity, promote energy security, protect the interests of taxpayers, and safeguard the health of our environment.” Federal fleets will reach this vision by reducing fleet GHG emissions through reduced petroleum consumption. EO 13514 establishes GHG and petroleum reduction requirements relevant to Federal fleet management. The EO 13514 changes the EO 13423 requirement to reduce the fleet’s total consumption of petroleum products by 2% annually FY 2005 through FY 2015 to FY 2005 through FY 2020 (reference 2-17).

11.4.4 Current Baseline Information

The 2009 and 2010 SB/WAAF light-duty fleet consisted of approximately 750 vehicles. The fleet consists of gasoline, diesel, compressed natural gas/gasoline, E85/gasoline, hybrid, and electric vehicles. The SB/WAAF currently uses a "rolling" fleet database to track all vehicles, i.e., new vehicles are continuously entered into the same database and old ones are taken out of it but are not tracked annually. For this reason, previous calendar year inventories are not available/obtainable and it is not possible to compare the current fleet’s fuel economy average to previous year’s fleet’s fuel economy averages. Better record keeping on annual fleet vehicle types is necessary to in order to verify if the goals indicated in section 11.1 of this chapter are met.

Around 35% of the 2009 and 2010 SB/WAAF light-duty fleet vehicles are AFVs. The problem is E85, fuel containing 85% ethanol, is not available on the island of Oahu and isn’t expected to be available in the near future. Purchasing hybrid or electric vehicles would be the better choice in this case.

The SB/WAAF has been replacing gasoline vehicles used primarily on-post with electric golf cart type vehicles. Eight all electric golf cart type vehicles are currently in the inventory and plans for more purchase are in place. Every electric vehicle purchased will replace a gasoline operated vehicle.

As discussed in Chapter 6, Air Emissions, the GHG policy is currently being written by the Army. It is believed the Army is primarily focusing on fuel usage as the main GHG emitter. Listed below, in Section 11.6, Potential P2 Initiatives are some potential ways to lower GHGs that can help meet any new possible GHG requirements. Replacing vehicles that use fossil fuels with electric type golf carts, for example, will meet any new requirements.

Table 11.4 shows the types of vehicles listed in the 2009 and 2010 SB/WAAF light-duty fleet inventory and Table 11.5 shows the fuel types and amounts used by those vehicles.

Table 11.4 – SB/WAAF Light Duty Fleet Vehicles by Fuel Type.

Fuel Type	FY 2009/2010 Vehicles Inventory	Percent Alternative Fuel Capable FY 2009/2010
Gasoline	442	0%
E85/Gasoline ¹	246	32.8%
Hybrid	3	0.4%
Gasoline/CNG	4	0.5%
Electric Vehicles	8	1.1%
Diesel	47	0%
Total	750	34.8%²

¹ Also known as dual-fuel or flex-fuel vehicles.

² In actuality, only 2% of vehicles are alternative fuel capable because there is no E85 available on Oahu.

Table 11.5 – SB/WAAF Petroleum Fuel Consumption for Vehicles.

Fiscal Year	Gasoline (gal/yr)	Diesel (gal/yr)	Compressed Natural Gas (gal/yr)	Percent Petroleum Reduction (EO 13423, EO 13514)	Percent Alternate Fuel Increase (EO 13423)
2005 Baseline EO 13423	ND	ND	ND	NA	NA
2006	ND	ND	ND	NA	NA
2007	ND	ND	ND	NA	NA
2008	322,130	66,978	15	NA	NA
2009	395,516	98,639	162	- 27% ¹	980%
2020 Target: 20% less petroleum; 10% more alternative fuel than 2005 baseline					

¹ 27% increase, not a reduction

The fuel usage for both gasoline and diesel *increased* from 2008 to 2009 by 27%. The EO 13514 and 13423 requirements to reduce the fleet's total consumption of petroleum products by 2% annually were not met. However, the alternate fuel usage of CNG increased by 980%.

11.5 CURRENT P2 INITIATIVES

11.5.1 Increase the number of AFVs in the fleet

The SB/WAAF is currently increasing AFV light duty fleet. Old larger gasoline powered sedans and other vehicles are being replaced with Hybrid or dual-fuel vehicles. Vehicles that are primarily driven on-post are being replaced by 100% electric golf cart type vehicles. Because E85 is not available on the island of Hawaii, CNG dual-fueled vehicles should be purchased instead of E85 dual-fueled vehicles.

11.6 POTENTIAL P2 INITIATIVES

11.6.1 Dual - Fueled Vehicles or AFV - Gasoline/CNG

Description. Gasoline/CNG dual-fueled vehicles can operate using either fuel as a fuel source. Using CNG as the primary fuel generates fewer air emissions than gasoline while delivering comparable engine performance. The vehicle operator can choose which fuel to use by simply flipping a switch inside the vehicle. At this time, the only CNG vehicles offered through GSA are full-sized, light-duty pickup trucks. These trucks are dual-fueled vehicles that can operate on either CNG or unleaded gasoline. While other dual-fueled vans and heavy-duty trucks are commercially available, they are not available through the GSA at this time.

Environmental Evaluation. A CNG vehicle emits approximately 33% fewer reactive hydrocarbons, 20% less nitrogen oxides, and 60% less carbon monoxide than a gasoline vehicle. The reduction of emissions generated by dual-fueled vehicles is proportional to the amount of CNG used instead of gasoline.

Materials Compatibility. No materials compatibility issues were identified.

Safety and Health. No safety and health concerns were identified.

Advantages.

- Reduces air and vehicle exhaust emissions.
- Aids in the reduction of petroleum consumption.

Disadvantages.

- At this time, the only CNG vehicles offered through GSA are full-sized, light-duty pickup trucks.

Economic Evaluation. This evaluation is based on replacing a gasoline-fueled 2010 Ford F-150 pickup with a dual-fueled, full-size, 4x2, regular cab 2010 Ford F-150 truck.

Assumptions.

- Average annual mileage of vehicles: 8,000 miles/yr.
- CNG and gasoline will be used equally (4,000 miles/yr).
- Vehicle use approximates city driving; city fuel efficiencies will be used.
- Average Gasoline fuel economy = 17 mpg.
- Average CNG fuel economy = 17 mpg.
- Cost unleaded gasoline: \$4.00/gal.
- Cost LPG: \$3.70/gal.
- Additional cost of alternative-fueled truck over gasoline fueled truck: \$3,500.

Table 11.6 – Annual Fuel Cost Gasoline-Fueled Truck vs. LPG Fueled-Truck.

Itemization	Gasoline Fueled-Truck	CNG Fueled-Truck
Additional Cost Over Gasoline Truck	NA	\$3,500
Fuel Cost	\$1,882/yr	\$1,811/yr (\$941 gasoline + \$870 CNG)
Fuel Savings	NA	\$71/yr
Payback Period	NA	49 years

Economic Evaluation Summary. The payback period is calculated by dividing the implementation costs by the difference between the recurring cost savings and the recurring costs.

$$\$3,500/(\$1,882/\text{yr} - \$1,811/\text{yr}) = 49 \text{ years}$$

The payback period exceeds the life expectancy of a dual-fueled vehicle. However, this initiative should be considered for reduced emissions benefits and to meet the goals set forth in EO 13514.

11.6.2 Increase Fleet Fuel Efficiency to Reduce Fuel Usage

Description. To increase the fleet's average fuel economy and reduce fuel usage, personnel responsible for leasing vehicles through the GSA acquisition process will consider vehicle fuel economy. The following steps will assist in the fuel economy considerations:

- Determine the required features for each new vehicle. For example, before ordering a pickup truck, research the GSA vehicle list to find *all* makes and models of the trucks that have the required features. Do not simply look for the same make and model as the vehicle to be replaced. Select the vehicle with the highest fuel economy.
- Determine the estimated EPA fuel economy for each vehicle acquisition. Refer to the www.fueleconomy.gov Website for a list of available fuel economy vehicles. The Website offers a search engine to determine the fuel economy of a specific vehicle, provides a list of vehicles in a specific class (i.e., sedans, pickup trucks, vans, or sport utility), and includes a side-by-side vehicle comparison feature.

Environmental Evaluation. Increasing the fleet's fuel efficiency to reduce fuel usage will bring the installation into compliance with EO 13514. By increasing the average fuel economy of the fleet, the SB/WAAF will also reduce air emissions from the operation of the vehicles. This evaluation is based on purchasing low-fuel economy vehicles as the older, low-fuel economy vehicles are replaced.

Materials Compatibility. No materials compatibility issues were identified.

Safety and Health. No safety and health issues were identified.

Advantages.

- Fuel savings.
- Reduction in air and vehicle exhaust emissions.
- Aids in the reduction of vehicle petroleum consumption.

Disadvantage.

- May require additional research when choosing a vehicle for purchase.

Economic Evaluation.

Assumptions.

- Cost of additional research for better fuel economy vehicles is negligible.

- Cost of higher fuel economy vehicle: considered to be negligible because older, low-fuel economy vehicles would be replaced with higher economy vehicles as part of the regular vehicle replacement cycle.
- No additional recurring costs are expected.
- Vehicle mileage: 8,000 miles/yr.
- Average fuel economy: 20 mpg¹.
- Cost gasoline: \$4.00.
- Approximately 50 vehicles are replaced annually.

Table 11.7 – Fuel Economy Savings.

Itemization	Low Fuel Economy Vehicle	Higher Fuel Economy Vehicle
Implementation Cost	none	none
Recurring Cost	none	none
EPA Estimated Fuel Economy	20 mpg ¹	25 mpg ¹
Annual Fuel Consumption	400 gal/yr	320 gal/yr
Annual Fuel Cost	\$1,600/yr	\$1,280/yr
Cost Benefit Single Vehicle	NA	\$320/yr
Cost Benefit Gasoline Fleet	NA	\$16,000/yr
Payback Period	NA	Immediate

¹Data derived from the EPA Fuel Economy Guide (reference 11-1).

Economic Evaluation Summary. The payback period is calculated by dividing the implementation costs by the difference between the recurring cost savings and the recurring costs. Because this initiative has no implementation cost and the cost savings are greater than the recurring costs, the payback is immediate.

11.6.3 HEVs - Gasoline/Electric

Description. An HEV is one of the most fuel-efficient vehicles. HEVs are primarily propelled by an internal combustion engine and are projected to have a driving range of over 300. They also convert energy normally wasted during coasting and braking into electricity, which is stored in the battery until needed by the electric motor.

Environmental Evaluation. HEVs use two sources of power: electric and an internal combustion source. HEVs will improve fuel economy without sacrificing performance or driving range .

Materials Compatibility. No materials compatibility issues were identified.

Safety and Health. No safety and health issues were identified.

Advantages.

- Driving range is comparable to gasoline-operated vehicles.
- Converts energy that is normally wasted into electricity and stores in the battery.
- Improvement of fuel economy.
- Possible Federal and state tax incentives for HEVs.

Disadvantages.

- Runs on gasoline and is therefore not considered for credits under the EPAct.
- More costly than gasoline-powered vehicles.
- Not all maintenance shops are certified to service HEV engines.

Economic Evaluation. The initial cost of an HEV can be as much as \$3,000 - \$10,000 more than that of a regular vehicle. However, the capital investment cost is offset by the fuel savings over a gasoline vehicle. As gasoline prices rise, HEVs become more cost effective. Other factors such as the percentage of city driving and annual mileage will also contribute to the cost effectiveness of HEVs. This evaluation compares a Ford Fusion hybrid and a gasoline Ford Fusion car.

Assumptions.

- Cost Hybrid car: \$28,340 and average fuel economy is 36 mpg.
- Cost gasoline car: \$20,000 and average fuel economy is 28 mpg.
- Cost of gasoline: \$4.00/gal for regular unleaded.
- Additional cost of HEV over cost over gasoline only car: \$8,340.
- Average annual mileage of vehicles: 8,000 miles/yr.

Table 11.8 – Hybrids vs. Gasoline Vehicles.

Itemization	Gasoline Fueled-Car	HEV -Car
Additional Cost Over Gasoline Truck	N/A	\$8,340
Fuel Cost	\$1,143/yr	\$889/yr
Fuel Savings	N/A	\$254/yr
Payback Period	N/A	33 years

Data provided from fueleconomy.gov and chevrolet.com/corvette/.

Economic Evaluation Summary. The payback period is calculated by dividing the implementation costs by the difference between the recurring cost savings and the recurring costs.

$$\$8,340/(\$1,143/\text{yr} - \$889/\text{yr}) = 33 \text{ years}$$

The initiative does not have a feasible payback period but is still considered a good management practice to implement. Purchasing HEV vehicles will meet the requirements under EO 13514.

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CHAPTER 12 GREEN PROCUREMENT

12.1 GREEN PROCUREMENT GOALS

Executive Order 13423 (reference 2-15) and the Instructions for Implementing Executive Order 13423 (reference 5-1) mandates that Federal agencies:

- Give preference in their procurement and acquisition programs to the purchase of:
 - Recycled content products designated in the EPA's Comprehensive Procurement Guidelines.
 - Energy Star ® products identified by the DOE and EPA, as well as Federal Energy Management Program (FEMP)-designated energy-efficient products.
 - Water-efficient products, including those meeting EPA's WaterSense standards.
 - Energy from renewable sources.
 - Biobased products designated by the U.S Department of Agriculture (USDA) in the BioPreferred Program.
 - Environmentally preferable products and services, including Electronic Product Environmental Assessment Tool (EPEAT)-registered electronic products.
 - Alternative fuel vehicles and alternative fuels required by the Energy Policy Act.
 - Products with low or no toxic or hazardous constituents.
 - Non-ozone depleting substances, as identified in EPA's Significant New Alternatives Program.
- Continue to use paper of at least 30% postconsumer fiber content.
- Meet EPEAT standards on 95% of electronic products purchased on an annual basis.
- Construct or renovate buildings in accordance with sustainable strategies (comply with *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings*).
- Incorporate sustainable practices in the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings* in 15% of the existing Federal capital asset building inventory by FY 2012.

Executive Order 13514 (reference 2-17) requires that Federal agencies:

- Ensure that 95% of new contract actions for products and services are energy efficient, water efficient, biobased, environmentally preferable, non-ozone depleting, contain recycled content, or are non-toxic or less toxic alternatives.
- Acquire uncoated printing and writing paper containing at least 30% post-consumer fiber.
- Promote electronic stewardship.

12.1.2 DOD Green Procurement Program Policy

The DOD issued a Green Procurement (GPP) policy and updated strategy document on 2 December 2008 (reference 12-1). The DOD GPP requires green products and services to be purchased to the maximum extent practicable. The responsibility for implementing DOD's GPP lies not within any single organization, but with every person involved in the procurement process. This includes, but is not limited to, the technical/requirements planner, contracting specialist, contracting officer, persons requisitioning products or services through any source of supply, and GPC holders. The strategy document defines the GPP goals and also provides metrics to measure the success of the GPP. The DOD Green Procurement Program goals are:

- Educate appropriate DOD employees on the requirements of Federal GP preference programs, their roles and responsibilities relevant to these programs and the DOD GPP, and the opportunities to purchase green products and services.
- Increase purchases of green products and services consistent with the demands of mission, efficiency, and cost effectiveness, with continual improvement toward federally established procurement goals.
- Reduce the amount of SW generated.
- Reduce consumption of petroleum and increase the use of alternative and renewable fuel sources.
- Increase the use of renewable energy.
- Reduce the use of ODS and hazardous and toxic chemicals.
- Improve the procurement of green electronic equipment through smarter acquisition.
- Increase the use of biobased products and reduce dependence on fossil energy-based products derived from imported oil and gas.
- Reduce consumption of energy and natural resources.
- Expand markets for green products and services.

Department of Defense Green Procurement Program Metrics are:

- Reduce the percentage of "Not Required" codes in the Use of EPA-Designated Products field in the Contracting Action Report (CAR) (or corresponding fields in successor data capture system) and increase the percentage of "Meets Requirements" codes in the Use of EPA-Designated Products field in the CAR (or corresponding fields in successor data capture system).
- Increase the purchase of federally defined indicator items.
- Increase the percentage of personnel trained in GP.
- Increase the number or organizations or installations participating in the Federal Electronics Challenge (FEC).

- Decrease the number of contract audit findings indicating lack of compliance with GPP requirements.

12.1.3 Army Green Procurement Program Policy

The 2006 Army GP program policy (reference 12-2) and the Army Installation Green Procurement Program Implementation Guide (Version 2) (reference 12-3), which align with the DOD strategy, requires full compliance with Federal GP requirements in support of the Army strategy for the environment.

12.1.4 Army Regulation 200-1, Environmental Protection and Enhancement

This regulation (reference 12-4) addresses GP under Pollution Prevention (Chapter 7). The regulation directs Army installations to “develop and implement a Green Procurement Program with emphasis on the mandatory purchasing preference programs.”

12.2 SEM OBJECTIVES AND TARGETS

The USAG-HI has an SEM; however, GP has not been identified as a significant aspect. The current EMS objectives and targets were written in December 2006 and are outdated. The USAG-HI should consider green procurement when it updates its SEM.

The USAG-HI is in the early stages of implementing its GP program. The Garrison does not currently have a GP Plan. Some individuals have received GP training, but the Garrison has not provided GP-specific training to a broad range of installation personnel.

12.3 PREVIOUS POLICY

The 2004 DOD GPP policy (reference 12-5) required installations to prepare/update and implement a GP Plan. The USAG-HI does not have a GP Plan and did not meet this requirement.

12.4 GREEN PROCUREMENT BACKGROUND

Green procurement can be defined as the purchase of environmentally preferable products and services in accordance with one or more of the established Federal procurement preference programs. The DOD Strategy and Army GP guide include the following Federal procurement preference programs, but are not limited to these components: recycled-content and biobased products, energy efficiency and renewable energy, alternative fuels and vehicles, water efficiency, environmentally preferable, sustainable buildings, EPEAT-registered electronic equipment, and elimination of toxic chemicals and ODS. Two of the first procurement preference programs were defined in RCRA (reference 12-6) and the Farm Bill (reference 12-7), which target the purchase of designated products made with recycled content (“Buy Recycled”

Program) and biobased products (“BioPreferred” Program), respectively. The “Buy Recycled” Program and “BioPreferred” Program are discussed in more detail below. Some of the elements of GP, such as energy efficiency and renewable energy, alternative fuels and vehicles, water efficiency, and elimination of toxic chemicals and ODS are discussed in other chapters of this plan.

The “Buy Recycled” program focuses on the consideration and purchase of recycled-content products. Under the “Buy Recycled” program, Federal facilities show preference for products made with recycled materials, which increases the demand for those products, advances the technology used to manufacture them, and benefits recycling programs by increasing the value of recyclable materials. The “Buy Recycled” Program is mandatory for Federal agencies, is structured around specific designated products, has associated purchasing guidelines and standards, and has specific reporting requirements under RCRA Section 6002. Under this program, the EPA designates products that are or can be made with recycled materials, and Federal agencies must include these products in their GP Programs within a year of designation. Designations are made based on available technologies, proven performance, impact on Federal procurement, contribution to the waste stream, and cost considerations. The EPA’s list of designated products is published in the Comprehensive Procurement Guidelines (CPGs) and codified in Federal regulations (reference 12-8). A list of the CPG products currently designated is shown in Table 11.1. A companion document issued with each CPG is the Recovered Materials Advisory Notice which provides guidance on purchasing items with recovered materials and establishes recommended recycled-content levels (specific to each product) that should be met when purchasing the recycled products.

The “BioPreferred” Program is also mandatory for Federal agencies, is structured around specific designated items, and has associated purchasing guidelines and standards. The RCRA Section 6002 reporting requirements now include biobased purchases in addition to recovered materials. Biobased products are defined as commercial or industrial products (other than food or feed) that utilize biological products or renewable domestic agricultural or forestry materials. These products are produced from renewable plant and animal sources, and are generally more environmentally preferable than comparable petroleum-based products. They are typically biodegradable, are easily recyclable, and pose fewer hazards when disposed. Increasing production and demand for biobased products will enhance U.S. energy security by replacing petroleum-derived products from imported oil and natural gas with domestically produced biobased products. The USDA published the first six designated biobased items in March 2006, has periodically added items since then, and will continue to expand the list as new materials are produced and evaluated. The items currently designated are shown in Table 12.2. Federal agencies purchasing those products must show preference for biobased content. Specific biobased items designated by the USDA must become part of a Federal Agency GP Program within a year of designation.

Table 12.1 – Comprehensive Procurement Guideline Items (EPA-Designated Products).

CPG Category	CPG Items	
Paper and Paper Products	Sanitary tissue Newsprint Miscellaneous papers	Printing and writing papers Paperboard and packaging
Non-Paper Office Products	Binders (paper, plastic) Office waste receptacles Plastic envelopes Printer ribbons Plastic clipboards Plastic file/presentation folders	Office recycling containers Office furniture Plastic trash bags Toner cartridges Plastic clip portfolios Plastic desktop accessories
Construction Products	Building insulation products Carpet cushion Floor tiles Laminated paperboard Modular threshold ramps Patio blocks Roofing materials Shower and restroom dividers/partitions	Carpet Cement and concrete Flowable fill Latex paint Nonpressure pipe Railroad grade crossing surfaces Structural fiberboard
Landscaping Products	Compost Garden and soaker hoses Landscaping timbers and post	Fertilizers Hydraulic mulch Lawn and garden edging
Transportation Products	Channelizers Flexible delineators Traffic barricades	Delineators Parking stops Traffic cones
Vehicular Products	Engine coolants Retread tires	Re-refined lubricating oils Rebuilt vehicle parts
Park and Recreation Products	Park and recreational furniture Playground equipment Running tracks	Plastic fencing Playground surfaces
Miscellaneous Products	Awards and plaques Blasting grit Mats Signage Strapping and stretch wrap	Bike racks Industrial drums Pallets Sorbents

Table 12.2 – USDA-Designated Biobased Items.

Category	Biobased Items	
Building Materials	Composite panels Roof coatings	Insulating foam
Construction and Road Maintenance Products	Dust suppressants Concrete and asphalt release fluids Forming lubricants	Deicers Wood and concrete sealers
Furniture and Furnishings	Bedding, linens, and towels	Carpets
Housewares and Cleaning Products	Adhesive and mastic removers Carpet and upholstery cleaners Floor strippers Graffiti and grease removers Multipurpose cleaners Disposable food handling and storage containers	Bathroom and spa cleaners Cutlery Glass cleaners Laundry products Ink removers and cleaners General purpose household cleaners
Industrial Supplies	2-cycle engine oils Firearm lubricants Hydraulic fluids (mobile equipment) Metalworking fluids Sorbents Chain & cable lubricants Industrial cleaners Parts wash solution Gear lubricants Heat transfer fluids Turbine drip oils	Diesel fuel additives Greases Hydraulic fluids (stationary equipment) Penetrating lubricants Water tank coatings Expanded polystyrene foam recycling products Corrosion preventatives Diesel fuel additives Multipurpose lubricant
Landscaping and Agriculture	Fertilizers	Mulch and compost materials
Office Supplies	Films	
Personal Care and Toiletries	Hand cleaners and sanitizers Topical pain relief products	Lip care products
Utilities	Fluid-filled transformers	

Executive Order 13423, Strengthening Federal Environmental, Energy, and Transportation Management, sets forth policy that Federal agencies “conduct their environmental, transportation, and energy-related activities under the law in support of their respective missions in an environmentally, economically and fiscally sound, integrated, continuous improving,

efficient, and sustainable manner.” This EO supersedes and revokes several EOs relating to GP (EO 13101, EO 13123, EO 13148, and EO 13149), but also reinforces GP programs and updates goals and metrics for electronics management, building performance, energy use, and P2. Implementation instructions were published subsequent to the EO (reference 5-1) that contain details, requirements, and specific targets for Federal agencies to achieve the EO’s sustainability goals. The instructions make it clear that existing working groups, reporting procedures, and practices implemented under prior EOs remain in effect. Relevant sections of the implementing instructions are listed below:

- **Section VII – Acquisition and Green Product Designations.** This section introduces new elements to the Federal green purchasing program, including electronics (specifically EPEAT-registered computers), water-efficient products (including those meeting EPA’s WaterSense standards), and products with no/low toxic or hazardous constituents.
- **Section VIII – Pollution Prevention and Management of Toxic and Hazardous Materials.** This section lists the comprehensive factors and attributes defining hazardous and toxic materials and requires agencies to develop goals and actions to reduce the purchase and use of these products. It also re-emphasizes the limitation and eradication of ODSs.
- **Section X – Sustainable and High Performance Buildings.** This section requires Federal agencies to design, construct, and maintain sustainable buildings that are energy and water efficient, provide healthy working environments, use renewable energy sources, and reduce life-cycle costs. It adopts guiding principles from the 2009 Leadership in High Performance and Sustainable Buildings Memorandum of Understanding and requires that these principles be followed in all future projects.
- **Section XI – Vehicle Fleet Management.** This section provides strategies and tools for meeting the EO 13423 targets for reduction in petroleum fuel use and use of plug-in hybrid electric vehicles. It also lists exemptions, including certain military tactical vehicles, and reporting requirements.
- **Section XII – Electronics Stewardship.** This section addresses the life cycle management of electronic products and expands upon the EO 13423 requirement to purchase EPEAT-registered computers and monitors and to enable energy-saving devices on electronic equipment. The instructions also require Federal facilities to join the FEC or implement an equivalent electronics stewardship program.

The Federal Acquisition Regulations (FAR) contains the governing rules for Federal agency contract management. Part 23 of the FAR (Environment, Energy and Water Efficiency, Renewable Energy Technologies, Occupational Safety, and a Drug-Free Workplace) (reference 12-9) addresses environmental and energy considerations in the Federal contracting process. The FAR requires Federal agencies to administer “green” contracts by requiring the procurement and use of designated recycled products and other environmentally preferable and energy efficient products. Requirements include maximizing the use of recovered materials, identifying hazardous substances, acquiring energy- and water-efficient products and services, and limiting the use of hazardous chemicals such as those harmful to the ozone layer. The FAR was updated

in 2000 to incorporate GP requirements in several parts of the FAR, including Part 4 (Administrative Matters), Part 7 (Acquisition Planning), Part 10 (Market Research), Part 11 (Describing Agency Needs), Part 12 (Acquisition of Commercial Items), Part 13 (Simplified Acquisition Procedures) and Part 36 (Construction and Architect-Engineer Contracts).

12.5 APPLICABILITY

The requirements of the GP program apply to all USAG-HI activities that:

- Prepare plans, work statements, specifications, or product descriptions.
- Procure or request procurement of products (consumers).
- Provide support to base organizations, such as central supply, logistics, and contracting.
- Are contracted to provide goods or services (appropriate specifications, provisions, and clauses must be contained in contract documents).

12.6 EXCEPTIONS TO GREEN PROCUREMENT REQUIREMENTS

There are three instances where the purchase of a noncompliant product is permitted (i.e., a CPG item that does not contain the minimum recommended recovered material content, or a designated biobased item that is not made with biobased material):

- The price of the product is unreasonable.
- The product does not meet reasonable performance standards.
- The product is not available in a reasonable timeframe or at a sufficient level of competition.

The above exceptions of price, performance, and availability must be documented for all noncompliant purchases [except for purchases below the micropurchase threshold (\$3,000 or \$2,000 for construction acquisitions, or \$2,500 for service contracts) which are excluded from documentation requirements].

12.7 CURRENT P2 INITIATIVES

12.7.1 Implementation of Green Procurement

While USAG-HI has no formal GP Program and no Plan, it has taken steps to implement GP. GP is one of the initiatives under sustainability efforts of the PAIO. The PAIO participates in a joint sustainability working group with other services, and is making GP an element in the USAG-HI strategic plan. Most significantly, they have incorporated a sustainability review into the Services and Infrastructure Contract Management (SIECM) Program monthly review, with GP as one of the elements of this review.

12.7.2 Green Product Availability

While the USAG-HI does not have a formal GP program or formal policy requiring purchase of recycled-content paper, remanufactured toner cartridges, and similar green products, such products are readily available through government purchasing systems, and also readily available at the GSA Store on Schofield Barracks. The GSA Store has a wide range of green products, including both office and cleaning supplies made with either recycled or biobased materials.

12.8 POTENTIAL P2 INITIATIVES

12.8.1 Implement a Green Procurement Program

Description. The USAG-HI should formalize their GP efforts with the implementation of a GP Program, preparation of a GP Plan, and provision of GP training to appropriate personnel. The following discussion offers suggestions and provides potential cost elements to personnel responsible for developing the GP program. In an effort to strengthen postconsumer markets and comply with RCRA, EO 13423, and DOD policy (reference 12-1), the GP program must include the following elements:

- A program to educate procurement personnel and credit cardholders on the requirements and opportunities for GP purchasing.
- A designated GP manager and GP implementation team.
- The creation of a GP Plan.
- Policies and practices for ensuring all installation contracts comply with the FAR's GP requirements.
- Policies and implementation schedule for the systematic evaluation of purchasing practices.
- Mechanisms for sharing GP information among installation organizations and tenants.
- Procedures to evaluate the compliance status and progress of the program implementation.
- A forum for informing the command of GP initiatives and progress.

The implementation of a GP program is a team effort and needs to include installation organizations and tenants. Primary responsibilities lie with contracting, logistics, and public works, and may include modifications to ordering and supply processes, contract preparation/execution, and evaluation of current standards and practices. The process begins with raising awareness and educating purchasers, specification writers, and contract personnel.

Environmental Evaluation. There are many environmental benefits to be derived from GP. Green Procurement programs stimulate recycling on an economic level by creating and sustaining demands for recycled products. The increased demand also provides incentive for

industries to utilize recycled products in their manufacturing processes, which may make the products cheaper and more available. The end result is that more recyclable materials are diverted from landfills or incinerators and are instead remanufactured into usable materials. Another environmental benefit of GP is the conservation of natural resources and energy used in the manufacturing process. Green Procurement has many more environmental and health benefits such as increased energy efficiency; the increased use of alternative fuels and vehicles, agricultural and forestry products, and renewable energy; and the decreased use of ODSs and toxic chemicals.

Materials Compatibility. There are no compatibility issues identified.

Safety and Health. There are no adverse safety and health risks associated with implementing a GP program. Procurement of certain environmentally preferred products may decrease health risks to personnel using the products. For example, a pilot project involving the use of environmentally preferable cleaning products in Yellowstone National Park allowed the janitorial staff to reduce the number of cleaning products from 130 to 15, while switching to less toxic, biodegradable products. Supervisors at the site noted a reduction in sick leave, increased worker productivity, and improved morale among the janitorial staff as a result of the use of greener products (reference 12-10).

Advantages.

- Ensures compliance with Federal, DOD, and Army policies.
- Reduces waste and prevents pollution (such as lowering greenhouse gas emissions and saving landfill space).
- Increases use of recycled-content products and supplies, potentially improving markets for materials collected under the recycling program.
- Reduces consumption of energy and natural resources.
- Reduces health risks.
- Supports manufacturers and providers of green products and services.
- Improves public image of installation.

Disadvantages.

- Labor costs will be incurred to implement a GP program.
- Some green products may have higher upfront procurement costs.
- Additional effort may be required to locate green alternatives to traditional products.
- Green procurement training will be necessary.

Economic Evaluation. Implementing a GP program will have some initial costs (primarily labor). Procurement efforts that result in greater energy and water efficiency, reduced fuel

usage, and reduced hazardous substance usage (with decreased HW disposal costs) will result in long-term cost savings. Although there are published success stories in which the substitution of a recycled-content product saved money, in most cases the cost of a recycled-content product is fairly comparable to that of its virgin material counterpart. The true benefits of GP are related to compliance, resource conservation, and stimulation of recycling markets, rather than lowering procurement expenditures.

The development of a GP program will not require capital investment; however, the primary cost includes the labor required to develop and implement the program. This is best performed by an installation team with participants from contracting, logistics, public works, and other installation directorates as appropriate. Neither the DOD nor the Army has issued policy as to which organization should take the GP program lead at an installation, but the DOD Green Procurement Strategy assigns responsibilities to procurement request originators, acquisition program managers, installation procurement offices, and environmental managers. Assuming the program takes one year to fully implement, the costs are estimated to total between \$28,000 and \$40,000. The costs are broken down as follows:

- **Green Procurement Program Lead.** The GP program lead will serve as chairperson of the GP committee or team. The program lead will document the goals and objectives of the team, track the program's progress, establish a formal installation policy for GP, and report to the commander and/or Environmental Quality Control Committee or other forums on the progress of GP implementation. It is estimated that this function will take 10% of a man year.

Program Lead: 200 hours x \$32 per hour = \$6,400

- **Green Procurement Plan.** Developing a GP Plan may be useful to USAG-HI as they implement a GP Program. The Army Installation Green Procurement Program Implementation Guide (reference 14-6) is a useful tool to help with the creation of a GP Plan. The cost of creating a plan ranges from \$8,000 to \$18,000 depending on whether in-house or outside sources are used.

Plan: \$8,000 - \$18,000

- **Training.** All installation purchasers (including credit cardholders, supply personnel, and office assistants), and contracting personnel (including specification writers, contracting officers, contracting officer's representatives, and contract administrators), require training on GP requirements and procedures. Development of general in-house training is estimated to cost \$6,000. Initial training can also be provided by an outside source. Inhouse or outsourced training should be reinforced with updated refresher training on a regular basis. A cost of \$9,000 is estimated to cover a one-time training event by an outside source.

Training: \$6,000 - \$9,000

- **Recurring Costs.** The primary recurring cost associated with a GP program is the labor involved and the continuation of awareness training, particularly for credit cardholders. There will also be labor cost associated with GP program team meetings which should be

scheduled either quarterly or semiannually. The USAG-HI is currently implementing GP as part of sustainability program efforts, and future recurring costs for GP can be minimized by continued implementation under the sustainability umbrella. The labor costs can be absorbed by incorporating GP duties into job descriptions. Since the EPA and USDA periodically add to the list of CPG products and biobased items, respectively, training updates are necessary. Green Procurement requirements are easily integrated into existing purchase card training, so there is no appreciable recurring cost for training development. Neither the DOD nor the Army has issued specific guidance on implementing a reporting system to track GP purchases and monitor compliance. To date, DOD has proposed reporting systems that do not place a heavy burden on the individual purchaser or purchase card holder. Rather, the proposed systems are automated or built in to existing forms and systems.

Economic Evaluation Summary. It is difficult to measure the cost savings associated with implementing an installation GP program. The purchase of specific recycled-content products may prove economically advantageous; however, this may not always be the case. There are cost savings associated with purchasing more fuel efficient or alternatively fueled vehicles and with procuring water- and energy-saving products.

A payback period for implementing a GP Program cannot be calculated due to the difficulty in measuring resulting total cost savings. Implementation costs are estimated to range between \$20,400 and \$33,400.

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4-25. MIL-C-5541F, Detail Specification Chemical Conversion Coatings on Aluminum and Aluminum Alloys, 11 Jul 2006.

Chapter 5 – Solid Waste

5-1. Executive Office of the President, Council on Environmental Quality, "Instructions for Implementing Executive Order 13423", March 29, 2007.

5-2. Unified Facilities Guide Specification (UFGS) UFGS-017419, Construction and Demolition Waste Management, January 2007.

Chapter 6 – Air Emissions

6-1. Annual Emissions and Fee Summary for Covered Sources for Air Pollutants Emitted During Calendar Year 2005 on Schofield Barracks/Wheeler Army Airfield, Feb 06.

6-2. Annual Emissions and Fee Summary for Covered Sources for Air Pollutants Emitted During Calendar Year 2006 on Schofield Barracks/Wheeler Army Airfield, 27 Feb 07.

6-3. Annual Emissions and Fee Summary for Covered Sources for Air Pollutants Emitted During Calendar Year 2007 on Schofield Barracks/Wheeler Army Airfield, 18 Feb 08.

6-4. Annual Emissions and Fee Summary for Covered Sources for Air Pollutants Emitted During Calendar Year 2008 on Schofield Barracks/Wheeler Army Airfield, 25 Feb 09.

6-5. Annual Emissions and Fee Summary for Covered Sources for Air Pollutants Emitted During Calendar Year 2009 on Schofield Barracks/Wheeler Army Airfield, 25 Feb 10.

6-6. Public Law No. 106-436, Section 359, 2001.

6-7. <http://www.sightline.org/>.

Chapter 7 – Water and Wastewater

7-1 Authorization to Discharge Under the National Pollutant Discharge Elimination System, Hawaii Department of Health, Permit# HI S000090, effective 7 February 2007.

7-2. U.S. Army Garrison Hawaii, Storm Water Pollution Prevention Plan, USACHPPM-Pacific, May 2008.

7-3. U.S. Army Corps of Engineers, Basis of Design Report, Nov 2006.

7-4. New York Times, 5 October 2010 and R.S. Means Building Construction Cost Data 2007.

Chapter 8 – Toxic Release Inventory Form R Releases

8-1. Instructions for Implementing Executive Order 13423, March 29, 2007, available at: http://www.fedcenter.gov/Documents/index.cfm?id=6825&pge_prg_id=19636&pge_id=1862.

8-2. Executive Order 12856, “Compliance With Right-to-Know Laws and Pollution Prevention Requirements,” 3 August 1993.

8-3. SB/WAAF Reporting Year 2007 Form R’s for Lead, Lead Compounds and Copper, 2008.

8-4. SB/WAAF Reporting Year 2008 Form R’s for Lead, Lead Compounds and Copper, 2009.

8-5. SB/WAAF Reporting Year 2009 Form R’s for Lead, Lead Compounds and Copper, 2010.

Chapter 9 – Emerging Contaminants

9.1. <http://www.denix.osd.mil/>.

9-2. Office of Deputy Under Secretary of Defense Memorandum, “Best Management Practices for Fireworks to Minimize Perchlorate Releases,” 21 May 2009.

Chapter 10 – Ozone Depleting Substances

10-1. Memorandum for Installation Management Agency and U.S. Army National Guard, from Department of the Army, Assistant Chief of Staff for Installation Management, Subject: Change in Army Policy for the Elimination of Ozone Depleting Chemicals, 07 Jan 2003.

10-2. Memorandum for Assistant Chief of Staff for Installation Management, Department of the Army, Office of the Assistant Secretary, Installations and Environment, Subject: Elimination of Ozone Depleting Substances in Army Facilities, 22 November 2002.

10-3. USAG-HI Ozone Depleting Chemical Elimination Plan, 2009.

10-4. Memorandum, Assistant Secretary of the Army, 13 February 1996.

Chapter 11 – Vehicle Fuel Conservation and Alternative Fuel Vehicles

11-1. www.fueleconomy.gov

Chapter 12 – Green Procurement

12-1. Department of Defense Green Procurement Program Strategy, Promoting Environmental Stewardship Throughout the Department of Defense, updated November 2008.

12-2. Memorandum, Department of the Army, Subject: Establishment of the Army Green Procurement Program, 22 November 2006.

12-3. Army Installation Green Procurement Implementation Guide, Version 2.0, December 2010.

12-4. Army Regulation 200-1, Environmental Protection and Environment.

12-5. Memorandum, Under Secretary of Defense for Acquisition, Technology, and Logistics, Subject: Establishment of the DOD Green Procurement Program (GPP), August 27, 2004.

12-6. Resource Conservation and Recovery Act, Public Law 94-580, 21 October 1976, Section 6002.

12-7. Farm Security and Rural Investment Act of 2002, Title IX (Energy), Federal Procurement of Biobased Products, 13 May 2002.

12-8. 40 CFR 247, Comprehensive Procurement Guidelines for Products Containing Recovered Materials.

12-9. Federal Acquisition Regulations, Part 23 - Environment, Energy and Water Efficiency, Renewable Energy Technologies, Occupational Safety, and a Drug-Free Workplace.

12-10. Federal Pioneers: Environmentally Preferable Purchasing Success Stories from the Federal Government, U.S. Environmental Protection Agency, EPA472-F-00-008, September 2000. <http://www.epa.gov/epp/pubs/FedPioneers.pdf>.

APPENDIX B - TABLES

Table 1 - Summary of Pollution Prevention Goals.

ENVIRONMENTAL MEDIA AREA	GOAL	SOURCE OF GOAL	BASELINE	YEAR
Hazardous Waste	Reduce the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of.	EO 13423 & EO 13514	NA	Continual
Solid Waste	Maintain cost-effective waste prevention and recycling programs.	EO 13423	NA	Continual
	Increase diversion of solid waste as appropriate. Strive to meet the national 35% recycling goal established by EPA.	EO 13423 & Instructions for Implementing EO 13423	NA	Continual
	Diversion goal for non-hazardous solid waste without construction and demolition (C&D) waste is 40% by 2010.	DOD Integrated (Non-Hazardous) Solid Waste Management Policy, Feb 08	NA	2010
	Diversion goal for C&D waste is 50% diversion by 2010.	DOD Integrated (Non-Hazardous) Solid Waste Management Policy, Feb 08	NA	2010
	Divert at least 50% non-hazardous solid waste, excluding construction and demolition debris.	EO 13514	NA	FY 2015 (increase of OSD DOD goal of 40%, and extended 5 years)
	Divert at least 50% of construction and demolition materials and debris.	EO 13514	NA	FY 2015 (same as existing OSD DOD goal, extended 5 years)
	Ensure that all non-usable electronic products are reused, donated, sold, or recycled using environmentally sound management practices at end of life.	EO 13423 & Instructions for Implementing EO 13423	NA	Continual

ENVIRONMENTAL MEDIA AREA	GOAL	SOURCE OF GOAL	BASELINE	YEAR
	Reduce printing paper use.	EO 13514	NA	Continual
Air Emissions	Establish Scope 1 and 2 GHG emission reduction targets (DOD established a 34% reduction target).	EO 13514 & DOD Strategic Sustainability Performance Plan FY 2010, Aug 2010	FY 2008	2020
	Establish Scope 3 GHG emission reduction targets (DOD established a 13.5% reduction target).	EO 13514 & DOD Strategic Sustainability Performance Plan FY 2010, Aug 2010	FY 2008	2020
	Decrease use of chemicals that will assist in achieving GHG emission reduction targets.	EO 13514	NA	Continual
Drinking Water	Reduce water consumption intensity (per ft ²) through life-cycle cost-effective measures by 2% annually, or 16% total, by target date.	EO 13423	FY 2007	FY 2015
	Reduce potable water consumption intensity by 2% annually, or 26% total by implementing water management strategies.	EO 13514	FY 2007	FY 2020 (extends above EO 13423 goal by 5 years)
	Conduct water and energy evaluations for 25% of facilities annually, each facility must be evaluated once in a 4 year cycle.	EISA 2007	CY 2008	Continual
	Reduce industrial, landscaping, and agricultural water consumption by 2% annually, or 20% total.	EO 13514	FY 2010	FY 2020

ENVIRONMENTAL MEDIA AREA	GOAL	SOURCE OF GOAL	BASELINE	YEAR
Wastewater	Identify, promote, and implement water reuse strategies that reduce potable water consumption.	EO 13514	NA	Continual
	Require that any development or redevelopment project involving a Federal facility with a footprint that exceeds 5,000 ft ² shall use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow.	EISA 2007 (also referenced by EO 13514)	FY 2007	NA
TRI Form R Releases	Ensure the agency (DOD) reduces the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of by the agency.	EO 13423	NA	Continual
	Ensure each agency continues to comply with Sections 301 through 313 of the Emergency Planning and Community Right-to-Know Act and future amendments using Internet reporting.	Instructions for Implementing EO 13423	NA	Continual
Emerging Contaminants	No goals have been established at this time.	NA	NA	NA

ENVIRONMENTAL MEDIA AREA	GOAL	SOURCE OF GOAL	BASELINE	YEAR
ODSs	Through evaluating present and future uses of ozone-depleting substances (ODSs) and maximizing the purchase and the use of safe, cost-effective, and environmentally preferable alternatives, each agency shall develop a plan to phase out the procurement of Class I ODSs for all nonexcepted uses.	DA ACSIM Memorandum, 7 Jan 2003	NA	Dec 2010
	Maximize the use of alternative refrigerant and fire suppressant ODSs, as approved by the EPA's Significant New Alternatives Policy program.	DA ACSIM Memorandum, 7 Jan 2003	NA	NA
Vehicle Fuel Conservation and Alternate Fuel Vehicles	Use alternate fuels in dual-fuel vehicles unless the Secretary of Energy determines an agency qualifies for a waiver. Grounds for a waiver are: alternate fuel is not reasonably available to the fleet and the cost of alternate fuel is unreasonably more expensive than conventional fuel.	Energy Policy Act of 2005 (EPAct 2005)	NA	Continual
	Reduce the fleet's total consumption of petroleum products by 2% annually.	EO 13423	FY 2005	FY 2015
	Reduce the fleet's total consumption of petroleum products by 2% annually.	EO 13514	FY 2005	FY 2020 (extends above EO 13423 goal by 5 years)

ENVIRONMENTAL MEDIA AREA	GOAL	SOURCE OF GOAL	BASELINE	YEAR
	Increase non-petroleum based fleet fuel consumption by 10% annually.	EO 13423	FY 2005	Continual
	Use plug-in hybrid vehicles when commercially available at a cost reasonably comparable, on the basis of life-cycle cost, to non-PIH vehicles.	EO 13423	NA	Continual
Green Procurement	Reduce percentage of contracts using 'not required' for Use of EPA-Designated Products field in the Contract Action Report (CAR); Increase percentage of contracts citing 'Meets Requirements' in CAR.	DOD GPP Policy and Updated Green Procurement Strategy, Nov 08	NA	Continual
	Increase in the purchases of Federally-defined indicator items.	DOD GPP Policy and Updated Green Procurement Strategy, Nov 08	NA	Continual
	Increase in the percentage of personnel trained in GP.	DOD GPP Policy and Updated Green Procurement Strategy, Nov 08	NA	Continual
	Increase the number of organizations or installations participating in the Federal Electronics Challenge.	DOD GPP Policy and Updated Green Procurement Strategy, Nov 08	NA	Continual
	Decrease in the number of contract audit findings indicating lack of compliance with GP requirements.	DOD GPP Policy and Updated Green Procurement Strategy, Nov 08	NA	Continual

ENVIRONMENTAL MEDIA AREA	GOAL	SOURCE OF GOAL	BASELINE	YEAR
Green Procurement (continued)	Require in acquisitions of goods and services the use of sustainable environmental practices, including acquisition of biobased, environmentally preferable, energy-efficient, water-efficient, and recycled content products.	EO 13423	NA	Continual
	Ensure that 95% of new contract actions for products and services are energy-efficient, water-efficient, biobased, environmentally preferable, non-ozone depleting, contain recycled content, or are non-toxic or less toxic alternatives.	EO 13514 (similar to EO 13423 requirement above, but is quantified)	NA	Continual
	Continue to use paper with at least 30% post-consumer fiber content.	EO 13423	NA	Continual
	Acquire uncoated printing and writing paper containing at least 30% post-consumer fiber.	EO 13514 (similar to EO 13423 requirement above)	NA	Continual
	95% of electronic products acquired are Electronic Product Environmental Assessment Tool registered, unless there is no EPEAT standard for such product.	EO 13423	NA	Continual
	Promote electronic stewardship.	EO 13514	NA	Continual

Table 2 - Potential Pollution Prevention Initiatives Summary Table.

ENVIRONMENTAL MEDIA	POTENTIAL P2 INITIATIVE	SECTION	START DATE	STATUS	ESTIMATED ANNUAL SAVINGS
Hazardous Waste	Can, Pail, and Aerosol Can Crusher	4.7.1			
	Fully Implement the HMCP	4.7.2			
	Absorbed Glass Mat Batteries	4.7.3			
	Waste Paint Management	4.7.4			
	Recycle Non-HW Paint	4.7.5			
	Antifreeze Recycling	4.7.6			
	Hazardous Material Management	4.7.7			
	Substitute Conversion Coating Application Product	4.7.8			
	Management of Bullet Traps	4.7.9			
Solid Waste	Require C&D Waste Management Plans	5.7.1			
Air Emissions	Replacement of Laundry Facility Boilers	6.6.1			
	Update Air Emissions Inventory	6.6.2			
	Telecommuting	6.6.3			
	Carpooling	6.6.4			
Water and Wastewater	Expansion of R-1 Water Reuse	7.7.1			

ENVIRONMENTAL MEDIA	POTENTIAL P2 INITIATIVE	SECTION	START DATE	STATUS	ESTIMATED ANNUAL SAVINGS
	Increase Water Metering and Charge for Usage	7.7.2			
Water and Wastewater	Acoustic Leak Detection Survey	7.7.3			
Ozone Depleting Substances	Replacement of Class III ODS Equipment	10.8.1			
	New Refrigerant Purchase Procedures	10.8.2			
Vehicle Fuel Conservation	Dual - Fueled Vehicles or AFV	11.6.1			
	Increase Fleet Fuel Efficiency	11.6.2			
	HEVs - Gasoline/Electric	11.6.3			
Green Procurement	Implement a Green Procurement Program	12.8.1			

APPENDIX C - VENDOR AND CONTACT INFORMATION

Chapter 4 - Hazardous Waste

4.7.1 Can, Pail, and Aerosol Can Crusher

TeeMark Corporation
1132 Air Park Drive
Aitkin, Minnesota 56431
800-428-9900
<http://www.teemarkcorp.com/>

4.7.2 Fully Implement the HMCP

A & A Sheet Metal Products, Inc.
5122 N. State Road 39 ,P.O. Box 1848
La Porte, IN 46350-8782
(219)326-7890
govsales@securallproducts.com

GSA small business contract: GS-28F-0010B

See page C-5 for a detailed cost estimate.

4.7.5 Recycle Non-HW Paint

Amazon Environmental, Inc.
6688 Doolittle Ave.
Riverside, VA 92503
(951)588-0206
<http://www.amazonpaint.com/>

FedEx Freight
(800)393-4685

4.7.6 Antifreeze Recycling

BE 55C

Finish-Thompson
921 Greengarden Road
Erie, PA 16501
(800) 814-4478

Small business contract: GS-07F-9999H
KFM Coolant Purification System

KFM, LLC
506 Camson Road
Anderson, SC 29625
(800)736-1404
info@kfmlc.com

Small business contract: GS-07F0075J

4.7.8 Substitute Conversion Coating Application Product

Paul Robinson
AMCOM G-4
Technology Integration Branch
(256)842-0251
james.p.robinson2@conus.army.mi

4.7.9 Management of Bullet Traps

C.M. Recycling
POC: Mr. Cath Pak
204 Sand Island Access Rd.
Honolulu, HI 96819
(808)842-6640

Suzanne Jones
City Recycling Branch Chief
sjones@honolulu.gov

Saskia Van Gendt
EPA Region 9
Office of Recycling and Solid Waste Management
VanGendt.Saskia@epamail.epa.gov

Olof Hansen
U.S. EPA – Pacific Southwest Region
75 Hawthorne Street, WST-2
San Francisco, CA 94105
(415) 72-3328
Hansen.Olof@epamail.epa.gov

Tim Lindell
Vice President

Range Systems
(763)398-5522
tim@range-systems.com

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Quote

A & A Sheet Metal Products Inc.
 5122 N. State Rd. 39
 P.O. Box 1848
 La Porte, IN 46352-1848

Date	Estimate #
6/2/2011	44140

Name / Address	Ship To
US Army Public Health Command Dominique Lowrance-Snyder Aberdeen Proving Ground, MD 21010	Honolulu, HI 96786

Rep	Terms
Ryan	NET 30

Item	Description	Qty	Rate	Weight	Color	Open Mkt Item	Total
Smart	Securall's SMaRT sustainable certified products comply with Executive Order 13514 that mandate certified sustainable products. The goal of EO 13514 is "to establish an integrated strategy towards sustainability in the Federal Government and to make reduction of greenhouse gas emissions (GHG) a priority for Federal agencies."		0.00				0.00T
B1600	Chemical Storage Locker W/ out explosion Panel 84"H x 10'W x 8'D Weight: 5,515 lbs Sump Capacity: 272 gals	1	5,944.50	5515	Gray	No	5,944.50T
OPFR2-1600	2-Hour Fire Rating Upgrade -Fire Rated Walls are Intertek tested and FM approved for 2 Hours. -Fire Rated Roof is Intertek tested and FM Approved for 1.5 Hours.	1	2,098.80	2693		No	2,098.80T
OP0007-19	Explosion-Proof Air Conditioner-19,500 Btu -With Color Coded Thermostat -Class 1, Division 2	1	2,448.75	175		No	2,448.75T
OP0009-16	R-11 Insulation Walls and Ceiling	1	219.00	40		No	219.00T
OP0041-1C	Adjustable Vents with Insulated Cover-18 x 18	4	271.36			No	1,085.44T
Shipping FL...	Freight Estimate/Via Freight All Kinds Flatbed PP&A Shipping Weight: 8,500 lbs Shipping Dimensions: 84"H x 106"W x 8'6"	1	8,638.00				8,638.00

Subtotal					
-----------------	--	--	--	--	--

Phone #	Fax #	E-mail	Sales Tax (0.0%)
---------	-------	--------	------------------

219-326-7890	219-324-3780	custserv@securallproducts.com	Total
--------------	--------------	-------------------------------	--------------

This quote is good for 30 days excepting clerical mistakes

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 La Porte, IN 46352-1848

Date	Estimate #
6/2/2011	44140

Name / Address	Ship To
US Army Public Health Command Dominique Lowrance-Snyder Aberdeen Proving Ground, MD 21010	Honolulu, HI 96786

Rep	Terms
Ryan	NET 30

Item	Description	Qty	Rate	Weight	Color	Open Mkt Item	Total
Spec Shipp...	No Tender/Freight All Kinds Flashed Contract # GS 28F 0010B		0.00				0.00T
Shipping P...	Prepaid and Add Freight Terms and Conditions: Customer/Consignee agrees to inspect product upon arrival for any freight damage. If freight damage is found the customer should refuse the shipment and note the damage on the Bill of Lading. If the damage is noted on the Bill of Lading and the product is not refused the customer agrees to pay for the return freight. A&A Sheet Metal Products/Securall will not file freight claims on behalf of the customer/consignee or accept the returned product if the above terms and conditions are not followed.		0.00				0.00T
SF B>16	NOTE: Building may require State Approval. Please check with your Local Authorities (ie: Fire Marshall) to determine if State Approval and/or State Seal are required. Additional charges and lead times may apply. Standard Features: *Standard options are located on right side of building. * Building has double wall, Welded construction, 3" airspace throughout. * Exterior walls are 12-gauge Galvannealed steel. Interior walls 20-gauge cold roll.		0.00				0.00T

			Subtotal	
Phone #	Fax #	E-mail	Sales Tax (0.0%)	
219-326-7890	219-324-3780	custserv@securallproducts.com	Total	

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Item	Description	Qty	Rate	Weight	Color	Open Mkt Item	Total
	<ul style="list-style-type: none"> * One 60"W x 80"H, Double Door with a UL classified Commercial grade keyed lock set. * 12 Gauge steel sump. * Heavy Gauge forklift channels with open-end construction. * Bolt-down plates (4) with 7/8" diameter holes for wind and seismic bracing. * Multiple static grounding connections. * Inlet vents for natural ventilation with fire dampers if a fire rated building. * Load Center is 120/240 Volt Single-Phase, NEMA 3R Rated. (If Installed) * Explosion relief panels located in the rear wall of the building. (If installed) * Hazard labeling (DOT Placard Holder, NFPA 704 rating signs). * Finish is a two-part chemical resistant aliphatic polyurethane. * Complies to NFPA Code 30. * Fire Rated Walls are Intertek tested and approved for either 2 or 4 Hours (If Installed). * Fire Rated Roofs are Intertek tested and FM Approved for 1.5 or 3 Hours (If Installed). * Building Factory Mutual approved, and UL listed accessories. * Electrical installed in accordance with the NEC 2008 and 2011 editions. 						

			Subtotal	
Phone #	Fax #	E-mail	Sales Tax (0.0%)	
219-326-7890	219-324-3780	custserv@securallproducts.com	Total	

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US Army Public Health Command Dominique Lowrance-Snyder Aberdeen Proving Ground, MD 21010	Honolulu, HI 96786

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Ryan	NET 30

Item	Description	Qty	Rate	Weight	Color	Open Mkt Item	Total
	<p>Lead Time: 8 to 12 weeks pending all approvals. Estimated, dependent upon all approvals and production schedule at time of order. Lead time subject to change without notice. FOB: LaPorte, IN 46350</p> <p>Customer is responsible for the off-loading of the building once it arrives at the destination. Freight based on quote from an independent trucking company and represents our best estimate. The actual freight charge incurred at time of shipment will be billed whether greater or lesser than the above estimate.</p> <p>Terms: Net 30</p> <p>**If Dry Chemical Fire Suppression System is Ordered** Fire Suppression System is designed and installed in accordance with the National Fire Protection Association (NFPA17). As required by the D.O.T. the system is shipped with the pressurized tank and the nitrogen cartridge un-installed to prevent discharge during shipment. We recommend you</p>						

						Subtotal	
Phone #	Fax #	E-mail				Sales Tax (0.0%)	
219-326-7890	219-324-3780	custserv@securallproducts.com				Total	

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6/2/2011	44140

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US Army Public Health Command Dominique Lowrance-Snyder Aberdeen Proving Ground, MD 21010	Honolulu, HI 96786

Rep	Terms
Ryan	NET 30

Item	Description	Qty	Rate	Weight	Color	Open Mkt Item	Total
	<p>contact your local ANSUL distributor for final activation. Securall will provide a list of distributors at time of shipment.</p> <p>*PRICING IS SUBJECT TO CHANGE DUE TO AN INCREASE IN STEEL PRICES.</p> <p>*PRICING IS GOOD FOR 30 DAYS.</p> <p>** A FINANCE CHARGE OF 2% (APR 24%) MAY BE CHARGED ON ALL PAST DUE ACCOUNTS**</p> <p>This building is designed to the best of our knowledge based on information provided by third parties and manufacturers of related equipment. A & A Securall is not acting in the capacity of engineer and does not assume any liability with respect to engineering requirements. Always consult a professional engineer for final design.</p> <p>* This document and all information herein is proprietary and shall not be disclosed outside your organization, nor shall it be duplicated, used or disclosed for purposes other than as permitted under written agreement with Securall Products.</p> <p>*All Sales are Final on custom models/No Returns, restocking/cancellation fees may apply on all models.</p> <p>* WARRANTY: One year limited warranty on all parts and accessories installed by the</p>						

			Subtotal	
Phone #	Fax #	E-mail	Sales Tax (0.0%)	
219-326-7890	219-324-3780	custserv@securallproducts.com	Total	

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6/2/2011	44140

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US Army Public Health Command Dominique Lowrance-Snyder Aberdeen Proving Ground, MD 21010	Honolulu, HI 96786

Rep	Terms
Ryan	NET 30

Item	Description	Qty	Rate	Weight	Color	Open Mkt Item	Total
Signature L...	<p>manufacturer at time of purchase. 15 year structural warranty from the date of delivery to the initial purchaser.</p> <p>Please sign below as acceptance of this quote as a purchase order of the above product(s). In signing this document, you are agreeing to all terms and conditions as stated in the quote as listed above.</p> <p>X _____</p> <p>Date: ___/___/___</p>		0.00				0.00T

						Subtotal	\$20,434.49
Phone #	Fax #	E-mail		Sales Tax (0.0%)		\$0.00	
219-326-7890	219-324-3780	custserv@securallproducts.com		Total		\$20,434.49	

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APPENDIX D - ATTACHMENTS

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29 JAN 2009

MEMORANDUM FOR AMSAM-EN-EV (Mr. Glenn Williams)

SUBJECT: TTS Tasker # 61144, Implementation of Non-hexavalent Chromium Coating System on Army Aircraft

1. References:

- a. TTS Tasker # 61144, dated 19 August 2008, subject as above.
- b. Memorandum, Subject: AMSAM-RD-AE-F Approval for the use of the Non-Hexavalent Chromium Coating System on All Army Rotary-wing Aircraft and Equipment, dated 19 August 2008.
- c. TTS 12144, Subject: Review and Provide Comments and Determine Which Non-Hexavalent Chromate Pretreatments, Primers, and Topcoats are Approved for Use.

2. We reviewed and approve the request to proceed with the implementation of non-hexavalent chromium coating systems for Aluminum alloy and composite exterior surfaces on all Army aviation platforms from a materials engineering point of view. These schemes consist of MIL-DTL-81706 Type II chemical conversion coatings in conjunction with MIL-PRF-23377 or MIL-PRF-85582 Class N primers and MIL-DTL-53039 or MIL-DTL-64159 Type II CARC topcoats. We offer the following comments:
 - a. Ref. 1.b. states that AMCOM G-4 will coordinate with IMMC to staff and distribute three Maintenance Information Messages (MIMs) when approval is received. All changes to technical publications including TMs, DMWRs, messages sent to the field, MIMs, etc. shall be submitted to this office for review.
 - b. A decrease in corrosion protection exists when no hexavalent chromium is present in the system—most notably in the primer. The best performing Class N primers are approximately 90-95% as effective as Class C primers. Consequently, corrosion touch-up and repair may be required more frequently in severe operational environments (ref. 1.c.).
 - c. When MIL-PRF-85582 Class N primers are reduced with water they may not be used for faying surfaces and wet installation of fasteners. An improper wet installation will lead to accelerated corrosion because the water acts as an electrolyte between the two metallic surfaces.

TTS 61144

AMSRD-AMR-AE-F-M

29 JAN 2009

SUBJECT: TTS Tasker #61144, Implementation of Non-hexavalent Chromium Coating System on Army Aircraft

3. The point of contact for this action is Benjamin T. Beyer, Wyle Laboratories, Inc., (256) 313-6395, ben.beyer@us.army.mil.



MICHAEL J. KANE, Ph.D.
Chief, Materials Branch
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UNCLASSIFIED

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SUBJECT - AVIATION MAINTENANCE INFORMATION MESSAGE (MIM),
GEN-MIM-08-010, NEW AVIATION SYSTEM COATING MATERIAL
PROCUREMENT INFORMATION AND APPLICATION GUIDELINES

Note: This message is not to be construed as a Safety of Flight message (SOF) or Aviation Safety Action Message (ASAM) as defined in Army Regulation (AR) 750-6. This is an Aviation Maintenance Information Message (MIM) issued per AMCOM Regulation 750-3 and AR 750-6, permissive in nature and has not been transmitted to units subordinate to addresses. Request addresses retransmit this message to all subordinate units, activities or elements affected or concerned. The retransmitted shall reference the message

NOTE: A listing of recently published MIM's, and any Supplements required by this message can be viewed/downloaded at: "<https://asmprd.redstone.army.mil>". This is a secure website which requires an Army Knowledge Online (AKO) ("www.us.army.mil") ID and password. This website includes published safety and maintenance messages, to include TAMMS Reports, Inspection Reports, and any Supplements/Addendums

1. SUMMARY: The purpose of this MIM is to alert the aviation user community regarding the availability of more environmentally-friendly high solids epoxy primer for aircraft coating operations.
2. END ITEMS AFFECTED: All Army Aviation assets and associated Aviation Ground Support Equipment (AGSE).
3. COMPONENT AFFECTED BY THIS MESSAGE: All Army Aviation assets and associated AGSE.
4. REFERENCE PUBLICATIONS: N/A.

5. TECHNICAL PROCEDURES/INSTRUCTIONS:

5.1. The Aviation and Missile Life Cycle Management Command (AMCOM LCMC) is working to revise system technical documents to update specification and NSN data but there has been a delay in revised document publication to field units and depot activities. This MIM provides appropriate information to allow end-users to procure environmentally acceptable primers conforming to MIL-PRF-23377 Type I and Type II Class N and MIL-PRF-85582 Type I and Type II Class N specifications.

5.2. Appropriate NSN and/or manufacturer's part number information for primer coating: epoxy, high solids, specification MIL-PRF-23377 Type I and Type II Class N are as follows:

MIL-PRF-23377 TYPE I CLASS N			
NSN	SIZE	PN	CAGE
8010-01-555-3281	1 Gallon Kit	16708TEP/16709CEH	09225
8010-01-555-3286	1 Quart KIT	16708TEP/16709CEH	09225

MIL-PRF-23377 TYPE II CLASS N			
NSN	SIZE	PN	CAGE
8010-01-555-3282	1 Gallon Kit	17176KEP/16709CEH	09225

5.3. Appropriate NSN and/or manufacturer's part number information for primer coating: epoxy, waterborne, specification MIL-PRF-85582 Type I Class N is as follows:

MIL-PRF-85582 TYPE I CLASS N			
NSN	SIZE	PN	CAGE
8010-01-466-9207	2 Gallon Kit	ENDY048 A/B	83574
8010-01-555-3285	1 Gallon Kit	44GN098	33461
8010-01-555-3288	1 Quart Kit	44GN098	33461

MIL-PRF-85582 TYPE II CLASS N			
NSN	SIZE	PN	CAGE
8010-01-466-9213	2 Gallon Kit	EWAE118 A/B	83574

5.4. Small quantity U/I products will be available in the future for minor repair and touch-up operations. Upon qualification and approval of these products additional information will be provided to end users via MIM or other appropriate means.

5.5. Application guidelines for MIL-PRF-23377 Type I and II Class N products as per TM 1-1500-344-23-2 cleaning and corrosion control and TM 55-1500-345-23 are as follows:

5.5.1. Ensure the appropriate manufacturer's technical data sheets for the selected primer are obtained prior to initial mixing and application of the MIL-PRF-23377 Class N primers.

CAUTION: Do not mix different manufacturers components. The MIL-PRF-23377 Class N primers are provided as a kit and should be used as a kit. As an example, the one gallon primer kit is provided as a partially filled 1 gallon container of resin and a smaller 1 quart container containing the appropriate quantity of hardener. These two components must be mixed in the appropriate proportions or the primer coating will not provide the specified performance.

5.5.2. MIL-PRF-23377 Class N primers are two-component, very high solids epoxy primers provided as a kit. Each individual component must be properly mixed to thoroughly distribute the settled solid components in the solvent carriers prior to mixing the resin and hardener together (parts a and b respectively). Class N primers do not normally require thinning prior to application.

5.5.3. Refer to aviation system technical manual TM 1-1500-344-23-2 cleaning and corrosion control, TM 55-1500-345-23 painting and marking of army aircraft and specification MIL-DTL-53072, Chemical Agent Resistant Coating (CARC) System Application Procedures when performing painting or finish touch-up tasks on aircraft having CARC finish for proper substrate preparation prior to primer application. MIL-DTL-53072 provides guidance for selection of the appropriate cleaning processes and materials and required surface pretreatments based on general substrate types (e.g. Aluminum, stainless steel, plated steel, etc.).

NOTE: Information on MIL-DTL-53072 can be viewed/downloaded at: <http://assist.daps.dla.mil/quicksearch/>. This website does not require an Army Knowledge Online (AKO) ("www.us.army.mil") ID and password. This website includes published Qualified Product Lists (QPLs), Detailed Specifications and Defense and Federal specifications and standards available in the official DOD repository including any Supplements/Addendums.

5.5.4. Allow the substrate to be coated to acclimate to the ambient conditions in the paint booth where the coating will be applied. If the coating is being applied on the flight line, the primer components should be allowed to reach ambient outside conditions then mixed and applied.

5.5.5. Proper high volume/low pressure spray painting equipment should be used if the primer will be sprayed onto the target substrate. If applying the primer via brush or roller, appropriate bristle type brush or nap length (roller) must be determined from the technical documentation and used.

5.5.6. Proper paint mixing equipment must be used to ensure the solids portion in components A and B (resin and hardener) are thoroughly distributed in their respective solvent carriers. It is recommended that a one-gallon, dual arm commercial shaker be used to properly disperse the solids in the resin and hardener containers. Follow the manufacturer's directions for adding component B to component A then homogenously mix the two components, thoroughly blending the resin and hardener prior to coating application. Coating application may normally begin immediately after properly mixing components A and B, follow the manufacturer's directions closely regarding any required induction time.

5.5.7. The use of pressure pot in-pot stirring equipment (paddle or vertical agitation) is strongly recommended. The in-pot agitation will keep the solids from settling during painting operations. The stirring attachment should be operated to keep the mixed primer blended but not so fast as to "whip" the primer in the pressure pot introducing additional air and foam into the primer being sprayed.

5.5.8. MIL-PRF-23377 and MIL-PRF-85582 class N primers are chemical-reaction cured products. The reaction rate is dependent on temperature. Temperatures below 70 deg F will significantly slow the cure time required prior to top coating application. (as an example an 18 deg F reduction in ambient temperature below 70 deg F will double the final cure time). Refer to the manufacture's technical data sheet and applicable specifications (MIL-PRF-23377 and MIL-DTL-83072) for recoating guidance.

5.5.9. The primer must be properly cured prior to chemical agent resistant coating (CARC) application. If MIL-DTL-53039 CARC is the intended top coating this is particularly important since this CARC normally has a fast cure time. If the primer is not allowed to sufficiently cure, the rapid curing of the CARC top coating may trap the primer's solvents resulting in poor adhesion and potential coating failure. Ensuring the primer is properly cured is also important if MIL-DTL-64159 CARC is the intended top coat. The solvents that are off-gassing from the primer may interact with the MIL-DTL-64159 CARC again resulting in poor coating adhesion or coating failure.

5.5.10. Film thickness is a critical factor in primer cure. Heavier film thickness will require extended cure times and may fail if the primer is applied too thick (>3.0 mil dry film thickness (DFT)). Wet film thickness (WFT) should be periodically checked during coating application to ensure the optimum film thickness is being maintained. Recommended WFT and DFT per specifications MIL-PRF-23377 and MIL-PRF-85582 is 1.0-2.0 WFT / 0.5-0.9 DFT for various substrate materials.

Hazardous Material Caution: All above listed coatings may contain some hazardous materials. MIL-PRF-23377 coatings contain regulated and exempt solvents and have low flash points (<60 deg F).

All appropriate safety requirements for flammable liquids and hazardous material (HM) exposure must be observed. The technician applying coatings to aviation assets and AGSE must use appropriate personal protective equipment (PPE) including face shield and rubber gloves; a minimum one half face-mask respirator is required unless otherwise specified by local industrial hygiene representative.

5.5.11. MIL-PRF-85582, Class N may only be used for faying surfaces and wet application of fasteners provided that the primer is not reduced with water. If MIL-PRF-85582, Class N is reduced with water and used within faying surfaces of for wet installation purposes, the evaporated water molecules may become trapped and initiate corrosion.

6. POINTS OF CONTACT:

6.1. Technical points of contact are:

6.1.1. Primary Mr. Glenn Williams AMSAM-EN-EV, DSN 746-6127, or 256-876-6127. Fax is DSN 645-0749, or (256) 955-0749. Email: "glenn.m.williams@conus.army.mil".

6.1.2. Alternate Mr. Kerry Blankenship AMSAM-EN-EV, DSN 746-8898, OR (256) 876-8898. Fax is DSN 746-5996, or (256) 876-5996. Email: "kerry.blankenship@conus.army.mil".

6.1.3. Foreign Military Sales POC: Mr. Ronnie Sammons, AMSAM-SA-AS-UT, DSN: 897-6825, or (256) 313-6825. Fax is DSN: 897-6825, or (256) 313-6825. Email: "ronnie.sammons@conus.army.mil".

6.1.4. Corrosion Prevention & Control Center of Excellence POC: Mr. Ted Wiesner, SFAE-AV-AS-AG, DSN: 897-0209, or (866) 222-2364. Fax is DSN: 897-9032, or (256) 876-9032. Email: "cpc-coe@peoavn.redstone.army.mil".

LESSONS LEARNED

First Application – Non-hexavalent Chromium Coating System

1109th AVCRAD, Groton CT

10-14 October 2005

This document is collection of the comments and recommendations that resulted from the initial on-aircraft application of the new coatings evaluated as part of the PEO Aviation non-hexavalent chromium coating system test program. The coating system was applied at the 1109th Aviation Classification Repair Activity Depot (AVCRAD) in Groton, CT, 10-14 October 2005. The document is divided into independent sections to address specific areas of the process and materials used to perform this coating operation.

Aircraft Preparation for and TCP Application

- Protection of high strength metals (steel, 7000 series aluminum), magnesium and other sensitive substrates is critical to prevent inadvertent damage during the initial cleaning and deoxidization steps. A review of the various substrates on the finished aircraft should be performed to identify these materials of interest to ensure proper masking and protection prior to initiating the trivalent chromium process (TCP) application process. Areas masked on the CH-47 test aircraft included wheels and struts, engine components, transmission assemblies, etc. However, familiarity with the aircraft to be coated will be critical to ensure no sensitive substrate is left unprotected. As an example, there are several aluminum vent opening covers along the sides of the aircraft above the fuel cell sponsons that vent the fuel cell areas. The vent openings penetrate down into the fuel cell areas which are a composite material. These areas were not masked when the test aircraft was cleaned and pretreated to apply the Alodine T5900 RTU (TCP) to the vent covers. The vent openings were thoroughly flushed during the rinse process following deoxidization and TCP application. There were other unknown fuselage penetrations that were plugged during the preparation clean/deox and TCP application to prevent cleaner and deoxidizer intrusion into the aircraft interior spaces. Each class of helicopter may have similar issues and should be thoroughly evaluated in conjunction with the aircraft PMO engineers prior to initiating the process steps to ensure inadvertent damage is avoided.

➤ **RECOMMENDATION**

Review each helicopter class fuselage drawings to identify potential openings in the exterior mold lines that could allow process chemicals to enter the interior of the aircraft. This review will also help identify other areas that will require masking to prevent inadvertent damage to the sensitive materials contained in and on the aircraft exterior surfaces.

- Areas where petroleum, oil or lubricants (POL) contamination on the substrate is a regular issue such as below engine nacelles, combining and main rotor gear boxes, transmission, drive shaft knuckles and universals, etc. should be hand wiped with a solvent cleaner prior to cleaning with the Aerowash cleaner. During the CH-47 surface preparation, full strength cleaner was required to remove the moderate contamination below both engine nacelles and power transmission assemblies. (Note: full strength cleaner should not be applied indiscriminately. For this effort the

cleaner was applied to the cleaning pads only, and then the selected areas were cleaned and rinsed.) Pre-cleaning these areas with a solvent should minimize the need to increase the strength of the cleaner above approximately 50:50 ratio (maximum), with an optimum cleaner concentration of 15% to 25%.

- **RECOMMENDATION**

Pre-clean aircraft fuselage areas subject to POL contamination with a solvent cleaner such as MIL-PRF-680 Type II or IV prior to initiating the aircraft wash / deox / TCP (Aerowash / Ridoline 4450 / Alodine T5900 RTU) sequence. Coordinate with the cleaner manufacturer to provide the Aerowash in a maximum concentration mix of 50:50. This will allow technicians to reduce the Aerowash concentration to the desired 15-25% but provide some flexibility to the workers to use a higher concentration when needed for spot cleaning stubborn soils. This will also ensure higher concentration cleaner is not indiscriminately applied to the aircraft.

- Aerowash cleaner and Ridoline 4450 deoxidizer should be mixed/diluted with deionized (DI) water. The varying condition of tap water and the potential presence of unwanted metallic or mineral ions may negatively impact TCP coating. Initial rinse of the aircraft following Aerowash cleaning using tap water should not be a significant issue, however the surface rinse following deoxidation and the TCP rinse should not be performed with tap water. Only DI water should be used for these rinse steps.

- **RECOMMENDATION**

Ensure facilities have the ability to install and operate DI water systems. DI water systems are normally leased from a water treatment company such as Culligan or US Filter. The systems consist of three bottles (cation and anion exchange bottles and a final polisher bottle) that are hooked to the normal potable water service through a ¾" hose connection. Service life of the tanks is dependent on several factors but a small system (as used at the Groton AVCRAD) can normally treat 3000-4000 gallons of water before ion exchange bottles require changeout. It is also recommended that a portable conductivity meter be purchased and used to determine the water condition prior to each use. Recommended DI water conductivity for use in this process is >10 MegOhms (0.1 µmhos) to ensure no reactive ions are present in the water used to dilute the cleaner and deoxidizer and for each indicated rinse step.

NOTE: A post treatment water heater may also be used to warm the DI water rinse. Hot water should not be processed through the Ion-exchange media as it will ruin the resin bed.

- Heating the Aerowash solution to approximately 125°-150°F would increase the ability of the cleaning solution to remove stubborn soils and minimize the amount of hand scrubbing required to thoroughly clean the aircraft substrates. The dwell time for cleaner on the aircraft surfaces could also be reduced with a heated cleaner solution. At the ambient conditions in the hanger (~68°F), the 15% solution concentration required a 10-15 minute dwell time to obtain the "water-break free" surface necessary for proper cleaning prior to deoxidization of the substrates. A thorough rinse of the entire aircraft is also necessary to ensure there are no potential pockets of cleaner remaining on or in the aircraft.

RECOMMENDATION

While not required, heating the cleaner will increase cleaner effectiveness and reduce process time. Electric immersion heaters or the use of steam heating coils in the cleaner tank to elevate the Aerowash solution temperature may be an option.

- Aircraft rinse following deoxidation should include a thorough flush into areas that did not receive the Ridoline directly but may be exposed to overspray or run-down. (Note: 1109th AVCRAD performed the full rinse step following TCP application but only performed a surface rinse following deoxidation.) This thorough DI rinse will minimize or eliminate any potential for cleaner or deoxidizer from pooling in lower aircraft interior or exterior surfaces.
- When practical, interior finishing with approved processes and coatings should be completed prior to exterior coating preparation and conversion coat application (TCP). Finishing interior areas will minimize the potential for damage to the previously indicated substrates that may be susceptible to hydrogen embrittlement, stress corrosion cracking or substrate damage (e.g. bare magnesium or steel) if exposed for extended periods during the cleaning / deox / TCP application process.
- TCP application and dwell time is ambient condition and substrate dependent. As the ambient temperature goes down, dwell time must be extended to allow for proper reaction of the TCP on the substrate. 2000 Series aluminum (aircraft skins) will require approximately 15-18 minutes at 55-60°F, 5000, 6000, and 7000 series aluminums will require less dwell time. Also, failure to properly rinse the applied TCP within the recommended time frame may result in an excess TCP build-up on the aircraft substrates which will negatively impact coating adhesion. (Note: The subtle color change indicating the completed TCP reaction will be more easily detected as technicians become more familiar with the processes and that should minimize the potential for over exposure of the substrates to the TCP solution.)

Aircraft Coating

- Primer mixing and application, MIL-PRF-23377 Type I Class N:

Proper mixing of the primer is critical to ensure optimum performance of the primer. Manufacturer's directions for mixing and thinning should be closely followed. Applying a proper 1.2-1.8 mil primer wet film thickness is crucial in the performance of the CARC coating system on the aircraft. Too heavy a coating in lower temperature conditions may result in significantly extended drying time for the primer and may also result in drips and runs on the vertical surfaces of the aircraft. The required dry film thickness (DFT) of the primer is 0.8 to 1.0 mil DFT (per the CARC application specification, MIL-DTL-53072), and 0.6 to 0.9 mil DFT per the primer material's specification, MIL-PRF-23377.

➤ **RECOMMENDATION**

Painter familiarity with the primers is critical to proper application of the CARC finish. Painters responsible for mixing the primer prior to application should be thoroughly familiar with the mixing requirements to prevent improper mixing and application problems. Painter training may be required when changing the coating being used to a new material.

- Primer mixing and application, MIL-PRF-23377 Type I Class N:
Proper mixing of this primer is also critical to ensure optimum performance of the primer (Hentzen product number 16708TEP/9TEH, Deft Primer 02GN084). Due to the high solids characteristics of this primer, settling is a normal issue and both the resin and hardner must be thoroughly agitated prior to mixing and properly shaken after mixing to ensure a homogenous blend. Manufacturer's directions for mixing and thinning should be closely followed. To familiarize painters with this primer or any other coating, an initial test application should be performed by the painters to prevent over thinning. Reduction in thinner use will reduce associated VOC emissions attributable to the required thinner (MIL-T-81772, Type II) and allow painters to achieve a proper wet film thickness. Painters The proper dry film thickness (DFT) of the primer (is 0.6 to 0.9 mil per the material's specification and 0.8 to 1.0 mil per the CARC application specification, MIL-DTL-53072) is recommended to be 0.8 to 1.0 mil DFT. Measured DFT film builds for this primer ranged from 0.6 to 0.9 mil.
- CARC Coating mixing and application, MIL-DTL-53039 Type IV:
MIL-DTL-53039 can be somewhat touchy when applied in high heat and humidity conditions.

SUPPORT EQUIPMENT and INFRASTRUCTURE

- A minimum of 2 air-Driven drum-style piston pumps similar or equivalent to the unit procured for the 1109th AVCRAD should be available at the facilities that will be applying the new coating system. Having only one pump slowed the process in applying the cleaner, deoxidizer and TCP to the aircraft. The pump and applicator equipment used by the 1109th AVCRAD was a Graco Model 224-350 5:1 Stainless (S/S) Monark Drum Pump; Graco 243-464X S/S Airless Gun with a 18" extension and .061 Tip; Graco Model TC14-50 1/4" Hose (Teflon) with SST Female Swivels (approximate cost for this equipment is \$2500 - \$2800 delivered). It is also recommended that 3-4 polypropylene drums that have band attach lids with a lid located bung opening be available to allow for cleaner and deoxidizer mixing. These drums should have a minimum capacity of 40 gallons.

Having additional pumps and drums will reduce process time by allowing process operators to perform cleaning, deoxidation and TCP application on each side of the aircraft simultaneously. However, the pumps will still require a complete tap water/DI water flush following each process step. As operators gain additional experience the quantity of cleaner and deoxidizer can be better estimated to minimize excess quantities of each process solution. Unused cleaner/deoxidizer should be discarded in an appropriate waste disposal process following completion of the aircraft cleaning and TCP application.

Pumps, hoses and guns should be completely flushed with water following completion of the coating process. Although constructed of stainless steel, the fresh water flush will minimize any potential for deterioration of the internal seals and other soft components and prolong the operational life of the equipment.
- Facilities will need to have a centralized waste water collection system that either treat hexavalent chromium contaminated water or a collection system that can capture and hold process water. This collection and holding system should be capable of holding and adjusting low and high pH waster

waters. The estimated total process waters collected during the initial aircraft coating were 650-750 gallons. Higher or lower total volumes may be anticipated dependent on several variables including aircraft size, aircraft cleanliness, etc..

1109th AVCRAD COST ESTIMATE - Non-Hexavalent Chromium Coating System Testing Program

Item Description & Part Number	NSN Data	Unit Cost (may not be up to date)	Items Rqd	U/I	Extended Cost	Supplier	POC Data	Address / Phone
Aircraft Cleaner, Aerowash	N/A	\$8.75	55	Gal	\$481.25	Henkel Surface Technologies	TBD	32100 Stephenson Hwy Madison Heights MI 48071 Vox: 248-589-4632 Fax: 248-588-0486
MIL-PRF-85570 Type II	6850-01-581-9413 6850-01-235-0872 6850-01-500-8919 6850-01-582-3708 6850-01-239-0571 6850-01-248-9828	\$6.90 \$71.63 - \$34.00 \$28.87 \$300.14	5 5 5 1 15	Spray Can gal		Various	Various	Various
Deoxidizer, Ridolene 4450	N/A	\$1.75	515	lb	\$901.25	Henkel Surface Technologies	TBD	32100 Stephenson Hwy Madison Heights MI 48071 Vox: 248-589-4632 Fax: 248-588-0486
Deoxidizer - MIL-C-10578 Type III Metal Cleaner and Conditioner	6805-00-854-7952	\$62.38	5	gal	\$62.38	GSA		
Alodine T5900 (TCP) Class 1A, Type 2, Form I	8030-01-560-9120 8030-01-560-9109 8030-01-560-9115	\$149.01 \$387.60 \$1271.60	5 15 55	gal	\$149.01 \$387.60 \$1271.60	Henkel Surface Technologies	TBD	32100 Stephenson Hwy Madison Heights MI 48071 Vox: 248-589-4632 Fax: 248-588-0486
Metalast TCP-HF Class 1A, Type 2, Form I						Metalast Inc	TBD	
Alodine T5900 (TCP) Class 1A, Type 2, Form III	NSNs Not Assigned - Procure from Manufacturer	TBDTBDTBD	51555	gal	TBD	Henkel Surface Technologies	TBD	32100 Stephenson Hwy Madison Heights MI 48071 Vox: 248-589-4632 Fax: 248-588-0486
Metalast TCP-HF Class 1A, Type 2, Form III						Metalast Inc	TBD	
Shipping - Henkel					TBD			
NOTE: POC Data TBD - costs cited are charges at Oct 2005 costs. Alodine T5900TRU is available from GSA in various quantities. It is recommended that you contact GSA or Henkel directly and verify the specific costs.								
TCP Products are also available from Metalast, however I recommend that the Henkel products be used for the initial work ups as they can provide onsite technical assistance.								

1109th AVCRAD COST ESTIMATE - Non-Hexavalent Chromium Coating System Testing Program

Item Description & Part Number	Unit Cost	Items Rqd	U/I	Extended Cost	Supplier	POC Data	Address / Phone
DI Water System							
DI Water System	\$1,655.00	1	EA	\$1,655.00	US Filter System		

Pump (Ridolene 4450 / Aerowash / TCP Application) and Spray Applicator Assemblies

Graco Stainless Steel, 5:1 Monark Pump for 55 Gallon Drum (P/A 224-350)	\$1,666.00	1	EA	\$1,666.00	GRACO		1-317-271-3065 or 1-800-823-7527
Graco Airless Gun and .061 Tip (P/N 235-464X)	\$306.70	1	EA	\$306.70			
50 Foot, 1/4" Teflon Hose with SST Female Swivels (P/N TC14-50)	\$250.00	1	EA	\$250.00			
18" SS Nozzle Extension (P/N 246-296)	\$84.25	1	EA	\$84.25			
36" SS Nozzle Extension (P/N Custom)	\$250.00	1	EA	\$250.00			

Support Materials

Cleaning Pads, Scotchbrite, medium	TBD
Sponges	TBD
Longhandles w/attachment pads for scotchbrite and sponges	TBD
40 gal Polypropylene drums w/top covers that have a standard bung opening	TBD

NOTE: POC Data is up to data - costs cited are charges from last Oct. It is recommended that you contact the identified POC and verify the specific costs.

You will have to identify a local vendor in the Corpus Christi area for the DI water system. The cited costs were what was paid in Ct last Fall.

A minimum of one complete pump/applicator assembly is required, for faster cleaner and TCP application and to minimize turn-around times a second pump assembly can be procured and available



Type of Bulletin: Technical Process Bulletin
Product Title: ALODINE® T 5900 RTU
Product View: ALODINE T 5900 RTU
Description: Conversion Coating Process for Aluminum
Status: complete

Technical Process Bulletin

Technical Process Bulletin No. 239582
This Revision: 04/12/2005

ALODINE® T 5900 RTU
Conversion Coating Process for Aluminum

1. Introduction:

Alodine T 5900 RTU treatment is a complex trivalent chromium conversion coating formulated for treating aluminum and its alloys, metals coated with IVD aluminum, magnesium, titanium and zinc surfaces. This Henkel product is formulated as a Ready-To-Use material for manual spray applications. The process provides bare ASTM-B-117 salt spray resistance and it also serves as an excellent base for organic finishes and adhesives.

Both the product itself and the conversion coating developed by Henkel Alodine T 5900 RTU do not contain Hexavalent Chromium.

2. Operating Summary:

<u>Chemical:</u>	<u>Bath Preparation per 100 Gallons:</u>
Alodine T 5900 RTU	Ready-to-use (100% concentration)
<u>Operation and Control:</u>	
Concentration	Ready-to-use concentration
pH (meter)	Stabilized (3.8 - 4.0)
Temperature (° Fahrenheit)	70-100 (21 - 37 °C)
Application Spray Time (minutes)	1/2 to 1 1/2
Immersion Contact Time (minutes)	5 to 9

3. Process:

The complete process sequence normally consists of the following steps:

- A. Cleaning using an Ridoline 298 or Parco Spray Wand Cleaner.
- B. Quality tap/city water rinse.
- C. Treating with Alodine T 5900 RTU.
- D. Water Rinse
- E. D.I. flush rinse
- F. Dry

4. Conversion Coating Materials:

Henkel Alodine T 5900 RTU

pH Meter

5. Spray Equipment/Storage Equipment:

Process tanks and equipment used to hold Alodine T 5900 RTU for spraying, spray housing, spray pumps and related piping should be fabricated from 316L, 316, 304L in descending order. Piping and hoses can be constructed of Teflon, PVC or other acid and chemically resistant polymers.

For manual spray equipment, thoroughly rinse pumps and hoses with DI water after each use.

Chemical feed pump parts and other elastomers which may come in contact with Alodine T 5900 RTU product should be EPDM, Viton or Teflon. Support equipment, such as chemical feed pumps, are available from Henkel.

6. Surface Preparation:

A. Cleaning:

All surfaces to be treated with Henkel Alodine T 5900 RTU must be cleaned to a Water-Break-Free surface after a thorough water rinse.

B. Deoxidizing (optional):

Aluminum surfaces with corrosion products or heavy/uneven surface oxidation should be chemically treated with Henkel Turco Metal-Glo #6 or Henkel Alumiprep before the application of Henkel Alodine T 5900 RTU.

After deoxidizing the aluminum surfaces, a thorough cold tap/city water rinse must follow.

Note:

Before applying Henkel Alodine T 5900 RTU all surfaces should receive a thorough DI- Water rinse. This second rinse should remove the last traces of cleaner, deoxidizer and rinse water salts.

7. Treating with the Alodine T 5900 RTU Processing Solution:

A. Spray Application:

Fill the holding tank or pump reservoir, hose and sprayer with Henkel Alodine T 5900 RTU product. Completely and generously wet the cleaned surfaces to be treated for 30-90 seconds. Allow the Henkel Alodine T 5900 RTU to dwell on the surface for up to an additional 5 minutes.

B. Wipe Application:

Wipe applications are mainly for repair purposes of small areas which may have been damaged.

Insure that the surface to receive the treatment is clean, and water-break-free and free of any corrosion or other surface discolorations.

With an appropriate applicator, uniformly and generously wet the surface with Henkel Alodine T 5900 RTU. Allow the product to contact the surface for an additional 5 minutes, re-wiping during the dwell time to keep the surface wet.

8. Water Rinsing After Treatment:

Two stages of water rinsing are desired.

Stage 1 water rinse with quality tap or city water removes the treatment chemistry.

Stage 2 rinse with D.I. water removes the water borne salts found in all non-purified water supplies.

9. Drying:

The conversion coated surfaces can simply be allowed to air dry in a clean environment, forced dried with moving (blowing) air, or dried in a low temperature dry oven now used to dry an Alodine Chromate conversion coating.

10. Coating:

The treated metal surfaces will possess a blue to blue iridescent or blue to gold iridescent coating color.

Once completely dried, the treated surfaces can be immediately painted or the work can be stored in a protected, uncontaminated environment until needed. When handling the dried, unpainted work, operators should wear clean, lint-free gloves.

11. Storage Requirements:

Alodine T 5900 RTU should be protected from freezing. If the chemical is frozen, it will be irreversibly damaged and should not be used. Alodine T 5900 RTU may precipitate if stored at temperatures below 40° and above 100° Fahrenheit (5-38 °C). If exposed to temperatures outside that range for short periods, the product should be immediately returned to the proper temperature and stirred.

12. Waste Disposal Information:

Applicable regulations covering disposal and discharge of chemicals should be consulted and followed.

Disposal information for Alodine T 5900 RTU is given on the Material Safety Data Sheet.

The processing bath is acidic contains heavy metals and fluorides. Waste treatment and neutralization may be required prior to discharge to sewer.

13. Precautionary Information:

When handling the chemical product used in this process, the first aid and handling recommendations on the Material Safety Data Sheet for the product should be read, understood, and followed.

The processing solution is acidic and may be irritating to skin and may cause burns to eyes. Avoid contact with skin and eyes. In case of contact follow the recommendations for contact given on the Material Safety Data Sheet for Alodine T 5900 RTU.

Henkel Technologies
32100 Stephenson Highway
Madison Heights, MI 48071
Telephone: 248-583-9300
Fax: 248-583-2976

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Stand vom: gedruckt am: 09/18/2006

Verborgene Felder: 3Parker Amchem

Material Safety Data Sheet



Revision Number: 002.1

Issue date: 04/03/2009

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: ALODINE T 5900 RTU
Product type: Conversion coating
IDH number: 772743
Region: United States
Company address: Henkel Corporation
32100 Stephenson Highway
Madison Heights, MI 48071
Contact information: Telephone: 248.583.9300
For Chemical Emergency: Call CHEMTREC at 800.424.9300
Internet: www.henkelna.com

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Physical state: Liquid
Color: Green
Odor: Mild
HMIS:
HEALTH: *2
FLAMMABILITY: 0
PHYSICAL HAZARD: 0
Personal Protection: See MSDS Section 8
WARNING: CAUSES EYE, SKIN AND RESPIRATORY TRACT IRRITATION.
MAY CAUSE ALLERGIC SKIN REACTION.

Relevant routes of exposure: Skin, Inhalation, Eyes

Potential Health Effects

Inhalation: This product is irritating to the respiratory system.
Skin contact: This product may cause irritation to the skin. This product contains a component that may cause allergic skin reactions.
Eye contact: This product may cause irritation to the eyes.
Ingestion: Ingestion of this product may cause nausea, vomiting and diarrhea.

Existing conditions aggravated by exposure: Eye, skin and respiratory disorders.

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

See Section 11 for additional toxicological information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous components	CAS NUMBER	%
Zirconium fluoride salt	Proprietary	0.1 - 1
Chromium compound	Proprietary	0.1 - 1

4. FIRST AID MEASURES

Inhalation: If mist or vapor of this product is inhaled, remove person immediately to fresh air. Seek medical attention if symptoms develop or persist.
Skin contact: Immediately flush skin with plenty of water (using soap, if available). If symptoms develop and persist, get medical attention.
Eye contact: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

IDH number: 772743

Page 1 of 5

Product name: ALODINE T 5900 RTU

Ingestion: Get immediate medical attention. Do not induce vomiting.

5. FIRE FIGHTING MEASURES

Flash point: Not applicable

Autoignition temperature: Not determined

Flammable/Explosive limits - lower: Not determined

Flammable/Explosive limits - upper: Not determined

Extinguishing media: Use media appropriate for surrounding material.

Special firefighting procedures: Wear full protective clothing. Wear self-contained breathing apparatus.

Unusual fire or explosion hazards: This product is an aqueous mixture which will not burn.

Hazardous combustion products: Irritating and/or toxic fumes and gases may be emitted upon the product's decomposition.

6. ACCIDENTAL RELEASE MEASURES

Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Environmental precautions: Prevent further leakage or spillage if safe to do so. Wear appropriate protective equipment and clothing during clean-up.

Clean-up methods: Absorb spill with inert material. Shovel material into appropriate container for disposal. Dispose of according to Federal, State and local governmental regulations.

7. HANDLING AND STORAGE

Handling: Prevent contact with eyes, skin and clothing. Do not breathe vapor and mist. Wash thoroughly after handling. Provide adequate ventilation. Do not take internally. For industrial use only.

Storage: For safe storage, store between 37.8 °C (100°F) and 4.4 °C (39.9 °F) Keep container tightly closed and in a cool, well-ventilated place away from incompatible materials. Protect from freezing. Ship and store above 40° F.

For information on product shelf life, please review labels on container or check the Technical Data Sheet.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.

Hazardous components	ACGIH TLV	OSHA PEL	AIHA WEEL	OTHER
Zirconium fluoride salt	5 mg/m ³ TWA (as Zr) 10 mg/m ³ STEL (as Zr) 2.5 mg/m ³ TWA (as F)	5 mg/m ³ TWA (as Zr) 2.5 mg/m ³ TWA Dust. 2.5 mg/m ³ TWA (as F)	None	None
Chromium compound	None	0.5 mg/m ³ TWA (as Cr) 1 mg/m ³ TWA (as Cr)	None	None

Engineering controls: Provide local and general exhaust ventilation to effectively remove and prevent buildup of any vapors or mists generated from the handling of this product.

Respiratory protection: If ventilation is not sufficient to effectively prevent buildup of aerosols, mists or vapors, appropriate NIOSH/MSHA respiratory protection must be provided.

Eye/face protection: Wear safety glasses; chemical goggles for fumes which may arise from thermal processing.

Skin protection: Chemical resistant, impermeable gloves. Use of impervious apron and boots are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Liquid
Color: Green
Odor: Mild
Odor threshold: Not available
pH: 3.8 - 4.0
Vapor pressure: Not determined
Boiling point/range: > 100 °C (> 212°F) calculated
Melting point/ range: Not determined
Specific gravity: 1.00 - 1.02 at 22.2 °C (71.96 °F)
Vapor density: Not available
Flash point: Not applicable
Flammable/Explosive limits - lower: Not determined
Flammable/Explosive limits - upper: Not determined
Autoignition temperature: Not determined
Evaporation rate: Not determined
Solubility in water: Complete
Partition coefficient (n-octanol/water): Not available
VOC content: Not available

10. STABILITY AND REACTIVITY

Stability: Stable at normal conditions.

Hazardous reactions: Will not occur.

Hazardous decomposition products: Irritating and/or toxic fumes and gases may be emitted upon the product's decomposition.

Incompatible materials: This product may react with strong oxidizing agents.

Conditions to avoid: Avoid excessive heat and ignition sources.

11. TOXICOLOGICAL INFORMATION

Hazardous components	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen (Specifically Regulated)
Zirconium fluoride salt	No	No	No
Chromium compound	No	No	No

Hazardous components	Health Effects/Target Organs
Zirconium fluoride salt	Allergen, Blood, Cardiac, Central nervous system, Corrosive, Gastrointestinal tract, Irritant, Kidney, Lung, Metabolic, Muscle, Teeth, Less weight gain and food intake.
Chromium compound	Allergen, Corrosive, Irritant, Respiratory

12. ECOLOGICAL INFORMATION

Ecological information: Not available

13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

Recommended method of disposal: Follow all local, state, federal and provincial regulations for disposal.
Hazardous waste number: This product contains chromium which is a hazardous waste (D007).

14. TRANSPORT INFORMATION

U.S. Department of Transportation Ground (49 CFR)

Proper shipping name: Not regulated
Hazard class or division: None
Identification number: None
Packing group: None

International Air Transportation (ICAO/IATA)

Proper shipping name: Not regulated
Hazard class or division: None
Identification number: None
Packing group: None

Water Transportation (IMO/MDG)

Proper shipping name: Not regulated
Hazard class or division: None
Identification number: None
Packing group: None

15. REGULATORY INFORMATION

United States Regulatory Information

TSCA 8 (b) Inventory Status: All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.
TSCA 12(b) Export Notification: None above reporting de minimus
CERCLA/SARA Section 302 EHS: None above reporting de minimus
CERCLA/SARA Section 311/312: Immediate Health, Delayed Health
CERCLA/SARA 313: None above reporting de minimus
California Proposition 65: No California Proposition 65 listed chemicals are known to be present.

Canada Regulatory Information

CEPA DSL/NDSL Status: All components are listed on or are exempt from listing on the Canadian Domestic Substances List.
WHMIS hazard class: D.2.A, D.2.B

16. OTHER INFORMATION

This material safety data sheet contains changes from the previous version in sections: New Material Safety Data Sheet format.

Prepared by: John DiCerbo, Regulatory Affairs Specialist

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IDH number: 772743

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Product name: ALODINE T 5900 RTU

APPENDIX E
PRESIDENTIAL EXECUTIVE ORDERS



Federal Register

Friday,
January 26, 2007

Part II

The President

Executive Order 13423—Strengthening
Federal Environmental, Energy, and
Transportation Management

Presidential Documents

Title 3—

Executive Order 13423 of January 24, 2007

The President

Strengthening Federal Environmental, Energy, and Transportation Management

By the authority vested in me as President by the Constitution and the laws of the United States of America, and to strengthen the environmental, energy, and transportation management of Federal agencies, it is hereby ordered as follows:

Section 1. Policy. It is the policy of the United States that Federal agencies conduct their environmental, transportation, and energy-related activities under the law in support of their respective missions in an environmentally, economically and fiscally sound, integrated, continuously improving, efficient, and sustainable manner.

Sec. 2. Goals for Agencies. In implementing the policy set forth in section 1 of this order, the head of each agency shall:

(a) improve energy efficiency and reduce greenhouse gas emissions of the agency, through reduction of energy intensity by (i) 3 percent annually through the end of fiscal year 2015, or (ii) 30 percent by the end of fiscal year 2015, relative to the baseline of the agency's energy use in fiscal year 2003;

(b) ensure that (i) at least half of the statutorily required renewable energy consumed by the agency in a fiscal year comes from new renewable sources, and (ii) to the extent feasible, the agency implements renewable energy generation projects on agency property for agency use;

(c) beginning in FY 2008, reduce water consumption intensity, relative to the baseline of the agency's water consumption in fiscal year 2007, through life-cycle cost-effective measures by 2 percent annually through the end of fiscal year 2015 or 16 percent by the end of fiscal year 2015;

(d) require in agency acquisitions of goods and services (i) use of sustainable environmental practices, including acquisition of biobased, environmentally preferable, energy-efficient, water-efficient, and recycled-content products, and (ii) use of paper of at least 30 percent post-consumer fiber content;

(e) ensure that the agency (i) reduces the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of by the agency, (ii) increases diversion of solid waste as appropriate, and (iii) maintains cost-effective waste prevention and recycling programs in its facilities;

(f) ensure that (i) new construction and major renovation of agency buildings comply with the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings set forth in the Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding (2006)*, and (ii) 15 percent of the existing Federal capital asset building inventory of the agency as of the end of fiscal year 2015 incorporates the sustainable practices in the *Guiding Principles*;

(g) ensure that, if the agency operates a fleet of at least 20 motor vehicles, the agency, relative to agency baselines for fiscal year 2005, (i) reduces the fleet's total consumption of petroleum products by 2 percent annually through the end of fiscal year 2015, (ii) increases the total fuel consumption that is non-petroleum-based by 10 percent annually, and (iii) uses plug-in hybrid (PIH) vehicles when PIH vehicles are commercially available at

a cost reasonably comparable, on the basis of life-cycle cost, to non-PIH vehicles; and

(h) ensure that the agency (i) when acquiring an electronic product to meet its requirements, meets at least 95 percent of those requirements with an Electronic Product Environmental Assessment Tool (EPEAT)-registered electronic product, unless there is no EPEAT standard for such product, (ii) enables the Energy Star feature on agency computers and monitors, (iii) establishes and implements policies to extend the useful life of agency electronic equipment, and (iv) uses environmentally sound practices with respect to disposition of agency electronic equipment that has reached the end of its useful life.

Sec. 3. Duties of Heads of Agencies. In implementing the policy set forth in section 1 of this order, the head of each agency shall:

(a) implement within the agency sustainable practices for (i) energy efficiency, greenhouse gas emissions avoidance or reduction, and petroleum products use reduction, (ii) renewable energy, including bioenergy, (iii) water conservation, (iv) acquisition, (v) pollution and waste prevention and recycling, (vi) reduction or elimination of acquisition and use of toxic or hazardous chemicals, (vii) high performance construction, lease, operation, and maintenance of buildings, (viii) vehicle fleet management, and (ix) electronic equipment management;

(b) implement within the agency environmental management systems (EMS) at all appropriate organizational levels to ensure (i) use of EMS as the primary management approach for addressing environmental aspects of internal agency operations and activities, including environmental aspects of energy and transportation functions, (ii) establishment of agency objectives and targets to ensure implementation of this order, and (iii) collection, analysis, and reporting of information to measure performance in the implementation of this order;

(c) establish within the agency programs for (i) environmental management training, (ii) environmental compliance review and audit, and (iii) leadership awards to recognize outstanding environmental, energy, or transportation management performance in the agency;

(d) within 30 days after the date of this order (i) designate a senior civilian officer of the United States, compensated annually in an amount at or above the amount payable at level IV of the Executive Schedule, to be responsible for implementation of this order within the agency, (ii) report such designation to the Director of the Office of Management and Budget and the Chairman of the Council on Environmental Quality, and (iii) assign the designated official the authority and duty to (A) monitor and report to the head of the agency on agency activities to carry out subsections (a) and (b) of this section, and (B) perform such other duties relating to the implementation of this order within the agency as the head of the agency deems appropriate;

(e) ensure that contracts entered into after the date of this order for contractor operation of government-owned facilities or vehicles require the contractor to comply with the provisions of this order with respect to such facilities or vehicles to the same extent as the agency would be required to comply if the agency operated the facilities or vehicles;

(f) ensure that agreements, permits, leases, licenses, or other legally-binding obligations between the agency and a tenant or concessionaire entered into after the date of this order require, to the extent the head of the agency determines appropriate, that the tenant or concessionaire take actions relating to matters within the scope of the contract that facilitate the agency's compliance with this order;

(g) provide reports on agency implementation of this order to the Chairman of the Council on such schedule and in such format as the Chairman of the Council may require; and

(h) provide information and assistance to the Director of the Office of Management and Budget, the Chairman of the Council, and the Federal Environmental Executive.

Sec. 4. *Additional Duties of the Chairman of the Council on Environmental Quality.* In implementing the policy set forth in section 1 of this order, the Chairman of the Council on Environmental Quality:

(a) (i) shall establish a Steering Committee on Strengthening Federal Environmental, Energy, and Transportation Management to advise the Director of the Office of Management and Budget and the Chairman of the Council on the performance of their functions under this order that shall consist exclusively of (A) the Federal Environmental Executive, who shall chair, convene and preside at meetings of, determine the agenda of, and direct the work of, the Steering Committee, and (B) the senior officials designated under section 3(d)(i) of this order, and (ii) may establish subcommittees of the Steering Committee, to assist the Steering Committee in developing the advice of the Steering Committee on particular subjects;

(b) may, after consultation with the Director of the Office of Management and Budget and the Steering Committee, issue instructions to implement this order, other than instructions within the authority of the Director to issue under section 5 of this order; and

(c) shall administer a presidential leadership award program to recognize exceptional and outstanding environmental, energy, or transportation management performance and excellence in agency efforts to implement this order.

Sec. 5. *Duties of the Director of the Office of Management and Budget.* In implementing the policy set forth in section 1 of this order, the Director of the Office of Management and Budget shall, after consultation with the Chairman of the Council and the Steering Committee, issue instructions to the heads of agencies concerning:

(a) periodic evaluation of agency implementation of this order;

(b) budget and appropriations matters relating to implementation of this order;

(c) implementation of section 2(d) of this order; and

(d) amendments of the Federal Acquisition Regulation as necessary to implement this order.

Sec. 6. *Duties of the Federal Environmental Executive.* A Federal Environmental Executive designated by the President shall head the Office of the Federal Environmental Executive, which shall be maintained in the Environmental Protection Agency for funding and administrative purposes. In implementing the policy set forth in section 1 of this order, the Federal Environmental Executive shall:

(a) monitor, and advise the Chairman of the Council on, performance by agencies of functions assigned by sections 2 and 3 of this order;

(b) submit a report to the President, through the Chairman of the Council, not less often than once every 2 years, on the activities of agencies to implement this order; and

(c) advise the Chairman of the Council on the Chairman's exercise of authority granted by subsection 4(c) of this order.

Sec. 7. *Limitations.* (a) This order shall apply to an agency with respect to the activities, personnel, resources, and facilities of the agency that are located within the United States. The head of an agency may provide that this order shall apply in whole or in part with respect to the activities, personnel, resources, and facilities of the agency that are not located within the United States, if the head of the agency determines that such application is in the interest of the United States.

(b) The head of an agency shall manage activities, personnel, resources, and facilities of the agency that are not located within the United States, and with respect to which the head of the agency has not made a determination under subsection (a) of this section, in a manner consistent with the policy set forth in section 1 of this order to the extent the head of the agency determines practicable.

Sec. 8. Exemption Authority. (a) The Director of National Intelligence may exempt an intelligence activity of the United States, and related personnel, resources, and facilities, from the provisions of this order, other than this subsection and section 10, to the extent the Director determines necessary to protect intelligence sources and methods from unauthorized disclosure.

(b) The head of an agency may exempt law enforcement activities of that agency, and related personnel, resources, and facilities, from the provisions of this order, other than this subsection and section 10, to the extent the head of an agency determines necessary to protect undercover operations from unauthorized disclosure.

(c) (i) The head of an agency may exempt law enforcement, protective, emergency response, or military tactical vehicle fleets of that agency from the provisions of this order, other than this subsection and section 10.

(ii) Heads of agencies shall manage fleets to which paragraph (i) of this subsection refers in a manner consistent with the policy set forth in section 1 of this order to the extent they determine practicable.

(d) The head of an agency may submit to the President, through the Chairman of the Council, a request for an exemption of an agency activity, and related personnel, resources, and facilities, from this order.

Sec. 9. Definitions. As used in this order:

(a) "agency" means an executive agency as defined in section 105 of title 5, United States Code, excluding the Government Accountability Office;

(b) "Chairman of the Council" means the Chairman of the Council on Environmental Quality, including in the Chairman's capacity as Director of the Office of Environmental Quality;

(c) "Council" means the Council on Environmental Quality;

(d) "environmental" means environmental aspects of internal agency operations and activities, including those environmental aspects related to energy and transportation functions;

(e) "greenhouse gases" means carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride;

(f) "life-cycle cost-effective" means the life-cycle costs of a product, project, or measure are estimated to be equal to or less than the base case (i.e., current or standard practice or product);

(g) "new renewable sources" means sources of renewable energy placed into service after January 1, 1999;

(h) "renewable energy" means energy produced by solar, wind, biomass, landfill gas, ocean (including tidal, wave, current and thermal), geothermal, municipal solid waste, or new hydroelectric generation capacity achieved from increased efficiency or additions of new capacity at an existing hydroelectric project;

(i) "energy intensity" means energy consumption per square foot of building space, including industrial or laboratory facilities;

(j) "Steering Committee" means the Steering Committee on Strengthening Federal Environmental, Energy, and Transportation Management established under subsection 4(b) of this order;

(k) "sustainable" means to create and maintain conditions, under which humans and nature can exist in productive harmony, that permit fulfilling

the social, economic, and other requirements of present and future generations of Americans; and

(l) "United States" when used in a geographical sense, means the fifty states, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, and the Northern Mariana Islands, and associated territorial waters and airspace.

Sec. 10. General Provisions. (a) This order shall be implemented in a manner consistent with applicable law and subject to the availability of appropriations.

(b) Nothing in this order shall be construed to impair or otherwise affect the functions of the Director of the Office of Management and Budget relating to budget, administrative, or legislative proposals.

(c) This order is intended only to improve the internal management of the Federal Government and is not intended to, and does not, create any right or benefit, substantive or procedural, enforceable at law or in equity by a party against the United States, its departments, agencies, instrumentalities, entities, officers, employees or agents, or any other person.

Sec. 11. Revocations; Conforming Provisions. (a) The following are revoked:

(i) Executive Order 13101 of September 14, 1998;

(ii) Executive Order 13123 of June 3, 1999;

(iii) Executive Order 13134 of August 12, 1999, as amended;

(iv) Executive Order 13148 of April 21, 2000; and

(v) Executive Order 13149 of April 21, 2000.

(b) In light of subsection 317(e) of the National Defense Authorization Act for Fiscal Year 2002 (Public Law 107-107), not later than January 1 of each year through and including 2010, the Secretary of Defense shall submit to the Senate and the House of Representatives a report regarding progress made toward achieving the energy efficiency goals of the Department of Defense.

(c) Section 3(b)(vi) of Executive Order 13327 of February 4, 2004, is amended by striking "Executive Order 13148 of April 21, 2000" and inserting in lieu thereof "other executive orders".



THE WHITE HOUSE,
January 24, 2007.

[PR Doc. 07-374
Filed 1-25-07; 8:50 am]
Billing code 3165-01-F

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Federal Register

Thursday,
October 8, 2009

Part VII

The President

Executive Order 13514—Federal
Leadership in Environmental, Energy,
and Economic Performance

Presidential Documents

Title 3—

Executive Order 13514 of October 5, 2009

The President

Federal Leadership in Environmental, Energy, and Economic Performance

By the authority vested in me as President by the Constitution and the laws of the United States of America, and to establish an integrated strategy towards sustainability in the Federal Government and to make reduction of greenhouse gas emissions a priority for Federal agencies, it is hereby ordered as follows:

Section 1. Policy. In order to create a clean energy economy that will increase our Nation's prosperity, promote energy security, protect the interests of taxpayers, and safeguard the health of our environment, the Federal Government must lead by example. It is therefore the policy of the United States that Federal agencies shall increase energy efficiency; measure, report, and reduce their greenhouse gas emissions from direct and indirect activities; conserve and protect water resources through efficiency, reuse, and stormwater management; eliminate waste, recycle, and prevent pollution; leverage agency acquisitions to foster markets for sustainable technologies and environmentally preferable materials, products, and services; design, construct, maintain, and operate high performance sustainable buildings in sustainable locations; strengthen the vitality and livability of the communities in which Federal facilities are located; and inform Federal employees about and involve them in the achievement of these goals.

It is further the policy of the United States that to achieve these goals and support their respective missions, agencies shall prioritize actions based on a full accounting of both economic and social benefits and costs and shall drive continuous improvement by annually evaluating performance, extending or expanding projects that have net benefits, and reassessing or discontinuing under-performing projects.

Finally, it is also the policy of the United States that agencies' efforts and outcomes in implementing this order shall be transparent and that agencies shall therefore disclose results associated with the actions taken pursuant to this order on publicly available Federal websites.

Sec. 2. Goals for Agencies. In implementing the policy set forth in section 1 of this order, and preparing and implementing the Strategic Sustainability Performance Plan called for in section 8 of this order, the head of each agency shall:

(a) within 90 days of the date of this order, establish and report to the Chair of the Council on Environmental Quality (CEQ Chair) and the Director of the Office of Management and Budget (OMB Director) a percentage reduction target for agency-wide reductions of scope 1 and 2 greenhouse gas emissions in absolute terms by fiscal year 2020, relative to a fiscal year 2008 baseline of the agency's scope 1 and 2 greenhouse gas emissions. Where appropriate, the target shall exclude direct emissions from excluded vehicles and equipment and from electric power produced and sold commercially to other parties in the course of regular business. This target shall be subject to review and approval by the CEQ Chair in consultation with the OMB Director under section 5 of this order. In establishing the target, the agency head shall consider reductions associated with:

(i) reducing energy intensity in agency buildings;

- (ii) increasing agency use of renewable energy and implementing renewable energy generation projects on agency property; and
- (iii) reducing the use of fossil fuels by:
 - (A) using low greenhouse gas emitting vehicles including alternative fuel vehicles;
 - (B) optimizing the number of vehicles in the agency fleet; and
 - (C) reducing, if the agency operates a fleet of at least 20 motor vehicles, the agency fleet's total consumption of petroleum products by a minimum of 2 percent annually through the end of fiscal year 2020, relative to a baseline of fiscal year 2005;
- (b) within 240 days of the date of this order and concurrent with submission of the Strategic Sustainability Performance Plan as described in section 8 of this order, establish and report to the CEQ Chair and the OMB Director a percentage reduction target for reducing agency-wide scope 3 greenhouse gas emissions in absolute terms by fiscal year 2020, relative to a fiscal year 2008 baseline of agency scope 3 emissions. This target shall be subject to review and approval by the CEQ Chair in consultation with the OMB Director under section 5 of this order. In establishing the target, the agency head shall consider reductions associated with:
 - (i) pursuing opportunities with vendors and contractors to address and incorporate incentives to reduce greenhouse gas emissions (such as changes to manufacturing, utility or delivery services, modes of transportation used, or other changes in supply chain activities);
 - (ii) implementing strategies and accommodations for transit, travel, training, and conferencing that actively support lower-carbon commuting and travel by agency staff;
 - (iii) greenhouse gas emission reductions associated with pursuing other relevant goals in this section; and
 - (iv) developing and implementing innovative policies and practices to address scope 3 greenhouse gas emissions unique to agency operations;
- (c) establish and report to the CEQ Chair and OMB Director a comprehensive inventory of absolute greenhouse gas emissions, including scope 1, scope 2, and specified scope 3 emissions (i) within 15 months of the date of this order for fiscal year 2010, and (ii) thereafter, annually at the end of January, for the preceding fiscal year.
- (d) improve water use efficiency and management by:
 - (i) reducing potable water consumption intensity by 2 percent annually through fiscal year 2020, or 26 percent by the end of fiscal year 2020, relative to a baseline of the agency's water consumption in fiscal year 2007, by implementing water management strategies including water-efficient and low-flow fixtures and efficient cooling towers;
 - (ii) reducing agency industrial, landscaping, and agricultural water consumption by 2 percent annually or 20 percent by the end of fiscal year 2020 relative to a baseline of the agency's industrial, landscaping, and agricultural water consumption in fiscal year 2010;
 - (iii) consistent with State law, identifying, promoting, and implementing water reuse strategies that reduce potable water consumption; and
 - (iv) implementing and achieving the objectives identified in the stormwater management guidance referenced in section 14 of this order;
- (e) promote pollution prevention and eliminate waste by:
 - (i) minimizing the generation of waste and pollutants through source reduction;
 - (ii) diverting at least 50 percent of non-hazardous solid waste, excluding construction and demolition debris, by the end of fiscal year 2015;
 - (iii) diverting at least 50 percent of construction and demolition materials and debris by the end of fiscal year 2015;
 - (iv) reducing printing paper use and acquiring uncoated printing and writing paper containing at least 30 percent postconsumer fiber;

- (v) reducing and minimizing the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of;
 - (vi) increasing diversion of compostable and organic material from the waste stream;
 - (vii) implementing integrated pest management and other appropriate landscape management practices;
 - (viii) increasing agency use of acceptable alternative chemicals and processes in keeping with the agency's procurement policies;
 - (ix) decreasing agency use of chemicals where such decrease will assist the agency in achieving greenhouse gas emission reduction targets under section 2(a) and (b) of this order; and
 - (x) reporting in accordance with the requirements of sections 301 through 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (42 U.S.C. 11001 *et seq.*);
- (f) advance regional and local integrated planning by:
- (i) participating in regional transportation planning and recognizing existing community transportation infrastructure;
 - (ii) aligning Federal policies to increase the effectiveness of local planning for energy choices such as locally generated renewable energy;
 - (iii) ensuring that planning for new Federal facilities or new leases includes consideration of sites that are pedestrian friendly, near existing employment centers, and accessible to public transit, and emphasizes existing central cities and, in rural communities, existing or planned town centers;
 - (iv) identifying and analyzing impacts from energy usage and alternative energy sources in all Environmental Impact Statements and Environmental Assessments for proposals for new or expanded Federal facilities under the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 *et seq.*); and
 - (v) coordinating with regional programs for Federal, State, tribal, and local ecosystem, watershed, and environmental management;
- (g) implement high performance sustainable Federal building design, construction, operation and management, maintenance, and deconstruction including by:
- (i) beginning in 2020 and thereafter, ensuring that all new Federal buildings that enter the planning process are designed to achieve zero-net-energy by 2030;
 - (ii) ensuring that all new construction, major renovation, or repair and alteration of Federal buildings complies with the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings*, (*Guiding Principles*);
 - (iii) ensuring that at least 15 percent of the agency's existing buildings (above 5,000 gross square feet) and building leases (above 5,000 gross square feet) meet the *Guiding Principles* by fiscal year 2015 and that the agency makes annual progress toward 100-percent conformance with the *Guiding Principles* for its building inventory;
 - (iv) pursuing cost-effective, innovative strategies, such as highly reflective and vegetated roofs, to minimize consumption of energy, water, and materials;
 - (v) managing existing building systems to reduce the consumption of energy, water, and materials, and identifying alternatives to renovation that reduce existing assets' deferred maintenance costs;
 - (vi) when adding assets to the agency's real property inventory, identifying opportunities to consolidate and dispose of existing assets, optimize the performance of the agency's real-property portfolio, and reduce associated environmental impacts; and
 - (vii) ensuring that rehabilitation of federally owned historic buildings utilizes best practices and technologies in retrofitting to promote long-term viability of the buildings;
- (h) advance sustainable acquisition to ensure that 95 percent of new contract actions including task and delivery orders, for products and services with the exception of acquisition of weapon systems, are energy-

efficient (Energy Star or Federal Energy Management Program (FEMP) designated), water-efficient, biobased, environmentally preferable (e.g., Electronic Product Environmental Assessment Tool (EPEAT) certified), non-ozone depleting, contain recycled content, or are non-toxic or less-toxic alternatives, where such products and services meet agency performance requirements;

(i) promote electronics stewardship, in particular by:

(i) ensuring procurement preference for EPEAT-registered electronic products;

(ii) establishing and implementing policies to enable power management, duplex printing, and other energy-efficient or environmentally preferable features on all eligible agency electronic products;

(iii) employing environmentally sound practices with respect to the agency's disposition of all agency excess or surplus electronic products;

(iv) ensuring the procurement of Energy Star and FEMP designated electronic equipment;

(v) implementing best management practices for energy-efficient management of servers and Federal data centers; and

(j) sustain environmental management, including by:

(i) continuing implementation of formal environmental management systems at all appropriate organizational levels; and

(ii) ensuring these formal systems are appropriately implemented and maintained to achieve the performance necessary to meet the goals of this order.

Sec. 3. *Steering Committee on Federal Sustainability.* The OMB Director and the CEQ Chair shall:

(a) establish an interagency Steering Committee (Steering Committee) on Federal Sustainability composed of the Federal Environmental Executive, designated under section 6 of Executive Order 13423 of January 24, 2007, and Agency Senior Sustainability Officers, designated under section 7 of this order, and that shall:

(i) serve in the dual capacity of the Steering Committee on Strengthening Federal Environmental, Energy, and Transportation Management designated by the CEQ Chair pursuant to section 4 of Executive Order 13423;

(ii) advise the OMB Director and the CEQ Chair on implementation of this order;

(iii) facilitate the implementation of each agency's Strategic Sustainability Performance Plan; and

(iv) share information and promote progress towards the goals of this order;

(b) enlist the support of other organizations within the Federal Government to assist the Steering Committee in addressing the goals of this order;

(c) establish and disband, as appropriate, interagency subcommittees of the Steering Committee, to assist the Steering Committee in carrying out its responsibilities;

(d) determine appropriate Federal actions to achieve the policy of section 1 and the goals of section 2 of this order;

(e) ensure that Federal agencies are held accountable for conformance with the requirements of this order; and

(f) in coordination with the Department of Energy's Federal Energy Management Program and the Office of the Federal Environmental Executive designated under section 6 of Executive Order 13423, provide guidance and assistance to facilitate the development of agency targets for greenhouse gas emission reductions required under subsections 2(a) and (b) of this order.

Sec. 4. *Additional Duties of the Director of the Office of Management and Budget.* In addition to the duties of the OMB Director specified elsewhere in this order, the OMB Director shall:

(a) review and approve each agency's multi-year Strategic Sustainability Performance Plan under section 8 of this order and each update of the Plan. The Director shall, where feasible, review each agency's Plan concurrently with OMB's review and evaluation of the agency's budget request;

(b) prepare scorecards providing periodic evaluation of Federal agency performance in implementing this order and publish scorecard results on a publicly available website; and

(c) approve and issue instructions to the heads of agencies concerning budget and appropriations matters relating to implementation of this order.

Sec. 5. Additional Duties of the Chair of the Council on Environmental Quality. In addition to the duties of the CEQ Chair specified elsewhere in this order, the CEQ Chair shall:

(a) issue guidance for greenhouse gas accounting and reporting required under section 2 of this order;

(b) issue instructions to implement this order, in addition to instructions within the authority of the OMB Director to issue under subsection 4(c) of this order;

(c) review and approve each agency's targets, in consultation with the OMB Director, for agency-wide reductions of greenhouse gas emissions under section 2 of this order;

(d) prepare, in coordination with the OMB Director, streamlined reporting metrics to determine each agency's progress under section 2 of this order;

(e) review and evaluate each agency's multi-year Strategic Sustainability Performance Plan under section 8 of this order and each update of the Plan;

(f) assess agency progress toward achieving the goals and policies of this order, and provide its assessment of the agency's progress to the OMB Director;

(g) within 120 days of the date of this order, provide the President with an aggregate Federal Government-wide target for reducing scope 1 and 2 greenhouse gas emissions in absolute terms by fiscal year 2020 relative to a fiscal year 2008 baseline;

(h) within 270 days of the date of this order, provide the President with an aggregate Federal Government-wide target for reducing scope 3 greenhouse gas emissions in absolute terms by fiscal year 2020 relative to a fiscal year 2008 baseline;

(i) establish and disband, as appropriate, interagency working groups to provide recommendations to the CEQ for areas of Federal agency operational and managerial improvement associated with the goals of this order; and

(j) administer the Presidential leadership awards program, established under subsection 4(c) of Executive Order 13423, to recognize exceptional and outstanding agency performance with respect to achieving the goals of this order and to recognize extraordinary innovation, technologies, and practices employed to achieve the goals of this order.

Sec. 6. Duties of the Federal Environmental Executive. The Federal Environmental Executive designated by the President to head the Office of the Federal Environmental Executive, pursuant to section 6 of Executive Order 13423, shall:

(a) identify strategies and tools to assist Federal implementation efforts under this order, including through the sharing of best practices from successful Federal sustainability efforts; and

(b) monitor and advise the CEQ Chair and the OMB Director on the agencies' implementation of this order and their progress in achieving the order's policies and goals.

Sec. 7. Agency Senior Sustainability Officers. (a) Within 30 days of the date of this order, the head of each agency shall designate from among

the agency's senior management officials a Senior Sustainability Officer who shall be accountable for agency conformance with the requirements of this order; and shall report such designation to the OMB Director and the CEQ Chair.

(b) The Senior Sustainability Officer for each agency shall perform the functions of the senior agency official designated by the head of each agency pursuant to section 3(d)(i) of Executive Order 13423 and shall be responsible for:

- (i) preparing the targets for agency-wide reductions and the inventory of greenhouse gas emissions required under subsections 2(a), (b), and (c) of this order;
- (ii) within 240 days of the date of this order, and annually thereafter, preparing and submitting to the CEQ Chair and the OMB Director, for their review and approval, a multi-year Strategic Sustainability Performance Plan (Sustainability Plan or Plan) as described in section 8 of this order;
- (iii) preparing and implementing the approved Plan in coordination with appropriate offices and organizations within the agency including the General Counsel, Chief Information Officer, Chief Acquisition Officer, Chief Financial Officer, and Senior Real Property Officers, and in coordination with other agency plans, policies, and activities;
- (iv) monitoring the agency's performance and progress in implementing the Plan, and reporting the performance and progress to the CEQ Chair and the OMB Director, on such schedule and in such format as the Chair and the Director may require; and
- (v) reporting annually to the head of the agency on the adequacy and effectiveness of the agency's Plan in implementing this order.

Sec. 8. Agency Strategic Sustainability Performance Plans. Each agency shall develop, implement, and annually update an integrated Strategic Sustainability Performance Plan that will prioritize agency actions based on lifecycle return on investment. Each agency Plan and update shall be subject to approval by the OMB Director under section 4 of this order. With respect to the period beginning in fiscal year 2011 and continuing through the end of fiscal year 2021, each agency Plan shall:

- (a) include a policy statement committing the agency to compliance with environmental and energy statutes, regulations, and Executive Orders;
- (b) achieve the sustainability goals and targets, including greenhouse gas reduction targets, established under section 2 of this order;
- (c) be integrated into the agency's strategic planning and budget process, including the agency's strategic plan under section 3 of the Government Performance and Results Act of 1993, as amended (5 U.S.C. 306);
- (d) identify agency activities, policies, plans, procedures, and practices that are relevant to the agency's implementation of this order, and where necessary, provide for development and implementation of new or revised policies, plans, procedures, and practices;
- (e) identify specific agency goals, a schedule, milestones, and approaches for achieving results, and quantifiable metrics for agency implementation of this order;
- (f) take into consideration environmental measures as well as economic and social benefits and costs in evaluating projects and activities based on lifecycle return on investment;
- (g) outline planned actions to provide information about agency progress and performance with respect to achieving the goals of this order on a publicly available Federal website;
- (h) incorporate actions for achieving progress metrics identified by the OMB Director and the CEQ Chair;
- (i) evaluate agency climate-change risks and vulnerabilities to manage the effects of climate change on the agency's operations and mission in both the short and long term; and

(j) identify in annual updates opportunities for improvement and evaluation of past performance in order to extend or expand projects that have net lifecycle benefits, and reassess or discontinue under-performing projects.

Sec. 9. Recommendations for Greenhouse Gas Accounting and Reporting. The Department of Energy, through its Federal Energy Management Program, and in coordination with the Environmental Protection Agency, the Department of Defense, the General Services Administration, the Department of the Interior, the Department of Commerce, and other agencies as appropriate, shall:

(a) within 180 days of the date of this order develop and provide to the CEQ Chair recommended Federal greenhouse gas reporting and accounting procedures for agencies to use in carrying out their obligations under subsections 2(a), (b), and (c) of this order, including procedures that will ensure that agencies:

(i) accurately and consistently quantify and account for greenhouse gas emissions from all scope 1, 2, and 3 sources, using accepted greenhouse gas accounting and reporting principles, and identify appropriate opportunities to revise the fiscal year 2008 baseline to address significant changes in factors affecting agency emissions such as reorganization and improvements in accuracy of data collection and estimation procedures or other major changes that would otherwise render the initial baseline information unsuitable;

(ii) consider past Federal agency efforts to reduce greenhouse gas emissions; and

(iii) consider and account for sequestration and emissions of greenhouse gases resulting from Federal land management practices;

(b) within 1 year of the date of this order, to ensure consistent and accurate reporting under this section, provide electronic accounting and reporting capability for the Federal greenhouse gas reporting procedures developed under subsection (a) of this section, and to the extent practicable, ensure compatibility between this capability and existing Federal agency reporting systems; and

(c) every 3 years from the date of the CEQ Chair's issuance of the initial version of the reporting guidance, and as otherwise necessary, develop and provide recommendations to the CEQ Chair for revised Federal greenhouse gas reporting procedures for agencies to use in implementing subsections 2(a), (b), and (c) of this order.

Sec. 10. Recommendations for Sustainable Locations for Federal Facilities. Within 180 days of the date of this order, the Department of Transportation, in accordance with its Sustainable Partnership Agreement with the Department of Housing and Urban Development and the Environmental Protection Agency, and in coordination with the General Services Administration, the Department of Homeland Security, the Department of Defense, and other agencies as appropriate, shall:

(a) review existing policies and practices associated with site selection for Federal facilities; and

(b) provide recommendations to the CEQ Chair regarding sustainable location strategies for consideration in Sustainability Plans. The recommendations shall be consistent with principles of sustainable development including prioritizing central business district and rural town center locations, prioritizing sites well served by transit, including site design elements that ensure safe and convenient pedestrian access, consideration of transit access and proximity to housing affordable to a wide range of Federal employees, adaptive reuse or renovation of buildings, avoidance of development of sensitive land resources, and evaluation of parking management strategies.

Sec. 11. Recommendations for Federal Local Transportation Logistics. Within 180 days of the date of this order, the General Services Administration, in coordination with the Department of Transportation, the Department of

the Treasury, the Department of Energy, the Office of Personnel Management, and other agencies as appropriate, shall review current policies and practices associated with use of public transportation by Federal personnel, Federal shuttle bus and vehicle transportation routes supported by multiple Federal agencies, and use of alternative fuel vehicles in Federal shuttle bus fleets, and shall provide recommendations to the CEQ Chair on how these policies and practices could be revised to support the implementation of this order and the achievement of its policies and goals.

Sec. 12. Guidance for Federal Fleet Management. Within 180 days of the date of this order, the Department of Energy, in coordination with the General Services Administration, shall issue guidance on Federal fleet management that addresses the acquisition of alternative fuel vehicles and use of alternative fuels; the use of biodiesel blends in diesel vehicles; the acquisition of electric vehicles for appropriate functions; improvement of fleet fuel economy; the optimizing of fleets to the agency mission; petroleum reduction strategies, such as the acquisition of low greenhouse gas emitting vehicles and the reduction of vehicle miles traveled; and the installation of renewable fuel pumps at Federal fleet fueling centers.

Sec. 13. Recommendations for Vendor and Contractor Emissions. Within 180 days of the date of this order, the General Services Administration, in coordination with the Department of Defense, the Environmental Protection Agency, and other agencies as appropriate, shall review and provide recommendations to the CEQ Chair and the Administrator of OMB's Office of Federal Procurement Policy regarding the feasibility of working with the Federal vendor and contractor community to provide information that will assist Federal agencies in tracking and reducing scope 3 greenhouse gas emissions related to the supply of products and services to the Government. These recommendations should consider the potential impacts on the procurement process, and the Federal vendor and contractor community including small businesses and other socioeconomic procurement programs. Recommendations should also explore the feasibility of:

- (a) requiring vendors and contractors to register with a voluntary registry or organization for reporting greenhouse gas emissions;
- (b) requiring contractors, as part of a new or revised registration under the Central Contractor Registration or other tracking system, to develop and make available its greenhouse gas inventory and description of efforts to mitigate greenhouse gas emissions;
- (c) using Federal Government purchasing preferences or other incentives for products manufactured using processes that minimize greenhouse gas emissions; and
- (d) other options for encouraging sustainable practices and reducing greenhouse gas emissions.

Sec. 14. Stormwater Guidance for Federal Facilities. Within 60 days of the date of this order, the Environmental Protection Agency, in coordination with other Federal agencies as appropriate, shall issue guidance on the implementation of section 438 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17094).

Sec. 15. Regional Coordination. Within 180 days of the date of this order, the Federal Environmental Executive shall develop and implement a regional implementation plan to support the goals of this order taking into account energy and environmental priorities of particular regions of the United States.

Sec. 16. Agency Roles in Support of Federal Adaptation Strategy. In addition to other roles and responsibilities of agencies with respect to environmental leadership as specified in this order, the agencies shall participate actively in the interagency Climate Change Adaptation Task Force, which is already engaged in developing the domestic and international dimensions of a U.S. strategy for adaptation to climate change, and shall develop approaches through which the policies and practices of the agencies can be made compatible with and reinforce that strategy. Within 1 year of the date of

this order the CEQ Chair shall provide to the President, following consultation with the agencies and the Climate Change Adaptation Task Force, as appropriate, a progress report on agency actions in support of the national adaptation strategy and recommendations for any further such measures as the CEQ Chair may deem necessary.

Sec. 17. Limitations. (a) This order shall apply to an agency with respect to the activities, personnel, resources, and facilities of the agency that are located within the United States. The head of an agency may provide that this order shall apply in whole or in part with respect to the activities, personnel, resources, and facilities of the agency that are not located within the United States, if the head of the agency determines that such application is in the interest of the United States.

(b) The head of an agency shall manage activities, personnel, resources, and facilities of the agency that are not located within the United States, and with respect to which the head of the agency has not made a determination under subsection (a) of this section, in a manner consistent with the policy set forth in section 1 of this order to the extent the head of the agency determines practicable.

Sec. 18. Exemption Authority.

(a) The Director of National Intelligence may exempt an intelligence activity of the United States, and related personnel, resources, and facilities, from the provisions of this order, other than this subsection and section 20, to the extent the Director determines necessary to protect intelligence sources and methods from unauthorized disclosure.

(b) The head of an agency may exempt law enforcement activities of that agency, and related personnel, resources, and facilities, from the provisions of this order, other than this subsection and section 20, to the extent the head of an agency determines necessary to protect undercover operations from unauthorized disclosure.

(c) (i) The head of an agency may exempt law enforcement, protective, emergency response, or military tactical vehicle fleets of that agency from the provisions of this order, other than this subsection and section 20.

(ii) Heads of agencies shall manage fleets to which paragraph (i) of this subsection refers in a manner consistent with the policy set forth in section 1 of this order to the extent they determine practicable.

(d) The head of an agency may exempt particular agency activities and facilities from the provisions of this order, other than this subsection and section 20, where it is in the interest of national security. If the head of an agency issues an exemption under this section, the agency must notify the CEQ Chair in writing within 30 days of issuance of the exemption under this subsection. To the maximum extent practicable, and without compromising national security, each agency shall strive to comply with the purposes, goals, and implementation steps in this order.

(e) The head of an agency may submit to the President, through the CEQ Chair, a request for an exemption of an agency activity, and related personnel, resources, and facilities, from this order.

Sec. 19. Definitions. As used in this order:

(a) "absolute greenhouse gas emissions" means total greenhouse gas emissions without normalization for activity levels and includes any allowable consideration of sequestration;

(b) "agency" means an executive agency as defined in section 105 of title 5, United States Code, excluding the Government Accountability Office;

(c) "alternative fuel vehicle" means vehicles defined by section 301 of the Energy Policy Act of 1992, as amended (42 U.S.C. 13211), and otherwise includes electric fueled vehicles, hybrid electric vehicles, plug-in hybrid electric vehicles, dedicated alternative fuel vehicles, dual fueled alternative

fuel vehicles, qualified fuel cell motor vehicles, advanced lean burn technology motor vehicles, self-propelled vehicles such as bicycles and any other alternative fuel vehicles that are defined by statute;

(d) "construction and demolition materials and debris" means materials and debris generated during construction, renovation, demolition, or dismantling of all structures and buildings and associated infrastructure;

(e) "divert" and "diverting" means redirecting materials that might otherwise be placed in the waste stream to recycling or recovery, excluding diversion to waste-to-energy facilities;

(f) "energy intensity" means energy consumption per square foot of building space, including industrial or laboratory facilities;

(g) "environmental" means environmental aspects of internal agency operations and activities, including those aspects related to energy and transportation functions;

(h) "excluded vehicles and equipment" means any vehicle, vessel, aircraft, or non-road equipment owned or operated by an agency of the Federal Government that is used in:

(i) combat support, combat service support, tactical or relief operations, or training for such operations;

(ii) Federal law enforcement (including protective service and investigation);

(iii) emergency response (including fire and rescue); or

(iv) spaceflight vehicles (including associated ground-support equipment);

(i) "greenhouse gases" means carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride;

(j) "renewable energy" means energy produced by solar, wind, biomass, landfill gas, ocean (including tidal, wave, current, and thermal), geothermal, municipal solid waste, or new hydroelectric generation capacity achieved from increased efficiency or additions of new capacity at an existing hydroelectric project;

(k) "scope 1, 2, and 3" mean:

(i) scope 1: direct greenhouse gas emissions from sources that are owned or controlled by the Federal agency;

(ii) scope 2: direct greenhouse gas emissions resulting from the generation of electricity, heat, or steam purchased by a Federal agency; and

(iii) scope 3: greenhouse gas emissions from sources not owned or directly controlled by a Federal agency but related to agency activities such as vendor supply chains, delivery services, and employee travel and commuting;

(l) "sustainability" and "sustainable" mean to create and maintain conditions, under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirements of present and future generations;

(m) "United States" means the fifty States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, and the Northern Mariana Islands, and associated territorial waters and airspace;

(n) "water consumption intensity" means water consumption per square foot of building space; and

(o) "zero-net-energy building" means a building that is designed, constructed, and operated to require a greatly reduced quantity of energy to operate, meet the balance of energy needs from sources of energy that do not produce greenhouse gases, and therefore result in no net emissions of greenhouse gases and be economically viable.

Sec. 20. *General Provisions.*

(a) This order shall be implemented in a manner consistent with applicable law and subject to the availability of appropriations.

(b) Nothing in this order shall be construed to impair or otherwise affect the functions of the OMB Director relating to budgetary, administrative, or legislative proposals.

(c) This order is intended only to improve the internal management of the Federal Government and is not intended to, and does not create any right or benefit, substantive or procedural, enforceable at law or in equity by any party against the United States, its departments, agencies, or entities, its officers, employees, or agents, or any other person.



THE WHITE HOUSE,
Washington, October 5, 2009.

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APPENDIX F
ENERGY INDEPENDENCE AND SECURITY ACT OF 2007

Due to the large size of this document it is not possible to attach it to this plan. Please access the document at:

http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:h6enr.txt.pdf

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GLOSSARY

AAF	Army Airfield
AAFES	Army Air Force Exchange Service
ACSIM	Assistant Chief of Staff, Installation Management
AC&R	Air Conditioning & Refrigeration
AEDB-EQ	Army Environmental Database Program – Environmental Quality
AFSC	Army Field Command
AFV	Alternative Fueled Vehicle
AGM	Absorbed Glass Mat
AMCOM	Aviation and Missile Life Cycle Management Command
AP	Affirmative Procurement
ARC	Army Recycling Center
ASE	Army Strategy for the Environment
ATSM	American Society for Testing and Materials
AUL	Authorized Use List
BTU	British Thermal Units
BMP	Best Management Practices
C&D	Construction and Demolition
CAA	Clean Air Act
CAR	Contracting Action Report
CCC	Chromate Conversion Coating
CCL	Contaminate Candidate List
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFC	Chlorofluorocarbon
CFR	Code of Federal Regulations
CID	Commercial Item Description
CINCPAC	Commander-in-Chief, Pacific
CMRM	Chemical and Material Risk Management Plan
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CPG	Comprehensive Procurement Guidelines
CWA	Clean Water Act
CY	Calendar Year
DA	Department of the Army
DFMWR	Directorate of Family and Morale, Welfare, and Recreation
DOD	Department of Defense
DOE	Department of Energy
DOH	Department of Health
DOL	Directorate of Logistics

DOT	Department of Transportation
DPW	Directorate of Public Works
DRMO	Defense Reutilization and Marketing Office
DSCR	Defense Supply Center Richmond
E85	Alternative fuel with 85% ethanol, 15% gasoline
EC	Emerging Contaminant
ECO	Environmental Compliance Officer
EI	Emissions inventory
EISA 2007	Energy Independence and Security Act of 2007
EMS	Environmental Management System
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPAct	Energy Policy Act of 1992 and 2005
EPAS	Environmental Performance Assessment System
EPCRA	Emergency Planning and Community Right-to-Know Act
EPEAT	Electronic Product Environmental Assessment Tool
EQCC	Environmental Quality Control Committee
FAR	Federal Acquisition Regulations
FEC	Federal Electronics Challenge
FEDS	Flexible Emissions Diagnostic System
FEMP	Federal Energy Management Program
FOV	Family of Vehicles
ft ²	Square Foot
FRS	Forward Repair System
FY	Fiscal Year
gal	Gallon
GC	Garrison Commander
GHG	Green House Gases
GP	Green Procurement
GPC	Government Purchase Card
gpm	gallons per minute
GPP	Green Procurement Program
GSA	General Services Administration
GVWR	Gross Vehicle Weight Rating
GW	Ground Water
HAP	Hazardous Air Pollutant
HAZMAT	Hazardous Material
HEV	Hybrid Electric Vehicle
HFCs	Hydrofluorocarbons
HI	Hawaii
HM	Hazardous Material
HMCP	Hazardous Material Control Point

HMMP	Hazardous Management Program
HMMS	Hazardous Material Management System
HQDA	Headquarters, Department of the Army
hr	Hour
HMMP	Hazardous Substance Management System
HVAC	Heating, Ventilation, and Air Conditioning
HW	Hazardous Waste
ICAP	Installation Corrective Action Plan
IMCOM	Installation Management Command
IRIS	integrated Risk information System
kg	Kilogram
lb	Pound
LEED	Leadership in Energy and Environmental Design
LPG	Liquefied Petroleum Gas
LSS	Lean Six Sigma
m ²	Square Meter
MACOM	Major Army Command
MERIT	Materials of Emerging Regulatory Interest Team
MGD	Million Gallons per Day
MoM	Measure of Merit
mpg	Miles per Gallon
MS4	Municipal Separate Storm Sewer System
MSA	Metropolitan Statistical Area
MSC	Major Subordinate Command
MSW	Municipal Solid Waste
MWR	Morale, Welfare, and Recreation
NA	Not Applicable/Not Available
NAAQS	National Ambient Air Quality Standards
ND	No Data
NDAA	National Defense Authorization Act
NO _x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NR	Not Reported
NSN	National Stock Number
OCD	Open Circuit Voltage Check
ODS	Ozone Depleting Substance
ODUSD (I&E)	Office of Deputy Under Secretary of Defense (Installations and Environment)
OSHA	Occupational Safety and Health Administration

P2	Pollution Prevention
P2OA	Pollution Prevention Opportunity Assessment
PAIO	Plans, Analysis, and Integration Office
PCB	Polychlorinated Biphenyl
PCE	Perchloroethylene
PIHs	Plug-in-Hybrids
PIR	Plug-in Rechargeable
PM ₁₀	Particulate Matter w/aerodynamic diameter of 10 microns (10 ⁻⁶ meters)
POL	Petroleum, Oil, and Lubricant
PPA	Pollution Prevention Act
PPE	Personal Protective Equipment
ppm	Parts per Million
PTA	Pohakuloa Training Area
QC	
QRP	Qualified Recycling Program
RCRA	Resource Conservation and Recovery Act
RDX	Research Department Explosive (Cyclotrimethylenetrinitramine)
SAIC	Science Applications International Corporation
SATS	Standard Automotive Tool Set
SB	Schofield Barracks
SEM	Sustainable Environmental Management
SF6	Sulfur Hexafluoride
SIECM	Services and Infrastructure Contract Management
SNAP	Significant New Alternatives Policy
SO ₂	Sulfur Dioxide
SPiriT	Sustainable Project Rating Tool
SSA	Supply Support Activity
SSAP	Strategic Sustainability Action Plan
SW	Solid Waste
SWAR	Solid Waste Annual Report
SWARWeb	Web-Based Solid Waste Annual Report
SWARS	Solid Waste Annual Report Software
SWMA	Solid Waste Management Act
t	Ton
TAMC	Tripler Army Medical Center
TAP	Transfer Accumulation Point
TBD	To Be Determined
TCE	Trichloroethylene
TCLP	Toxic Characteristic Leaching Procedure
TRI	Toxic Release Inventory
UIC	Underground Injection Control

USACE	U.S. Army Corps of Engineers
USACHPPM	United States Army Center for Health Promotion and Preventive Medicine
USAG-HI	U.S. Army Garrison-Hawaii
USARPAC	U.S. Army Pacific
USASCH	U.S. Army Support Command, Hawaii
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
UST	Underground Storage Tank
V	Volt
VOC	Volatile Organic Compound
VRLA	Valve Regulated Lead Acid
W	Watts
WAAF	Wheeler Army Airfield
WTE	Waste to Energy
WWTP	Waste Water Treatment Facility
yr	Year