Pollution Prevention Plan

Prepared for:

MARINE CORPS AIR STATION

Miramar

San Diego, California

Prepared by:

The Alliance Compliance Group Joint Venture

28 September 2009

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LIST OF ACRONYMS

AC/S	Assistant Chief of Staff
AFFF	Aqueous Film Forming Foam
AFV	alternative-fueled vehicle
AST	aboveground storage tank
AUL	Authorized Use List
BEQ	Bachelor Enlisted Quarters
BMP	Best Management Practice
CAAA	1990 Amendments to Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CETEP	Comprehensive Environmental Training and Education Program
CG	Commanding General
CMC	Commandant of the Marine Corps
CNG	compressed natural gas
CO	carbon dioxide
CWC	California Waste Code
DLA	Defense Logistics Agency
DoD	Department of Defense
DTSC	Department of Toxic Substances Control
EMD	Environmental Management Department
EMH	Environmental Management Hierarchy
EMS	Environmental Management System
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPAct	The Energy Policy Act of 1992
EPCRA	Emergency Planning and Community Right-to-Know Act
FEE	Federal Environmental Executive
FOD	Foreign Object Damage/Foreign Object Debris
FSC	Federal Supply Class
FY	Fiscal Year
gpd	gallons per day
GPP	Green Procurement Program
GSE	ground support equipment
HAP	hazardous air pollutant
HAZMIN	Hazardous Material Minimization
HMBP	Hazardous Material Business Plan
HQMC	Headquarters Marine Corps
IR	Installation Restoration
lb	pound
LFF	CMC Facilities Branch
LFL	Land Use Military Construction Branch

LIST OF ACRONYMS (CONTINUED)

MAG	Marine Aircraft Group
MAW	Marine Aircraft Wing
MMBtu/ksf	Million British thermal units per thousand square feet
MCAS	Marine Corps Air Station
MCCS	Marine Corps Community Services
MCO	Marine Corps Order
MOM	Measures of Merit
MOU	Memorandum of Understanding
MWSG	Marine Wing Support Group
NAS	Naval Air Station
NDAA	National Defense Authorization Act
NEPA	National Environmental Policy Act
NO_x	oxides of nitrogen
NR	Not Reported
OPPTD	Office of Pollution Prevention and Technology Development
OWS	Oil/Water Separator
oz	ounce
PACE	Marine Corps Pollution Prevention Approach to Compliance Efforts
PBT	persistent, bioaccumulating, or toxic
PM_{10}	particulate matter less than 10 microns in diameter
POA&M	Plan of Action and Milestones
POL	Petroleum, Oil, and Lubricant
PPOA	Pollution Prevention Opportunity Assessment
PSOA	Process-Specific Opportunity Assessment
PWD	Public Works Division
P2	Pollution Prevention
P2ADS	Pollution Prevention Annual Data Summary
QRP	Qualified Recycling Program
RCRA	Resource Conservation and Recovery Act
RY	Reporting Year
SB	Senate Bill
SDAPCD	San Diego Air Pollution Control District
SO_x	oxides of sulfur
SPCC	Spill Prevention, Control, and Countermeasure
SWRFT	Southwest Regional Fleet Transportation
TRI	Toxic Release Inventory
UST	underground storage tank
VOC	volatile organic compound

1. Introduction

In January 1989, the U.S. Environmental Protection Agency (EPA) proposed a new pollution prevention (P2) policy that would significantly change the course of environmental compliance and protection techniques across the country. This new commitment changed the traditional focus from pollution control to P2.

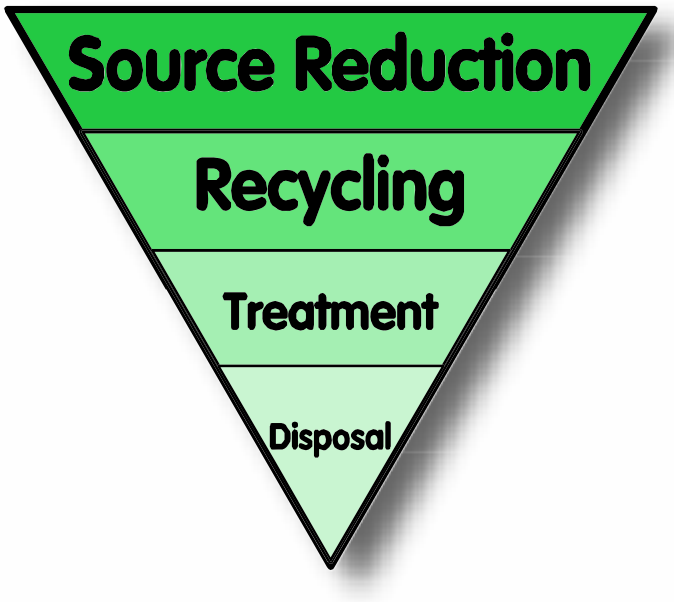
What is Pollution Prevention?

Pollution prevention is usually referred to as P2.

P2 is a way of reducing wastes and emissions by changing the way things are done. Its goal is to reduce the volume or toxicity of pollutants released to land, air, and water and aims at conserving our natural resources.

Marine Corps Air Station (MCAS) Miramar uses the following methods to reduce pollution:

- **Source reduction.** Reduces wastes at the source of generation. The best approach to waste reduction.
  - Example: Using less toxic paints and thinners.
- **Recycling.** Recycles the wastes on or off site.
  - Example: Antifreeze or lead-acid battery recycling.



Why Pollution Prevention?

The DoD uses P2 as its preferred approach to environmental management.

At MCAS Miramar P2 is required by federal legislation, Presidential Executive Orders (EO), and Department of Defense (DoD) mandates. P2 also offers a creative approach to environmental management and has many benefits, including, but not limited to:

- **Human Health and Safety and Environmental Protection**
  By reducing the amount and toxicity of pollutants right from the start, the quality of the environment is better preserved, which contributes to improved human health and safety.
  - Fewer air emissions = Cleaner air
  - Less hazardous waste = Less chance of spills
  - Conserving resources = Natural resources are preserved for years to come
- **Money Savings**
  P2 projects can reduce the amount of raw materials purchased and wastes that must be disposed of. P2 also can save money on facility operating costs like energy and water.
- **Good Community Relations**
  An active P2 program shows the community and regulators that MCAS Miramar is dedicated to a cleaner environment for California.
- **Environmental Compliance through P2**
  P2 can help MCAS Miramar reduce the cost of regulatory compliance. It also can reduce the risk of non-compliance and other liability risks.

Purpose of This P2 Plan

Cost Conscious!
P2 projects are selected in part based on their cost effectiveness. Most P2 projects save more money over their lifetime than they cost..

This P2 Plan establishes an installation-wide P2 program for MCAS Miramar. The P2 program:

1. Defines a broad, but concrete, approach to reducing pollution at MCAS Miramar;
2. Sets goals for reductions in all environmental media;
3. Establishes a baseline of all types of waste generated, tracks progress, and documents P2 projects; and
4. Provides practical tools for management to implement P2 at MCAS Miramar.

Regulations

The Marine Corps' P2 policies originate in legislation enacted by the U.S. Congress. 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 distributed publicly in Marine Corps Orders (MCOs), directives, guidance, instructions, and other policy documents. In addition, MCAS Miramar may adopt and implement supplemental policies to facilitate reaching established P2 goals for the organization.

This section *discusses the major laws, EOs, and DoD policies directly related to P2. See Chapters 5 through 10 for information about regulations for a specific medium.. Some of these media have an associated survey or report that discusses the applicable regulations in more detail..*

Federal P2 Legislation

Clean Air Act of 1970, as Amended

The 1990 Amendments to the Clean Air Act (CAAA) mandate P2 measures, such as the use of clean fuels and alternative-fueled vehicles (AFV).

Resource Conservation and Recovery Act of 1976

The Resource Conservation and Recovery Act of 1976 (RCRA) was the first major law requiring P2. It states, in part, "...it shall be a condition of any permit issued under this section for the treatment, storage, or disposal of hazardous waste on the premises where such waste was generated that the permittee certify, no less often than annually, that the generator of the hazardous waste 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."

Clean Water Act of 1977, as Amended

The 1987 Amendments to the Clean Water Act establish the regulation of storm water discharges from industrial facilities and require states to establish nonpoint source pollution management programs that identify best management practices (BMP) for reducing non-point source pollution.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requires generators of hazardous waste to evaluate and document their procedures for controlling the environmental impacts of their operations.

Hazardous and Solid Waste Amendments of 1984

The Hazardous and Solid Waste Amendments of 1984 require all RCRA-regulated generators of hazardous waste to develop waste minimization programs.

Emergency Planning and Community Right-to-Know Act of 1986

The Emergency Planning and Community Right-to-Know Act (EPCRA), which is Title III of the Superfund Amendments and Reauthorization Act, encourages and supports emergency planning and requires that the public receive timely and comprehensive information about possible or potential hazards associated with toxic chemical releases. Most notably, specific sections of EPCRA require immediate notification of releases of extremely hazardous substances and hazardous substances as defined under CERCLA to state and local emergency response planners.

EPCRA requires state and local coordination in planning response actions to chemical emergencies. Also, the act requires the submission of information on chemical inventories and releases.

Pollution Prevention Act of 1990

The Pollution Prevention Act of 1990 requires facilities that are required to report releases for the Toxic Release Inventory (TRI) under EPCRA (1986) to provide documentation of their procedures for preventing the release of, or for reusing these materials. However, this act goes beyond wastes designated as hazardous.

The intent of the act is to force industries to reduce or prevent pollution at the source. In addition to source reduction, it emphasizes reuse and closed-loop recycling, whenever possible. The emphasis is fundamentally different from off-site recycling, treatment, and disposal as primary ways to handle waste.

The Energy Policy Act of 1992

The Energy Policy Act of 1992 (EPAct) seeks to enhance the nation's long-term energy security by reducing dependency on imported oil, improving energy efficiency, and reducing air emissions from fossil fuels. EPAct establishes a federal leadership strategy that encourages automobile manufacturers and fuel suppliers to expand the commercial availability of alternative fuels and AFVs. Under EPAct, federal agencies must acquire increasing numbers of AFVs, reduce energy consumption, and increase energy efficiency. No later than 1 January 2005, each agency must, to the maximum extent practicable, install in federal buildings owned by the U.S. all energy and water conservation measures with payback periods of less than 10 years.

EPAct encourages the use of "alternative fuels" (i.e., those not derived from petroleum, which could help reduce U.S. dependence on imported oil for transportation). Congress established several regulatory activities within EPAct. These provisions focused on building an inventory of AFVs in large, centrally fueled fleets in metropolitan areas. EPAct established requirements for alternative-fuel providers and state and federal fleets to purchase light-duty AFVs. EPAct requirements apply to agency fleets of 20 or more light-duty vehicles (in this case, the DoD is considered the agency). Vehicles heavier than 8,500 pounds (lbs) gross vehicle weight rating, and law enforcement, emergency, and military tactical vehicles are exempt from EPAct requirements.

The EPAct established the specific goal that, beginning in fiscal year (FY) 2000 and thereafter, 75% of all covered light-duty vehicle acquisitions must be AFVs, agency-wide.

National Defense Authorization Act FY 2002

For FY 2005 and 2006, the National Defense Authorization Act (NDAA) of FY 2002 requires 5% of the procured light-duty trucks that fall under Section 303 of EPAct to be alternatively-fueled or hybrid vehicles. In FY 2007 and beyond, the percentage rises to 10 percent. Also, starting in FY 2005, NDAA Section 318 requires 100% of the light-duty (i.e., non-tactical) truck acquisitions not falling under Section 303 of EPAct to be hybrid.

State of California P2 Legislation

The State of California Department of Toxic Substances Control's (DTSC) P2 program promotes P2 by providing state leadership, guidance, and assistance to industry, local government, and other environmental agencies.

The objectives of DTSC's P2 program are to:

- Establish effective networks for communicating, promoting, and distributing P2 information;
- Promote and provide support to local P2 programs;
- Achieve measurable reductions in the generation of hazardous waste and/or the hazardous properties of waste produced in California through source reduction;
- Ensure that inspectors and permit staff at both the state and local levels promote P2 during routine regulatory activities;
- Expand current hazardous waste P2 efforts to include other environmental regulatory agencies, so as to achieve better overall environmental results and minimize the unwanted shift of pollutants between environmental media; and
- Develop detailed technical and broad-based materials that support P2 efforts.

Hazardous Waste Source Reduction and Management Review Act of 1989 (Senate Bill 14)

The Hazardous Waste Source Reduction and Management Review Act of 1989, or Senate Bill 14 (SB-14), requires hazardous waste generators to consider source reduction as the preferred method of managing hazardous waste. Source reduction is more desirable than recycling and treatment options because source reduction avoids waste generation costs and management liability. Also, source reduction provides the very best protection for public health and the environment.

SB-14 requires facilities generating more than 12,000 kilograms of hazardous waste, or 12 kilograms of extremely hazardous waste, annually to develop a Source Reduction Plan. The plan covers a four year period, and targets waste streams that represent 5% or more in weight of the hazardous waste routinely generated. MCAS Miramar developed a Source Reduction Plan in 2009.

Hazardous Waste Source Reduction – Toxic Chemical Releases (Senate Bill 1916)

The requirements of SB-1916 Statutes of 1999 build upon activities already conducted by DTSC to promote hazardous waste source reduction. SB-1916 requires certain organizational changes and specifies a set of activities designed to promote source reduction of hazardous waste using education, outreach, and other effective voluntary techniques.

Vehicle Service and Repair Project

As a result of the SB-1916 Statutes of 1999, the DTSC Office of Pollution Prevention and Technology Development (OPPTD) has instituted a program to promote the use of P2 methods in the vehicle service and repair industry in California. The program focuses on several typical activities in the vehicle service and repair shop, and introduces alternative methods that will reduce the amount of hazardous wastes generated, reduce operational costs, and increase shop operators' ability to comply with environmental regulations. These alternative methods include aqueous cleaning technologies for vehicle parts and brakes, antifreeze recycling, oil-life extension, use of re-refined oil, and dry floor cleaning methods. Fact sheets and videos describing P2 alternatives and implementation guidelines are available through OPPTD.

Presidential Executive Orders

Executive Order 13423, "Strengthening Federal Environment, Energy, and Transportation Management," January 2007

The federal government introduced EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management* on 24 January 2007. EO 13423 builds on the successes of past EOs through the integration of prior practices, strategies, and requirements to further enhance the environmental and energy performance and compliance requirements within the federal government.

EO13423 sets goals in the areas of energy efficiency, acquisition, renewable energy, toxics reductions, recycling, renewable energy, sustainable buildings, electronics stewardship, fleets, and water conservation. In addition, this order requires more widespread use of Environmental Management Systems (EMS) as the framework in which to manage and continually improve these sustainable practices. This EO requires federal agencies to lead by example in advancing the nation's energy security and environmental performance by achieving a set of agency goals. These goals are presented and discussed in Chapter 3.

EO 13423 replaces the "Greening the Government" series of EOs that were applicable to P2 and hazardous waste minimization. The following is a list of the EOs that was superseded upon the signing of EO 13423:

- EO 13101: *Greening the Government Through Waste Prevention Recycling and Federal Acquisition*;
- EO 13123: *Greening the Government through Efficient Energy Management*;
- EO 13134: *Developing and Promoting Biobased Products and Bioenergy*
- EO 13148: *Greening the Government Through Leadership in Environmental Management*; and
- EO 13149: *Greening the Government through Federal Fleet and Transportation Efficiency*.

DoD Directives and Instructions

DoD Instruction 4715.4, "Pollution Prevention," June 1996

DoD Instruction 4715.4 provides explicit guidance on P2 activities. It reiterates the P2 hierarchy principle, and establishes the DoD P2 measures of merit (MoM) for TRI release reduction, hazardous waste reduction, non-hazardous solid waste diversion, and AFVs. Note that the TRI and hazardous waste reduction goals became obsolete on 31 December 1999. As a result, the DoD is currently developing new MoMs that will be incorporated into this P2 Plan as soon as they become available.

DoD Memorandum, "New DoD P2 Measure of Merit," May 1998

This memorandum established solid waste MoMs to replace those in DoD Instruction 4715.4 (above). The MoM was established to "ensure that the diversion rate for non-hazardous solid waste is greater than 40 percent while ensuring integrated non-hazardous solid waste management programs provide an economic benefit when compared with disposal using landfilling and incineration alone." This goal was to be attained by the end of FY 2005.

Marine Corps Order P5090.2A – Environmental Compliance and Protection Manual, July 1998

MCO P5090.2A provides information on the Marine Corps Pollution Prevention Approach to Compliance Efforts (PACE). Through the PACE initiative, the Marine Corps will reduce the life-cycle costs of environmental compliance and enable installations to meet existing compliance requirements and alleviate future compliance costs by implementing P2 techniques to address compliance issues.

MCO P5090.2A provides information on achieving P2 goals that are in accordance with DoD policy, the Marine Corps PACE process, and the DoD P2 Strategy. In addition, this MCO details policy for P2 practices, training activities, plan development, and establishing outreach partnerships to share information technologies and provide information on Marine Corps P2 efforts.

Areas related to P2, and covered in this manual, include developing a qualified recycling program, energy and water conservation actions, reductions in hazardous materials and hazardous wastes, environmentally preferably purchasing, compliance through P2, and life-cycle cost-effectiveness.

DoD Green Procurement Strategy, "Green Procurement Policy, 2004"

This document formally established the DoD Green Procurement Program (GPP) in FY 2004 and provides an agency-wide strategy for implementing an effective program. The purpose of the DoD GPP is to enhance and sustain mission readiness through cost-effective acquisition that achieves compliance and reduces resource consumption and solid and hazardous waste generation. Green procurement is the purchase of environmentally preferable products and services in accordance with one or more of the established Federal "green" procurement preference programs. The GPP applies to all acquisitions from major systems programs to individual unit supply and service requisitions. A more detailed discussion of green procurement is presented in Chapter 11.

*This **P2 plan complies** with Navy and Marine Corps guidance for developing P2 plans.*

Environmental Management Systems

Headquarters Marine Corps (HQMC) issued a policy on 3 March 2004 defining the Marine Corps EMS applicability, implementation criteria, and reporting requirements. HQMC subsequently published additional policy on conformance with the Marine Corps EMS on 29 December 2004. This policy requires all Marine Corps installations and Marine Forces Reserve to fully conform to the Marine Corps EMS by 31 December 2007, and for all active and reserve tenant commands to fully support their host facility in attaining and maintaining conformance with their EMS. The Marine Corps policy also provides guidance in the form of an "EMS Conformance Guide" for evaluating, certifying, self-declaring, and reporting conformance with the Marine Corps EMS. Beginning in 2005, the policy also requires installations to use the well-established Marine Corps Environmental Compliance Evaluation Program to evaluate conformance. The Marine Corps developed and fielded an EMS awareness training module via the MarineNet training web site and CD-ROM. The Marine Corps has also developed an EMS portal for day-to-day, installation level EMS management that includes training tools and a web portal for access to EMS policies, procedures, and other EMS related documentation.

2 Installation Description, Mission, and Organization

Installation Description

Installation Location

MCAS Miramar occupies 23,606 acres in the northern portion of the City of San Diego. It is bordered by Interstate 805 on the west, State Highway 52 and Mission Trails Regional Park on the south, and the City of Santee and unincorporated San Diego on the east. Interstate 15 divides MCAS Miramar into two halves. West of Interstate 15 is the Main Station, which sits atop Kearney Mesa. East of Interstate 15 is known as East Miramar. The very eastern-most edge of MCAS Miramar is referred to as Sycamore Canyon.

MCAS Miramar location information is listed below:

EPA Identification Number:	CA9170024740
Generator's Name:	Marine Corps Air Station Miramar
Mailing Address:	Commanding Officer, MCAS Miramar Environmental Management Department PO Box 452001, Bldg 6022 San Diego, CA 92145-2001
SIC Code:	9711

Description of Operations

Approximately 19,940 military personnel, their dependents, and over 403 civilian employees serve at MCAS Miramar. MCAS Miramar is home to four subordinate units of the 3rd Marine Aircraft Wing (3d MAW), including jet fighter, helicopter, unmanned aircraft and supporting functions (see Figure 2-1). The majority of civilians work for Base command, Marine Corps Community Services (MCCS), and the Exchange. Marines serve in the units stationed at MCAS Miramar. The following is a brief description of the Station, major subordinate commands, and other tenant commands included in the P2 Plan.

MARINE AIRCRAFT GROUP (MAG) 11. The MAG-11 group operates eight jet fighter attack squadrons and one heavy lift squadron, which are listed below. Squadrons consist of FA-18 and C-130 aircraft. The P2 surveys targeted the MAG-11 aircraft maintenance processes.

- MALS-11
- VMFAT-101
- VMFA(AW)-121
- VMFA(AW)-225
- VMFA-232
- VMFA-314
- VMFA-323
- VMGR-352

MAG 16. MAG-16 operates nine Marine medium and heavy helicopter squadrons listed below. Squadron aircraft consist of CH-46 and CH-53 helicopters. The P2 surveys targeted the helicopter maintenance processes.

- MALS-16
- HMM-161
- HMM-163
- HMM-165
- HMM-166
- HMH-361
- HMH-462
- HMH-465
- HMH-466

MARINE WING SUPPORT GROUP (MWSG) 37. MWSG-37 provides logistical support for ground units through a single activity at MCAS Miramar, which is listed below. The P2 survey focused mainly on MWSG-37's motor vehicle and equipment maintenance processes.

- MWSS-373

MARINE AIR CONTROL GROUP 38 (MACG-38). MACG-38 is composed of five squadrons and one battalion that provide the 3rd Marine Aircraft Wings tactical headquarters, positive and procedural control to aircraft, air defense and Unmanned Aerial Vehicle support for the I Marine Expeditionary Force.

- 3rd Low Altitude Air Defense Battalion
- Marine Air Control Squadron 1
- Marine Air Support Squadron 3
- Marine Tactical Air Command Squadron 38
- Marine Wing Communications Squadron 38
- Marine Unmanned Aerial Vehicle Squadron 1
- Marine Unmanned Aerial Vehicle Squadron 3

NAVAL HOSPITAL. The Naval Hospital at MCAS Miramar provides medical and administrative support to personnel and dependents of MCAS Miramar. The Naval Hospital is responsible for maintaining the health of all eligible personnel through the promotion of physical fitness, prevention and control of diseases and injuries, and treatment and care of the sick and injured.

OTHER TENANT ORGANIZATIONS. Tenant organizations at MCAS Miramar are many and varied. These include: Marine Corps units whose parent commands are located elsewhere, units from other services, satellite offices of government agencies, and civilian organizations. Other tenants include the Naval Consolidated Brig, Public Works Department, Federal Aviation Administration, and MCCS.

Installation History

The first military presence came to MCAS Miramar during World War I when the U. S. Army training center known as Camp Kearny was developed. By the end of World War II, the southern portion of MCAS Miramar became an auxiliary landing field for Marine Corps Air Depot, Miramar.

Installation Description, Mission, and Organization

In 1947, the Marine Corps moved their operations to MCAS El Toro in Orange County, California. The Navy master plan then destined Miramar to become "Fightertown U.S.A." and on 1 April 1952, Naval Air Station (NAS) Miramar was established. The 1993 and 1995 Base Closure and Realignment Commission recommended the realignment of NAS Miramar to MCAS Miramar. With this decision and the hard work and dedication of both Navy and Marine Corps personnel, NAS Miramar reverted back to a Marine Corps installation on 1 October 1997.

MCAS Miramar Mission

The primary mission of MCAS Miramar is to maintain and operate facilities, provide services and material to support the operations of the 3d Marine Aircraft Wing and the other tenant organizations, and support all aircraft operations occurring on Station.

Commanding Officer

The Commanding Officer (CO) is responsible for developing and implementing a P2 program and an installation P2 Plan in accordance with MCO 5090.2. The CO is responsible for programming and budgeting for personnel, equipment, materials, training, and monitoring required to comply with P2 requirements and submitting project documentation and funding requirements to the Commandant of the Marine Corps (CMC) (LFL) and the CMC (LFF) See Figure 2-2 on the following page for the MCAS Miramar Command Organization Chart.

Environmental Program Organization

The P2 program will be more effective if it is integrated into existing environmental and energy programs. The following paragraphs describe the current organization of the Environmental Management Department (EMD). More detail is provided to describe the status of several key program areas that impact P2. Included in this discussion are sections on waste management practices; hazardous materials procurement and distribution; P2 efforts; storm water management; wastewater management; and TRI target chemical releases identified by the P2 survey.

Environmental Management Department Structure and Functions

The EMD S-7 is currently divided into four divisions, all headed by the Assistant Chief of Staff (AC/S) Environmental Management Officer and his Assistant. The EMD also has an Operations Officer, as shown on Figure 2-3.

Waste Management Division. The Waste Management Division manages Station and tenant hazardous waste and hazardous materials programs. The civilian staff consists of a Waste Management Division Director, and four Environmental Protection Specialists who manage P2, Spill Response, EPCRA, Compliance Inspections, and other Hazardous Waste/Hazardous Material programs.

Engineering Division. The Engineering Division civilian staff consists of a Team Lead and three Environmental Engineers who manage the air quality, water quality, Installation Restoration (IR), and underground / aboveground storage tank (UST/AST) programs.

Natural Resources Division. The Natural Resources Division manages both the natural and cultural resource programs, including environmental documentation and quality control processes

for MCAS Miramar. The civilian staff consists of a Natural Resources Division Director, a Wildlife Biologist, a Geographer, and a Botanist.

Program Support Division. The Program Support Division manages administrative requirements, budgeting, and National Environmental Policy Act (NEPA) documentation for MCAS Miramar. The civilian staff consists of a NEPA Planner Division Director, a Budget Analyst, a NEPA Planner, and an Administrative Information Support Specialist.

Installation and Logistics Department

Installation and Logistics Department S-4 is divided into four divisions as shown in Figure 2-4. The Public Works Division (PWD) S-4 is involved in the Green Initiative and Green Procurement Programs as part of its facility and energy functions.

Figure 2-1. 3D MAW Organization Chart

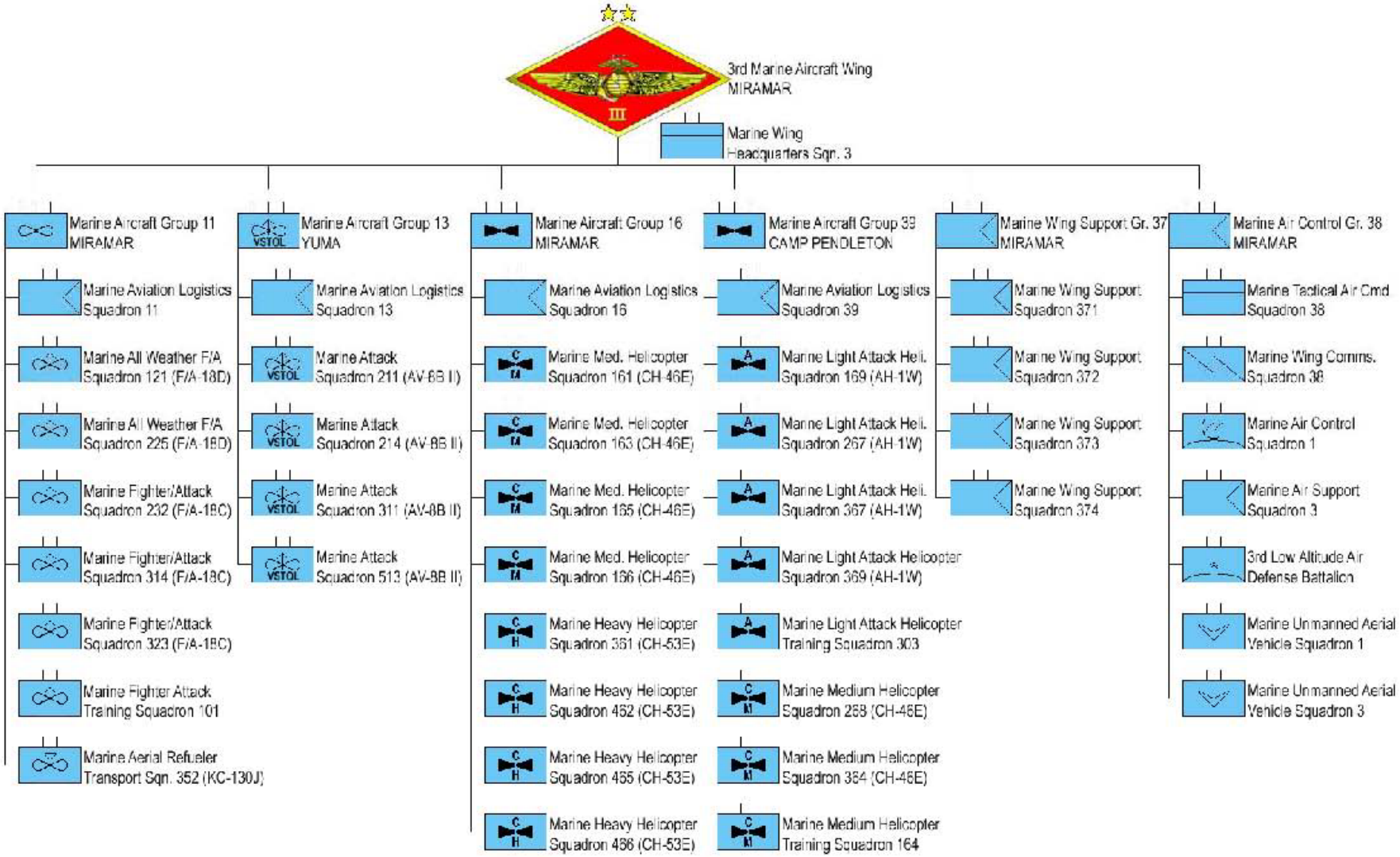


Figure 2-2. MCAS Miramar Command Organization Chart

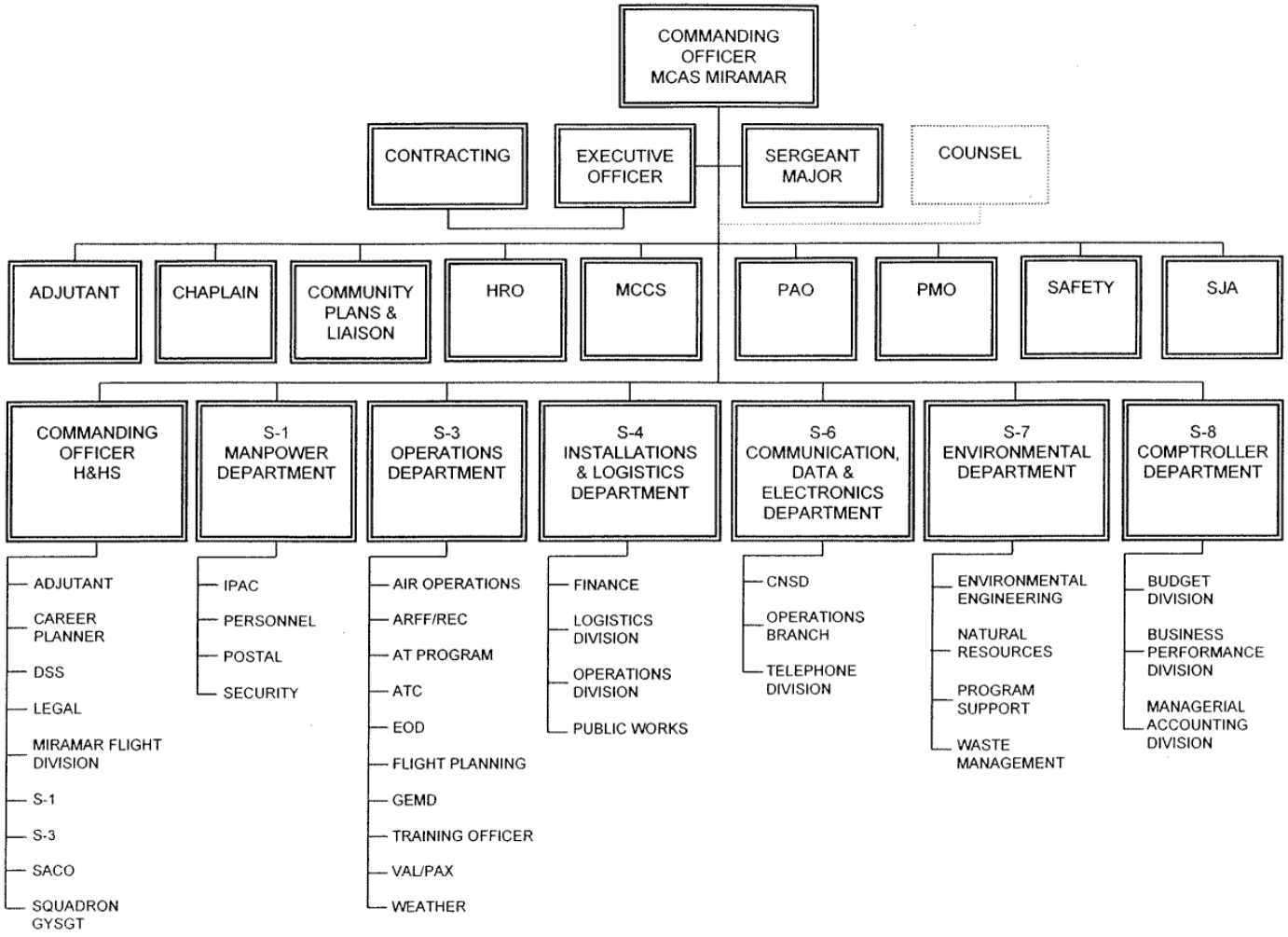


Figure 2-3. MCAS Miramar Environmental Management Department Organization Chart (S-7)

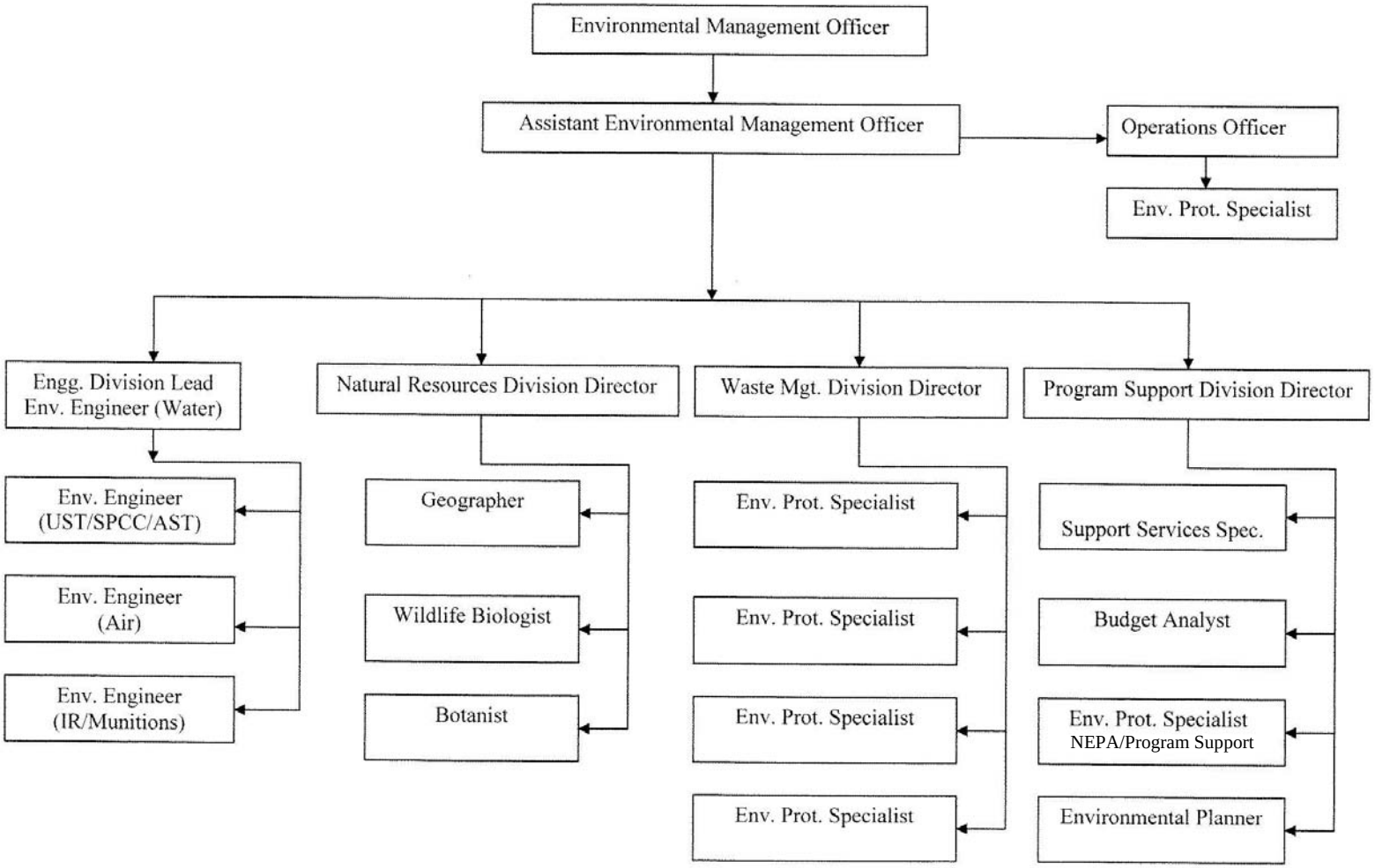


Figure 2-4. MCAS Miramar Installations and Logistics Department Chart (S-4)

3. Approach to P2 at MCAS Miramar

MCAS Miramar has a comprehensive, yet practical, approach to implementing P2. This chapter outlines MCAS Miramar's step-by-step approach to P2:

Step 1. Set policy.

Step 2. Set goals.

Step 3. Establish a baseline and measure progress.

Step 4. Identify and evaluate ideas for P2 projects.

Step 5. Put P2 projects into action.

Step 6. Track P2 projects and results.

Step 1. Set Policy

MCAS Miramar P2 Policy Statement

MCAS Miramar is committed to an active policy of protecting the environment through the following efforts:

- Providing a clean and safe environment in the community;
- Ensuring a safe and healthy workplace for all staff;
- Complying with all applicable laws and regulations;
- Reducing the use of hazardous substances;
- Reducing releases of pollutants to the environment;
- Conserving energy and natural resources;
- Maximizing recycling efforts; and
- Promoting P2 through education, training, and awareness.

MCAS MIRAMAR is committed *to reducing the negative environmental effects of its operations through its active P2 program. In support of this commitment, the MCAS Miramar P2 Policy Statement was created for distribution to all affected personnel.*

To accomplish these objectives, MCAS Miramar will continuously identify opportunities to reduce or eliminate pollution through source reduction and other prevention methods. This policy extends to all environmental media including hazardous waste, solid waste, air, water, and wastewater. P2 will be used to the maximum extent possible to reduce pollution, meet regulatory compliance requirements, and reduce environmental program life-cycle costs.

MCAS Miramar is committed to reducing the amount and toxicity of pollution it generates. As part of this commitment, priority is given to source reduction. Where source reduction is not feasible, it will investigate and implement other prevention measures such as recycling, treatment, and controlled disposal. P2 is the responsibility of everyone at MCAS Miramar.

Step 2. Set Goals

MCAS Miramar has set reduction goals for each environmental medium. These goals are based on environmental laws, EOs, DoD policies, and the guidance for developing Marine Corps P2 Plans, MCO 5090.2A. As new laws and policies are developed, P2 goals will change to meet policy demands.

*The **"Summary of P2 Goals and Regulatory Drivers"** table is located in the inside pocket of this plan for quick reference. Goals also are discussed in Chapters 5 through 10 for each respective medium.*

Executive Order 13423

The federal government introduced EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management* on 24 January 2007.

Table 3-1 provides a detailed summary of the elements and requirements presented in EO 13423. Note that requirements and goals presented in EO 13423 are for agencies, not individual bases or organizations. Each agency will be required to issue guidance to individual organizations within the agency to ensure these requirements are met. To date, DoD has not issued specific guidance to bases on what will be required at the base level to meet the agency requirements.

Table 3-1. Summary of EO 13423 Requirements

Element	Requirement	Baseline Year
Energy Efficiency	Agencies are required to improve their overall energy efficiency and reduce greenhouse gas emissions by 3% annually through the end of 2015 or 30% by the end of 2015, relative to the energy efficiency baseline year of 2003.	2003
Renewable Power	Each agency shall ensure that at least 50% of the statutorily required renewable energy consumed by the agency in a FY comes from renewable energy sources. In addition, to the extent feasible, the agency should implement renewable energy generation projects on agency property for agency use.	None
Water Conservation	Agencies are required to reduce water consumption intensity relative to the baseline year of the agency's water consumption in FY 2007. A 2% annual reduction through the end of 2015 or a 16% total reduction by 2015 is required to comply with this section of the EO. The Federal Energy Management Program has developed a guidance document to assist agencies in meeting water conservation requirements entitled *Establishing Baseline and Meeting Water Conservation Goals of Executive Order 13423*. The guidance document identifies and presents information on baseline development, efficiency opportunity identification and implementation, and necessary reporting requirements.	2007

Element	Requirement	Baseline Year
Procurement	Federal agencies are required to procure environmentally sound goods and services that are environmentally preferred, energy-efficient, water-efficient, and produced in a sustainable environmental manner. In addition, agencies must also acquire biobased and recycled-content products. Agencies are required to use paper with at least 30% post consumer-fiber content. Each agency shall purchase environmentally preferred products and services using the EPA's guidance on the *Acquisition of Environmentally Preferred Products and Services*.	None
P2	There are three main components of the P2 goal listed in EO 13423. First, agencies are required to reduce the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of through efficient material management. Second, agencies shall increase the diversion of solid waste as appropriate. Lastly, agencies shall maintain a cost-effective waste prevention and recycling program in its facilities. By 24 January 2008, each agency shall develop written goals and support actions to identify and reduce the release and use of toxic and hazardous chemicals that may result in significant harm to human health or the environment. By 30 May 2008, the Executive Committee will draft goals, roles, and responsibilities for lifecycle chemical management to lead the DoD toward systematic reductions in the use of toxic and hazardous chemicals. By 29 August 2008, the Executive Committee will issue an interim final policy memo launching a lifecycle chemical management program addressing, at a minimum, goals, roles, and responsibilities for the organizations represented on the EO 13423 Executive Committee.	None
	Agencies shall increase the diversion of solid waste as appropriate. By 24 April 2007, each agency shall establish solid waste diversion goals to be achieved by 31 December 2010. Each agency shall maintain waste prevention and recycling programs in the most cost-effective manner possible. At a minimum, agencies shall strive to meet the national 35% recycling goal established by the EPA.	2000
Building Performance	Agencies are mandated to the elements set forth by the High Performance Buildings Memorandum of Understanding (MOU) signed by 19 agencies in January 2006. Buildings shall be constructed or renovated in accordance with sustainability strategies, including resource conservation, reduction, and use; siting; and indoor environmental quality. From 1985 to 2005, on average, building energy use decreased 12.9%, or 16.3% energy intensity.	2007
Fleet Management	Each agency must increase the purchasing of alternative fuel, hybrid, and plug-in hybrid electronic vehicles when commercially available. Agencies must also reduce consumption of petroleum by fleet vehicles by 2% annually through 2015. Agencies are required to reduce energy intensity by 3% annually through 2015 or by 30% by 2015; by reducing energy intensity by 3% annually or 30% by 2015 a reduction of greenhouse gases will result.	2007

Element	Requirement	Baseline Year
Electronics Management	Agencies are mandated to the elements of the 2004 Federal Electronics Stewardship MOU signed by 12 agencies and the EO of the president. Annually, 95% of electronic products purchased must meet Electronic Product Environmental Assessment Tool standards where applicable; enable Energy Star® features on 100% of computers and monitors; and reuse, donate, sell or recycle 100% of electronic products using environmentally sound management practices. The federal government spends approximately $60 billion annually on information technology-related purchases.	2007

MCAS Miramar has set goals for reducing wastes and emissions and conserving resources in nearly every environmental medium. Many of these goals are driven by regulatory requirements. The baseline year (i.e., the year the goal is measured against), and the target year (i.e., the year that the goal should be reached) can all be found in Table 3-2.

Table 3-2. Summary of P2 Goals and Regulatory Drivers

Media	Goal	Source of Goal	Baseline Year	Target Year
Hazardous, Universal, and Industrial Waste	Develop a Source Reduction Plan targeting reductions in wastes streams 5% or greater of total hazardous waste.	SB-14	2006	2010
Solid Waste	Waste diversion goal – meet 35% recycling goal established by EPA.	EO 13423	2000	2010
	Reduce the amount of sludge generated by oil/water separators (OWS) (California Waste Code [CWC] 491).	SB-14	2006	2010
	Reduce the amount of saturated oily debris (CWC 223) generated by aircraft maintenance.	SB-14	2006	2010
	Reduce the amount of solvent based paint and paint related waste (CWC 461) generated.	SB-14	2006	2010
Air Emissions	Reduce greenhouse gas emissions by 3% annually through the end of 2015 or 30% by the end of 2015.	EO 13423	2003	2015
Energy Use	Improve overall energy efficiency and reduce greenhouse gas emissions by 3% annually through the end of 2015 or 30% by the end of 2015.	EO 13423	2003	2015
Electronics Management	Annually, 95% of electronic products purchased must meet Electronic Product Environmental Assessment Tool standards where applicable; enable Energy Star® features on 100% of computers and monitors; and reuse, donate, sell or recycle 100% of electronic products using environmentally sound management practices.	EO 13423	NA	NA

Media	Goal	Source of Goal	Baseline Year	Target Year
Pollution Prevention	Reduce the use of chemicals and toxic materials and purchase lower risk chemicals and toxic materials from top priority list. [1]	EO 13423	NA	NA
Building Performance	Construct or renovate buildings in accordance with sustainable strategies, including resource conservation, reduction, and use; siting; and indoor environmental quality.	EO 13423	NA	NA
Procurement	Procure environmentally sound goods and services that are environmentally preferred, energy-efficient, water-efficient, and produced in a sustainable environmental manner. Acquire biobased and recycled-content products, including paper with at least 30% post consumer-fiber content.	EO 13423	NA	NA
Renewable Power	At least 50% of current renewable energy purchases must come from new renewable sources (in service after 1 January 1999).	EO 13423	NA	NA
Vehicle Fuel	Expand purchases of environmentally-sound goods and services, including biobased products.	EO 13423	NA	NA
	Increase purchase of alternative fuel, hybrid, and plug-in hybrid electric vehicles when commercially available.	EO 13423	NA	NA
	Reduce petroleum consumption in fleet vehicles by 2% annually through 2015.	EO 13423	2005	2015
	Increase alternative fuel consumption at least 10% annually.	EO 13423	Measure Against Previous Year	Measure Against Previous Year
Water Conservation	Reduce water consumption intensity by 2% annually through 2015 or a 16% total reduction by 2015.	EO 13423	2007	2015
Program Management	Implement EMS at all appropriate organizational levels; ensure use of EMS as the primary management approach for addressing environmental aspects of internal agency operational and activities.	EO 13423	NA	NA

[1] DoD has not issued this list to date.

Step 3. Establish a Baseline and Measure Progress

Baseline data are important for two reasons:

1. Baseline data are used as a measuring stick: they can be compared with data in the future to determine if MCAS Miramar is reducing waste and emissions. Many of the goals are based on reducing waste by a certain percentage from a specific baseline year.

2. Baseline data and goals are used to target areas for P2. See "Step 4: Identify and Evaluate Ideas for P2 Projects" of this chapter for more information.

Baseline data were gathered for this P2 Plan for each medium. Some goal areas are simply measured against the previous years' generation/use, while others require a certain percentage reduction by the end of a target year from a baseline year. Table 3-2 contains baseline and target year information for each goal area as applicable. The baseline data for each medium are also contained in the respective chapters discussing each medium. Where more than one year of data is available, the progress made to-date in attaining the P2 goals was evaluated and is discussed. Data will need to be collected in future years to measure progress against the baseline data.

Step 4. Identify and Evaluate Ideas for P2 Projects

There are two primary ways to identify potential P2 projects:

- Pollution Prevention Opportunity Assessments (PPOA); and
- Idea Sharing.

The MCAS Miramar EMS is a formal process of managing and implementing environmental programs at MCAS Miramar. The EMS process works in parallel with the development of P2 projects.

***PPOAs** help to identify the best P2 options because they involve people with different types of expertise (including shop-level personnel) and because they provide such a thorough understanding of the waste-generating process.*

Pollution Prevention Opportunity Assessments

The PPOA is a tool to be used by MCAS Miramar organizations to evaluate hazardous waste streams and/or hazardous materials generated on site that have the potential to be replaced by more sustainable materials or reduced through operational and/or equipment changes. Conducting PPOAs is the most widely used method to identify ideas for P2 projects. They are the heart of the P2 program. The PPOA holds MCAS Miramar organizations responsible for identifying potential methods for minimizing pollutants that are generated as the result of their normal routine activities.

The PPOA will assist MCAS Miramar EMD in complying with EO 13423 and MCO 5090.2A P2 requirements, as well as other DoD directives, orders and guidance. These assessments will be performed on both a large and small scale. For waste streams generated by multiple organizations that impact goal achievement, large-scale, traditional PPOAs will be conducted using a team of base stakeholders, EMD personnel, and potentially outside contractors. For daily activities, small scale PPOAs will be conducted annually by Environmental Coordinators and shop supervisors.

For the small-scale PPOAs, MCAS Miramar organizations will be required to evaluate at least two hazardous waste streams and/or hazardous materials per year that have the potential to be replaced

or reduced. The Workcenter PPOA Form (Appendix C) will be completed and maintained by the Environmental Coordinators and will be used to document the P2 reviews.

The completed forms will be submitted to the EMD Hazardous Waste Management Division for review. These reviews will also be used to help select waste streams that may warrant a large-scale PPOA.

The PPOA process will ensure increased participation in P2 by Station organizations, improve implementation of P2 opportunities at the organizational level, and reinforce that P2 is everyone's responsibility.

MCAS Miramar will conduct PPOAs on processes as needed to identify and evaluate P2 ideas. Priority will be given to wastes or materials targeted for reduction by DoD and by the State.

Briefly, the steps to conduct a PPOA include the following:

1. **Establish a P2 team or task force and select a process to conduct the evaluation.** The team may include Hazardous Waste Coordinators, shop personnel, and any other appropriate managers.

2. **Conduct a site visit to observe the process.** The team thoroughly examines all input sources, material use, and waste generation by type and weight.

3. **Have a brainstorming session.** The Team will work with Station organizations to formulate ideas to reduce waste and emissions and conserve resources.

4. **Evaluate all P2 ideas.** Assess P2 opportunities for their ability to meet MCAS Miramar mission and environmental requirements at a minimum life-cycle cost. The basic question that needs to be answered is, "Will the opportunity work in this specific application and achieve the mission goals?"

Idea Sharing

Sometimes a P2 opportunity is fairly simple and does not involve capital purchases or major changes to the process. Examples include purchasing only as much of a chemical as is needed, or participating in the re-refined oil program. These ideas can be put into action without detailed evaluation, and shop personnel can start using them right away. Hazardous Waste Coordinators can help by sharing information on these new ideas with other shop personnel.

Selecting P2 Projects

Rank the process-specific opportunities before prioritizing and selecting P2 initiatives for implementation. The following project scoring methodology presented in Table 3-3 should be used to evaluate and select P2 projects. Note that a high score corresponds to a high priority for implementation. The maximum score an option can receive is 20.

See Appendix C *for a list of online references that are loaded with "off-the-shelf" P2 ideas.*

Table 3-3. P2 Project Scoring Methodology

Criteria	Contributing Factors	Weight	Scoring System
Marine Corps P2 Goal	▪ Contribution to meeting numeric goals	1.0	5 = 60-100% reduction 4 = 33-60% reduction 3 = 20-33% reduction 2 = 10-20% reduction 1 = 1-10% reduction 0 = no reduction
Cost	▪ Annual costs ▪ Capital costs ▪ Payback period	1.0	5 = 1 year or less 4 = 1-2 years 3 = 2-5 years 2 = 5-8 years 1 = >8 years
Environmental impact	▪ Environmental benefit ▪ Safety improvement ▪ Improvement to image as environmental steward and good neighbor	0.8	5 = very positive benefit 4 = substantial benefit 3 = some benefit 2 = minimal benefit 1 = no benefit
Compliance	▪ Legal liability	0.6	5 = currently out of compliance 4 = out of compliance in 1 year 3 = out of compliance in 2-4 years 2 = future (>4 years) requirement 1 = not a compliance issue
Technical Feasibility	▪ Maturity of technology ▪ Impact on mission ▪ Required expertise	0.6	5 = in use at other Marine Corps installations 4 = in use at other federal facilities 3 = in use in industry 2 = new process/equipment 1 = research and development

Step 5. Put P2 Projects into Action

Once a P2 idea is selected, it needs to be carried out. Sometimes this will involve getting approval for the change. MCAS Miramar will ensure that any change to a process complies with all applicable lubrication orders, technical manuals, or military specifications.

If a P2 project requires a capital purchase, funding will need to be obtained. Money can come from the process organization itself or from funds available for P2 projects.

Plans and schedules for implementing a P2 project should be detailed in the P2 Opportunity Plan of Action and Milestones (POA&M).

See the "Detailed Planning" section *of "A Guide to the Navy's Environmental Quality Initiative – Using Pollution Prevention to Achieve Environmental Excellence" for guidance on creating a POA&M.*

Step 6. Track P2 Projects and Results

Initial baseline data are extremely helpful to track P2 projects and results. Waste generation quantities can be compared before and after a P2 project is implemented to determine if the P2 project helped to reduce waste. Sometimes the data are not detailed enough to evaluate the project's effectiveness. In this case, the project can be evaluated qualitatively.

Following implementation, it is essential to track pollutant reductions and other benefits of the project. The POA&M documents progress toward accomplishing the P2 and compliance goals outlined in this P2 Plan and helps to ensure the success of installation P2 projects and gain support for additional P2 projects.

Pollutant reductions and regulatory compliance benefits resulting from the P2 projects should be quantified and documented. In addition, effects on the mission of MCAS Miramar, implementation costs, operational costs, costs avoided, and lessons learned from implementing the P2 project should be maintained as part of the P2 Plan annual review.

See Appendix D for additional P2 resources.

4. P2 Opportunity Action Plan

Potential P2 Projects

Table 4-1 briefly summarizes newly identified P2 options that should be considered for implementation by MCAS Miramar. These options were generated as a result of PPOAs conducted in February 2009. The focus of the PPOAs was determined by the goals set forth in EO 13423, the waste streams targeted for reduction in the most recent SB-14 Plan (based on 2006 data), and the base 2008 hazardous waste generation data. Based on 2008 data, the top five waste streams were identified as follows:

- OWS sludge (681,880 lbs);
- POL (petroleum/oil/lubricant) (149,322 lbs);
- Oil (29,083 lbs);
- Oily debris (20,476 lbs); and
- Coatings (15,779 lbs).

The largest waste stream generated in 2008 was oily water (and sludge) from OWSs. A detailed PPOA was conducted on this waste stream in 2004 and presented in the 2005 version of the P2 Plan. Several of the options generated from this 2004 PPOA are still viable and are discussed in Chapter 12. Since options were already on deck for the OWSs, the PPOA team focused on the next largest waste streams based on 2008 data, which were POL, oil, oily debris, coatings (primarily solvent based paint), and POL debris. Three options were identified for three of the largest generators of the POL, oil, oily debris, and POL debris waste streams. Table 4-1 lists the option descriptions, work centers/activities and locations where new P2 equipment or measures may be used, the process it will be used for, whether the option is economically feasible, the targeted pollution sources, P2 benefits, and the estimated dates of completion. The complete option descriptions and economic analyses are provided in Appendix B. A summary of the options, the BMPs, and options to consider investigating in the future are presented in Chapter 12.

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Newly Identified P2 Technologies

Table 4-1. Potential P2 Projects

ID.	P2 Opportunity Description	Activities Affected	Detailed Analysis?	Economic Feasibility	Targeted Pollution Source and P2 Benefits	Estimated Completion Date
1.	**Purchase Drip Pans for MALS-11 Power Plant** MALS-11 is one of the largest generators of POL, POL debris, and oily rags on MCAS Miramar, most of which comes from spills generated by improperly designed drip pans. New metal drip pans should be purchased in order to improve oil handling.	MALS-11	Yes. See Appendix B	0.47 year payback period	Hazardous Waste	
2.	**Purchase Drip Pans and Oil Drains for MALS-16 Ground Support Equipment** MALS-16 is also one of the largest generators of POL, POL debris, and oily rags on MCAS Miramar, most of which comes from spills generated by faulty equipment. New enclosed drip pans, an oil evacuation drain, and oil transfer pump should be purchased in order to improve oil handling.	MALS-16	Yes. See Appendix B	0.78 year payback period	Hazardous Waste	
3.	**Purchase Rolling Drip Pans and Oil Tank for VMGR-352** A large percent of POL, POL debris, and oily rags on MCAS Miramar comes from this facility, some of which is the result of faulty equipment as well as improper placement of used oil storage tank. Rolling drip pans and a smaller oil tank are recommended for purchase in order to improve oil handling.	VMGR-352	Yes. See Appendix B	3.67 year payback period	Hazardous Waste	

Current or Completed P2 Projects

Table 4-2 provides a quick look at the P2 projects in place at MCAS Miramar.

Table 4-2. Current P2 Projects

Project Description	Activities Affected	Targeted Pollution Source	Status
Implementation of the Hazardous Material Minimization Center (HAZMIN Center) The HAZMIN Center is a centralized storage facility for hazardous materials. The HAZMIN Center manages just-in-time inventories for MCAS Miramar customers while drawing on regional excesses before ordering new material. Safety in the work place is increased due to minimal quantities being stored there. The HAZMIN Center saves money and protects the environment from large quantities of excess material whose shelf-life usually expires and then is turned in as hazardous waste.	HAZMIN Center; Base-wide	Chemical Use Hazardous Waste	Complete
Lube Oil and Aqueous Film Forming Foam (AFFF) Program MCAS Miramar acquires much of their lube oil from decommissioning ships and ships going into availability or overhaul. After passing a lab test, the oil is taken off one ship and offered to others free of charge. Under this program, MCAS Miramar is reusing an oil that would otherwise become a waste and saves money by not having to buy new oil. This program is currently being used for 2190 and 9250 type oils. The same principle of this program also is in place for AFFF.	Base-wide	Chemical Use Hazardous Waste	Ongoing
Shelf-life Training The HAZMIN Center provides individualized and group training on how to build an effective shelf-life management program and provides tools to properly extend shelf-life on qualified materials.	HAZMIN Center; Base-wide	Chemical Use Hazardous Waste	Ongoing
Antifreeze Recycling Antifreeze recycling has been performed at the shop level in the past. MCAS Miramar began operating a centralized on-site recycling program at the HAZMIN Center for all shops to use. Under the program, shops delivered used antifreeze to the HAZMIN Center. The used antifreeze was inspected, any oils skimmed off, and the antifreeze was then processed. The on-site Antifreeze Recycling Program is no longer in operation because it was labor and cost prohibitive. Having a vendor recycle the antifreeze off site was found to be a better alternative. In 2008, approximately four 55-gallon drums of antifreeze were recycled off site.	HAZMIN Center; Base-wide	Chemical Use Hazardous Waste	Inactive

Table 4-2. Current P2 Projects (Continued)

Project Description	Activities Affected	Targeted Pollution Source	Status
Cleaning and Degreasing MCAS Miramar has installed 10 aqueous parts washers (Better Engineering) and 10 Microbial parts washers to reduce its old sink-type Safety-Kleen PD-680 parts washers.		Chemical Use Hazardous Waste Air Emissions	Ongoing
Qualified Recycling Program (QRP) MCAS Miramar operates a QRP on Base. The following items are recycled through the QRP: paper, including office paper, magazines, and phone books; ferrous and non-ferrous metals, including aluminum beverage cans; cardboard; plastics; glass; pallets; batteries; drained oil filters; aerosol cans; and brass.	Base-wide	Solid Waste	Ongoing
Office Paper Reduction Paper reduction initiatives include the following: duplex copying— when and where possible— personnel print to both sides of office paper; used paper is used for note paper; electronic mail is used to minimize paper use.	Base-wide	Solid Waste	Ongoing
Reuse Office Items Certain office items in good condition, such as index tabs, file folders, paper clips, and three-ring binders, are reused.	Base-wide	Solid Waste	Ongoing
Reuse Pallets Wooden pallets are reused until they are no longer serviceable. Unserviceable pallets are disposed of in the solid waste dumpsters or roll-offs.	Supply	Solid Waste	Ongoing
Pneumatic Tire Retread Program MWSS-373 maintains approximately 600 pieces of wheeled Marine Corps equipment, both construction-type heavy equipment and motor transport equipment. During the course of routine/cyclic maintenance, approximately 250 tires are replaced each year. Instead of past practices of sending all tires to disposal, in 1999 MWSS-373 began to retread every tire that meets the criteria for safe recapping. The Pollution Prevention Annual Data Summary (P2ADS) report for 1999 estimates a minimum typical savings of $642 over the life of each retread tire. At the time of the report, savings in the program for just less than one year were $17,641, in addition to a labor savings from reduced man-hours for replacing tires. The report also estimates a diversion of tire waste of 66%, and full implementation of the program could divert up to 75% of tire waste.	MWSS 373	Solid Waste Green Procurement	Ongoing

Table 4-2. Current P2 Projects (Continued)

Project Description	Activities Affected	Targeted Pollution Source	Status
Restoration Activities on the Fish Pond MCAS Miramar has been conducting restoration activities on the Fish Pond and has used recyclable materials to complete the restoration. Approximately 200 Christmas trees and 80 tons of concrete have been used for artificial reefs. Approximately 100,000 tons of removed sediment and soils from various facility projects have been stock piled at the same site for future use in soil erosion and road maintenance projects conducted on the station. Concrete debris from building demolition were crushed and used to surface roads around the pond. This project has diverted concrete and trees from disposal and has been an important component to properly restoring the Fish Pond. The materials have created an artificial habitat for invertebrates and fish, which would not have been attainable due to a limited budget. In addition, when the stock piled soils are used in the future, MCAS Miramar will save approximately $6.00 per ton of soil used.	MCCS	Solid Waste	Complete
Install Low-flow Toilets and Showerheads Low-flow toilets, faucets, and showerheads have been installed at many facilities.	Base-wide	Water Use; Wastewater	Ongoing
Train Personnel in Storm Water Pollution Prevention All appropriate personnel are trained annually in storm water P2, and receive updated training as required.	Water Manager	Wastewater	Ongoing
Clean Out OWSs on a Regular Basis OWSs require regular cleaning to ensure functionality and to prevent clogging of the sanitary sewer lines and impacts to the wastewater treatment plant system. All OWSs are cleaned on a performance-based schedule, which includes skimming accumulated oil from the systems.	S4-Public Works (See Appendix A for list of OWSs)	Wastewater	Active
Lead-acid Battery Recycling MCAS Miramar recycles its lead-acid batteries used in motor vehicles. Used batteries are recycled through a contractor (currently Interstate Batteries) on a one-for-one change-out basis. As new batteries are needed, the contractor picks up the old battery and drops off a recharged battery. Recharging, or recycling, of the batteries is performed by the contractor off site. This program is administered through a separate contract; therefore, these recycled batteries are not listed in the chemical use data (see Chapter 6, Hazardous Materials Use) or as a hazardous waste. Batteries	EMD	Chemical Use Hazardous Waste Green Procurement	Active

Table 4-2. Current P2 Projects (Continued)

Project Description	Activities Affected	Targeted Pollution Source	Status
used in aircraft are not recycled in this way due to technical order requirements.			
64% of Non-tactical Vehicles are AFVs MCAS Miramar leases 234 AFVs, including: ▪ 32 dual-fuel (or flexible-fuel) ethanol based (i.e., E85) vehicles,; ▪ 56 dual-fuel compressed natural gas (CNG) vehicles; ▪ 65 dedicated CNG vehicles; and ▪ 81 dual-fuel biodiesel vehicles. These vehicles represent 64% of the 364 vehicles leased by MCAS Miramar.	SWRFT	Vehicle and Fuel Use	Active
Storm Water Diversion System The City of San Diego expressed concern regarding the amount of uncontaminated storm water that enters their wastewater treatment plant intake from wash racks and OWS discharge at MCAS Miramar. Eight automated diversion systems have been installed around the Base to prevent large inputs of storm water to the sanitary sewer.	MWSS 373; Base-wide; Flight Line	Wastewater; Compliance and relationship with City of San Diego.	Complete
Install New Energy-Saving Fluorescent Light Bulbs and Ballasts at Remaining Facilities New energy-saving fluorescent light bulbs and ballasts will be installed at remaining facilities as they require change-out.	Base-wide	Energy	Active
Reclaimed Water MCAS Miramar has completed five of twelve phases of their water reclamation project that reduces dependency on potable water. Phases 1 through 3 were completed in 2007, bringing the golf course fully online. Phases 4 and 5 were also completed and provide reclaimed water for irrigation, toilets, urinal, street sweepers, and dust suppression. MCAS Miramar is now connected to the City of San Diego's reclaimed water system that runs along the northern boundary of the Station. By converting the golf course to reclaimed water, MCAS Miramar reduced potable water usage by 29,000 Kgal. The reclaimed water system is metered, and measurements between FY 2006 and FY 2007 indicated a decrease in potable water consumption of 15 percent. In 2007, reclaimed water usage at the golf course saved a total of 126,000 Kgal in potable water and $1,049,300 in costs. As of the second quarter of 2008, MCAS	Base-wide	Water Conservation	Active

Table 4-2. Current P2 Projects (Continued)

Project Description	Activities Affected	Targeted Pollution Source	Status
Miramar's potable water reduction was 12% below the FY 2007 baseline.			
Leak Detection Survey In 2007, a leak detection survey was conducted at the Bachelor Enlisted Quarters (BEQ) complex. Several lines from the central boiler plant were repaired that had been leaking hot water into the BEQ. In addition to the water savings from identifying and repairing the leaks, energy savings will be recognized from the reduction in natural gas in the boiler plant to heat the replenished water.	BEQ	Water Conservation; Energy	Complete

Best Management Practices

Table 4-3 provides a quick look at BMPs that are recommended for implementation at MCAS Miramar. More detailed information on each of the BMPs listed can be found in Chapter 12.

Table 4-3. Recommended BMPs

BMP Description	Activities Affected	Targeted Pollution Source/ P2 Benefit
Minimize Use of Aerosol Cans Use non-aerosol products instead of aerosol when non-aerosols are available and approved for a particular application. Use stickers, vinyl stencils, and paint markers instead of aerosol paints whenever possible.	All industrial shops	Chemical Use; Hazardous Waste; Air Emissions; Decreased personnel exposure; and Reduction in toxicity of solvents used and disposed of.
Prepare a P2 Environmental Standard Operating Procedure In order to promote the base EMS program and move away from the mindset that P2 is solely the responsibility of the P2 Program Manager, a P2 Environmental Standard Operating Procedure (ESOP) should be developed and implemented. This document should clarify the roles and responsibilities for P2 at MCAS Miramar by addressing all levels of operation on board the installation.	Base-wide	Base-wide pollution sources.
Develop a P2 Training Module Through the Comprehensive Environmental Training and Education Program (CETEP) A training module should be developed through the CETEP in order to support the ESOP.	Base-wide	Base-wide pollution sources.
Technical Representative Training Sessions Epoxy paint mixing and use training should be provided regularly to any Base personnel performing painting operations by the individual paint manufacturers' technical representatives that are frequently present on the installation. This will help reduce the amount of solvent waste generated by epoxy paints as active military personnel are frequently turned over due to deployment.	Aircraft and Equipment Painting	Hazardous waste; Air Emissions; Decreased personnel exposure; and Reduction in toxicity of solvents used and disposed of.
Promote the Station Antifreeze Recycling Service Awareness of the antifreeze recycling program is needed and should include the Point of Contact, locations, times, and frequency of the contracted service.	All industrial shops performing engine maintenance.	Hazardous waste; and Decreased personnel exposure.

BMP Description	Activities Affected	Targeted Pollution Source/ P2 Benefit
Encourage the Use of Storm Water BMPs Continue to promote awareness of storm water runoff flows from Base activities. BMP are implemented in industrial areas, construction sites, and other areas (e.g. dirt roads, fuel breaks, erosions sites, etc) to prevent erosion and potential storm water pollution.	Base-wide	Base-wide storm water sources.

5 EMS

Program Overview

An EMS is a formal framework for integrating the management of environmental issues into the overall management structure at DoD installations and ranges. The MCAS Miramar EMS identifies the environmental aspects of the mission, highlights and prioritizes areas of risk, promotes P2, and tracks progress toward environmental goals. The purpose of the EMS is to improve operational efficiency while reducing environmental risk and associated costs.

The EMS is managed by the EMD and is overseen by the EMS Program Manager. In addition to maintaining the list of environmental aspects, impacts, risks, and goals, the EMS Program Manager also oversees the CETEP. CETEP was established to support the Marine Corps' goal of full compliance with state and federal environmental requirements and Marine Corps P2 goals. The program incorporates the application of established Marine Corps training and leadership concepts and procedures to characterize and address the environmental training challenge systematically. It includes various needs analyses, professional development initiatives, public outreach projects, program development strategies, and research efforts to ensure that appropriate environmental instruction and information is provided at all levels of the installation.

All the elements of the EMS, including guidance documents, environmental practices/aspects, objectives and targets, and ESOPs, can be accessed through the MCAS Miramar EMS website: http://www.miramar.usmc.mil/ems/index.html. In regards to the P2 program, the EMS elements of Objectives and Targets, Training, and ESOPs are of particular importance and represent the key areas where P2 principles and activities are to be incorporated into the EMS.

Objectives and Targets

The objectives and targets are defined as follows:

- **Environmental objective –** overall environmental goal, arising from the environmental policy, MCAS Miramar sets itself to achieve, and which is quantified where practicable.
- **Environmental target –** detailed performance requirement, quantified when practicable, applicable to MCAS Miramar, that arises from the environmental objectives and that needs to be set and met to achieve those objectives.

The EMS Core Team is responsible for identifying objectives and targets related to MCAS Miramar operations. The objectives and targets should demonstrate commitment to MCAS Miramar's Environmental Policy and relate to the significant aspects that pose a threat to our military mission that was identified in the EMS risk prioritization process.

When establishing objectives and targets, the EMS Core Team considers the following:

- Operational and mission-related activities;
- Legal and other requirements;
- Stakeholders' interests and priorities;
- Available technology options and infrastructure; and
- Financial resources.

The EMS Core Team maintains a list of objectives and targets and monitors progress towards achieving them via interviews and monthly status reports provided by the responsible party/program managers. Objectives and targets will be reviewed as necessary and at least annually. Progress is documented in EMS Element 5 "Objectives/Targets & Actions" and posted on the MCAS Miramar Environmental Intranet.

Training

MCAS Miramar established and maintains a training program designed to make relevant employees aware of the following:

- The importance of conforming with the EMS Policy;
- The significant environmental aspects of their work activities and the benefit of improved personal performance;
- Their responsibilities for implementing the EMS;
- Their roles and responsibilities for emergency preparedness and response; and
- The operational controls that are in-place to ensure the proper management of environmental aspects associated with their duties and the potential consequences of not following specified controls.

Training needs and requirements are identified for each affected job/function and documented in the Training Topics Summary provided on the EMS web site under the EMS tab. The topics in the summary address the requirements of CETEP in MCO P5090.2A.

The EMD Director notifies the Human Resources Director and affected Area/Department Managers of new and emerging environmental regulatory training requirements that require modification of the training program and ensures that practice owners understand the procedures for controlling their practices. Area/Department Managers notify the Human Resources Director of which job functions, if any, will be impacted by the new training requirements.

Area/Department Managers, the Environmental Coordinator, the Organization Manager, etc. notify the Human Resources Director whenever there is a process and/or material change that may result in a new or different environmental impact that requires a revision to the content of the training program.

ESOPs

The MCAS Miramar ESOPs establish instructions for operational control, internal communication, emergency preparedness and response, inspection and corrective action, and training and awareness applicable to MCAS Miramar's activities and practices. They also identify who is responsible for implementing each instruction and how often the instruction is to be carried out.

ESOPs are available on the MCAS Miramar EMS web site at: http://www.miramarenvironmentalintranet.com/ems/13_environmental_SOPs/default.htm.

The Role of P2 in the EMS

P2 is to be incorporated into the key elements discussed above as follows:

Objectives and Targets: Application of the P2 Environmental Management Hierarchy (EMH) (i.e., Source Reduction, Treatment, Recycling, and Disposal) must be applied to any projects or activities proposed to address an objective or target related to reducing a particular waste stream or hazardous material. The PPOA process should also be used to identify technically and economically feasible solutions to meet the objectives.

Training: All training should include teaching practice owners to apply the EMH wherever appropriate. It should also be emphasized that P2 is the responsibility of every person living and working on board MCAS Miramar. Brochures and posters produced by the CETEP should also contain text to prompt practice owners to apply the EMH. Depending on the content of the poster, specific P2 guidance may also be presented. An example might be "Only purchase hazardous materials in aerosol cans when there is no acceptable alternative. Aerosol can waste is targeted for reduction at MCAS Miramar."

ESOPs: All ESOPs should be reviewed for application of P2 principles and procedures. Incorporating the P2 process into ESOPs further enforces the directive of MCO 5090.2A that P2 is everyone's responsibility and its practices and principles should be applied daily in the work centers as part of regular work processes.

6. Hazardous Materials Use

Program Overview

A Hazardous Material Business Plan (HMBP) is the minimum requirement of the California Health and Safety Code Chapter 6.95 and should contain basic information on the location, type, quantity, and health risks of hazardous materials stored, used, or disposed of. Each MCAS Miramar unit is required to have a HMBP if hazardous materials or extremely hazardous materials are used, handled, or stored in quantities greater than or equal to the following:

- 500 lbs of a solid substance;
- 55 gallons of a liquid;
- 200 cubic feet of a compressed gas;
- A hazardous compressed gas in any amount; and
- Hazardous waste in any quantity.

Hazardous material use data give the best picture of how chemicals are used at MCAS Miramar. Many chemicals do not show up in the hazardous and industrial waste data. For example, solvents evaporate as air emissions.

There are currently 54 MCAS Miramar activities required to submit HMBPs. MCAS Miramar Hazardous communication Standard Written Program is contained in Station Order P5100.1

Major Chemical Usage

Table 6-1 on the following pages summarizes the types of chemical materials purchased and used for each area in 2008. The largest user of chemical materials is the MALS-11 Power Plant, with approximately 36% of the total usage.

Where Do These Numbers Come From?
Chemical use data were obtained from HAZMIN Center. Data were then entered into a database and sorted into categories by chemical type and the activity ordering the materials.

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Table 6-1. 2008 Chemical Usage & Cost by Workcenter

Activity Name / Code	FSC Code	Chemical/Material Use Stream	Subcategory	lbs Used 2008	Material Cost
MALS 41 GROUND SUPPORT EQUIPMENT SUPPORT	6810	Chemicals & Chemical Products	Chemicals	7	$8.00
	6850		Miscellaneous Chemical Specialties	45	$34.00
	8030	Brushes, Paints, Sealers, & Adhesives	Preservative & Sealing Compounds	3	$29.00
	9150	Fuels, Lubricants, Oils, & Waxes	Oils & Greases, Cutting, Lubricating, & Hydraulic	17	$127.00
	9160		Miscellaneous Waxes, Oils, & Fats	7	$15.00
TOTAL				**79**	**$213.00**
MALS-11 AIRFRAMES	6525		X-ray Equipment & Supplies, Medical, Dental, Veterinary	1	$24.00
	6810	Chemicals & Chemical Products	Chemicals	104	$171.00
	6830		Gases: Compressed & Liquefied	42	$197.00
	6850		Miscellaneous Chemical Specialties	64	$516.00
	7920	Cleaning Equipment & Supplies	Brooms, Brushes, Mops, & Sponges	1	$1.00 (REUSE)
	7930		Cleaning & Polishing Compounds & Preparations	48	$62.00
	8010	Brushes, Paints, Sealers, & Adhesives	Paints, Dopes, Varnishes, & Related Products	1,677	$5,490.00
	8030		Preservative & Sealing Compounds	89	$389.00
	8040		Adhesives	74	$1,828.00
	8520	Clothing & Individual Equipment	Toilet Soap, Shaving Preparations, & Dentifrices	62	$103.00
	9150	Fuels, Lubricants, Oils, & Waxes	Oils & Greases, Cutting, Lubricating, & Hydraulic	258	$991.00
TOTAL				**2,420**	**$9,772.00**

Table 6-1. 2008 Chemical Usage & Cost by Workcenter (Continued)

Activity Name / Code	FSC Code	Chemical/Material Use Stream	Subcategory	lbs Used 2008	Material Cost
MALS-11 ALSS	4220	Fire Fighting, Rescue, & Safety Equipment	Marine Lifesaving & Diving Equipment	0.3285	$18.25
	6135	Electrical Wire & Power Distribution Equipment	Batteries, Non-rechargeable	3.5	$117.52
	6810	Chemicals & Chemical Products	Chemicals	5	$11.00
	6830		Gases: Compressed & Liquefied	50	$29.00
	6850		Miscellaneous Chemical Specialties	2	$17.00
	8010	Brushes, Paints, Sealers, & Adhesives	Paints, Dopes, Varnishes, & Related Products	69.2	$180.26
	8030		Preservative & Sealing Compounds	4.1	$40.28
	8040		Adhesives	4	$95.00
	9150	Fuels, Lubricants, Oils, & Waxes	Oils & Greases, Cutting, Lubricating, & Hydraulic	6.9	$38.90
TOTAL				**145**	**$547.21**
MALS-11 AVIONICS	3439	Metalworking Machinery	Miscellaneous Welding, Soldering, & Brazing Supplies & Accessories	4	$20.00
	5970	Electrical & Electronic Equipment Components	Electrical Insulators & Insulating Materials	1	$25.00
	6810	Chemicals & Chemical Products	Chemicals	45.7	$82.31
	6830		Gases: Compressed & Liquefied	135	$821.00
	6840		Pest Control Agents & Disinfectants	38	$340.17
	6850		Miscellaneous Chemical Specialties	58.7	$827.26
	7920	Cleaning Equipment & Supplies	Brooms, Brushes, Mops, & Sponges	45	$5.00 (REUSE)
	7930		Cleaning & Polishing Compounds & Preparations	36.6	$57.31
	8010	Brushes, Paints, Sealers, & Adhesives	Paints, Dopes, Varnishes, & Related Products	57	$395.25
	8030		Preservative & Sealing Compounds	49	$461.00

Table 6-1. 2008 Chemical Usage & Cost by Workcenter (Continued)

Activity Name / Code	FSC Code	Chemical/Material Use Stream	Subcategory	lbs Used 2008	Material Cost
	8040		Adhesives	51	$918.00
	9150	Fuels, Lubricants, Oils, & Waxes	Oils & Greases, Cutting, Lubricating, & Hydraulic	102.5	$264.12
	9160		Miscellaneous Waxes, Oils, & Fats	21	$55.00
TOTAL				**644.5**	**$4,266.42**
MALS-11 CYRO	6135	Electrical Wire & Power Distribution	Batteries, Non-rechargeable	3	$25.00
	6840	Chemicals & Chemical Products	Pest Control Agents & Disinfectants	2	$25.00
	6850		Miscellaneous Chemical Specialties	7	$20.00
	7930	Cleaning Equipment & Supplies	Cleaning & Polishing Compounds & Preparations	60	$93.00
	8010	Brushes, Paints, Sealers, & Adhesives	Paints, Dopes, Varnishes, & Related Products	153	$405.00
	8520	Clothing & Individual Equipment	Toilet Soap, Shaving Preparations, & Dentifrices	9	$14.00
	9150	Fuels, Lubricants, Oils, & Waxes	Oils & Greases, Cutting, Lubricating, & Hydraulic	185	$1,098
TOTAL				**419**	**$1,680.00**
MALS-11 HEADQUARTERS	8010	Brushes, Paints, Sealers, & Adhesives	Paints, Dopes, Varnishes, & Related Products	165	$350.60 (REUSE)
	8520	Clothing & Individual Equipment	Toilet Soap, Shaving Preparations, & Dentifrices	1	$7.00 (REUSE)
TOTAL				**166**	**357.60**
MALS-11 NADEP DET	6810	Chemicals & Chemical Products	Chemicals	234	$237.56
	7930	Cleaning Equipment & Supplies	Cleaning & Polishing Compounds & Preparations	35.1	$30.88
	8010	Brushes, Paints, Sealers, & Adhesives	Paints, Dopes, Varnishes, & Related Products	83	$916.00
	8030		Preservative & Sealing Compounds	79	$1,414
	8040		Adhesives	19.5	$652.86
	9150	Fuels, Lubricants, Oils, & Waxes	Oils & Greases, Cutting, Lubricating, & Hydraulic	22.5	$201.01
TOTAL				**473.1**	**$3,452.31**

Table 6-1. 2008 Chemical Usage & Cost by Workcenter (Continued)

Activity Name / Code	FSC Code	Chemical/Material Use Stream	Subcategory	lbs Used 2008	Material Cost
MALS-11 ORDNANCE	6810	Chemicals & Chemical Products	Chemicals	28	$32.00
	6830		Gases: Compressed & Liquefied	3	$11.00
	6840		Pest Control Agents & Disinfectants	2	$20.00
	6850		Miscellaneous Chemical Specialties	581.7	$433.43
	7920	Cleaning Equipment & Supplies	Brooms, Brushes, Mops, & Sponges	2	$1.00 (REUSE)
	7930		Cleaning & Polishing Compounds & Preparations	36	$67.95
	8010	Brushes, Paints, Sealers, & Adhesives	Paints, Dopes, Varnishes, & Related Products	275.1	$757.80
	8030		Preservative & Sealing Compounds	12	$147.01
	8040		Adhesives	3	$147.01
	8520	Clothing & Individual Equipment	Toilet Soap, Shaving Preparations, & Dentifrices	10	$14.00
	9150	Fuels, Lubricants, Oils, & Waxes	Oils & Greases, Cutting, Lubricating, & Hydraulic	61.6	$1,783.41
TOTAL				**1,014.4**	**$3,413.61**
MALS-11 POWER PLANT	6640	Instruments & Laboratory Equipment	Aircraft Alarm & Signal Systems	4	$29.00
	6810	Chemicals & Chemical Products	Chemicals	250	$377.00
	6850		Miscellaneous Chemical Specialties	1,696	$1,956.00
	7920	Cleaning Equipment & Supplies	Brooms, Brushes, Mops, & Sponges	451	$3.00 (REUSE)
	7930		Cleaning & Polishing Compounds & Preparations	142	$215.00
	8010	Brushes, Paints, Sealers, & Adhesives	Paints, Dopes, Varnishes, & Related Products	278.5	$767.32
	8030		Preservative & Sealing Compounds	481	$755.00
	8040		Adhesives	32	$843.00
	8520	Clothing & Individual Equipment	Toilet Soap, Shaving Preparations, & Dentifrices	116	$172.55
	9150	Fuels, Lubricants, Oils, & Waxes	Oils & Greases, Cutting, Lubricating, & Hydraulic	15,802	$35,967.00

Table 6-1. 2008 Chemical Usage & Cost by Workcenter (Continued)

Activity Name / Code	FSC Code	Chemical/Material Use Stream	Subcategory	lbs Used 2008	Material Cost
TOTAL				**19,252.5**	**$41,081.87**
MALS-11 S5	6840	Chemicals & Chemical Products	Pest Control Agents & Disinfectants	2	$25.00
	7930	Cleaning Equipment & Supplies	Cleaning & Polishing Compounds & Preparations	132	$127.00
	8010	Brushes, Paints, Sealers, & Adhesives	Paints, Dopes, Varnishes, & Related Products	24	$77.00
	8520	Clothing & Individual Equipment	Toilet Soap, Shaving Preparations, & Dentifrices	5	$6.79
TOTAL				**163**	**$235.79**
MALS-11 SE	6810	Chemicals & Chemical Products	Chemicals	2.1	$10.49
	6830		Gases: Compressed & Liquefied	89	$333.00
	6850		Miscellaneous Chemical Specialties	1,400.5	$1,267.87
	7920	Cleaning Equipment & Supplies	Brooms, Brushes, Mops, & Sponges	1,369	$1 (REUSE)
	7930		Cleaning & Polishing Compounds & Preparations	48.6	$63.74
	8010	Brushes, Paints, Sealers, & Adhesives	Paints, Dopes, Varnishes, & Related Products	627	$1,067.00
	8030		Preservative & Sealing Compounds	25.45	$371.38
	8040		Adhesives	59.1	$102.58
	8520	Clothing & Individual Equipment	Toilet Soap, Shaving Preparations, & Dentifrices	38	$57.70
	9150	Fuels, Lubricants, Oils, & Waxes	Oils & Greases, Cutting, Lubricating, & Hydraulic	11,088	$15,856
	9160		Miscellaneous Waxes, Oils, & Fats	21	$45.00
TOTAL				**14,767.75**	**$19,174.76**
MALS-11 SUPPLY	7920	Cleaning Equipment & Supplies	Brooms, Brushes, Mops, & Sponges	2	$0.11 (REUSE)
	7930		Cleaning & Polishing Compounds & Preparations	17.1	$18.88
	8010	Brushes, Paints, Sealers, & Adhesives	Paints, Dopes, Varnishes, & Related Products	120	$264.00
TOTAL				**139.1**	**$282.88**
MALS-16 ARMORY	8010	Brushes, Paints, Sealers, & Adhesives	Paints, Dopes, Varnishes, & Related Products	40	$29.00

Table 6-1. 2008 Chemical Usage & Cost by Workcenter (Continued)

Activity Name / Code	FSC Code	Chemical/Material Use Stream	Subcategory	lbs Used 2008	Material Cost
TOTAL				**40**	**$29.00**
MALS-16 AIRFRAMES	6140	Electrical Wire & Power Distribution	Batteries, Rechargeable	0.5	$9.50
	6810	Chemicals & Chemical Products	Chemicals	108	$75.28
	6830		Gases: Compressed & Liquefied	1.5	$41.71
	6850		Miscellaneous Chemical Specialties	12	$271.00
	7920	Cleaning Equipment & Supplies	Brooms, Brushes, Mops, & Sponges	1	$0.11 (REUSE)
	7930		Cleaning & Polishing Compounds & Preparations	47	$45.00
	8010	Brushes, Paints, Sealers, & Adhesives	Paints, Dopes, Varnishes, & Related Products	422	$2,538.00
	8030		Preservative & Sealing Compounds	12	$722.00
	8040		Adhesives	135.5	$2,536.65
	8520	Clothing & Individual Equipment	Toilet Soap, Shaving Preparations, & Dentifrices	9	$14.00
	9150	Fuels, Lubricants, Oils, & Waxes	Oils & Greases, Cutting, Lubricating, & Hydraulic	139	$287.22
	9330	Nonmetallic Crude & Fabricated Materials	Plastics Fabricated Materials	45	$774.00
TOTAL				**932.5**	**$7,314.36**
MALS-16 ALSS	4220	Fire Fighting, Rescue, & Safety Equipment	Marine Lifesaving & Diving Equipment	0.79	$31.64
	6135	Electrical Wire & Power Distribution	Batteries, Non-rechargeable	4	$121.52
	6810	Chemicals & Chemical Products	Chemicals	1	$5.00
	6840		Pest Control Agents & Disinfectants	2	$25.00
	7930	Cleaning Equipment & Supplies	Cleaning & Polishing Compounds & Preparations	9	$21.00
	8010	Brushes, Paints, Sealers, & Adhesives	Paints, Dopes, Varnishes, & Related Products	3.8	$19.11
	8030		Preservative & Sealing Compounds	5.3	$31.47
	8040		Adhesives	21	$570.00

Table 6-1. 2008 Chemical Usage & Cost by Workcenter (Continued)

Activity Name / Code	FSC Code	Chemical/Material Use Stream	Subcategory	lbs Used 2008	Material Cost
TOTAL				**46.9**	**$824.74**
MALS-16 AVIONICS	6810	Chemicals & Chemical Products	Chemicals	1	$4.00
	6850		Miscellaneous Chemical Specialties	8.2	$23.56
	7930	Cleaning Equipment & Supplies	Cleaning & Polishing Compounds & Preparations	44.6	$57.44
	8010	Brushes, Paints, Sealers, & Adhesives	Paints, Dopes, Varnishes, & Related Products	8.1	$60.22
	8030		Preservative & Sealing Compounds	10	$74.00
	8040		Adhesives	0.0088	$37.25
	8520	Clothing & Individual Equipment	Toilet Soap, Shaving Preparations, & Dentifrices	9	$14.00
TOTAL				**80.9**	**$270.47**
MALS-16 L3 COMM (RAYTHEON)	6810	Chemicals & Chemical Products	Chemicals	66	$74.23
	7920	Cleaning Equipment & Supplies	Brooms, Brushes, Mops, & Sponges	0.38	$3.99 (REUSE)
	8010	Brushes, Paints, Sealers, & Adhesives	Paints, Dopes, Varnishes, & Related Products	10.3	$146.04
	8030		Preservative & Sealing Compounds	32.4	$376.62
	8040		Adhesives	11.4	$230.24
	8520	Clothing & Individual Equipment	Toilet Soap, Shaving Preparations, & Dentifrices	28	$42.00
TOTAL				**148.5**	**$869.13**
MALS-16 ORDNANCE	6850	Chemicals & Chemical Products	Miscellaneous Chemical Specialties	1	$2.00
	8010	Brushes, Paints, Sealers, & Adhesives	Paints, Dopes, Varnishes, & Related Products	20	$44.00
	9150	Fuels, Lubricants, Oils, & Waxes	Oils & Greases, Cutting, Lubricating, & Hydraulic	1	$22.00
TOTAL				**22**	**$68.00**
MALS-16 POWER PLANTS	6810	Chemicals & Chemical Products	Chemicals	31	$48.00
	6850		Miscellaneous Chemical Specialties	637	$939.00
	7920	Cleaning Equipment & Supplies	Brooms, Brushes, Mops, & Sponges	14	$1.00

Table 6-1. 2008 Chemical Usage & Cost by Workcenter (Continued)

Activity Name / Code	FSC Code	Chemical/Material Use Stream	Subcategory	lbs Used 2008	Material Cost
					(REUSE)
	7930		Cleaning & Polishing Compounds & Preparations	102.3	$149.48
	8010	Brushes, Paints, Sealers, & Adhesives	Paints, Dopes, Varnishes, & Related Products	106	$3,015.00
	8030		Preservative & Sealing Compounds	44	$679
	8040		Adhesives	106	$1,338
	8520	Clothing & Individual Equipment	Toilet Soap, Shaving Preparations, & Dentifrices	18	$28.00
	9150	Fuels, Lubricants, Oils, & Waxes	Oils & Greases, Cutting, Lubricating, & Hydraulic	1,016	$3,129.00
TOTAL				**2,074.3**	**$9,325.48**
MALS-16 SE	6810	Chemicals & Chemical Products	Chemicals	8.2	$41.28
	6840		Pest Control Agents & Disinfectants	2	$25.00
	6850		Miscellaneous Chemical Specialties	1,111	$1,535.11
	7920	Cleaning Equipment & Supplies	Brooms, Brushes, Mops, & Sponges	917.3	$0.66 (REUSE)
	7930		Cleaning & Polishing Compounds & Preparations	83	$153.41
	8010	Brushes, Paints, Sealers, & Adhesives	Paints, Dopes, Varnishes, & Related Products	597	$2,967
	8030		Preservative & Sealing Compounds	21.7	$92.38
	8040		Adhesives	2.5	$48.96
	8520	Clothing & Individual Equipment	Toilet Soap, Shaving Preparations, & Dentifrices	57	$84.85
	9150	Fuels, Lubricants, Oils, & Waxes	Oils & Greases, Cutting, Lubricating, & Hydraulic	7,999	$12,098.00
TOTAL				**10,798.7**	**$17,045.99**
MALS-16 SUPPLY	8010	Brushes, Paints, Sealers, & Adhesives	Paints, Dopes, Varnishes, & Related Products	66	$333.20
TOTAL				**66**	**$333.20**
GRAND TOTAL				**53,893**	**$120,557.82**

Note: FSC = Federal Supply Class

Table 6-2 lists the type and quantity of engine lubricating oils purchased by MCAS Miramar in 2008. The largest quantity came from FSC Code 9150 – Oils and Greases, cutting, lubricating, and hydraulics.

Table 6-2. Breakdown of Types of Engine Lubricating Oils Purchased by MCAS Miramar in 2008

Type of Lubricating Oil	Annual Quantity in lbs
Oils and Greases, cutting, lubricating, and hydraulics (FSC Code 9150)	75,175
Miscellaneous waxes, oils and fats (FSC Code 9160)	193
Total lubricating oils	75,368

Goals

- A continuous reduction in chemical use;
- Reduce the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of through efficient material management;
- Maintain a cost-effective waste prevention and recycling program; and
- Develop an Authorized Use List (AUL) (for each activity).

MCAS Miramar is committed to the continuous reduction in chemical use as outlined in MCO 5090.2A.

Five of the major hazardous waste minimization programs at MCAS Miramar include:

1. Hazardous Material Reuse
2. Shop Towel Program
3. POL Management Program
4. Clay Absorbent
5. Miscellaneous Hazardous Waste Recycling Programs
    a. Oil Filters
    b. Batteries
    c. Aerosol Cans
    d. Surplus Jet Fuel
    e. Antifreeze

Re-refined Oil Purchases

Table 6-2 above shows that lubricating oils make up the largest portion of all chemicals purchased at MCAS Miramar.

In March, 1999, the Under Secretary of Defense, Dave Oliver, issued a memorandum directing DoD activities to participate in the re-refined program, and that "All DoD activities purchasing oil from sources other than Defense Logistics Agency (DLA) must comply with the legal requirement to use re-refined oil." MCAS Miramar then is required to use re-refined oil for all eligible motor oils (which does not include oil for aircraft).

The DLA offers lubricating oil under a Basic Re-refined Motor Oil Program, and a Closed Loop Re-refined Motor Oil Program. Re-refined oil is used oil that has been collected and sent to a re-refiner for processing. This used oil is put through essentially the same manufacturing/refining process that is used to produce motor oil from virgin oil. In the Basic Re-refined Motor Oil Program, the oil purchased has been re-refined from waste oil, but the waste oil is not returned for re-refining, rather it is disposed of or incinerated for energy. In the Closed Loop Re-refined Motor Oil Program, the waste oil is picked up at no charge and is then re-refined to be used again. Because it incorporates affirmative procurement, the Closed Loop Re-refined Motor Oil Program is the preferred program.

The re-refined oil is suitable for use as motor oil in ground support equipment (GSE) and motor vehicles; there is no current program for lubricating oil for aircraft. Amounts of basic re-refined oil are purchased. Currently, used oil generated by MCAS Miramar is taken off site by an outside contractor (i.e., Safety-Kleen) for a nominal cost, and burned for energy recovery.

Pesticide Use

Pesticides used at MCAS Miramar must be approved prior to use. The applicant must complete and submit the Pesticide Approval Spreadsheet, which includes the following information:

- Pesticide Trade Name
- Active Ingredient
- EPA Registration Number
- Form (e.g., dust, aerosol, bait, suspension, etc.)
- Application Rate or Concentration
- Target Treatment Areas
- Target Pests
- Time Frequency
- Applicator
- Special Instructions
- Approval Date

Any new pesticide or application is submitted by the MCAS Miramar Pesticide Management Coordinator to the Naval Facilities Engineering Command Entomologist for approval. Pesticide use at MCAS Miramar is applied and managed according to the MCAS Miramar Integrated Pesticide Management Plan. Table 6-3 lists the amounts of pesticides used at MCAS Miramar from January to March of 2009.

Table 6-3. Amounts of Pesticides Used at MCAS Miramar from January to March of 2009

Pesticide Name/Manufacturer	Total Usage (Jan-March 2009)	Units
Wisdom/AMVAC Chemical Corp	9,375	lbs
Spray Oil 415/Helena Chemical Co.	448	gallons
Snapshot 2.5 TG/Dow Agro Sciences	400	lbs
Quail-Pro Oxadiazon 2G	200	lbs
Gavcide Green 415/Leaf Life	111	gallons
Glyphosate Pro/Prokoz Inc.	4,960	ounces (oz)
Oryzalin 4 Pro/Vegetation Management	2,560	oz
M-Pede/Mycogen	14	gallons
Safe-T-Side/Brandt Consolidated	14	gallons
Orthene/Valent	512	oz
Safari 20 sg/Valent	152	oz
Champ II/Nufarm	120	oz
Banner Maxx/Syngenta	104	oz
Transom 50 WSB/Prokoz	64	oz
Mavrik/Sandoz	40	oz
Heritage/Zeneca	20	oz
Avid .15 EC/Syngenta	20	oz
Subdue Maxx/Novartis	18	oz
Vapor Gard/Miller Fert.@Chem Corp	16	oz
Talstar One/F.M.C.	10	oz

Toxic Release Inventory Form R Releases

Program Overview

EPCRA, or Title III of the Superfund Amendments and Reauthorization Act of 1986, acknowledges the public's right to information concerning toxic chemical usage and releases to the environment. Section 313 of EPCRA establishes a framework for reporting the use of listed toxic chemicals from facilities that meet reporting criteria and providing the EPA with release information to assist the agency in determining the need for future regulations. Facilities are required to submit a TRI Report under EPCRA Section 313 and must complete a Form R for each listed toxic chemical that meets the reporting criteria. The TRI consists of all of the Form Rs required for that facility.

EPCRA Section 313 *is also known as the TRI. This regulation requires facilities to submit a Form R Report with information on all releases of specific chemicals if the facilities manufacture, process, or otherwise use any listed toxic chemicals in excess of certain thresholds.*

Determining whether the threshold quantities have been met depends on how the toxic chemical is used (i.e., manufactured, processed, or otherwise used) at MCAS Miramar. The reporting thresholds are defined below, with the threshold quantities in parentheses. More extensive definitions can be found in Toxic Chemical Release Inventory Reporting Forms and Instructions:

- Manufacture (25,000 lbs) – produce, prepare, compound, or import from a foreign supplier. This category also includes coincidentally manufactured chemicals, such as combustion or waste treatment byproducts.

- Process (25,000 lbs) – preparation of a listed chemical, after its manufacture, for distribution in commerce.

- Otherwise Use (10,000 lbs) – any use of a listed chemical that is not covered under the definitions of manufacture or process, or non-incorporative activities.

The Consolidated EPCRA Policy for DoD Installations, Munitions Activities, and Operational Ranges (September 2006) took effect for Reporting Year (RY) 2007. Beginning with RY 2007, adjacent ranges are considered part of the facility for Section 313 and all of EPCRA. In other words, non-range and range activities are added together for threshold calculations and must be reported if reporting levels are exceeded.

The EPA has published two final rules that lowered the TRI reporting thresholds for certain persistent, bioaccumulating, or toxic (PBT) chemicals and added certain other PBT chemicals to the TRI list of toxic chemicals. These PBT chemicals are of particular concern not only because they are toxic but also because they remain in the environment for long periods of time, are not readily destroyed, and build up or accumulate in body tissue.

MCAS Miramar determined that its use/release of lead triggered the lower EPCRA Section 313, or TRI Form R requirements and began reporting for lead in 2002. The lead is used/released at the Range Complex as part of the weapons training, an essential part of MCAS Miramar's mission.

Goals

While EO 13423 calls for each agency to reduce toxic and hazardous chemical use, the specific amount of reduction and the chemicals targeted for reduction are to be determined by each agency. To DoD has not finalized a list of targeted chemicals or an overall toxic and hazardous chemical reduction goal. Until specific numeric goals are set by DoD, the Marine Corps, or MCAS Miramar EMD, the goals for hazardous chemical use will be as follows:

- Continue to reduce chemical use each year.

- Reduce the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of through efficient material management.

- Develop and maintain a current AUL for each activity.

MCAS Miramar is committed to the continuous reduction in chemical use as outlined in MCO 5090.2A

Baselines and Progress

Table 6-4 below shows the total lbs of TRI chemicals released from MCAS Miramar between 2002 and 2007. Table 6-5 shows the total lbs of each chemical (as well as chemical media) for 2002-2007.

Table 6-4. Total Aggregate Releases of TRI Chemicals (lbs) 2001 through 2007

Media	2002	2003	2004	2005	2006	2007
Air Emissions	NR	NR	6,634	2,141	487.68	1,096
Surface Water Discharges	NR	NR	NR	NR	NR	NR
Releases to Land	7,671	10,138.6	12,538.3	14,242.3	11,959.5	24,508.4
Underground Injection	NR	NR	NR	NR	NR	NR
Total On-Site Releases	7,671	10,138.6	19,172.3	16,383.3	12,447.18	25,604.4
Transfer Off-Site to Disposal	1.7	NR	NR	NR	NR	NR
TOTAL RELEASES	7,671	10,138.6	19,172.3	16,383.3	12,447.18	25,606.1

Source: EPA Envirofacts Report (2009)
NR = Not Reported

Table 6-5. TRI Chemicals Releases (lbs)
2001 though 2007

Chemical Name	Source	2002	2003	2004	2005	2006	2007
1,2,4-Trimethylbenzene	Air Stack	NR	NR	NR	NR	NR	46
Benzene	Air Stack	NR	NR	NR	366	258	NR
Copper	Oth Disp	NR	NR	NR	NR	NR	6,518
Ethylbenzene	Air Fug	NR	NR	NR	NR	NR	1
Ethylbenzene	Air Stack	NR	NR	NR	126	37	46
Lead	Disp Non Metals	NR	NR	NR	NR	NR	0.7
Lead	Oth Disp	7,671	10,138.6	12,538.3	14,242.3	11,959.5	17,990.4
Methyl Tert-Butyl Ether	Air Stack	NR	NR	4,343	NR	NR	NR
N-Hexane	Air Stack	NR	NR	NR	467	3.68	NR
Naphthalene	Air Stack	NR	NR	NR	NR	NR	122
Toluene	Air Fug	NR	NR	NR	NR	NR	5
Toluene	Air Stack	NR	NR	1,546	832	106	456
Toluene	Disp Non Metals	NR	NR	NR	NR	NR	1
Xylene (Mixed Isomers)	Air Fug	NR	NR	NR	NR	NR	2
Xylene (Mixed Isomers)	Air Stack	NR	NR	745	350	83	418

Source: EPA Envirofacts Report (2009).
NR = Not Reported
Air Stack = Stack or point air emission.
Oth Disp = Other on-site land disposal.
Air Fug = Fugitive or non-point air emissions.
Disp Non Metals = The summation of a group of the methods that can be used to dispose of a metal or non-metal chemical off-site.

7 Hazardous Waste

Program Overview

MCAS Miramar Waste Management Division operates and manages the on-site hazardous waste accumulation area, and a solid waste collection and recycling program. The main components of the Hazardous Waste Management Program include source reduction, on- or off-site recycling, and off-site treatment. MCAS Miramar maintains a Hazardous Waste Management Plan that provides guidance for matters relating to hazardous waste management and disposal. In addition, a HMBP is submitted to the County of San Diego's Department of Environmental Health Hazardous Material Division.

The Waste Management Division tracks hazardous waste disposal and trends with a hazardous waste database that is regularly updated. The database is programmed to produce summary reports that assist the Department with tracking hazardous waste throughout the year.

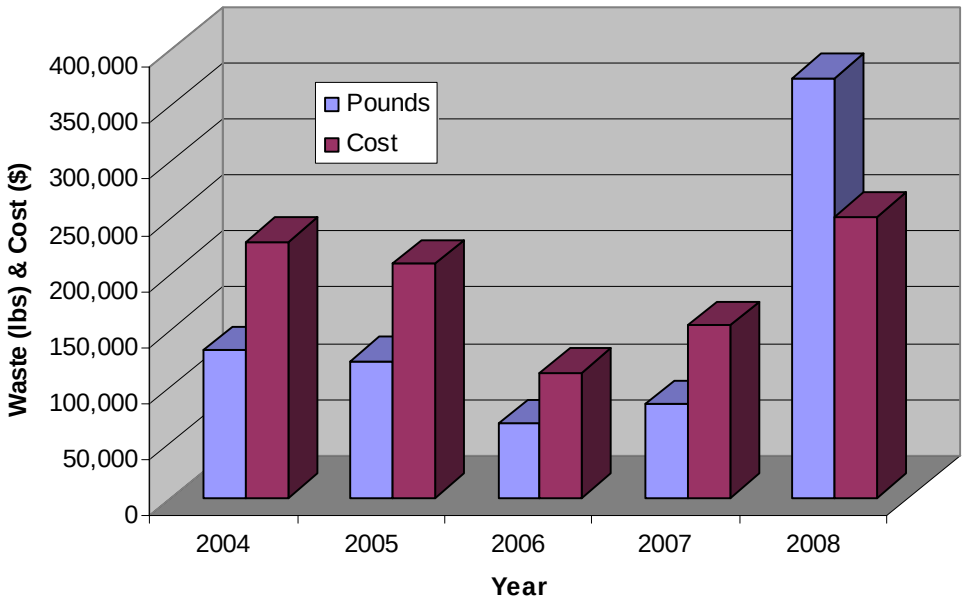
Major Hazardous Waste Streams

Table 7-1 lists the total quantities and costs of hazardous waste disposed of off site for the years 2004 to 2008. Figure 7-1 shows the quantities graphically. The "Gap Analysis" section of this chapter describes why there was an increase in hazardous wastes generated in 2008.

Table 7-1. Hazardous Waste Quantities and Costs for 2004 to 2008

Hazardous Waste Category		2004	2005	2006	2007	2008
Total Waste Disposed of Off Site	Pounds	131,568	121,884	65,871	83,445	374,543
	Cost	$228,225	$208,793	$111,076	$153,186	$250,314

Figure 7-1. Hazardous Waste Quantities and Costs for 2004 to 2008



Hazardous wastes *include all wastes that fall under an EPA or California hazardous waste code and that require a hazardous waste manifest for disposal. Examples are paint, solvents, and flammable liquids. California-only hazardous wastes include used oil and antifreeze.*

Table 7-2 lists major hazardous waste streams for MCAS Miramar for CY 2008. The top hazardous waste streams (not including recycled waste) are listed below. Oily water and sludge generated from the 56 on-Base OWSs make up approximately 70% of the major waste streams.

Where Do These Numbers Come From? Data were obtained from a hazardous waste database from the Environmental Management's Waste Management Division.

Table 7-2. Largest Hazardous Waste Streams for CY2008

Waste Stream	Lbs
Oily Water (Generated from OWSs)	681,880
POL	149,322
Oil	29,083
Oily debris	20,476
Coatings	15,779
POL debris	12,227
Tires	11,920
Aerosols	11,124
Batteries	7,394
Lamps	6,624
Paint debris	6,323
Antifreeze	6,281
Desiccant	4,971
Adhesive	3,408
Asbestos	2,832

Recycled or Recovered Hazardous Waste

In 2008, a total of 29,136 tons of batteries, antifreeze, oils and construction/demolition hazardous waste was taken off site and recycled or recovered for energy. Table 7-3 below shows the recycled/recovered hazardous waste streams for 2008 tracked in the P2ADS system. Note that some waste streams are in both the hazardous waste disposed of table (Table 7-2), as well as the recycled hazardous waste shown in Table 7-3. For example, some lead-acid batteries are recycled, while others are not. Most antifreeze and oil is recycled or recovered for energy, but contaminated antifreeze or oil cannot be recycled and is disposed.

Table 7-3. Tons Recycled/Recovered Hazardous Waste Streams 2005-2008

Waste Stream	2005	2006	2007	2008
Lead Acid Batteries	25.67	30	29.2	47.24
Antifreeze	10.02	4	7.12	10.88
Oils	168.98	157	176.26	151.10
Construction & Demolition	550	5554.59	0	28,926.65

SB-14 Hazardous Waste

SB-14 requires hazardous waste generators to consider source reduction as the preferred method of managing hazardous waste. To promote source reduction, SB-14 requires that covered facilities prepare a Source Reduction Evaluation Review and Plan (SB-14 Plan). The 2009 MCAS Miramar SB-14 Plan identifies, evaluates, and develops means and methods to reduce hazardous wastes generated at the facility. The waste stream evaluation conducted as part of the plan preparation determined that three waste streams constituted the top 5% of the routinely generated hazardous wastes in CY 2006. These three waste streams were: OWS Sludge, Saturated Oil Debris, and Solvent Based Paint.

The SB-14 Plan, in conjunction with this P2 Plan, will be used to manage and reduce the largest waste streams at MCAS Miramar and provides detailed guidance on hazardous waste reduction.

Major Waste Generating Activities

Based on 2008 data, the major activities that generate hazardous waste are related to vehicle and aircraft maintenance, including washing, corrosion control and painting, repairs, fluid changes, and parts cleaning. Additional information is contained in the SB-14 worksheet results submitted to the State of California.

Oil/Water Separators

The largest hazardous waste stream generated at MCAS Miramar is sludge from approximately 56 OWSs supporting various vehicle washing operations. Wastewater from vehicle and equipment washing is contaminated with sediment, oil, and fuel. The OWS operates to remove oil and sediment to minimize contamination and performance issues of the wastewater collection and treatment system, but also results in a large hazardous waste stream from the required OWS maintenance activities (e.g., clean-out of OWSs).

Corrosion Control and Painting

Paint is applied to aircraft, aircraft components, GSE, and other miscellaneous items at MCAS Miramar. Aircraft and aircraft components are touched-up with paint primarily to prevent corrosion. This corrosion control painting occurs in spray booths and at spray hoods. Spray guns, aerosol cans, brushes, and rollers are used to apply paint to the GSE and miscellaneous items.

Fluid Changes

As part of routine maintenance for aircraft and GSE, fluids are changed out. These fluids include oil, hydraulic fluid, and antifreeze.

Parts Cleaning

As part of routine maintenance for aircraft and GSE, parts are cleaned in a variety of parts washers. These include solvent-based PD-680 parts cleaners, aqueous parts cleaners, and microbial parts cleaners. The PD-680 type parts cleaners must be changed out with fresh solvent periodically, thus generating solvent waste. Waste from the aqueous and microbial washers is disposed of as hazardous waste only if there are metals or other constituents in the sludge.

Other Activities

A variety of personnel activities generate battery, spill cleanup, and miscellaneous wastes.

Goal

EO 13423 requires a reduction in the quantity of toxic chemicals and toxic materials acquired, used, and disposed of by MCAS Miramar. However, DoD has yet to determine specific numeric goals for EO 13423 reduction and recycling requirements.

The goal for MCAS Miramar is to have a continuous reduction in the generation and disposal of hazardous wastes. Achieving this goal will reduce compliance issues, save money, and comply with requirements set forth in the following laws and regulations:

- MCO 5090.2A establishes a goal of 50% reduction in the generation of hazardous waste by 1999 from a baseline year of 1992. Although the timeline for this goal has passed, the goal of continuous reduction is in line with both MCO 5090.2A and MCAS Miramar's commitment to P2.

- California SB-14 requires a Source Reduction Plan to reduce generation of hazardous waste streams 5% or greater of all non-exempt hazardous waste generated at MCAS Miramar. Hazardous waste streams greater than 5% for 2006 include OWS sludge, saturated oil debris, and solvent-based paint. A SB-14 for MCAS Miramar was completed in 2009.

Gap Analysis

MCAS Miramar personnel have a goal of continuously reducing hazardous waste generation and disposal. However, non-routine events in 2008 caused an increase in the quantity of hazardous waste normally generated at MCAS Miramar:

- Total clean-outs of OWSs produced a spike in the oily water generation that is disposed of as hazardous waste. As a result of this spike, altered maintenance (e.g., performance-based clean-out) procedures have been developed to reduce this stream in the future.

- In December 2008, an F/A-18 jet crashed in University City just west of MCAS Miramar. Cleanup from this event caused a spike in debris and contaminated soils that were disposed of as hazardous waste.

8 Solid Waste

Program Overview

The Solid Waste Compliance Program is managed by the EMD and is overseen by the Solid Waste Program Manager. The Station QRP is managed by the MCAS Miramar Recycling Department and is overseen by the AC/S, G-4 Installation and Logistics. The Solid Waste Program is comprised of the following compliance sites/activities:

Permitted Sites. There is one operational landfill permitted by the State of California. The City of San Diego operates its landfill on the MCAS Miramar Reservation under a lease issued by the Department of Navy. Under terms of the lease, MCAS Miramar does not pay for non-hazardous solid waste disposal at the landfill.

Storage Sites. MCAS Miramar uses solid waste dumpsters and roll-off containers for the collection and storage of solid waste. These containers are located throughout the installation.

Recycling Site. Station Order 6280.1 establishes uniform procedures for operating, managing, and enhancing MCAS Miramar's solid waste recycling program. Six personnel are employed to run the facility: (1) Recycling Manager: (1) Budget / Administrative Assistant: (1) Training / Work Leader: and (3) Material Examiners / Classifiers / Laborers. The program utilizes five vehicles, four bailers, one bobcat, and two forklifts. There are approximately 55 trailers for cardboard collection located throughout MCAS Miramar that are taken to the recycling facility when full.

Major Solid Waste Streams

There are no data regarding the breakdown of all solid waste types generated at MCAS Miramar. The only data maintained regarding actual constituents of the solid waste stream is for recyclable materials turned into the QRP. Recycling data from the QRP and Other Select Wastes is maintained. Other Selected Waste includes antifreeze, used motor oil, lead-acid batteries, and construction & debris wastes.

Recycled Wastes

The Station QRP is managed by the MCAS Miramar Recycling Department and is overseen by the AC/S, G-4 Installation and Logistics. The following materials are diverted from the landfill and processed at the on-site recycling facility as part of the Miramar QRP: ferrous metals, non-ferrous metals, newspaper, office paper, phone books, cardboard, glass, magazines, drained oil filters, steel, aerosol cans, plastics, aluminum, brass, pallets, tin cans, electric parts, refrigerators and batteries.

Table 8-1 shows a breakdown of recycled waste types for 2005 through 2008.

Table 8-1. Quantities of Recycled Solid Waste Streams

Recycled Category	FY 2008 Tons
Cardboard	553.28
Paper	123.83
Plastic	11.63
Glass	5.09
Brass	22.99
Metal	667.10
Toner Cartridges	1.12
Pallets	22.51
Batteries	25.88
Electric Parts	64.67
Refrigerators	15.34
Other	0
Total Tons Recycled	1,513.43

Yard Wastes

Most landscaping at MCAS Miramar is maintained by a private contractor and is hauled directly to the Miramar landfill. The MCCS staff maintains the lawns of the golf course located at the Base. The crews leave the grass where it is cut in part to reduce disposal quantities.

Goal

The solid waste goals established in MCO 5090.2A are out dated and have been replaced by the mandates of EO13423. Each federal agency has been given specific actions to meet the requirements of the EO and set goals specific to the agency. At present, all action items are still being evaluated at the agency level, and the Marine Corps has not yet issued specific guidance to installations. Until specific installation guidance is received, the goals and guidance from the Instructions for Implementing EO 13423 will be followed and are as follows:

- By 24 April 2007, each agency shall establish and submit to the Federal Environmental Executive (FEE) solid waste diversion goals to be achieved by 31 December 2010. Where an agency has already established a goal and reported it to the FEE, it shall re-affirm to the FEE that the previous goal is still in effect. Agencies establishing a goal for the first time shall use FY 2000 as the base year.

- At a minimum, each agency shall strive to meet the national 35% recycling goal established by EPA. Those agencies that have a 35% or higher recycling rate shall strive for annual continuous improvement. Each agency shall recycle materials to the maximum extent practicable, considering cost, cost avoidance, return on investment, and availability of markets.

MCAS Miramar will strive to meet the 35% annual recycling goal at a minimum. As specific DoD/Marine Corps goals are established, this section will be updated.

Goal Progress

The diversion rate is the percent of solid waste that is diverted from disposal. Note that this goal does not have a true baseline since the 35% diversion rate represents 35% of the total amount of solid waste generated in 2008 and is independent of previous years' diversion amounts. Diversion rates before 2008, however, give a good picture of the progress made toward reaching the goal and where improvements can be made.

Diversion rates were calculated for MCAS Miramar as a whole. The diversion rate is based on recycling activities that divert materials from landfills. The Office of the FEE has issued guidance that states when calculating diversion rates, materials recycled as part of waste-to-energy programs should be reported separately from source reduction and recycling data. Only data on waste for which there is no cost effective source reduction and recycling option available should be included. Therefore, for goal tracking, only materials diverted from landfills are used for calculating diversion rates.

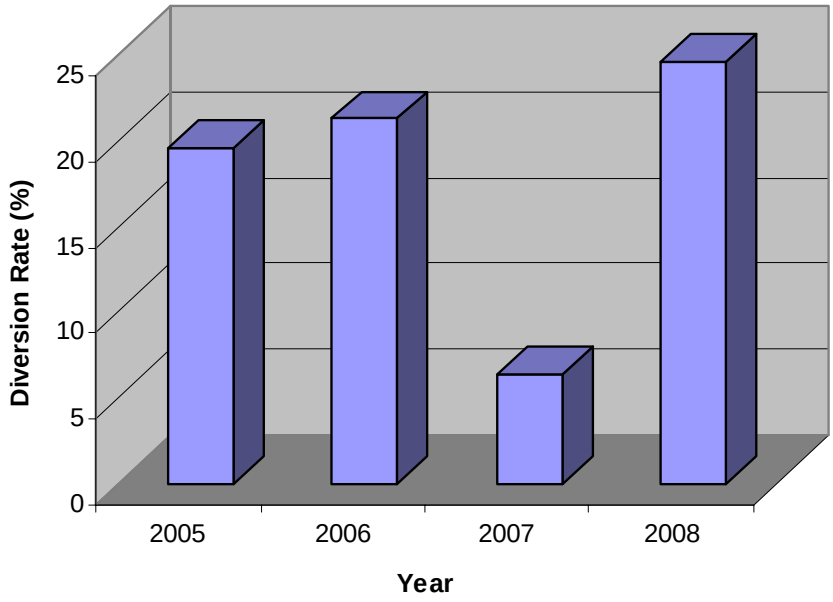
Using data contained in the 2008 P2ADS report, the diversion rate including only QRP recycled and landfilled wastes (excluding construction and debris waste) is 24.7 percent. The quantities of solid waste landfilled and recycled (not including construction and demolition), and the diversion rates for 2005 through 2008 are presented in Table 8-2. Figure 8-1 shows the trend in diversion rates graphically.

Table 8-2. Solid Waste Quantities and Diversion Rates for MCAS Miramar 2005 through 2008

Waste Category	2005	2006	2007	2008
Landfilled, tons	5,384	5,829	14,699	4,534
Composted, tons	0	0	0	0
Recycled, tons	1,310.66	1,576.61	1,010.78	1,487.56
Total Installation Population[1]	10,641	13,253	13,000[3]	14,834
Diversion Rate, %[2]	19.6%	21.3%	6.4%	24.7%

[1]Total includes military residents, military non-residents, civilian residents, and civilian non-residents.
[2] Diversion Rate, % = Recycled ÷ (Landfilled + Recycled) x 100
[3] Population data for 2007 is an estimate.

Figure 8-1. Solid Waste Diversion Rate by Year



Note: 2007 diversion rates not accurately represented due to unavailable population data.

Financial Summary

Facilities should show savings associated with their source reduction, recycling, and reuse efforts where possible. Savings are calculated by subtracting the actual cost of the solid waste management program from the cost of the program if there were no recycling.

MCAS Miramar does not pay tipping fees for landfill disposal. San Diego County operates its landfill on the MCAS Miramar Military Reservation under a lease issued by the Department of Navy. Under terms of the lease, MCAS Miramar does not pay for non-hazardous solid waste disposal at the landfill. Nevertheless, the QRP shows a cost savings for recycling. According to figures maintained by the QRP Manager, in FY 2008, the total QRP cost was $313,562, and the QRP revenue was $348,262; therefore, the net total profit from the QRP was $34,700.

Gap Analysis

MCAS Miramar is making progress toward reaching the goal of a 35% diversion rate as specified in EO 13423. The spike in waste generation in 2007 was due to non-recurring activities that included UST clean-outs and construction projects in excess of the normal number being conducted on site in a given year.

9. Air Emissions

Program Overview

The Air Quality Program is managed by the EMD and is overseen by the Air Quality Program Manager. MCAS Miramar works with the San Diego Air Pollution Control District (SDAPCD) to comply with applicable air quality regulations for criteria pollutants and hazardous air pollutants (HAP).

What Are Criteria Pollutants and HAPs?

The EPA established six criteria pollutants under Title I and Title III of the CAAA :

- Carbon monoxide (CO);
- Nitrogen dioxide;
- Ground-level ozone (the regulated precursors of ozone are volatile organic compounds [VOCs] and oxides of nitrogen [NO_x]);
- Particulate matter less than 10 microns in diameter (PM_{10});
- Oxides of sulfur (SO_x); and
- Lead.

The EPA also incorporated a listing of HAPs, which may also be referred to as Toxic Air Contaminants, under Title III of the CAAA.

Facilities like MCAS Miramar must track their air emissions of criteria pollutants and HAPs to determine if they need a Title V operating permit. MCAS Miramar is separated into six functional groups for the purposes of Title V permit requirements. MCAS Miramar is not required to have a Title V permit, but has over 100 pieces of equipment permitted by the SDAPCD. Because San Diego Air Basin is a non-attainment area for 8-hour ozone, NO_x and VOCs, ozone precursor emissions, particular attention is paid to these air pollutants.

Title V Permits

The CAAA Title V Operating Permit Program sets forth a federal standard for facility operating permits that must considered if a facility has the potential to emit air emissions above specified criteria pollutant or HAP thresholds. For San Diego County, the Title V thresholds are 100 tons per year (tpy) for criteria pollutants, 10 tpy for individual HAPs, and 25 tpy for all HAPs combined.

Per Title V guidance for federal facilities, MCAS Miramar is divided into six functional areas, which are considered separate “facilities” for the purposes of air emissions reporting. None of the functional areas exceed federal Title V operating permit levels; therefore, MCAS Miramar is not subject to Title V.

San Diego Air Pollution Control District Permitted Equipment

MCAS Miramar has over 100 pieces of equipment that are permitted or registered with the SDAPCD. Table 9-1 in Appendix A contains a list of this equipment. The usage from this equipment is required to be reported annually to SDAPCD as part of the Air Emissions Inventory Report . SDAPCD then calculates the resulting air emissions using standard equations and reported by functional group, as well as for the entire facility. Since San Diego County is a nonattainment area for ozone (i.e., NO_x and VOCs [also known as reactive organic gases (ROG) in San Diego]), particular attention is paid to these air pollutants. SDAPCD forwards an Emissions Statement to the facility for their signature, certifying the accuracy of the reported information.

Major Emission Sources

The 3D Marine Aircraft Wing is the functional area with the largest source of permitted air emissions. These sources as follows:

- Paint spray booths;
- Coating operations in hangars; and
- Jet engine test cells.

Goal

The air emissions goal is to have a continuous reduction in air emissions for criteria pollutants. In addition, the EO 13423 lists the following goals for the reduction of greenhouse gases:

- Reduce greenhouse gas emissions by 3% annually through the end of 2015 or 30% by the end of 2015; and
- Improve overall energy efficiency by 3% annually through the end of 2015 or 30% by the end of 2015.

Goal Progress

Table 9-2 below shows the amount of each criteria pollutant and toxic air contaminant emitted from MCAS Miramar. The quantities include emissions from all permitted sources and combine emissions for all six functional areas within MCAS Miramar. Figure 9-1 shows a graphical representation of air emissions for 2004 through 2007 for criteria pollutants and total toxic air contaminants.

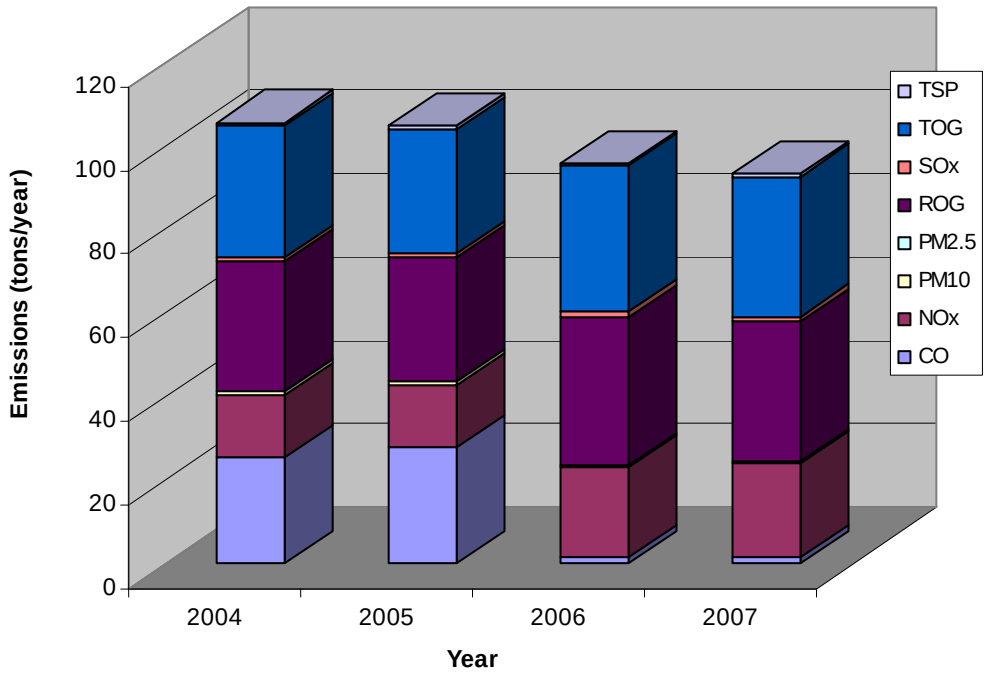
Table 9-2. Annual Air Emissions Inventory for MCAS Miramar

Pollutant	2004 Emissions	2005 Emissions	2006 Emissions	2007 Emissions
Criteria Pollutants (tpy)				
CO	25.5	27.8	1.6	1.4
NO_x	14.9	14.9	21.7	22.7
PM_{10}	0.9	1	0.5	0.4
Particulate Matter less than 2.5 microns in diameter	--	0.2	<0.1	<0.1
ROG	31.3	29.6	35.2	33.5
SO_x	0.7	0.8	1.3	1.3
Total Organic Gases	31.5	29.8	35.3	33.5
Total Particulates	0.9	1	0.5	0.5
Toxic Air Contaminants (lbs per Year)				
1,1,1-Trichloroethane	9.16	9.01	8.39	8.39
1,3-Butadiene	290.93	323.23	679.49	171.6
2,2,4-Trimethylpentane	261.76	236.98	208.11	91.60
Acetaldehyde	441.4	496.31	1,029.88	1,099.08
Acrolein	301.68	332.95	701.41	743.8
Arsenic	1.22	1.28	1.72	1.69
Benzene	440.1	449.53	729.96	691.75
Benzo[a]Anthracene	0	--	--	--
Benzo[a]Pyrene	0	--	--	--
Benzo[b]Fluoranthene	0	--	--	--
Benzo[k]Fluoranthene	0	--	--	--
Cadmium	0.03	0.04	0.03	0.03
Chlorobenzene	--	0	0	0
Chromium, Hexavalent	0.01	0.01	0	0
Chromium, Non-Hexavalent	0.06	0.02	0.06	0.05
Copper	0.09	0.11	0.09	0.08
Dibenz[a,h]Anthracene	0.01	--	--	--
Dichlorobenzene	7.50	7.34	6.73	6.73
Diesel Particulate	--	411.65	81.97	104.76
Ethanol	--	3,929.77	3,450.31	1,519.16
Ethyl Benzene	164.69	156.75	178.85	134.07
Formaldehyde	1,338.14	1,493.03	3,118.16	3,306.88
Glycol Ethers, Unspecified	36.65	36.03	33.58	33.58
Hexane	670.83	151.38	459.97	222.46
Hydrogen Chloride	--	2.11	0.36	0.62

Table 9-2. Annual Air Emissions Inventory for MCAS Miramar (Continued)

Pollutant	2004 Emissions	2005 Emissions	2006 Emissions	2007 Emissions
Indeno(1,2,3-cd)Pyrene	0	--	--	--
Lead	0.07	0.12	0.06	0.05
Manganese	0.02	0.04	0.02	0.02
Mercury	0.04	0.04	0.02	0.01
Methylene Chloride	5.50	5.40	5.04	5.04
Naphthalene	193.48	200.27	293.49	305.15
Nickel	0.05	0.07	0.05	0.04
Polycyclic Aromatic Hydrocarbons, Unspecified	94.27	104.21	221.22	234.62
Perchloroethylene	9.16	9.01	8.39	8.39
Phenol	44.92	49.53	104.25	110.55
Propylene	3.96	5.29	0.91	1.53
Selenium	0.14	0.08	0.09	0.06
Styrene	49.23	54.27	116.89	123.95
Toluene	891.11	833.32	859.24	535.52
Xylenes	382.82	366.58	423.28	329.04
Zinc	2.37	2.69	3.35	3.33

Figure 9-1. Air Emissions for Criteria Pollutants (tons/yr)



Gap Analysis

Overall air emissions of criteria pollutants and toxic air contaminants have remained fairly constant since 2005. Some of the perturbations noted in the criteria pollutants have come as the result of some equipment increases or changes in the SDAPCD emission factors used. MCAS Miramar is striving to make progress for the goal of continuous reductions of air emissions of criteria pollutants.

10. Water, Energy, and Wastewater

Program Overview

The Environmental Engineering Division manages water quality, and wastewater at MCAS Miramar to ensure compliance with multiple environmental regulations and permits. A Water and Energy Annual Report is developed each year by the PWD S-4 to summarize trends in water and energy use and management throughout MCAS Miramar.

Water Use

Goal

With regard to water conservation, EO 13423 requires a 2% reduction in water consumption annually through 2015 or an overall reduction of 16% by 2015. This section will describe water conservation measures taken by MCAS Miramar to achieve these goals.

Where Do These Numbers Come From?
The quantities for water use were provided by the MCAS Miramar PWD S-4.

Baseline and Progress

Table 10-1 shows water use for all MCAS Miramar facilities for FYs 2007 and 2008 in both gallons and cubic feet.

Table 10-1. Total Water Use at MCAS Miramar

Facility	Total Gallons & Cubic Feet FY 2007	Total Gallons & Cubic Feet FY 2008
All Facilities	198,582,000 gallons 26,548,396 cubic feet	175,048,000 gallons 23,402,139 cubic feet

Source: PWD, April 2009.

Gap Analysis

From baseline year of 2007 to 2008, MCAS Miramar has reduced water consumption by approximately 12 percent. This sizable reduction is due to the completion of Phases 1 through 5 of the reclaimed water system. The new system provides reclaimed water to MCAS Miramar for use in irrigation, toilets, urinals, street sweepers, and dust control. Transitioning to the reclaimed water has decreased MCAS Miramar's dependence on potable water supplies and will continue to result in water savings as Phases 6 through 12 are completed.

Energy Use

Goal

EO13423 provides specific requirements for energy efficiency and renewable power. For example, beginning in baseline year 2003, agencies are required to improve overall energy efficiency and reduce greenhouse gas emissions by 3% annually through the end of 2015; or by 30% overall by the

end of 2015. Additionally, at least 50% of the statutorily required renewable energy consumed by MCAS Miramar in any fiscal year has to come from renewable energy sources. Agencies are also encouraged to implement renewable energy generation projects on-site for agency use. Table 10-2 lists the goals for energy use.

Table 10-2. Goals for Energy Use

Goal	Regulatory Driver	Baseline Year	Target Year
Improve overall energy efficiency and reduce greenhouse gas emissions by 3% annually through 2015 or 30% by end of 2015.	EO13423	2003	2015
At least 50% of statutorily required renewable energy consumed in a fiscal year comes from renewable energy sources.	EO13423	None	Annual

Baseline and Progress

Table 10-3 shows energy use for all facilities in MCAS Miramar for FYs 2002 through 2008, and projections for FYs 2009 through 2010. Figure 10-1 shows the energy use quantities graphically in millions of British thermal units per thousand square feet (MMBtu/ksf) for all years.

Table 10-3. Energy Use for FYs 2002-2010

Fiscal Year	Energy Use (MMBtu)	Energy Use (ksf)	% Progress From Previous Year
2002	325,022	4,820	
2003	319,749	5,612	-15.51%
2004	314,976	5,635	-1.89%
2005	316,618	5,646	0.33%
2006	311,582	5,692	-2.39%
2007	277,156	5,599	-9.57%
2008	286,218	5,852	-4.12%
2009	275,000	5,910	-3.07%
2010	200,000	5,900	-27.15%

Source: MCAS Miramar Energy & Water Management Annual Report, FY 2007.

Where Do These Numbers Come From? *The quantities for energy use were provided by the PWD S-4 as part of their Energy and Water Management Annual Report.*

Figure 10-1. Reduction (and Projected Reduction) in Energy Use 2002 - 2010

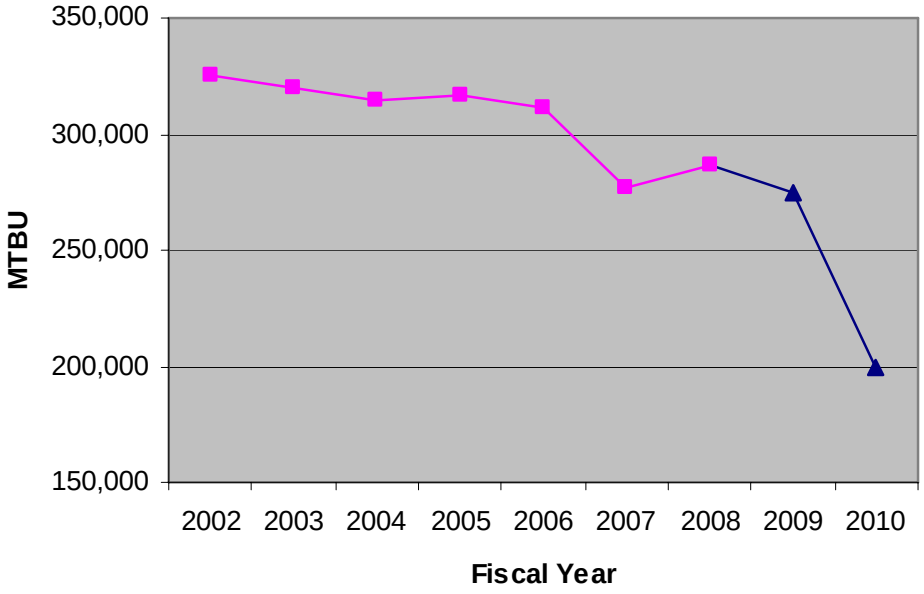


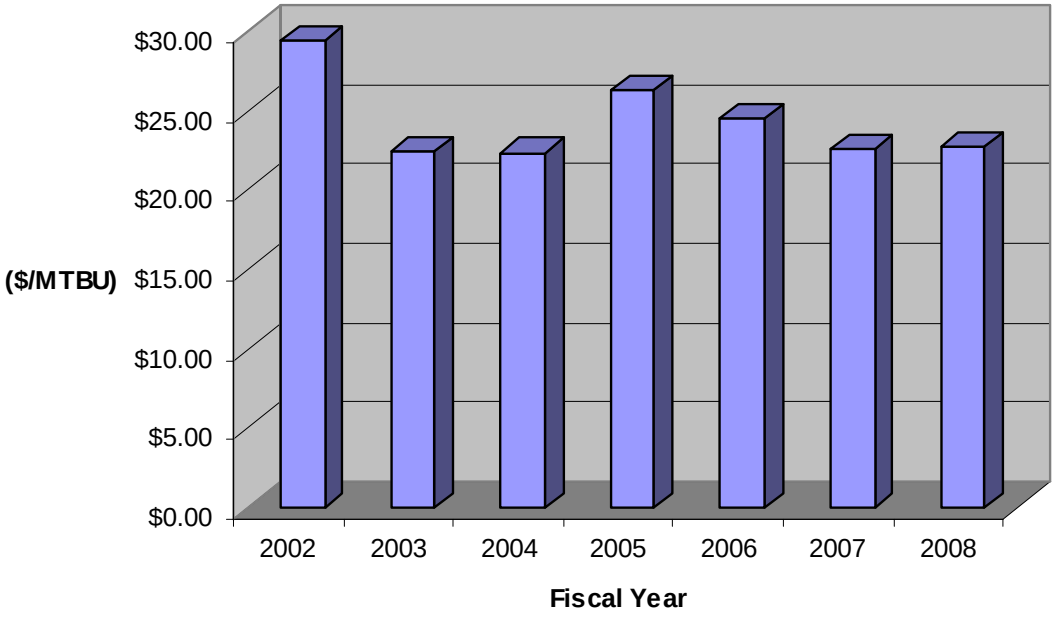
Table 10-4 shows energy costs for all facilities in MCAS Miramar for FYs 2002 - 2008. Figure 10-2 shows the costs graphically in dollars spent per year.

Table 10-4. Energy Costs for FYs 2002 - 2008

Fiscal Year	Cost ($)	Energy Cost ($/MMBtu)
2002	$9,546,245	$29.37
2003	$7,154,296	$22.37
2004	$7,031,047	$22.32
2005	$8,325,968	$26.30
2006	$7,626,299	$24.48
2007	$6,245,229	$22.53
2008	$6,488,965	$22.67

Source: MCAS Miramar Energy & Water Management Annual Report, FY 2007.

Figure 10-2 Energy Costs per MMBtu for FYs 2002 - 2008



Gap Analysis

MCAS Miramar is on track with meeting energy reduction goals, including reducing energy use by 12% from 2002 to 2008. With additional future energy savings projected, a reduction of 40% is expected by 2010. These energy consumption reductions will help meet the goals of EO 13423. MCAS Miramar will continue to seek out energy-saving opportunities to ensure that it maintains these reductions and, where possible, exceeds them.

Where Do These Numbers Come From?
Wastewater generation data was provided by the MCAS Miramar Environmental Engineering Division. Sewage is metered before discharge to the City of San Diego.

Wastewater

Goal

The wastewater goal is to have a continuous reduction in wastewater generation. There are no specific regulatory drivers for this goal, but it is in line with MCAS Miramar's commitment to P2.

Baseline and Progress

In 2009, the City of San Diego renewed MCAS Miramar's Industrial Wastewater Permit with an average wastewater discharge volume of 736,628 gallons per day (gpd). Wastewater associated with sanitary and process related activities is discharged to the sanitary sewer for treatment by the Point Loma Wastewater Treatment Plant. No wastewater is treated on site at MCA Miramar. The maximum volume of wastewater permitted to be discharged by MCAS Miramar is 1.6 million gallons per day. Volumes of wastewater generated correlate with the number of people present on site on any given day.

The latest improvements in wastewater management include the installation of eight storm water diversion systems that redirect storm water runoff away from the sanitary system. This storm water diversion system prevents storm water runoff from overwhelming the Point Loma Wastewater Treatment Plant. Table 10-5 in Appendix A provides a list of storm water outfalls at MCAS Miramar.

To prevent sediment, grit, sand, oil/fuel, and other materials from entering the sewer system, MCAS Miramar has installed OWSs at all wash racks. The OWSs remove oil and sediments from wash water before it is discharged, reducing the pollutant load to the wastewater collection and treatment system. Table 10-6 in Appendix A provides a list of OWSs at MCAS Miramar.

In addition, MCAS Miramar operates two Silver Recovery Units to remove silver from wastewater before discharge. Table 10-7 lists the processing rates for the two on-site treatment units.

Table 10-7. Silver Recovery Units at MCAS Miramar

Building #	Activity	Processing Rate (gallons/day)	Equipment Serviced
2495	Dental Clinic	0.1	X-Ray Processor
7550	MALS 11 NDI	0.3	NDI X-Ray

Gap Analysis

Industrial wastewater discharges are estimated based on water consumption at MCAS Miramar. These discharges are made up of sanitary discharges (391,250 gpd from restrooms), process discharges (19,291 gpd from cooling tower blow down and wash racks), and other water losses (e.g., irrigation runoff). As MCAS Miramar works towards reducing water consumption, lower water consumption should result in a decrease of wastewater discharges. These improvements in efficiency, as well as future plans to install additional metering stations within the Station, will provide more detail on where discharges are coming from and how they can be reduced.

11 Green Procurement Program

Green Procurement Program

EO 13423 consolidated the existing preference purchasing programs, energy-efficient and water-conservation programs, and sustainable design requirements into one program. On 27 August 2004, the Under Secretary of Defense issued a policy memorandum entitled "Establishment of the DoD Green Procurement Program (GPP)." The DoD goal is to achieve 100% compliance with mandatory Federal GPP programs in all acquisitions transactions. The GPP applies to all DoD and operations, except military tactical vehicles and equipment. The GPP elements are listed below:

- Recovered material (green procurement);
- Energy efficient;
- Alternative fuels/AFVs;
- Biobased products;
- Non ozone-depleting substances; and
- Environmentally preferable products.

With the exception of the U.S. Department of Agriculture Biobased Products Program that is still being defined, none of the GPP elements are new initiatives.

The purpose of the DoD GPP is to enhance and sustain mission readiness through cost-effective acquisition that achieves compliance and reduces resource consumption as well as solid and hazardous waste generation. Green procurement includes the acquisition of:

- Recycled content products;
- Environmentally preferable products and services;
- Biobased products and energy- and water-efficient products;
- AFVs and alternative fuels;
- Products using renewable energy; and
- Alternatives to hazardous or toxic chemicals.

The GPP strategy is used as the management framework for all DoD organizations and will be implemented to ensure compliance with procurement preference requirements as a routine part of day-to-day purchasing activities. DoD's procurement of green products and services contributes to sound management of the DoD's financial resources, natural resources, and energy. In its daily operations, the DoD has the opportunity and obligation to be environmentally and energy conscious in its selection and use of products and services. As the single largest buyer of supplies and services throughout the government, the DoD is a leader in green procurement. DoD strives to ensure that every procurement meets the requirements of applicable Federal green procurement preference programs. Proper attention to green procurement will enhance the DoD's credibility and demonstrate DoD's commitment to environmental stewardship by becoming a model consumer of green products and services. The DoD's GPP is different from other procurement programs such as Affirmative Procurement and Environmentally Preferable Purchasing in that it not only focuses on the procurement function, but also on the roles and responsibilities of each member of the DoD and recognizes that every person has a role to play.

GPP Goals and Objectives

- Educate appropriate DoD employees on the requirements of Federal "green" procurement preference programs, their roles and responsibilities relevant to 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 solid waste generated;
- Reduce consumption of petroleum and increase the use of alternative and renewable fuel sources;
- Increase in the use of renewable energy;
- Reduce the use of ozone-depleting substances 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; and
- Expand markets for green products and services.

Fleet Management Goals

As part of fleet management, each agency must increase the purchasing of alternative fuel, hybrid, and plug-in hybrid electronic vehicles when commercially available. Agencies must also reduce consumption of petroleum by fleet vehicles by 2% annually through 2015.

Green Procurement Program

Fleet vehicles at MCAS Miramar and all Marine Corps Installations West bases are managed by Southwest Regional Fleet Transportation (SWRFT). The number and type of vehicles at MCAS Miramar is determined by SWRFT, which is headquartered at Marine Corps Base (MCB) Camp Pendleton. SWRFT personnel stationed at MCAS Miramar determine the type of vehicle needed in general terms, such as a certain size pick-up truck or car, and then submit the request for purchase to personnel at MCB Camp Pendleton. MCAS Miramar personnel can request an AFV, but the final decision lies with the SWRFT. Therefore, goal achievement with regard to purchasing AFVs is primarily the responsibility of MCB Camp Pendleton SWRFT personnel.

The goal for reduction in petroleum consumption by fleet vehicles can be impacted by policies and procedures followed by MCAS Miramar SWRFT personnel. They will be responsible for tracking progress and putting policies, projects, and procedures in place to ensure the goal is achieved.

12 Pollution Prevention Opportunities

An effective P2 Program depends upon ideas, that when implemented, have a positive environmental benefit and contribute towards meeting a Marine Corps P2 goal. These ideas come from a variety of sources including formal Process-Specific Opportunity Assessments (PSOAs), suggestions from shop personnel and supervisors, lessons learned at other Marine Corps installations, and other P2 data sources such as the Joint Service P2 Technical Library. The P2 opportunities listed in this chapter were derived primarily from PSOAs and interviews with personnel aboard MCAS Miramar. P2 options are initiatives that involve significant equipment, process, or technology modifications, and implementation usually requires an initial capital expenditure.

BMPs are initiatives that typically involve changes in administrative procedures, service contract modifications, changes in management practices, or minor process modifications. Examples of BMPs include substitution of a water-based cleaner for a chlorinated solvent, or improved housekeeping. BMPs typically do not require significant capital investment.

Recommended 2009 P2 Options

Based upon the information obtained during site visits and interviews with Station personnel, it is recommended that MCAS Miramar implement the options provided in Appendix B. A brief summary of each option is provided below.

1. Drip Pans for MALS-11 Power Plant

MALS-11 Power Plant was identified as one of the largest generators of POL, POL debris, and oily rags for MCAS Miramar. The PSOA conducted at the work center revealed that a primary source of the POL debris was from spills caused by using drip pans that are not sized correctly to adequately fit underneath the engines being maintained or repaired. To facilitate the capture of leaking POLs from the engines and minimize the risk of spills, it is recommended that 20 96" x 41" x 2" and 15 48" x 36"x 2" metal drip pans be purchased for MALS-11 Power Plant. Purchase of these pans is estimated to reduce spill debris generation by 385 lbs/year and rag use by 16,200 rags/year. Improved oil handling procedures are anticipated to result in an increase in used liquid POLs because more will be recovered instead of spilled. The liquid POLs are recycled through a contractor and are not disposed of as hazardous waste.

2. Purchase of Drip Pans and Oil Drain for MALS-16 GSE

MALS -16 GSE was also identified as one of the largest generators of POL, POL debris, and oily rags for MCAS Miramar. The PSOA conducted at the work center revealed that a primary source of the POL debris was from spills caused by using equipment not properly designed for the tasks performed:

- The oil pans currently in use are too small for the equipment being maintained. Oil is frequently spilled when attempting to pour the captured oil from the oil pans to the used oil tank (i.e., "Blue Betty").
- The oil pump used to transfer new oil from drums had broken and the oil was being poured by hand (resulting in frequent spills).

- Used oil in equipment placed on lifts for maintenance was drained into bucket held up by shop personnel and then poured into the used oil tank.

To facilitate transfer of POLs and minimize the risk of spills, it is recommended that the following be purchased for MALS-16 GSE:

- Enclosed oil pans;
- A 20-gallon pressurized oil evacuation drain; and
- An oil transfer pump.

Implementation of this option is anticipated to reduce the generation of spill debris by 170 lbs/year and the rag use by 2,475 rags/year. Improved oil handling procedures are anticipated to result in an increase in used liquid POLs because more will be recovered instead of spilled. The liquid POLs are recycled through a contractor and are not disposed of as hazardous waste.

3. Purchase of Rolling Drip Pans and Oil Tank for VMGR-352

VMGR-352 also generates a large percentage of the POL, POL debris, and oily rags generated by MCAS Miramar. The PSOA conducted at the work center revealed that a primary source of the POL debris was from spills caused by using equipment not properly designed for the tasks performed and from improper placement of the used oil storage tank. The tank was placed inside a three-sided enclosure made for a dumpster and the inlet spout was facing toward one of the walls. The restricted access was causing a significant number of spills. The waste generation data for 2008 showed that the shop generated a total of 610 gallons of used POLs, with the largest generation rate for any one month being 170 gallons.

To facilitate transfer of POLs and minimize the risk of spills, it is recommended that the following be purchased for VMGR-352:

- Purchase a 30-gal rolling drip pan equipped with an electric pump to transfer the used POLs to the storage tank.
- Possibly purchase a smaller, 180-gallon used POL storage tank that can be kept in the hangar if a plug-in electric pump is selected for the rolling drip pans. If a battery-powered pump is selected, the existing "Blue Betty" could continue to be used. (No hardwire power is available near the storage tanks current location.)
- It should be noted it appears that the current tank is oversized for the amount of used POLs generated.

Implementation of this option is anticipated to reduce spill debris generation by 3,661 lbs/year and rag use for spill clean-up by 6,525 rags/year. Improved oil handling procedures are anticipated to result in an increase in used liquid POLs because more will be recovered instead of spilled. The liquid POLs are recycled through a contractor and are not disposed of as hazardous waste.

A detailed description and economic analysis of this option is presented in Appendix B.

P2 Option Summary

Table 12-1 provides a summary of the recommended options, including the capital costs, the amount of waste reduced, the payback period, and the option scores.

Table 12-1. Recommended Options

Project No.	Title	Capital Cost	Waste Reduction		Estimated Annual Cost Savings	Payback Period	Score
			Spill Debris (lbs/year)	Rag Use (rags/year)			
1	Drip Pans for MALS-11 Power Plant	$3,790	385	6,200	$7,980	0.47	12.8
2	Purchase of Drip Pans and Oil Drain for MALS-16 GSE	$1,920	170	2,475	$5,050	0.78	12.8
3	Purchase of Rolling Drip Pans and Oil Tank for VMGR-352	$12,850	3,661	6,525	$3,500	3.67	9.6
Total		**$18,560**	**4,216**	**15,200**	**$16,530**	**-**	**-**

Recommended 2008 P2 Best Management Practices

The following BMPs have been identified for implementation onboard MCAS Miramar:

1. ***Minimize Use of Aerosol Cans.*** In CY 2008, MCAS Miramar generated 11,124 lbs of aerosol can waste. This waste stream is particularly labor-intensive to manage because aerosol cans must be punctured and drained prior to disposal. During the site visit, there were several practices identified that could be modified to reduce the generation of aerosol can waste. Recommendations to modify those practices include the following:

   - **Use non-aerosol products instead of aerosols when non-aerosols are available and approved for a particular application.** An example is the use of the aerosol cleaner Aero Clean in use at VMFAT-101. The cleaner is used to clean the exterior of aircraft; however, a non-aerosol cleaner (MA-102 MIL-PRF-85570D) is also available for aircraft cleaning. This cleaner is purchased in 5-gallon containers and can be applied by mixing in a bucket and using a mop or it can be placed in a spray bottle.

     Shops and facilities that switch to refillable spray bottles can save money by avoiding the high cost of aerosol cans and can help to protect the environment by eliminating the solid and potentially hazardous waste streams they produce. Refillable spray bottles use a hand pump to spray the product on the part being cleaned. These bottles are available in different construction material and are filled with product from a bulk product container. Facilities save money by purchasing the product in a bulk container and transferring to smaller spray bottles instead of purchasing aerosol cans. Nozzle extensions are also available for spraying areas that are otherwise difficult or impossible to reach. Spray bottles can be purchased at a minimal cost and can be provided to each shop. The primary technical concern with this practice will be teaching shop personnel to maintain proper labels on the transfer spray containers.

- **Use stickers, vinyl stencils, and paint markers instead of aerosol paints whenever possible.** The Painting Application ESOP should be modified to discourage the use of aerosol paints and encourage personnel to find alternate methods of marking items whenever possible. The primary technical concern is ensuring the marking method matches the durability requirements.
- **Maximize Use of Epoxy Aerosol Paints.** Two-part epoxy paints are now available in aerosol cans to facilitate ease of application of mil-spec paints on aircraft. However, many of these aerosol cans are turned in for disposal when they are still half full due to the 24-hour pot life of the mixed paint. To minimize waste generation, work centers should "batch" painting jobs whenever possible so all the paint can be used. All the unused paint must be discarded as hazardous waste. Also see BMP #4.

2. ***Prepare a P2 ESOP.*** In order to officially establish P2 as an integral component of the EMS, it is recommended that a P2 ESOP be prepared to clearly assign the roles and responsibilities for P2 at MCAS Miramar. The ESOP will need to address all levels of operation on board the installation and require a commitment to P2 from upper management all the way through to the personnel in the shops. Shop supervisors and Environmental Coordinators will be key personnel in the implementation of the P2 ESOP. Ideally, P2 should be addressed first at the shop supervisor level and the P2 EMH should be applied by each practice owner. If the shop supervisors do not emphasize environmental issues/impacts, they are not emphasized. The Environmental Coordinators help address these issues at the shop level, but supervisor support and training is imperative. The Base must move away from the mindset that P2 is primarily the P2 Program Manager's responsibility. A form is provided in Appendix C for inclusion in this ESOP to assist supervisors and Environmental Coordinators in the application of the EMH to everything they do that has an environmental impact.

3. ***Develop a P2 Training Module Through the CETEP.*** After completion of the P2 ESOP, a training module should be developed to support the ESOP. The training would include basic P2 principles as well as specific roles and responsibilities on board MCAS Miramar.

4. ***Technical Representative Training Sessions.*** During the site visit, shop personnel stated that the technical representatives for the companies that supply epoxy paint to the installation are frequently on Base. Since they are already present, it is recommended that representatives be asked to conduct training seminars on proper mixing on a regular schedule. The Environmental Coordinators interviewed felt this was needed because they frequently observe Marines mixing paints incorrectly or in excess. This paint ends up as hazardous waste. The paint mixing problems are most likely due to the need for refresher training and due to the frequent turnover of personnel at the installation due to deployments.

5. ***Promote the Station Antifreeze Recycling Service.*** The Base recycled their own antifreeze in the HAZMIN Center until 2008. It was determined that the process was too expensive and time consuming, so a contracted service was procured to pick up and recycle the antifreeze off-Base at no cost. During the site visit, it was noted that some work centers still have their own antifreeze recycler units and are not aware that they can recycle antifreeze through the contracted service. MALS-16 GSE had a recycler unit that they use even though it is old and does not work well. They have been recycling approximately 55 gallons every three months

When combined, the P2 options and BMPs represent the potential to significantly reduce hazardous waste and solid waste generation, air emissions, and hazardous material consumption while contributing to MCAS Miramar's reputation as an environmental steward and good neighbor.

Options Identified for Further Investigation

The following options are currently being pursued by MCAS Miramar personnel or are recommended for investigation.

Oil/Water Separators. The largest hazardous waste stream generated at MCAS Miramar is sludge from 56 OWSs located on site. The OWSs support various vehicle washing operations and serve to reduce the amount of pollutants entering the sanitary sewer. Wastewater from vehicle and equipment washing is contaminated with sediment, oil, and fuel. The OWS remove oil and sediment to minimize contamination and performance issues of the wastewater collection and treatment system, but also results in a large hazardous waste stream from the required OWS maintenance activities (e.g., clean-out of OWSs).

In order for the OWSs to operate properly, they must be cleaned out to prevent sludge and oil build-up. In 2006, an overall assessment of OWSs was conducted for MCAS Miramar as part of a new OWS maintenance contract. OWSs at MCAS Miramar underwent a complete clean-out. All sludge and oil materials were removed, the OWSs were emptied and washed out, and then resulting waste (e.g., wash water, sludge) was disposed of as non-RCRA hazardous waste. This Base-wide clean-out resulted in a large spike in the hazardous waste generated at MCAS Miramar, but is expected to drop due to an altered maintenance and clean-out program. The new program calls for as-needed complete clean-outs based on monthly inspections. With these procedures in place, an OWS is only completely cleaned out when the level of sludge or surface oil indicates a clean-out is necessary. If appropriate, fuel and oil are skimmed from the OWS instead of doing a complete clean-out of the unit. This has resulted in drop in OWS sludge since 2006, but it is still the largest hazardous waste stream at MCAS Miramar.

The 2004 OWS PPOA Memo Report presented 10 P2 opportunities to reduce the amount of waste generated from OWS operation and maintenance activities. These opportunities were further evaluated as part of the April 2009 Source Reduction Evaluation and Review Plan prepared in accordance with SB-14 requirements. The following options were identified as still being viable solutions for reducing OWS waste:

- **Reevaluate Waste Characterization as Hazardous Waste.** It is possible that the OWS sludge has been improperly characterized as hazardous waste. The Station should evaluate each OWS stream and re-profile as necessary to properly characterize the waste. If the OWS sludge is non-hazardous, the Station can reduce its hazardous waste disposal and save on disposal costs. Depending on the results of analytical testing, a significant change in the amount of hazardous waste generated may occur.

- **Install Foreign Object Damage/Foreign Object Debris (FOD) Shaker at MCAS Miramar Range.** The option may have an impact on the amount of waste generated. The proposed option is to install a cattle guard type FOD shaker at an appropriate location that would require most equipment and vehicles leaving the east range to cross over it before re-entering the Main Base. FOD rumble strips are often used at constructions sites and airports to dislodge FOD from vehicle undercarriage. If used properly, the installation of the FOD shaker should reduce the amount of mud and sediment on the vehicles prior to

entering the MWSS-373 wash racks. In addition, the Station can target a significant number of tactical vehicles and equipment used for training that are washed on Station vehicle wash racks.

- **Install Sand Traps.** It was proposed in a former MCAS Miramar P2 Plan that sand traps be installed ahead of OWSs to remove heavy suspended solids and handle them separately from OWS sludge as a non-hazardous waste. Currently, there are sand traps in operation along the flight line. However, one of the main wash racks, which services MWSS-373 vehicles, does not have a sand trap installed. The MWSS-373 wash rack is a high use closed-loop wash rack. If the wash rack is properly maintained in conjunction with the installation of a sand trap, there should be a reduction in sludge production with the diversion of heavy sediment to the sand trap. The sediment collected in the sand trap should be tested to determine proper disposal methods. If the sand trap proves to be an effective tool at minimizing sludge production, it should be installed at other significant locations on Station.

In addition to these options, it is also recommended that personnel operating the OWSs be trained to remove as many solids as possible on the range prior to entering the wash racks.

Strip Tank/Blasting Unit for MALS-16 GSE. MALS-16 GSE is in the early stages of developing a pilot project to test the use of a strip tank that can be used for parts/wheel cleaning. The strip tank would use an environmentally friendly cleaner (trade name Green Piranha) that is formulated to clean efficiently with low-VOC emissions. The pilot project is still in the early design phase, but it is estimated that the tank will be 6 feet wide (to accommodate axles) by 3 feet deep (front to back) by 4.25-feet, high. The tank volume would be 76.5 cubic feet; requiring 572 gallons of Green Piranha. Green Piranha is sold by the gallon and in 330 gallon totes. It is estimated that the Green Piranha would last approximately one year (depending on frequency of strip tank use) before having to be cleaned out and refilled. Minor losses from drag out (e.g., small amount of cleaner that would be removed with the parts) would also need to be replenished. (Applied Chemical Laboratories 2009)

Process-Specific Training Modules. In order to integrate the P2 Program throughout the installation, EMD is considering developing training modules specific to processes conducted on the installation. The level of detail and the specific trainings will need to be determined. Training modules to consider could include specific trainings for painting, POL handling, parts washers, etc., or work centers with similar activities could be grouped and trainings developed for the activities conducted by the group. For example, an engine maintenance module could be developed that would apply to multiple organizations and would address topics such as POL handling, degreasing, hazardous waste minimization, and use of aerosol cans.

Solvent-Based Paint Reduction Opportunities. Per the SB-14 Plan, there are three maintenance functions that are primarily responsible for the generation of solvent-based paint waste: VFMAT-101, Aviation Museum Restoration Facility, and the Navy Brig. Some minor touch-up painting occurs in several other units located on Station; however, these three activities generated the largest quantities of this waste stream in RY 2006. Since RY 2002, there has been a 41% decrease in the solvent-based paint waste stream at MCAS Miramar. Deployment, reutilization of paint at the Self-Help Store, and smaller container substitution has contributed to the decrease in paint waste generation.

The following two options were presented in the SB-14 Plan for reducing this waste stream:

- Procure smaller pop cans for VMFAT-101; and
- Switch to water-based paint applications at the Aviation Museum.

These options should be further evaluated for implementation. Conducting a formal, large-scale PPOA on all processes using solvent-based paints is also a viable option.

13 References

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A Tables

Table 9-1. List of Air Emission Permitted or Registered Sites

Permit/ Registration Number	Equipment	Command/ Activity	Location	Equipment/ Permit Status	Comments
MCAS Miramar Facility I.D. 4824A					
006304	Gasoline Bulk Plant	MCAS Fuels Div	7902	Not Available	GASOLINE AST @ FUEL FARM, * ATC 984790
860736	Boiler	MCAS PWD	9570	In Use/Active	A.O. SMITH COF-600-1000, DIESEL FUELED
860738	Boiler	MCAS PWD	9570	In Use/Active	RITE ENGINEERING 165WO, DIESEL FUELED
890903	Emergency Diesel Generator	MCAS PWD	9266	In Use/Active	CUMMINS NT-855-G4, 375 HP
890904	Emergency Diesel Generator	MCAS PWD	9268	In Use/Active	CUMMINS 6-CTA-8.3, 277 HP
890905	Emergency Diesel Generator	MCAS PWD	9276	In Use/Active	CUMMINS 4BT-3.9 G2, 102 HP
900288	Gasoline Service Site	MCAS Fuels Div	8483	In Use/Active	NON-RETAIL, GOVERNMENT GDF
911513	Arresting Gear Engine	MCAS ARD	Airfield	In Use/Active	TELEDYNE WISCONSIN MOTOR V465D, 65 HP, GASOLINE
911514	Arresting Gear Engine	MCAS ARD	Airfield	In Use/Active	TELEDYNE WISCONSIN MOTOR V465D, 65 HP, GASOLINE
911515	Arresting Gear Engine	MCAS ARD	Airfield	In Use/Active	TELEDYNE WISCONSIN MOTOR V465D, 65 HP, GASOLINE
911516	Arresting Gear Engine	MCAS ARD	Airfield	In Use/Active	TELEDYNE WISCONSIN MOTOR V465D, 65 HP, GASOLINE
960041	Emergency Diesel Generator	MCAS PWD	8671	In Use/Active	JOHN DEERE 4039DD, 80 HP
960051	Emergency Diesel Generator	MCAS PWD	9452	In Use/Active	CATERPILLAR 3306, 320 HP

Table 9-1. List of Air Emission Permitted or Registered Sites (Continued)

Permit/ Registration Number	Equipment	Command/ Activity	Location	Equipment/ Permit Status	Comments
960397	Emergency Diesel Generator	MCAS PWD	9500	In Use/Active	FORD 363DF-6005-A, 73 HP
960560	Arresting Gear Engine	MCAS ARD	Airfield	In Use/Active	TELEDYNE WISCONSIN MOTOR V465D, 65 HP, GASOLINE
960561	Arresting Gear Engine	MCAS ARD	Airfield	In Use/Active	TELEDYNE WISCONSIN MOTOR V465D, 65 HP, GASOLINE
960562	Arresting Gear Engine	MCAS ARD	Airfield	In Use/Active	TELEDYNE WISCONSIN MOTOR V465D, 65 HP, GASOLINE
960563	Arresting Gear Engine	MCAS ARD	Airfield	In Use/Active	TELEDYNE WISCONSIN MOTOR V465D, 65 HP, GASOLINE
960564	Arresting Gear Engine	MCAS ARD	Airfield	In Use/Active	TELEDYNE WISCONSIN MOTOR V465D, 65 HP, GASOLINE
960565	Arresting Gear Engine	MCAS ARD	Airfield	In Use/Active	TELEDYNE WISCONSIN MOTOR V465D, 65 HP, GASOLINE
971304	Emergency Diesel Generator	MCAS PWD	7208	Storage/Active	DEUTZ BF6L913L, 120 HP
971629	Emergency Fire Pump	MCAS PWD	6017	In Use/Active	CLARKE/DETROIT DIESEL PDFP-L4YN2500F, 73 HP
971630	Emergency Fire Pump	MCAS PWD	6017	In Use/Active	CLARKE/DETROIT DIESEL PDFP-L4YN2500F, 73 HP
972451	Emergency Fire Pump	MCAS PWD	6218	In Use/Active	CLARKE/DETROIT DIESEL PDFP-L4YN2500F, 73 HP
972452	Emergency Fire Pump	MCAS PWD	6218	In Use/Active	CLARKE/DETROIT DIESEL PDFP-L4YN2500F, 60 HP
973752	Emergency Fire Pump	MCAS PWD	7122	In Use/Active	CLARKE/DETROIT DIESEL PDFP-L4YN2500F, 67 HP
973753	Emergency Fire Pump	MCAS PWD	6001	In Use/Active	CLARKE/DETROIT DIESEL PDFP-L4YN2500F, 60 HP
973800	Emergency Diesel Generator	MCAS PWD	2661	In Use/Active	JOHN DEERE4039TF004, 92 HP

Table 9-1. List of Air Emission Permitted or Registered Sites (Continued)

Permit/ Registration Number	Equipment	Command/ Activity	Location	Equipment/ Permit Status	Comments
973885	Emergency Diesel Generator	MCAS PWD	9470	In Use/Active	CUMMINS 6BT5.9-G2, 135 HP
974035	Arresting Gear Engine	MCAS ARD	Airfield	In Use/Active	TELEDYNE WISCONSIN MOTOR V465D, 65 HP, GASOLINE
975747	Emergency Diesel Generator	MCAS PWD	8672	In Use/Active	JOHN DEERE 4039TF004, 110 HP
977278	Emergency Diesel Generator	MCAS PWD	9227	In Use/Active	CUMMINS 4B3.9-G2, 68 HP
977383	Emergency Diesel Generator	MCAS PWD	9441	In Use/Active	CATERPILLAR 3306, 400 HP
977772	Emergency Diesel Generator	MCAS PWD	9275	In Use/Active	PERKINS 1004G, 73
977773	Emergency Diesel Generator	NMCSD	2496	In Use/Active	JOHN DEERE 6081AF001, 250 HP
977822	Emergency Diesel Generator	MCAS PWD	6311	Storage/Active	DEUTZ BF6L513, 326 HP
977823	Emergency Diesel Generator	MCAS PWD	6311	In Use/Active	DEUTZ BF6L913FR, 224 HP
977824	Emergency Diesel Generator	MCAS PWD	21135	Storage/Active	DEUTZ BF6L913, 118 HP
977825	Emergency Diesel Generator	MCAS PWD	6311	Storage/Active	DEUTZ BF6L913, 118 HP
977826	Emergency Diesel Generator	MCAS PWD	6311	In Use/Active	DEUTZ BF6L513, 197 HP
977827	Emergency Diesel Generator	MCAS PWD	6311	In Use/Active	DEUTZ BF6L413FR, 200 HP
977828	Emergency Diesel Generator	MCAS PWD	21135	Storage/Active	CUMMINS 6BT5.9-G2, 135 HP
977829	Emergency Diesel Generator	MCAS PWD	21135	Storage/Active	CUMMINS 6BT5.9-G1, 135 HP
977830	Emergency Diesel Generator	MCAS PWD	6311	Storage/Active	CUMMINS 6BT5.9-G1, 135 HP
977831	Emergency Diesel Generator	MCAS PWD	6311	In Use/Active	CUMMINS 6BT5.9-G1, 135 HP
977832	Emergency Diesel Generator	MCAS PWD	21135	Storage/Active	CUMMINS 6BT5.9-G1, 135 HP
977833	Emergency Diesel Generator	MCAS PWD	7134	In Use/Active	CUMMINS 4BT3.9, 86 HP
977835	Emergency Diesel Generator	MCAS PWD	8630	In Use/Active	MITSUBISHI 6D16-T, 184 HP
978785	Emergency Diesel Generator	MCAS PWD	9213	In Use/Active	VOLVO TAD741GE, 310 HP
978786	Emergency Diesel Generator	MCAS PWD	9213	In Use/Active	VOLVO TAD741GE, 310 HP
979801	Emergency Diesel Generator	MCAS PWD	9611	In Use/Active	DAEWOO 180LE, 752 HP

Table 9-1. List of Air Emission Permitted or Registered Sites (Continued)

Permit/ Registration Number	Equipment	Command/ Activity	Location	Equipment/ Permit Status	Comments
980782	Emergency Diesel Generator	MCAS PWD	7224	In Use/Active	JOHN DEERE 4045TF150, 99 HP
981811	Emergency Diesel Generator	MCAS PWD	21134a	In Use/Active	CUMMINS 6BT-5.9, 166 HP
981812	Emergency Diesel Generator	MCAS PWD	7494	In Use/Active	VOLVO D25096460, 394 HP
981930	Emergency Diesel Generator	MCAS PWD	7210	In Use/Active	JOHN DEERE 4045HF275H, 157 HP
984637	Emergency Diesel Generator	MCAS PWD	Ils Shelter	In Use/Active	JOHN DEERE 3029TF270, 64
985182	Emergency Diesel Generator	MCAS PWD	22111	In Use/Active	JOHN DEERE 4045TF270, 99 HP, GEN SN: 2144950
985183	Emergency Diesel Generator	MCAS PWD	2682	In Use/Active	JOHN DEERE 4045TF270, 99 HP, GEN SN: 2144936
985184	Emergency Diesel Generator	MCAS PWD	2130	In Use/Active	JOHN DEERE 4045TF270, 99 HP, GEN SN: 2144943
985185	Emergency Diesel Generator	MCAS PWD	9680	In Use/Active	JOHN DEERE 4045TF270, 99 HP, GEN SN : 214429
985186	Emergency Diesel Generator	MCAS PWD	9681	In Use/Active	JOHN DEERE 4045TF270, 99 HP, GEN SN: 2144943
985211	Emergency Diesel Generator	MCAS PWD	9211	In Use/Active	JOHN DEERE 6068HF285, 237 HP
985212	Emergency Diesel Generator	MCAS PWD	9211	In Use/Active	JOHN DEERE 6090HF485, 422 HP
985224	Emergency Diesel Generator	MCAS PWD	9226	In Use/Active	CATERPILLAR CP, 436 HP
985801	Arresting Gear Engine	MCAS ARD	Airfield	In Use/Active	TELEDYNE WISCONSIN MOTOR V465D, 65 HP, GASOLINE
985802	Arresting Gear Engine	MCAS ARD	Airfield	In Use/Active	TELEDYNE WISCONSIN MOTOR V465D, 65 HP, GASOLINE
986085	Gasoline Bulk Plant	MCAS FUELS DIV	7229	Not Available	TANK 7902 @ FUEL FARM, LOST PO AFTER ATC 984790 APPROVAL
985963	Emergency Diesel Generator	MCAS PWD	9470	IN USE/ACTIVE	JOHN DEERE 3029TF270, 64 HP, GEN SN: 2186243

Table 9-1. List of Air Emission Permitted or Registered Sites (Continued)

Permit/ Registration Number	Equipment	Command/ Activity	Location	Equipment/ Permit Status	Comments
985964	Emergency Diesel Generator	MCAS PWD	9570	IN USE/ACTIVE	JOHN DEERE 4045TF270, 99 HP, GEN SN: 2186279
986674	Emergency Diesel Generator	MCAS PWD	7117	IN USE/ACTIVE	JOHN DEERE 4045HF285, 185 HP, GEN SN: 2195480
Naval Consolidated Brig (Navcombrig) Facility I.D. 4824B					
870230	Emergency Generator	NAVCONBRIG	Brig	In Use/Active	Cummins; M/N: DMT350C; S/N: 870476; 470 HP; Diesel fueled
931071	Wood Products Coating Spray Booth	NAVCONBRIG	Brig	In Use/Active	Binks Paint Spray Booth; 12' X 8' X 7' w/Andrea exhaust filters and fan
Public Works Center (PWC) Facility I.D. 4824C: All Units Have Been Removed					
3d Marine Aircraft Wing (3d Maw) Facility I.D. 4824D					
005641	Paint Spray Booth	3RD MAW	7550	Not In Use/Inactive	MALS-16 AF, INACTIVE
005642	Paint Spray Booth	3RD MAW	7550	In Use/Active	MALS-16 AF East end of B7550 across from TS
005643	Paint Spray Booth	3RD MAW	8558	Not In Use/Inactive	MALS-11 GSE, INACTIVE
005822	Abrasive Blast Booth	3RD MAW	8461	Not In Use/Inactive	MALS-11 PP, INACTIVE
008199	Test Cell	3RD MAW	8545	In Use/Active	MALS-11 PP, F/A-18 ENGINES (GE F404-GE-400/2)
008250	Corrosion Control Cart	3RD MAW	8200	Not In Use/Inactive	INACTIVE
020133	Aircraft Parts Coating Operation	3RD MAW	9670	In Use/Active	HANGAR 6: HMM-161, HMM-163, HMM-165, HMM-166
020134	Aircraft Parts Coating Operation	3RD MAW	9570	In Use/Active	HANGAR 5: HMM-361, L-3 COMMUNICATIONS
020135	Aircraft Parts Coating	3RD MAW	9470	In Use/Active	HANGAR 4: HMH-462, HMH-465, HMH-466

Table 9-1. List of Air Emission Permitted or Registered Sites (Continued)

Permit/ Registration Number	Equipment	Command/ Activity	Location	Equipment/ Permit Status	Comments
	Operation				
020136	Aircraft Parts Coating Operation	3RD MAW	9500	In Use/Active	HANGAR 3: VMFAT-101
020137	Aircraft Parts Coating Operation	3RD MAW	9500	In Use/Active	HANGAR 3: VMFAT-101
020138	Aircraft Parts Coating Operation	3RD MAW	9215	In Use/Active	HANGAR 2: VMFA-134, VMFA-232, VMFA-314, VMFA-323
020139	Aircraft Parts Coating Operation	3RD MAW	9277	In Use/Active	HANGAR 1: VMFA-121, VMFA-225, VMFA-242
020143	Aircraft Parts Coating Operation	3RD MAW	9170	In Use/Active	HANGAR 0: VMGR-352
040306	Corrosion Control Cart	3RD MAW	8200	Not In Use/Inactive	INACTIVE
040490	Test Cell	3RD MAW	8679	In Use/Active	MALS-11 PP, F/A-18 ENGINES
870297	Paint Spray Booth	3RD MAW	8461	Not In Use/Inactive	MALS-11 PP, INACTIVE
920689	Cold Solvent Degreaser	3RD MAW	7490	In Use/Active	MALS-11 AF (TS), RAMCO 768J004-1
920690	Cold Solvent Dip Tank	3RD MAW	7550	In Use/Active	MALS-16 AF (TS), KLEER-FLO PW100G
920693	Cold Solvent Degreaser	3RD MAW	7490	In Use/Active	MALS-11 AF (TS), RAMCO XAS1197
920694	Metal Inspection Tanks	3RD MAW	7550	Not Available	MALS-11 AF (NDI), MAGNAFLUX H-810-G, PRE-DIP TANK ZA-28
930473	Cold Solvent Degreaser	3RD MAW	7550	In Use/Active	MALS-16 AF (TS), RAMCO MK 24
960117	Expeditionary Test Stand	3RD MAW	Mobile	In Use/Active	MALS-11 PP, AE37-T23, F/A-18 ENGINES MCAS IWAKUNI
960118	Expeditionary Test Stand	3RD MAW	8125	In Use/Active	MALS-16 PP, AE37T-2 TO TEST CH46/53 APU'S (T62-11/27)
960119	Expeditionary Test Stand	3RD MAW	8126	In Use/Active	MALS-11 PP, AE37T-26 TO TEST F/A-18 APU

Table 9-1. List of Air Emission Permitted or Registered Sites (Continued)

Permit/ Registration Number	Equipment	Command/ Activity	Location	Equipment/ Permit Status	Comments
					(GTC-36-200)
960120	Expeditionary Test Stand	3RD MAW	8127	Not In Use/Active	MALS-11 PP, AE37T-17 TO TEST C-130 ENGINES (T56)
960121	Expeditionary Test Stand	3RD MAW	8129	In Use/Active	MALS-16 PP, AE37T-24V4 TO TEST CH-46 ENGINES (T58-16)
960122	Expeditionary Test Stand	3RD MAW	8128	In Use/Active	MALS-16 PP, AE37T-24V2, CH-53 ENGINES (T64-413/416)
960123	Test Cell	3RD MAW	8117	In Use/Active	MALS-16 PP, TWIN, CH46 (T58-16) & CH53 (T64-613/617)
960125	Paint Spray Booth	3RD MAW	8119	In Use/Active	MALS-16 GSE, BINKS TA-634-T-LH
960127	Paint Spray Booth	3RD MAW	7125	In Use/Active	MALS-11 AF, BINKS TA-634-T-LH
970080	Paint Stripping Tank	3RD MAW	7490	In Use/Active	MALS-11 AF, RAMCO CM-72-ESS
973992	Remote Reservoir Cleaner	3RD MAW	8461	In Use/Active	MALS-16 PP, INLAND TECH. INC. IT48CWC
978846	Remote Reservoir Cleaner	3RD MAW	7550	In Use/Active	MALS-16 AF (HYD), INLAND TECH. INC. IT48CWC
981359	Cold Solvent Dip Tank	3RD MAW	9470	In Use/Active	HMH-462, RAMCO MK 24CMS
982909	Cold Solvent Cleaner	3RD MAW	8461	Not In Use/Active	MALS-11 PP, GRAYMILLS 900-A
985803	Paint Stripping Tank	3RD MAW	7550	In Use/Active	ACT MODEL STR4H PAINT STRIPPING TANK
Marine Corps Community Services (MCCS) Facility I.D. 4824E					
006392	Gasoline Service Site	MCCS	3426	In Use/Active	NON-RETAIL, GOLF COURSE
007647	Gasoline Dispensing Facility	MCCS	6214	In Use/Active	RETAIL, MCX, MAIN GAS STATION
007648	Gasoline Dispensing Facility	MCCS	7498	In Use/Active	RETAIL, MCX, ANNEX GAS STATION
960126	Paint Spray Booth	MCCS	2264	In Use/Active	AEROSPACE MUSEUM CTG APPLICATION STATION

Table 9-1. List of Air Emission Permitted or Registered Sites (Continued)

Permit/ Registration Number	Equipment	Command/ Activity	Location	Equipment/ Permit Status	Comments
Federal Aviation Administration (FAA) Facility 4824F					
920926	Emergency Generator	FAA	3720	In Use/Active	CUMMINS 4BT-3.9-G2, 102 HP
Naval Consolidated Brig (NAVCONBRIG) Facility I.D. 4824H					
880375	Boiler	NRSW/ NAVCONBRIG	Brig	In Use/Active	Cleaver Brooks; M/N: CB-100-200; S/N: 84023; 8.4 MM BTU/HR; Diesel fueled with a Lo Nox burner
981059	Boiler	NRSW/NAVCONBRIG	Brig	In Use/Active	Cleaver Brooks; M/N: CB-100-200; S/N: 84024; 8.4 MM BTU/HR; Diesel fueled with a Lo Nox burner

Table 10-5. Storm Water Outfalls in MCAS Miramar

Outfalls		Associated Industrial Facilities	
Outfall No.	**Location**	**Name (SWPPP Section)**	**Building No.**
1	A 12-inch diameter concrete pipe located south of Building 7685 (Brig. Works Shop), discharging into Rose Canyon	Brig Workshops (Sect. 4.6.29)	7685, 7741, 7742
6	An 18-inch diameter concrete pipe located east of Building 7498 (Annex Service Station), discharging into Rose Canyon	Fire Station (Sect. 4.6.4) Annex Service Station (Sect 4.6.15) MWCS-38 (Sect. 4.6.19) Supply Warehouse (Sect. 4.6.31)	7224 7498 7129 – 7132, 7515 7209
7	A 3-foot by 8-foot box culvert located south of the southeast corner of Building 7209 (Supply Warehouse), discharging into Rose Canyon	Hazardous Waste Storage Facility (Sect. 4.6.22) Supply Warehouse (Sect. 4.6.31) Tactical Refueling Vehicle Maintenance Facility (Sect 4.6.36) MAG 46 Maintenance Facility (Sect. 4.6.40) MSWSS 373 Maintenance Shop (Sect. 4.6.44)	6687 7209 6025-6029, 6028A 6014, 6168, 6237 6005 - 6010, 6015 - 6021
7A	Downstream of the four pipes in the headwall in the channel that discharges to Outfall 7	MSWSS 373 Maintenance Shop (Sect. 4.6.44)	6005 - 6010, 6015 - 6021
8	An 18-inch diameter concrete pipe located south of Building 6673 (Auto Hobby Shop) along the southern side of Miramar Way, discharging into Rose Canyon	Auto Hobby Shop Hazardous Waste Accumulation Pad (Sect. 4.6.43) Auto Hobby Shop (Sect. 4.6.43)	6002 6590 and 6673
10	A 24-inch diameter concrete pipe located north of Building 9527 (Missile Ready Magazines), discharging into Rose Canyon	MTACS 38 (Sect 4.6.30) Cryogenics Facility (Sect. 4.6.26) Missile Maintenance Shop (Section 4.6.54)	9176, 9404 8113, 8114, 9648

Table 10-5. Storm Water Outfalls in MCAS Miramar (Continued)

Outfalls		Associated Industrial Facilities	
Outfall No.	**Location**	**Name (SWPPP Section)**	**Building No.**
11	A 10-inch diameter PVC pipe located northeast of Building 8679 (Jet Engine Test Cell), discharging into Rose Canyon	Test Cells and Test Pads (Sect. 4.6.48)	8117, 8125 - 8129, 8545, 8679
12	A 30-inch diameter vitrified clay pipe located northwest of Building 8679 (Jet Engine Test Cell), discharging into Rose Canyon	Hazardous Materials Storage Shelter (Sect. 4.6.20) Jet Engine Maintenance Shop/ General Warehouse (Sect. 4.6.47) Test Cells and Test Pads (Sect. 4.6.48) Aircraft Acoustical Enclosures (Sect. 4.6.50)	9584 8461 8679 9565 and 9601
13	18-inch and 30-inch diameter concrete pipes located northeast of Mitscher Way and Edson Road intersection, discharging into Rose Canyon	Aircraft Hangar No. 1 (Sect. 4.6.2) Hazardous Materials Storage Shelter (Sect. 4.6.20)	9277 9584
14	Two 12-inch and one 24-inch diameter concrete pipes located in a storm drain north of Building 8656 (Applied Instruction), discharging into Rose Canyon	Aircraft Hangar No. 2 (Sect. 4.6.2) Liquid Oxygen/Nitrogen (Sect. 4.6.28)	9215 9221
15	A 30-inch diameter concrete pipe located northeast of the intersection of Edson Road and Schilt Avenue, discharging into Rose Canyon	Aircraft Ready Fuel Storage (Sect. 4.6.9) Hazardous Waste Accumulation Pad (Sect. 4.6.17) Aviation Armament Shop (Sect. 4.6.25)	9935 9488 9222
16	A 30-inch diameter concrete pipe culvert located near the western terminus of Edson Road, discharging into Rose Canyon	Filling Station (Sect. 4.6.14) Aircraft Ground Support Equipment (Sect. 4.6.53)	8483 8119 - 8122, 8200, 8478, 8558, 8713
17	A 24-inch diameter concrete pipe located northeast of Building 8633 (Grumman Building), discharging into Rose Canyon	Aircraft Hangar No. 3 (Sect. 4.6.2) Aircraft Fire and Rescue Station (Sect. 4.6.5)	9500 9227
18	A 30-inch diameter concrete pipe located northwest of Building 8671 (FRAMP Building), discharging into Rose Canyon	Hazardous Materials Storage (Sect. 4.6.23) Hazardous Materials Minimization Center (Sect. 4.6.24)	-- 8672
19	A 3-foot wide earthen channel located north of the cul-de-sac northwest of Building 8630 (MCAS Miramar	Aircraft Hangar No. 4 (Sect. 4.6.2)	9470

Table 10-5. Storm Water Outfalls in MCAS Miramar (Continued)

Outfalls		Associated Industrial Facilities	
Outfall No.	**Location**	**Name (SWPPP Section)**	**Building No.**
	Commanding General's [CGs] Headquarters), discharging into Rose Canyon	Hazardous Waste Containment Pad (Sect. 4.6.18) Hazardous Materials Minimization Center (Sect. 4.6.24)	9592 8672
20	A 24-inch diameter concrete pipe located north of Building 9670 (Hangar No. 6), discharging into Rose Canyon	Aircraft Hangar No. 5 (Sect. 4.6.2) Aircraft Hangar No. 6 (Sect. 4.6.2) Operational Hazardous/Flammable Building (Sect. 4.6.21)	9570 9670 9615
21	A 24-inch diameter concrete pipe located northeast of Building 9670 (Hangar No. 6), discharging into Rose Canyon	Aircraft Hangar No. 6(Sect. 4.6.2) Aircraft Wash Rack (Sect. 4.6.3)	9670 9712
22	A 30-inch diameter corrugated metal pipe culvert located west of Hangar No. 6 (Building 9670), discharging into Rose Canyon	Aircraft Hangar No. 6 (Sect. 4.6.2) Aircraft Wash Rack (Sect. 4.6.3)	9670 9712
23	A 36-inch diameter concrete pipe located southwest of Building 9670 (Hangar No. 6) and the Helo Pad area discharging into Rose Canyon	Airfield (Section 4.6.1)	--
24	A 6-foot by 5-foot concrete box culvert located southwest of Building 9670 (Hangar No. 6) and the Helo Pad area discharging into Rose Canyon	Airfield (Sect. 4.6.1) Helicopter Wash Rack(Sect. 4.6.3) Aircraft Direct Fueling Stations (Sect. 4.6.7) Fuel Octagon (Sect. 4.6.10)	-- -- 9387 – 9394 9940
31	A 12-inch diameter concrete pipe located northwest of Mitscher Way and Edson Road intersection, discharging into Rose Canyon	Compressed Air Plant (Sect. 4.6.27)	8219
33	A 54-inch diameter corrugated metal pipe located on the southern side of Wheat Drive northeast of the intersection of Cabot Drive and Miramar Road in the northeastern portion of the Golf Course, discharging into a municipal separate storm drain system	Public Works Shops/Administrative Offices (Sect. 4.6.39) Aviation Museum Restoration Facility (Sect. 4.62.42)	6311 2264
34	A 36-inch diameter concrete pipe located on the southern side of Wheat Drive along Miramar Road near the north	Golf Course Maintenance Facility - Pesticide and Battery Storage Area (Sect. 4.6.41)	3333, 3426

Table 10-5. Storm Water Outfalls in MCAS Miramar (Continued)

Outfalls		Associated Industrial Facilities	
Outfall No.	**Location**	**Name (SWPPP Section)**	**Building No.**
	central portion of the Golf Course, discharging into a municipal separate storm drain system		
36	An 8-inch diameter vitrified clay pipe located northwest of Building 8461 (Jet Engine Maintenance Shop/General Warehouse), discharging into Rose Canyon	Jet Engine Maintenance Shop/General Warehouse (Sect. 4.6.47)	8461
37	Three 18-inch diameter concrete culverts located south of the intersection of Runway 10/28 and 6L/24R, discharging into San Clemente Canyon	Airfield (Sect. 4.6.1)	--
41	A 19-inch wide, 6-inch deep concrete channel located south of Building 20300 (Navy and Marine Corps Reserve Training Center), discharging into San Clemente Canyon	Navy and Marine Corps Reserve Training Center (Sect. 4.6.55)	20300
42	A 30-inch wide, 6-inch deep concrete channel located south of Building 20300 (Navy and Marine Corps Reserve Training Center), discharging into San Clemente Canyon	Navy and Marine Corps Reserve Training Center (Sect. 4.6.55)	20300
46	A 24-inch wide by 6-inch deep concrete channel located at the north end of Moore Avenue and discharging into a municipal separate storm sewer system along Miramar Road	Miramar Exchange Warehouse and Retail Store/Commissary (Sect. 4.6.32)	2660 and 2661
51	A 96-inch wide approximately 36-inch deep drainage swale located east of Building 7550 (Aircraft Intermediate Maintenance Facilities), discharging into Rose Canyon	Supply Warehouse (Sect. 4.6.31) Aircraft Intermediate Maintenance Facilities (Sect. 4.6.49)	7209 7490, 7550, 7690
57	A 3-foot by 12-foot box culvert located southeast of Building 6214 (Exchange Service Station), discharging into Rose Canyon	Recycling Center (Sect. 4.6.35) IMA Det Maintenance Shop (Sect. 4.6.45)	6310 6215 – 6219

Table 10-5. Storm Water Outfalls in MCAS Miramar (Continued)

Outfalls		Associated Industrial Facilities	
Outfall No.	**Location**	**Name (SWPPP Section)**	**Building No.**
57A	Sheet flow located adjacent to and north of the catch basin in the parking lot to the east of Building 6310	Recycling Center (Sect. 4.6.35)	6310
58	A 3-foot by 5-foot box culvert located northwest of the intersection of Schilt Avenue and Burke Road, discharging into Rose Canyon	Supply Warehouse (Sect. 4.6.31) Public Works Bone Yard (Sect. 4.6.33) Transportation Vehicle Wash Rack (Sect. 4.6.36) Refueling Vehicle Shop (Sect. 4.6.37) Transportation Vehicle Maintenance Shop (Sect. 4.6.38) Public Works Shops/Administrative Offices (Sect. 4.6.39) MAG 46 Maintenance Facility (Sect. 4.6.40)	7209 -- 6667 6318 6317 6311 6237
59	A 14-inch diameter concrete pipe located northwest of Robinson Way and Boyington Road intersection, discharging into Rose Canyon	Aircraft Hangar No. 0 (Sect. 4.6.2) Aircraft Wash Rack (Sect. 4.6.3)	9170 9123
60	A 10-inch diameter corrugated metal pipe located southwest of Obregon Avenue and Miramar Way intersection near the southwest corner of the containment berm of the Kinder Morgan Refined Petroleum Products Handling Facility, discharging into Rose Canyon	Kinder Morgan Refined Petroleum Products Handling Facility (Sect. 4.6.13)	--
67	Sheet flow located southeast of the intersection of Silva Road and Schilt Avenue east of Building 7498 (Annex Service Station), discharging into Rose Canyon	Annex Service Station (Sect. 4.6.15)	7498
70	A 15-foot wide by 6-inch deep asphalt drainage swale located southwest of Building 7550 (Aircraft Intermediate Maintenance Facility) parking lot, discharging into Rose Canyon	Aircraft Intermediate Maintenance Facilities(Sect. 4.6.49)	7490, 7550, 7690

Table 10-5. Storm Water Outfalls in MCAS Miramar (Continued)

Outfalls		Associated Industrial Facilities	
Outfall No.	**Location**	**Name (SWPPP Section)**	**Building No.**
71	A 3-foot wide by 6-inch deep earthen swale located southeast of Building 7550 (Aircraft Intermediate Maintenance Facility), discharging into Rose Canyon	Aircraft Intermediate Maintenance Facilities (Sect. 4.6.49)	7490, 7550, 7690
72	A 12-foot wide by 6-inch deep swale located southeast of Building 7550 (Aircraft Intermediate Maintenance Facility), discharging into Rose Canyon	Supply Warehouse (Sect. 4.6.31) Aircraft Intermediate Maintenance Facilities(Sect. 4.6.49)	7209 7490, 7550, 7690
73	A 5-foot wide by 6-inch deep asphalt drainage swale located west of the fueling islands associated with Building 6214 (Exchange Service Station), discharging into Rose Canyon	Exchange Service Station (Sect. 4.6.16)	6214
74	A 2-foot wide by 3-inch deep asphalt drainage swale located south of the automobile repair stalls along the southern side of Building 6214 (Exchange Service Station), discharging into Rose Canyon	Exchange Service Station (Sect. 4.6.16)	6214
75	A 18-inch wide by 3-inch deep asphalt drainage swale located south of the automobile repair stalls along the southern side of Building 6214 (Exchange Service Station), discharging into Rose Canyon	Exchange Service Station (Sect. 4.6.16)	6214
76	A 18-inch wide by 6-inch deep asphalt drainage swale located south of the automobile repair stalls along the southern side of Building 6214 (Exchange Service Station), discharging into Rose Canyon	Exchange Service Station (Sect. 4.6.16)	6214
83	A 15-foot wide by 8-inch deep swale located south of the Fire Training Pit, discharging into San Clemente Canyon	Airfield (Sect. 4.6.1) Fire Training Pit (Sect. 4.6.6)	-- 9743
89	A 18-inch diameter concrete pressure drainline connected to an upwelling manhole located west of the City of San Diego Landfill, discharging into San Clemente Canyon	Airfield (Sect. 4.6.1)	--

Table 10-5. Storm Water Outfalls in MCAS Miramar (Continued)

Outfalls		Associated Industrial Facilities	
Outfall No.	**Location**	**Name (SWPPP Section)**	**Building No.**
90	A 42-inch diameter concrete pipe culvert located west of the City of San Diego Landfill, discharging into San Clemente Canyon	Airfield (Sect. 4.6.1)	--
91	A 36-inch diameter concrete pipe culvert located west of the City of San Diego Landfill, discharging into San Clemente Canyon	Airfield (Sect. 4.6.1)	--
94	A 2-foot wide by 3-inch deep drainage swale located north of Building 7230 (Low Point Drain Tank), discharging into Rose Canyon	Low Point Drain Tank (Sect. 4.6.11)	7230
98	A 24-inch diameter concrete pipe located southeast of Camp Elliot Warehouses along the southern side of the eastern dirt access road to the Sheriff's Pistol Range, discharging into Murphy Canyon	General Warehouses (Sect. 4.6.34)	21131, 21133 - 21135, 21138, 21139
112	A 18-inch wide by 6-inch deep asphalt drainage channel located south of the southern automobile repair stalls associated with Building 6214 (Exchange Service Station), discharging into Rose Canyon	Exchange Service Station (Sect. 4.6.16)	6214
113	A 18-inch wide by 6-inch deep asphalt drainage channel located south of the southern automobile repair stalls associated with Building 6214 (Exchange Service Station), discharging into Rose Canyon	Exchange Service Station (Sect. 4.6.16)	6214
114	Sheet flow in area southeast of Building 6214 (Exchange Service Station), discharging into Rose Canyon.	Exchange Service Station (Sect. 4.6.16)	6214
122	A 36-inch wide, 6-inch deep concrete channel located south of Building 20301 (Navy and Marine Corps Reserve Training Center), discharging into San Clemente Canyon	Navy and Marine Corps Reserve Training Center (Sect. 4.6.55)	20300
123	Sheet flow in area south of Building 20301 (Navy and Marine Corps Reserve Training Center), discharging into San Clemente Canyon	Navy and Marine Corps Reserve Training Center (Sect. 4.6.55)	20301
124	A 19-inch wide, 6-inch deep concrete channel located	Navy and Marine Corps Reserve Training Center (Sect.	20300

Table 10-5. Storm Water Outfalls in MCAS Miramar (Continued)

Outfalls		Associated Industrial Facilities	
Outfall No.	**Location**	**Name (SWPPP Section)**	**Building No.**
	south of Building 20301 (Navy and Marine Corps Reserve Training Center), discharging into San Clemente Canyon	4.6.55)	
125	A 8-foot wide by 6-inch deep earthen drainage swale located north of Building 8545 (Jet Engine Test Cell), discharging into Rose Canyon	Test Cells and Test Pads (Sect. 4.6.48)	8117, 8125 - 8129, 8545, 8679
126	A 12-inch diameter PVC pipe located east of Building 8679 (Test Cell), discharging into Rose Canyon	Test Cells and Test Pads (Sect. 4.6.48)	8117, 8125 - 8129, 8545, 8679
127	A 30-inch concrete pipe located southeast of the east end of Runway 28, discharging into San Clemente Canyon	Airfield (Sect. 4.6.1)	--
128	A 30-inch concrete pipe located south of the east end of Runway 28, discharging into San Clemente Canyon	Airfield (Sect. 4.6.1)	--
129	A 27-inch concrete pipe located south of the Helo Pads, discharging into Rose Canyon	Airfield (Sect. 4.6.1)	--
130	An 18-inch concrete pipe located near the southwest corner of the Helo Pads, discharging into Rose Canyon	Airfield (Sect. 4.6.1)	--
131	A 24-inch concrete pipe located near the northwest corner of the Helo Pads, discharging into Rose Canyon	Airfield (Sect. 4.6.1)	--
132	A 36-inch concrete pipe located near the southwest corner of the Helo Pads, discharging into Rose Canyon	Airfield (Sect. 4.6.1)	--
133	A 36-inch concrete pipe located near the southwest corner of the Helo Pads, discharging into Rose Canyon	Airfield (Sect. 4.6.1)	--
134	Drainage swale entering Fish Pond that discharges into Rose Canyon	Airfield (Sect. 4.6.1)	--
134A	Fish Pond that discharges into Rose Canyon	Airfield (Sect. 4.6.1)	--

Table 10-6. Oil Water Separators in MCAS Miramar

Site #	Building #	Facility Function	Total Capacity (gal.)	Oil Capacity (gal.)	Type of Containment	Alarm X= yes
8	7224	Lot Drain	NA	NA	OCS Clarifier	
6	6667	Transportation Car Wash	1,000	NA	Clarifier-SW Capped-Closed Loop Recycle	
11	7929	Fuel Farm/Area B	3,000	1,500	Coalescer- DW to San Diego Sewer	x
12	7234*	Fuel Farm/Area E	3,000	1,500	Coalescer- DW to San Diego Sewer	x
10	7938	Fuel Farm/Area A	3,000	1,500	Coalescer- DW to San Diego Sewer	x
39	9935	Fuel Farm/Area H	550	275	Coalescer- DW to San Diego Sewer	x
18	6673	MCCS Auto Hobby Shop	NA	700	Coalescer- DW to San Diego Sewer	
18A	6673	MCCS Auto Hobby Shop	1,000	NA	3 Chamber Clarifier to San Diego Sewer	
20	8679	Test Cell	NA	600	Clarifier in Vault to San Diego Sewer	
20A	8679	Test Cell	NA	NA	2 Chamber Clarifier to San Diego Sewer	
21	8545*	Test Cell	1,000	500	Coalescer- DW to San Diego Sewer	x
23	9565	Hush House I	2,000	1,000	Coalescer- DW to San Diego Sewer	x
24	9601	Hush House II	2,000	1,000	Coalescer- DW to San Diego Sewer	x
25	9706*	Hangar 1 Wash Rack	2,000	NA	3 Chamber Clarifier to San Diego Sewer	
26	8477*	Hanger 1 Drainage to 477 Parking	2,000	1,000	Coalescer- DW to San Diego Sewer	x
27	9707*	Hangar 2 Wash Rack	2,000	NA	3 Chamber Clarifier to San Diego Sewer	
28	8402*	Hangar 2 Drainage	2,000	1,000	Coalescer- DW to San Diego Sewer	x
29	9708*	Hangar 2 Wash Rack	2,000	1,000	Coalescer- DW to San Diego Sewer	x
33	8633	Hangar 3 Drainage	2,000	1,000	Coalescer- DW to San Diego Sewer	x
38	9470	Hangar 4 Wash Rack and Drainage	NA	NA	Coalescer- DW to San Diego Sewer	
45	9670	Hangar 6 Drainage	2,000	NA	3 Chamber Clarifier to San Diego Sewer	
45A	9712	Hangar 6 Wash Rack	2,000	NA	3 Chamber Clarifier to San Diego Sewer	

Table 10-6. Oil Water Separators in MCAS Miramar (Continued)

Site #	Building #	Facility Function	Total Capacity (gal.)	Oil Capacity (gal.)	Type of Containment	Alarm X= yes
52	9393	Fuel Pit Flight Line	NA	700	Coalescer in Vault Lift Sta. to San Diego Sewer	
53	9940	Fuel Octagon	5,000	536	Coalescer- DW -Lift Sta. to San Diego Sewer	x
54	8671	Wash Rack	NA	NA	Clarifier-SW	
58	8200	GSE Wash Rack	750	NA	Clarifier-SW to San Diego Sewer	x
59	9700*	Hangar 5 Wash Rack	2,000	1,000	Coalescer- DW to San Diego Sewer	
59A	7550	Lot Drain	NA	NA	NA	
60	6317	Transportation Wash Rack	NA	NA	1 Chamber Clarifier to San Diego Sewer	
61	6318	Truck Wash	NA	NA	3 Sump Clarifier	
62	9709*	Hangar 3 Wash Rack	3,000	NA	3 Chamber Clarifier to San Diego Sewer	
65	3426*	MCCS Golf Maintenance Wash Rack	550	275	Coalescer- DW to San Diego Sewer	x
66	2761*	Exchange Car Wash	NA	NA	Clarifier-SW to San Diego Sewer	
67	9746	Fire Training Pit	7,000	NA	Clarifier-SW Aboveground/ 3 Stage	
67	9743	A/C FF TRG Area	NA	NA	Combination	
68	1301	Reserve Center Maintenance Bldg.	NA	275	Coalescer- DW	x
69	1301	Reserve Center Wash Rack	NA	NA	NA	
71	7127*	Van Pad Wash Rack	NA	NA	Recycler to Sewer System	
72	7498*	Van Pad Wash Rack	NA	NA	Recycler to Sewer System	
72	7128	Gas Station	NA	NA		
73	6010*	MWSS-373 Auto Shop	NA	NA	To Sanitary Sewer	x
74	6019*	MWSS-373 Vehicle Wash	NA	NA	Recycler to Sewer System	x
74A	6019	MWSS Vehicle Wash	NA	NA	Recycler to Sewer System	
75	9170*	Hangar H-O Floor Drain (AFFF)	NA	NA	To San Diego Sewer	x
76	9123*	Hangar H-O Wash Rack	NA	NA	Recycler to Sewer System	
77		Helo Rinse	NA	NA	Clarifier-SW Recycle-Close Loop Overflow to SS	

Table 10-6. Oil Water Separators in MCAS Miramar (Continued)

Site #	Building #	Facility Function	Total Capacity (gal.)	Oil Capacity (gal.)	Type of Containment	Alarm X= yes
77B	9542	Helo Rinse Rack	NA	NA	OCS Clarifier	
78		Compass Rose Area	NA	NA	Stormwater Interceptors to Storm Drain	
79		Compass Rose Area	2-20,000	2-8,000	Stormwater Interceptors to Storm Drain	
79B	9940	Compass Rose Area	NA	NA	OCS Clarifier	
80	7129	Vehicle Grease Rack	NA	NA	Coalescer- DW	
81	7130	Vehicle Holding Shed	NA	NA		
82	7132*	Vehicle Wash Rack	NA	NA	Recycler to Sewer System	
83	7134	Armory	NA	NA	Clarifier-SW to Storm Drain	
84	8119	GSE-vehicle Maintenance Floor Drain	NA	NA	Coalescer- DW to San Diego Sewer	x
85	8117	Test Cell	NA	NA	Coalescer- DW to San Diego Sewer	x
86	8125*	Test Pad	6,000	NA	Coalescer- DW to San Diego Sewer	x
87	9677	Wash Rack	NA	NA	Coalescer- DW to San Diego Sewer	x
89	9500	Flight Line Sump	NA	NA	NA	
91	8483	NA	NA	NA	NA	

B P2 Options

Option 1. Drip Pans for MALS-11 Power Plant

MALS-11 Power Plant was identified as one of the largest generators of POL, POL debris and oily rags for MCAS Miramar. The opportunity assessment conducted at the work center revealed that a primary source of the POL debris was from spills caused by using drip pans that are not sized correctly to adequately fit underneath the engines being maintained or repaired.

To facilitate the capture of leaking POLs from the engines and minimize the risk of spills, it is recommended that the following be purchased for MALS-11 Power Plant:

- Purchase twenty 96" x 41" x 2" metal drip pans.
- Purchase fifteen 48" x 36"x 2" metal drip pans.

Environmental Analysis

According to interviews with shop personnel and the review of hazardous waste data, MALS-11 Power Plant generated 428 lb of POL spill debris waste in 2008 to clean up spills related to inadequate equipment. The shop used approximately 36,000 rags in 2008. To be conservative, it was assumed that half of these rags (18,000) were used to clean up spills from inadequate equipment. It is estimated that the purchase of the larger drip pans will reduce the spill debris generation by 385 lb to 43 lb/year (90% reduction) and rag use for spills to1,800 rags/year.

Improved oil handling procedures are anticipated to result in an increase in used liquid POLs because more will be recovered instead of spilled. The liquid POLs are recycled through a contractor and are not disposed of as hazardous waste.

Technical Analysis

The drip pans identified for this option can be made to any size needed by the customer. The dimensions of the pans were provided by shop personnel and are specific to the needs of the shop. Pans with these dimensions will fit precisely under the engines and allow of complete collection of drips and leaks. Two metal fabricator vendors were identified that could provide these pans, however, there are possibly other metal fabricators available in the San Diego area that could provide the pans.

Discussions with shop personnel revealed that the best procedure for capturing the POLs and transferring them to a storage container will be to line the pans with re-useable, wringable, absorbent pads and then run the pads through the wringer in the shop when they become saturated. There are no technology concerns for this option.

Implementation

Effective execution of the project will require full completion of the following action items:

- Contact drip pan vendors to obtain detailed, current price quotes that include shipping and tax.
- Obtain buy-in from equipment users in the shop by verifying the equipment proposed for purchase will meet the needs of shop personnel.
- Procure funding for capital expenditure.
- Purchase pans.
- Implement process and equipment change.
- Evaluate effectiveness and maintain metrics to show impacts on labor and waste.

Economic Analysis

Implementation of the project requires front-end administrative costs and equipment costs. The economic analysis is based on data provided by environmental and shop personnel. The capital and operational expenses included in the economic analysis were provided by the vendor via their website. The economic evaluation summary is:

Estimated Capital Cost	Cost Estimate for Current Process (before P2 Solution)	Projected Cost for New Process (After P2 Solution)	Payback Period (years)
$3,789.70	$14,644.00	$6,660.50	0.47

The following assumptions were used to assess the economics of implementing this project:

- The cost for the purchase of the galvanized steel drip pans was obtained from the ShortRun Pro web site. A quote was also received from a local metal fabricator, JCI Metals, however, it was higher than the cost from ShortRun Pro.
- Labor to clean-up and manage spill debris for the current process is 5 personnel x 40 min/day = 200 min/day or 3.33 hr. The total annual labor would therefore be: 3.33 hr/day x 5 days/wk x 52 wk/year = 866 hr/year. A labor rate of $15/hour was assumed for shop personnel.
- Assumed the new process would reduce the spill clean-up labor by 50%.
- Assumed the re-useable absorbant pads will be placed inside the drip pans and wrung out periodically. The re-useable pads and the wringer are already in place in the shop.
- The shop uses approximately 36,000 rags per year for wiping up POLs. It was assumed that half (18,000) of these rags were used to clean up spills, drips and leaks based on information provided by work center personnel. It was also assumed that new equipment and processes will reduce the rag generation by 90% to 1,800 rags/year for spill/drip clean-up.

- For POL debris, it was assumed that all the POL debris generated by the shop in 2008 was due to spills. In 2008, MALS-11 PP generated 428 lb of spill debris. The amount the base pays for disposal of spill debris fluctuates based on several variables. For the purposes of this economic analysis, a cost of $0.50/pound was used to estimate the operational costs and return on investment.

- While the amount of recovered used POLs will increase, this material is disposed of at no cost to the base and it is recycled. Therefore, there is no cost associated with the increase in liquid used POL generation.

Project Score

The P2 project score is presented in the following table as required by the MCAS Miramar P2 Plan.

Criteria	Contributing Factors	Weight	Raw Score	Weighted Score
Marine Corps P2 Goal	▪ Contribution to meeting numeric goals	1.0	1	1
Cost	▪ Annual Costs ▪ Capital Costs ▪ Payback Period	1.0	5	5
Environmental impact	▪ Environmental benefit ▪ Safety Improvement ▪ Improvement to image as environmental steward and good neighbor	0.8	4	3.2
Compliance	▪ Legal liability	0.6	1	0.6
Technical Feasibility	▪ Maturity of technology ▪ Impact on mission ▪ Required expertise	0.6	5	3
			Total	12.8

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Option 1. Cost Estimate Detail

MCAS Miramar

MALS-11 Power Plant Drip Pans

Cost Element	Compliance Cost Estimate (before P2 solution)			Projected Compliance Cost Estimate (after P2 Solution Identified)							
				Investment Costs				Operating Costs			
	Unit Cost	No. of Units	Cost per Year	Unit Cost	No. of Units	Cost	Diff. Savings	Unit Cost	No. of Units	Cost per Year	Diff. Savings
DIRECT CAPITAL COSTS											
96" x 41"x 2" Drip Pans				$124.40	20	$2,488.00					
48" x 36"x 2" Drip Pans				$62.78	15	$941.70					
						$0.00					
						$0.00					
						$0.00					
						$0.00					
INDIRECT CAPITAL COSTS											
Front-end administration to work with vendors and purchase equipment				$45.00	8	$360.00					
						$0.00					
OPERATING COSTS											
Labor to clean up spills and drips on floors	$15.00	866	$12,990.00					$15.00	433	$6,495.00	$6,495.00
Cost of Rag Contract	$0.08	18,000	$1,440.00					$0.08	1,800	$144.00	$1,296.00
Disposal of POL debris	$0.50	428	$214.00					$0.50	43	$21.50	$192.50
TOTAL COSTS/SAVINGS			$14,644.00			$3,789.70	0.00			$6,660.50	$7,983.50
PAYBACK PERIOD (YEARS):					**0.47**		NOTE: ( ) INDICATE NEGATIVE VALUE				

Notes: See Economic Analysis section of P2 Opportunity for cost estimate assumptions.

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Vendors

Short Run Pro World Leader in Custom Metal Products 53 Ervin St. Belmont, NC 28102 USA (877) 829-9293 Fax (704) 829-7992 www.shortrunpro.com	Richard Bartlett-May VP Business Development JCI Metal Products 619 997 4681 mobile 619 997 8206 ext 22 office richard@jcimetalproducts.com

Dear Susie,

We have put together a ROM for the items you requested. As you can see from the attached PDF files we have come up with a design for a fully self contained unit. I have also priced options for each wagon. I am aware that under GSA contracts the Marines can probably buy 12 volt deep cycle batteries cheaper than we can supply them and may not want the solar option.

There are of course economies of scale and the final price will vary accordingly. Please do not hesitate to contact me should you have any questions. I leave for the UK tomorrow but will be checking my e-mail daily.

WASTE OIL WAGON 67" x 31" x 4" Powder coated finish with galvanized oil screen			
Fully self contained solar powered battery driven oil pump			$2350.00
Price without solar			$2000.00
Price without solar and deep cycle battery			$1900.00
WASTE OIL WAGON 96" x 41" x 4" Powder coated finish with galvanized oil screen			
Fully self contained solar powered battery driven oil pump			$2500.00
Price without solar			$2150.00
Price without solar and deep cycle battery			$2050.00
OIL DRIP PANS			
20 each coated galvanized	96" x 41" x 2"	$306 each	$6139.00
15 each coated galvanized	8" x 36" x 2"	$230 each	$3455.00

Regards
Richard Bartlett-May
VP Business Development
JCI Metal Products

619 997 4681 mobile
619 997 8206 ext 22 office
richard@jcimetalproducts.com

Option 2. Purchase of Drip Pans and Oil Drain for MALS-16 GSE

MALS -16 GSE was identified as one of the largest generators of POL, POL debris, and oily rags for MCAS Miramar. The opportunity assessment conducted at the work center revealed that a primary source of the POL debris was from spills caused by using equipment not properly designed for the tasks performed. The oil pans currently in use are too small for the equipment being maintained, oil is frequently spilled when attempting to transfer the captured oil from the oil pans to the used oil tank, the oil pump used to transfer new oil from drums had broken and the oil was being poured by hand (resulting in frequent spills), and used oil in equipment placed on lifts for maintenance was drained into bucket held up by shop personnel and then poured into the used oil tank.

To facilitate transfer of POLs and minimize the risk of spills, it is recommended that the following be purchased for MALS-16 GSE:

- Enclosed oil pans
- A 20-gal pressurized oil evacuation drain, and
- An oil transfer pump.

Environmental Analysis

According to interviews with shop personnel and the review of hazardous waste data, MALS-16 GSE generated 189 lb of POL spill debris waste in 2008 to clean up spills related to inadequate equipment. The shop used approximately 5,500 rags in 2008. To be conservative, it was assumed that half of these rags (2,750) were used to clean up spills from inadequate equipment. It is estimated that the purchase of the proposed equipment will reduce the spill debris generation by 170 lb to 19 lb/year (90% reduction) and rag use for spills to 275 rags/year.

Improved oil handling procedures are anticipated to result in an increase in used liquid POLs because more will be recovered instead of spilled. The liquid POLs are recycled through a contractor and are not disposed of as hazardous waste.

Technical Analysis

A technical description of each item proposed for purchase is presented below. All of the items have been used for years by both military and private industry and the technologies are well established.

Enclosed Oil Pan

The oil pan pictured is the Blitz 58-qt crude oil pan. This pan was used for purposes of this assessment and the economic evaluation. Other models and manufacturers are available. This type of oil pan is designed to slide easily under vehicles. The oil drain is portable and has a center draw plug that accepts 58 quarts of oil with a screw vent for smooth filling and pouring. The pan is totally enclosed except for the drain opening, it has four large handle grips and a pour spout to facilitate carrying and pouring, and it is equipped with a heavy-duty built-in roller to assist with maneuverability. The dimensions if the pans are 36" x 26" x 9.5". The primary advantages of these pans over the ones in current use are the pour spout, the grip handles, and the total enclosure of the fluid once it has been drained.

Pressurized Evacuation Drain

The oil drain pictured is the Lincoln Pressurized 20-gal Evacuation Drain, model 3614. This drain was used for purposes of this assessment and the economic evaluation. Other models and manufacturers are available. This type of unit drains, transfers, and evacuates used motor oils, transmission fluids, power steering fluids and more. The offset drain bowl eliminates the need to reposition the tank, reducing the chance of spillage. The drained waste oil is stored in the heavy-gauge steel tank and is discharged using air pressure. Some key unit specifications for this model include:

- Tank size: 20 gallons
- Hose Length: 74 inches
- Drain Bowl Height: 44 – 72 inches
- Fixed air regulator and pressure relief valve prevents over-pressurization.
- Tank has wheels and swivel casters for easy maneuvering.
- Includes sight gauge and hose hanger built into bowl.

The current method for draining POLs from equipment on lifts is for a person to hold a bucket up under the piece of equipment and capture the fluid. This process takes approximately 10 minutes and the bucket has an open top. This system allows for the funnel to be elevated to minimize splashes and drips, the fluid drains directly into the reservoir and can subsequently be pumped into the used oil tank. The entire process is enclosed and greatly decreases the risk of spills.

Oil Transfer Pump

There are two basic styles of pumps, electric and air operated. One of each type is pictured above. The pumps are designed to attach directly to 55-gal drums so oil can be transferred directly from the drum to the receiving container through a totally enclosed system. The current method of transferring oil from drums is manual pouring. Transferring to a pumping system will greatly reduce the risk of spills. The shop personnel have used a transfer pump in the past, therefore this is not a new technology for the shop.

Implementation

Effective execution of the project will require full completion of the following action items:

- Contact the equipment vendors to obtain detailed price quotes that include shipping and tax. These products are widely available through internet companies as well as local businesses. Ensure all parts needed for complete operation are included in the quote.
- Obtain buy-in from equipment users in the shop by verifying the equipment proposed for purchase will meet the needs of shop personnel.
- Procure funding for capital expenditure.

- Purchase equipment.
- Train personnel on the use of the equipment.
- Implement process and equipment change.
- Evaluate effectiveness and maintain metrics to show impacts on labor and waste.

Economic Analysis

Implementation of the project requires front-end administrative costs and equipment costs. The economic analysis is based on data provided by environmental and shop personnel. The capital and operational expenses included in the economic analysis were provided by the vendors via their websites. The economic evaluation summary is:

Estimated Capital Cost	Cost Estimate for Current Process (before P2 Solution)	Projected Cost for New Process (After P2 Solution)	Payback Period (years)
$1,917.85	$5,834.50	$781.50	0.78

The following assumptions were used to assess the economics of implementing this project:

- Costs for the Blitz Crude Oil Pan with casters ranged from $78.99 to $99.55. An average price of $89.27 was used for the economic analysis.
- Costs for the Lincoln 20-gal pressurized oil drain ranged from $397.99 to $525.00. An average price of $461.50 was used for the economic analysis.
- Several models of pumps are available that can transfer product oil from drums. Vendor sheets for two of the most common types are attached to this assessment. An average pump price of $350 was used for the economic analysis.
- The shipping cost was conservatively estimated. Exact quotes should be obtained once the products and vendors are selected.
- It was estimated that environmental personnel would spend 8 hr working with vendors and shop personnel to implement this option.
- Labor for cleaning up spills due to inadequately designed drip pans was estimated to be 45 min/day. The total annual labor would therefore be: 0.75 hr/day x 5 days/week x 52 weeks/year = 195 hr/year
- After purchase of the new drip pans and oil drain, it is estimated that labor for spill clean-up will be reduced by approximately 75% to 50 hr/year.
- The process for draining equipment on lifts involves elevating the equipment and then a shop person stands under the lift with a bucket to catch the oil as it comes out. This is done to prevent splashes as the oil pours out. This process takes approximately 10 min/piece of equipment drained. For the purposes of the economic analysis, it was estimated that 20 pieces

of equipment are drained each week. This equates to a total labor of: 200 min/week x 52 weeks/year x 1 hr/60 min = 173 hr/year.

- After purchase of the new elevated oil drain, it is estimated that this labor will be eliminated since the unit can be positioned and left unattended.
- While the amount of recovered used POLs will increase, this material is disposed of at no cost to the base and it is recycled. Therefore, there is no cost associated with the increase in liquid used POL generation.
- For POL debris, it was assumed that all the POL debris generated by the shop in 2008 was due to spills and rags were used to clean up drips from leaking equipment and spills. In 2008, MALS-16 GSE generated 189 lb of spill debris. The amount the base pays for disposal of spill debris fluctuates based on several variables. For the purposes of this economic analysis, a cost of $0.50/pound was used to estimate the operational costs and return on investment.
- After adding the improved drip pans and the oil drain, it is estimated that POL debris waste will be reduced by 75% to approximately 47 lb.
- The shop uses approximately 5,500 rags per year for wiping up POLs. It was assumed that half (2,750) of these rags were used to clean up spills, drips and leaks based on information provided by work center personnel. It was also assumed that new equipment and processes will reduce the rag generation by 90% to 275 rags/year for spill/drip clean-up.

Project Score

The P2 project score is presented in the following table as required by the MCAS Miramar P2 Plan.

Criteria	Contributing Factors	Weight	Raw Score	Weighted Score
Marine Corps P2 Goal	▪ Contribution to meeting numeric goals	1.0	1	1
Cost	▪ Annual Costs ▪ Capital Costs ▪ Payback Period	1.0	5	5
Environmental impact	▪ Environmental benefit ▪ Safety Improvement ▪ Improvement to image as environmental steward and good neighbor	0.8	4	3.2
Compliance	▪ Legal liability	0.6	1	0.6
Technical Feasibility	▪ Maturity of technology ▪ Impact on mission ▪ Required expertise	0.6	5	3
			Total	**12.8**

Option 2. Cost Estimate Detail

MCAS Miramar

MALS-16 GSE Oil Drip Pans

Cost Element	Compliance Cost Estimate (before P2 solution)			Projected Compliance Cost Estimate (after P2 Solution Identified)							
				Investment Costs				Operating Costs			
	Unit Cost	No. of Units	Cost per Year	Unit Cost	No. of Units	Cost	Diff. Savings	Unit Cost	No. of Units	Cost per Year	Diff. Savings
DIRECT CAPITAL COSTS											
Blitz 58-qt Crude Oil Pan with Casters				$89.27	5	$446.35					
Lincoln Lubrication (LNC3614) Pressurized Used Oil Evacuation Drain				$461.50	1	$461.50					
Oil Transfer Pump				$350.00	1	$350.00					
Shipping				$300.00	1	$300.00					
INDIRECT CAPITAL COSTS											
Front-end administration to work with vendors and purchase equipment				$45.00	8	$360.00					
OPERATING COSTS											
Labor to clean up spills and drips on floors	$15.00	195	$2,925.00					$15.00	50	$750.00	$2,175.00
Labor to drain equipment on lifts with a bucket.	$15.00	173	$2,595.00					$15.00	0	$0.00	
Disposal of POL debris	$0.50	189	$94.50					$0.50	19	$9.50	$85.00
Rags	$0.08	2750	$220.00					$0.08	275	$22.00	$198.00
TOTAL COSTS/SAVINGS			$5,834.50			$1,917.85	0.00			$781.50	$2,458.00
PAYBACK PERIOD (YEARS):					0.78			NOTE: ( ) INDICATE NEGATIVE VALUE			

Notes: See Economic Analysis section of P2 Opportunity for cost estimate assumptions.

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Vendors

http://www.denlorstools.com

https://www.acehardwareoutlet.com

http://www.gemplers.com

http://qualitytoolsforless.com

http://www.tooldesk.com

http://www.thefind.com

Option 3. Purchase of Rolling Drip Pans and Oil Tank for VMGR-352

VMGR-352 was identified as one of the largest generators of POL, POL debris, and oily rags for MCAS Miramar. The opportunity assessment conducted at the work center revealed that a primary source of the POL debris was from spills caused by using equipment not properly designed for the tasks performed and from improper placement of the used oil tank. The tank was placed inside a three-sided enclosure made for a dumpster and the inlet spout was facing toward one of the walls. The restricted access was causing a significant number of spills. The waste generation data for 2008 showed that the shop generated a total of 610 gal of used POLs, with the largest generation rate for any one month being 170 gal.

To facilitate transfer of POLs and minimize the risk of spills, it is recommended that the following be purchased for VMGR-352:

- Purchase a 30-gal rolling drip pan equipped with an electric pump to transfer the used POLs to the storage tank , and
- Possibly purchase a smaller, 180-gal used POL storage tank that can be kept in the hangar if a plug in electric pump is selected for the rolling drip pans. If a battery powered pump is selected, the existing Blue Betty could continue to be used. It should be noted it appears the current tank is oversized for the amount of used POLs generated.

Environmental Analysis

According to interviews with shop personnel and the review of hazardous waste data, VMGR-352 generated 4,068 lb of POL spill debris waste 2008 to clean up spills related to inadequate equipment. The shop used approximately 14,500 rags in 2008. To be conservative, it was assumed that half of these rags (7,250) were used to clean up spills from inadequate equipment. It is estimated that the purchase of the proposed equipment will reduce the spill debris generation by 3,661 lb to 407 lb/year (90% reduction) and rag use for spills to725 rags/year.

Improved oil handling procedures are anticipated to result in an increase in used liquid POLs because more will be recovered instead of spilled. The liquid POLs are recycled through a contractor and are not disposed of as hazardous waste.

Technical Analysis

A technical description of each item proposed for purchase is presented below.

Rolling Drip Pan

The oil pan pictured below was found on www.lube-store.com. The general design of the pan was ideal for the shop activities, however it was too small. A larger pan of this type could not be found through additional vendors. It was determined, however, that metal fabricators were available that could make pans like the one pictured on the following page in a larger size. The shop personnel interviewed stated that the ideal size for their application would be 61" x 31" x 4". The capacity of a

pan with these dimensions is approximately 30 gal. The pan is portable, has a cover screen to minimize debris and splashes, and is equipped with an electric pump to drain the pans directly into a used oil tank or drum. This design eliminates the need to pour POLs and therefore reduces the spill risk significantly.

The technology for this pan is not new, however, the specific size will be new and the unit will be constructed to meet the specific requirements of the shop. Therefore, before the pans are ordered, it is recommended that the dimensions be confirmed with the shop. If possible, the vendor should visit the base and the shop to discuss specifics of the design to ensure the final design will meet the specific needs of the shop. Details to consider include use of a battery powered pump vs an electric pump (compare rate of transfer, frequency of recharging or replacing the battery, etc.), the length of the cord for an electric pump, and other details.

180-gal POL Storage Tank

The tank pictured is a double walled, 180 gal lube oil tank available from www.lube-store.com. This tank was used for the purposes of the economic and technical evaluation. However, it should be noted that there are many vendors that offer similar products. The benefit of switching to a smaller tank is that it minimizes the amount of hazardous material stored on site and it allows for the tank to be moved inside the hangar. If the tank is inside the hangar, it allows for the use of the plug-in rolling oil carts discussed above. The use of 55-gal drums should also be evaluated. This would be the cheapest option if the capacity would be sufficient.

Implementation

Effective execution of the project will require full completion of the following action items:

- Verify the dimensions of the rolling drip pan with shop personnel.
- Determine the smallest sufficient size for used oil containment and procure funding to purchase.
- Contact the vendors and arrange for a site visit if possible so vendor representatives can meet with shop personnel to discuss their needs and finalize the drawing of the pans to be constructed.
- Obtain a final price quote and submit project for funding.
- Commission the vendor to construct one pan as a prototype to use on base for a period of 3 months.
- Train personnel on the use of the equipment.
- After the 3 month trial period, modify the design if necessary and determine the final number of pans to be constructed for the base.
- Implement process and equipment change.
- Evaluate effectiveness and maintain metrics to show impacts on labor and waste.

Economic Analysis

Implementation of the project requires front-end administrative costs and equipment costs. The economic analysis is based on data provided by environmental and shop personnel. In order to provide the highest cost scenario, the used oil tank was evaluated for the economic analysis. If 55 gal drums are determined to be sufficient, the initial capital cost would be less, but the operating cost would be slightly higher due to the need to purchase drums throughout the year. The capital and operational expenses included in the economic analysis were provided by the vendors via their websites and quotes. The economic evaluation summary is:

Estimated Capital Cost	Cost Estimate for Current Process (before P2 Solution)	Projected Cost for New Process (After P2 Solution)	Payback Period (years)
$12,851	$4,564	$1,061.50	3.67

The following assumptions were used to assess the economics of implementing this project:

- The cost of the rolling drip pans, the drawing fee, and the shipping was obtained from a vendor quote from ShortRun Pro. A quote was also received from a local metal fabricator, JCI Metals, however, it was higher than the cost from ShortRun Pro.
- The cost for a 180-gal used oil tank was obtained from www.lube-store.com.
- It was estimated that environmental personnel would spend 12 hr working with vendors and shop personnel to implement this option.
- Labor for cleaning up spills due to inadequately designed drip pans was estimated to be 30 min/day. The total annual labor would therefore be: 0.50 hr/day x 5 days/week x 52 weeks/year = 130 hr/year
- After purchase of the new drip pans and oil drain, it is estimated that labor for spill clean-up will be reduced by approximately 75% to 33 hr/year.
- While the amount of recovered used POLs will increase, this material is disposed of at no cost to the base and it is recycled. Therefore, there is no cost associated with the increase in liquid used POL generation.
- For POL debris, it was assumed that all the POL debris generated by the shop in 2008 was due to spills and rags were used to clean up drips from leaking equipment and spills. In 2008, VMGR-352 generated 4,068 lb of spill debris. The amount the base pays for disposal of spill debris fluctuates based on several variables. For the purposes of this economic analysis, a cost of $0.50/pound was used to estimate the operational costs and return on investment.
- After adding the improved drip pans and the oil drain, it is estimated that POL debris waste will be reduced by 75% to approximately 1,017 lb.
- The shop uses approximately 14,500 rags per year for wiping up POLs. It was assumed that half (7,250) of these rags were used to clean up spills, drips and leaks based on information provided by work center personnel. It was also assumed that new equipment and processes will reduce the rag generation by 90% to 725 rags/year for spill/drip clean-up.

Project Score

The P2 project score is presented in the following table as required by the MCAS Miramar P2 Plan.

Criteria	Contributing Factors	Weight	Raw Score	Weighted Score
Marine Corps P2 Goal	▪ Contribution to meeting numeric goals	1.0	1	1
Cost	▪ Annual Costs ▪ Capital Costs ▪ Payback Period	1.0	3	3
Environmental impact	▪ Environmental benefit ▪ Safety Improvement ▪ Improvement to image as environmental steward and good neighbor	0.8	4	3.2
Compliance	▪ Legal liability	0.6	1	0.6
Technical Feasibility	▪ Maturity of technology ▪ Impact on mission ▪ Required expertise	0.6	4	1.8
			Total	9.6

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Option 3. Cost Estimate Detail

MCAS Miramar

VMGR-352 Rolling Drain Pans

Cost Element	Compliance Cost Estimate (before P2 solution)			Projected Compliance Cost Estimate (after P2 Solution Identified)							
				Investment Costs				Operating Costs			
	Unit Cost	No. of Units	Cost per Year	Unit Cost	No. of Units	Cost	Diff. Savings	Unit Cost	No. of Units	Cost per Year	Diff. Savings
DIRECT CAPITAL COSTS											
Rolling Drip Pan with Pump for Extraction				$592.00	15	$8,880.00					
Drawing Service				$15.00	1	$15.00					
Freight and Handling				$1,600.00	1	$1,600.00					
180-gal Used Oil Tank				$1,816.00	1	$1,816.00					
INDIRECT CAPITAL COSTS											
Front-end administration to work with vendors and purchase equipment				$45.00	12	$540.00					
OPERATING COSTS											
Labor to clean up spills and drips on floors	$15.00	130	$1,950.00					$15.00	33	$495.00	$1,455.00
Disposal of POL debris	$0.50	4,068	$2,034.00					$0.50	1,017	$508.50	$1,525.50
Rags	$0.08	7,250	$580.00					$0.08	725	$58.00	$522.00
TOTAL COSTS/SAVINGS			$4,564.00			$12,851.00	0.00			$1,061.50	$3,502.50
PAYBACK PERIOD (YEARS):					**3.67**			NOTE: ( ) INDICATE NEGATIVE VALUE			

Notes: See Economic Analysis section of P2 Opportunity for cost estimate assumptions.

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Vendors

Oil Tank
www.lube-store.com
http://www.thefind.com

Rolling Drip Pan Fabricators
Short Run Pro
World Leader in Custom Metal Products
53 Ervin St.
Belmont, NC 28102 USA
(877) 829-9293
Fax (704) 829-7992
www.shortrunpro.com

Richard Bartlett-May
VP Business Development
JCI Metal Products.
619 997 4681 mobile
619 997 8206 ext 22 office
richard@jcimetalproducts.com

Short Run Pro
Below is a quote for the specified product(s) you requested. We have established an account for your on www.shortrunpro.com and your login and password are below. We suggest that you change this password once you have logged into your account. **Please note that if you attempt to set up a new account using your email address the system will not allow it. You can use your email address and the referenced password to access your account.** password: 0rtcolv

NOTE: Please review the product quantities that are currently in your shopping cart before proceeding to checkout since you may have received multiple quotes. Adjust the quantities as desired and checkout.

If you would like to place this order, click here sign into your account using the password specified and complete the checkout process. Please review the product quantities that are currently in your shopping cart before proceeding to checkout since you may have received multiple quotes. Adjust the quantities as desired and checkout.

Thank you for your allowing Short Run Pro to assist you with this metal requirement. If you have any question or need additional information please contact us by replying to this email or calling us at 877-829-9293.

Sales Department
Short Run Pro
World Leader in Custom Metal Products
53 Ervin St.
Belmont, NC 28102 USA
(877) 829-9293

Fax (704) 829-7992
www.shortrunpro.com

Short Run Pro, LLC performs drawing and fabrication services based on customer specifications and cannot substantiate the function and loading capabilities of customer designs. An independent engineering firm should be consulted to verify use and loading calculations of SRP drawing designs.

***** PLEASE PRINT QUOTE AND RETAIN IT FOR FUTURE REFERENCE *****

Quote Number: RFQ 10199	**Quote Date:** 4/14/2009	**Quote Expires On:** 5/29/2009
Quantity: One Time Use	**Customer's Product Name or Job Number:** Rolling Drip Pan	

Customer Notes:

Customer Service Notes:
Susie: below is the quote for the custom rolling drip pan per you specifications. The quote includes the full complete unit with pump. As mentioned previously, we will need more specific information regarding dimensions and other specs if an order is placed. Thank you for the opportunity to quote this part and have a great day.
Regards, Scott Toal

Customer

Susie Brooks
E-Mail: susie_brooks@urscorp.com

PRODUCT PART NO	SKU	CUSTOMER QUANTITY	UNIT PRICE	PRICE
Rolling Drip Pan Production Notes: Customer to provide detailed specifications upon order		72267	$592.00	15 $8,880.00
Drawing Service - required on all new custom parts	80001	1	$15.00	$15.00
Freight & Handling	61207	1	$1,600.00	$1,600.00

Subtotal:	$10,495.00
Tax:	$0.00
Ground - Shipping Charges to be Applied Shipping/Handling:	$0.00
Total:	$10,495.00

Dear Susie,

We have put together a ROM for the items you requested. As you can see from the attached PDF files we have come up with a design for a fully self contained unit. I have also priced options for each wagon. I am aware that under GSA contracts the Marines can probably buy 12 volt deep cycle batteries cheaper than we can supply them and may not want the solar option.

There are of course economies of scale and the final price will vary accordingly. Please do not hesitate to contact me should you have any questions. I leave for the UK tomorrow but will be checking my e-mail daily.

WASTE OIL WAGON 67" x 31" x 4" Powder coated finish with galvanized oil screen			
Fully self contained solar powered battery driven oil pump			$2350.00
Price without solar			$2000.00
Price without solar and deep cycle battery			$1900.00
WASTE OIL WAGON 96" x 41" x 4" Powder coated finish with galvanized oil screen			
Fully self contained solar powered battery driven oil pump			$2500.00
Price without solar			$2150.00
Price without solar and deep cycle battery			$2050.00
OIL DRIP PANS			
20 each coated galvanized	96" x 41" x 2"	$306 each	$6139.00
15 each coated galvanized	8" x 36" x 2"	$230 each	$3455.00

Regards
Richard Bartlett-May
VP Business Development
JCI Metal Products

619 997 4681 mobile
619 997 8206 ext 22 office
richard@jcimetalproducts.com

C Mini P2 Assessments

Work Center Pollution Prevention Opportunity Assessment Form

The supervisors and environmental coordinators of each unit are responsible for selecting two waste streams or processes each calendar year for assessment. Upon completion of this assesment, submit to the Waste Management Division Director in EMD.

Date:	**Unit/Organization:**
Evaluator:	**Evaluator Phone No:**

List the wastes/pollutants and/or materials evaluated during this assessment

Material	Quantity/Month
1	
2	
3	
4	
5	

Describe the process that generates the waste/pollutant and/or uses the hazardous material.

Estimate the labor required to manage the waste/pollutant and/or hazardous material

i.e. 4 guys spend 30 min/day each cleaning up POL drips/spills

List any options that were identified to reduce the waste/pollutant generation and/or material use.

D Pollution Prevention Resources

What Kind of Information Do You Need?

- General ideas for a process
- Technical information about a specific idea
- Department of Navy or Marine Corps approvals or requirements associated with an idea

Types of Resources

- People

Start with people first—they are your best resource!

  - Mechanics
  - Environmental managers at other sites
  - Outside consultants
  - Contacts at DoD research facilities

- Vendors

Talk to the salesperson for prices.

  - Technical representatives can give good advice about using the product correctly. Ask them about P2 ideas – they often have great suggestions.
  - Identify vendors through referrals, or by doing simple searches on the Internet. For example, use a search engine and search on "paint guns." Look at their Website, and if the company has appropriate equipment/materials, then call and talk to the technical representative.

- Websites

  - Websites provide information about some of the most recent developments in P2.
  - Use Websites to get ideas, then call, write, or email a contact person to get more information. Websites can have great ideas, but you have to find out if the idea will work at your site, and whether it meets military requirements for your application.

Types of Useful Websites

- DoD sites
- EPA and related sites
- Trade associations/vendors

Tips for Using the Internet

- Websites may not have been updated recently—beware of outdated information.
- Even if an idea is on a DoD website, you may not have approval to apply it to your process (e.g., aqueous parts washers are listed on lots of DoD Websites, but you may not be able to use them for cleaning aircraft parts).
- Keep track of useful sites by recording them in your "Favorites" file for P2.
- Label downloads with the Webpage where you got it from – you'll often want to go back and get more information.
- It's very easy to get lost on the Web. Many of the major sites have links to other sites, which is helpful, but you can forget where you came from.

List of Resources

Table D-1. List of P2 Resources

Organization	Content	Website/Contact
Joint Service Pollution Prevention Technical Library	P2 Opportunity Handbook – 200 + fact sheets that identify "off-the-shelf" P2 technologies, management practices, and process changes. Defense Logistic Information Service (DLIS) Environmentally Preferred Products P2 Success Stories	http://enviro.nfesc.navy.mil/p2library
Defense Environmental Network & Information eXchange (DENIX)	Under "Public Menu," choose: Subject Areas, then choose: ▪ Pollution Prevention o Air Force Model Shops Program o DLA Environ. Products Catalog o P2 Equipment Book ▪ Recycling ▪ Alternative-fuel Vehicles ▪ MSDSs or DUSD(I&E) Programs, then choose: Pollution Prevention ▪ Affirmative Procurement ▪ Environmentally Preferable Purchasing ▪ Accomplishments and Future Directions P2 Success Stories	http://www.denix.osd.mil/
Defense Environmental Programs Fiscal Year 2004 Annual Report to Congress	Appendix A: Environmental	https://www.denix.osd.mil/portal/page/portal/denix/environment/ARC/FY2007

Table D-1. List of P2 Resources (Continued)

Organization	Content	Website/Contact
Army Environmental Center Homepage	AEC integrates, coordinates, and oversees implementation of the Army's environmental programs. P2 Success Stories Environmentally Preferable Purchasing Planning Documents for Managers	http://aec.army.mil/usaec
Navy Pollution Prevention Equipment Program (PPEP)	Provides database of P2 equipment which may be queried by equipment name, category or compliance area (RCRA, CWA, etc). The equipment has been tested and provides military POC and vendor information.	http://206.20.178.3/p2/
Air Force Center for Environmental Excellence	Promotes transfer of environmental information. Choose: PRO-ACT for information on: Research Services Success Stories Fact sheets P2 Toolbox for information on: Guides, Handbooks, Policies for P2 Success Stories	http://www.afcee.brooks.af.mil/
U.S. Army Acquisition Pollution Prevention Support Office	Provides publications and other information related to P2, including: ODC Elimination Program Solvent Substitution Guide Guide to Conducting PPOAs	http://www.aappso.com
Joint Group on P2	JP-PP is a partnership between the Military Services, NASA, and DCMA, chartered by the JLC to reduce or eliminate HazMats. Tracks P2 projects being researched, with POC information and recent updates. Look under "projects" to review status of P2 projects currently under research.	http://www.jgpp.com

Table D-1. List of P2 Resources (Continued)

Organization	Content	Website/Contact
P2 Information Clearinghouse (PPIC)	Provides publications and fact sheets related to P2.	www.epa.gov/opptintr/library/libppic.htm
U.S. EPA - Office of Pollution Prevention	Publications, libraries, and databases available.	www.epa.gov/opptintr/
Enviroene	Funded by the Strategic Environmental Research and Development Program (SEDRP) and the EPA, disseminates technical pollution prevention material. Solvent Substitution Vendor Database (http://es.epa.gov/vendors/) Search Engine Research and Development	http://www.epa.gov/envirosense/index.html
SAGE (Solvents Alternative Guide)	Provides pollution prevention information on solvent and process alternatives for parts cleaning and degreasing. Descriptions of All Solvents Listed Case Studies "Expert system" Available	http://clean.rti.org/
U.S. EPA's Significant Policy Program (SNAP)	Information on alternatives to Class I and Class II ozone-depleting substances.	http://www.epa.gov/ozone/title6/snap/
Coating Alternatives Guide (CAGE)	Contains several tools to help users identify low-volatile organic compound/hazardous air pollutant coatings that may serve as drop-in replacements for existing paint and coating operations. "Expert System" Available Cost Tools Product Guides	http://cage.rti.org/
P2 Gems	An internet search tool developed by the Toxics Reduction Institute for facility planners, engineers, and managers who are looking for technical and process/materials management information on the Web.	http://www.p2gems.org/
Energy Efficiency and Renewable Energy Network (EREN)	Range of information, from energy efficient and renewable energy technologies to the latest developments and news, plus a listing of additional resources.	1-800-363-3732 http://www.eren.doe.gov
National Alternative Fuels Hotline and Data Center	Information on all issues related to alternative transportation and fuel efficiency, and refueling and recharging sites.	1-800-423-1DOE (1-800-423-1363) http://www.afdc.doe.gov
General Services Administration (GSA)	Vehicle availability, including AFVs.	http://www.pub.fss.gsa.gov/vehicles/
Fuel Economy Guide	Fuel economy data. The DOE/EPA fuel economy guide is published by DOE each August, including data on upcoming vehicle models.	http://www.fueleconomy.gov

Table D-1. List of P2 Resources (Continued)

Organization	Content	Website/Contact
AFV USER Program	This program is creating a self-sustaining alternative fuel market by promoting infrastructure, currently in six (6) pilot program cities where Federal AFVs are concentrated.	http://www.ott.doe.gov/afvuser
U.S. Department of Energy	Executive Order 13149 requirements, this guidance, agency compliance, or related matters.	Shab Fardanesh Office of Transportation Technologies, U.S. Department of Energy, EE-34, 1000 Independence Avenue, S.W., Washington, D.C. 20585 Federal Fleet Voicemail Tel: (800) 254-6735 Federal Fleet e-mail: fed_fleets@afdc.nrel.gov Direct Email: shabnam.fardanesh@ee.doe.gov
National Renewable Energy Laboratory	Executive Order 13149 requirements, this guidance, agency compliance, the FAST reporting system, or related matters.	Margo Melendez National Renewable Energy Laboratory Federal Fleet Voicemail Tel: (800) 254-6735 Federal Fleet e-mail: fed_fleets@afdc.nrel.gov
Clean Cities	Information on this voluntary federal program whose mission is to accelerate and expand the use of AFVs.	1-800-CCITIES http://www.ccities.doe.gov
Office of the Federal Environmental Executive	Promotes sustainable environmental Stewardship throughout the federal government	http://www.ofee.gov/eo/eo13423_main.asp

Table D-1. List of P2 Resources (Continued)

Organization	Content	Website/Contact
Department of the Navy Research, Development and Acquisitions	Establishment of the Green Procurement Program	http://acquisition.navy.mil/rda/content/view/full/4262
U.S. Department of Energy	Energy Efficiency & Renewable Energy	http://eere.energy.gov/femp
The White House	Instructions for Implementing Executive Order 13423	http://www.whitehouse.gov/omb/assets/procurement_green/eo13423_instruction.pdf
MarineNet Distance Learning Environment	EMS Training for Marines	https://www.marinenet.usmc.mil
Marine Corps	Marine Corp Order P5090.2A – Environmental Compliance and Protection Manual	http://www.marine.mil/news/publications/Documents/MCO%20P5090.2A.pdf
Environmental Management Systems (EMS)	Environmental Management Systems Program	http://www.miramarenvironmentalintranet.com/
MCAS Miramar ESOPs	Environmental Standard Operating Procedures	http://www.miramarenvironmentalintranet.com/ems/13_environmental_SOPs/default.htm
Green Procurement Training		www.golearn.gov
MCO P5090.2A USMC Environmental Compliance and Protection Manual	Chapter 15-Compliance Manual	http://www.miramar.usmc.mil/ems/environmental_programs/5090/chp15.pdf