



**Naval Facilities Engineering Systems Command Southwest
San Diego, CA**

Final

**Marine Corps Air Station Miramar
Pollution Prevention and Green Procurement
Plan**

Marine Corps Air Station Miramar
San Diego, California

March 2021



**Naval Facilities Engineering Systems Command Southwest
San Diego, CA**

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Acronyms and Abbreviations

%	percent
BGI	Black Gold Industries
BMP	best management practice
C&D	construction and demolition
CalEPA	California Environmental Protection Agency
CalRecycle	California Recycle
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CNG	compressed natural gas
CO ₂	carbon dioxide
CY	calendar year
DLA	Defense Logistics Agency
DoD	United States Department of Defense
DOE	United States Department of Energy
DON	United States Department of the Navy
DTSC	California Environmental Protection Agency Department of Toxic Substances Control
ECE	Environmental Compliance Evaluation
EM	Environmental Management
EMS	Environmental Management System
EO	Executive Order
EPCRA	Emergency Planning and Community Right-to-Know Act
EPEAT	Electronic Product Environmental Assessment Tool
EPP	Environmentally Preferable Purchasing
ESI	Enviremedial Services, Inc.
FAST	Federal Automotive Statistical Tool
FEAD	Facilities Engineering and Acquisition Division
FEMP	Federal Energy Management Program
FSSI	Federal Strategic Sourcing Initiative
FY	fiscal year
GAL/SF	gallons per square foot
GHG	greenhouse gas

Acronyms and Abbreviations (continued)

GPC	Green Procurement Compilation
GPP	Green Procurement Plan
GSA	General Services Administration
GSE	ground support equipment
HazMin Center	MCAS Miramar Hazardous Material Minimization Center
HW	hazardous waste
ISWM	Integrated Solid Waste Management
KGAL	thousand gallons
KSF	thousand square feet
KW	kilowatt(s)
LPG	liquid petroleum gas
MACG	Marine Air Control Group
MAG	Marine Aircraft Group
MAGTF	Marine Air Ground Task Force
MAGS	Micro-Auto Gasification System
MALS	Marine Air Logistics Squadron
Marine Corps	United States Marine Corps
MAS	Multiple Award Schedules
MAW	Marine Aircraft Wing
MBTU	million British thermal units
MCAGCC	Marine Corps Air Ground Combat Center
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
MCI	Marine Corps Installations
MCCS	Marine Corps Community Services
MCO	Marine Corps Order
MMEC Group	Multi-Media Environmental Compliance Group
MS4	Municipal Separate Storm Sewer System
MT	metric ton(s)
MW	megawatt(s)
MWSS	Marine Wing Support Squadron
NAB	Naval Amphibious Base Coronado

Acronyms and Abbreviations (continued)

NASNI	Naval Air Station North Island
NAVWPNSTA.....	Naval Weapons Station
NAWS.....	Naval Air Weapons Station
NBSD	Naval Base San Diego
NFESC	Naval Facilities Engineering Service Center
NPDES	National Pollutant Discharge Elimination System
O&M	operation and maintenance
OWS.....	oil/water separator
P2.....	pollution prevention
PM.....	preventive maintenance
POA&M	Plan of Action and Milestones
POC	point of contact
POL	petroleum, oils, and lubricants
QRP	Qualified Recycling Program
RCPM.....	Recycled Content Product Manufacturers
RCRA	Resource Conservation and Recovery Act
RFP	Request for Proposal
SB	California Senate Bill
SB14 ..	California Senate Bill 14 (Hazardous Waste Source Reduction and Management Review Act of 1989)
SDG&E.....	San Diego Gas & Electric
SPCC	spill prevention, control, and countermeasures
SUV	sport utility vehicle
SW	non-hazardous solid waste
SWADS	Solid Waste Annual Data Summaries
SWPPP	stormwater pollution prevention plan
SWRFT.....	Southwest Region Fleet Transportation
TRI	Toxic Release Inventory
TTU	Transportable Treatment Unit
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency

Acronyms and Abbreviations (continued)

VIL vehicle identification link

WOES World Oil Environmental Services

1.0 Introduction

According to the United States Marine Corps (Marine Corps) Environmental Compliance and Protection Program, the goal of the Marine Corps Air Station (MCAS) Miramar Pollution Prevention (P2) Program is to minimize resource consumption and eliminate waste generation, where practicable, when planning, designing, manufacturing or constructing, maintaining, sustaining, and disposing of facilities, weapon systems, and equipment.¹ In addition, MCAS Miramar will also eliminate or minimize the use of hazardous materials and the generation of hazardous waste (HW), where practicable.²

P2 is defined as the use of processes, materials, or products that avoid, reduce, or control pollution, which may include recycling, treatment, process changes, control mechanisms, more efficient use of resources and material substitution.³

Key Marine Corps directives excerpted from the Environmental Compliance and Protection Program relevant to P2 include the following:

- *P2 is an objective of the Environmental Management System (EMS) and shall be incorporated into the objectives, targets, and Plan of Actions and Milestones (POA&Ms) to improve Environmental Management (EM), achieve cost avoidance, and protect human health and natural resources. P2 should be incorporated into EMS objectives, targets, and POA&Ms unless a separate P2 plan is required by state or local regulations.⁴*
- *EMS should be used to set and achieve P2 goals. When assessing environmental compliance alternative, installations and commands shall employ the Environmental Management Hierarchy, as established by Section 6601 of Public Law 101-508 (Reference (q)) in the following order of preference:*
 - (1) *Source reduction*
 - (2) *Reuse*
 - (3) *Recycling*

¹ United States Marine Corps, Environmental Compliance and Protection Program Volume 1, Chapter 3, 0320 (Pollution Prevention), June 11, 2018.

² IBID

³ United States Marine Corps, Environmental Compliance and Protection Program, Glossary, June 11, 2018.

⁴ United States Marine Corps, Environmental Compliance and Protection Program Volume 2, Chapter 3, 030506 (Practices and Pollution Prevention), June 11, 2018.

(4) *Treatment*

(5) *Disposal*⁵

- *One of the goals of P2 is to increase procurement of environmentally preferable items. The DoD Green Procurement Program is applicable to all procurement actions by Marine Corps commands, operations, and systems except military tactical vehicles and equipment as defined by the DON “Green Procurement Program Implementation Guide,” February 2009 (reference (c)).*⁶

Additionally, Executive Order 13834 (*Efficient Federal Operations*, May 2018) sets forth energy and environmental performance goals, based on statutory requirements, for federal agencies with respect to management of facilities, vehicles, and operations. Section 1 of Executive Order 13834 establishes the following policy priorities for federal agency implementation:

*Agencies shall meet such statutory requirements in a manner that increases efficiency, optimizes performance, eliminates unnecessary use resources, and protect the environment. In implementation this policy, each agency shall prioritize actions that reduce waste, cut costs, enhance the resilience of Federal infrastructure and operations, and enable more effective accomplishments of its mission.*⁷

The objectives of this P2 Plan are as follows:

- Outline a management system for sustaining the MCAS Miramar P2 and Green Procurement Programs.
- Review trends for various environmental media at MCAS Miramar (e.g., energy and consumption, greenhouse gas [GHG] emissions, and solid waste and HW generation).
- Identify current P2 opportunities and associated implementation plans to help achieve MCAS Miramar P2 objectives.

⁵ United States Marine Corps, Environmental Compliance and Protection Program Volume 1, Chapter 3, 0320 (Pollution Prevention), June 11, 2018.

⁶ United States Marine Corps, Environmental Compliance and Protection Program Volume 2, Chapter 3, 030506 (Practices and Pollution Prevention), June 11, 2018.

⁷ Council on Environmental Quality Office of Federal Sustainability, “Implementing Instructions for Executive Order 13834 Efficient Federal Operations”, April 2019.

1.1 MCAS Miramar Background Information

MCAS Miramar occupies 24,000 acres in the suburbs of San Diego, California, and is approximately 13 miles north of downtown. Nearly 17,000 acres are unimproved or semi-improved lands consisting of native vegetation. The installation lies on a plateau and is bordered by the communities of Mira Mesa and Scrips Ranch to the north, University City and Clairemont to the west, Kearny Mesa and to the south, and unincorporated rural areas of San Diego to the east. Interstate 15 divides the installation into two halves. West of Interstate 15 is the Main Station and South/West Miramar, which is occupied by operational, administrative, commercial, and residential facilities. East of Interstate 15 is East Miramar, which is composed of primarily undeveloped land use for military training and warehousing.

The primary mission of MCAS Miramar is to maintain and operate facilities and provide services and materials to support operations of the 3rd Marine Aircraft Wing (MAW) and other tenants of the air station. The mission of 3rd MAW is to provide combat ready expeditionary aviation forces capable of short-notice worldwide deployment to Marine Air Ground Task Force (MAGTF), fleet, and unified commanders. MCAS Miramar supports the military aviation training and maintenance operations for the squadrons of 3rd MAW.

Primary squadron activities at MCAS Miramar include the following:

- **3rd Marine Aircraft Wing:** 3rd MAW is the largest tenant of MCAS Miramar and provides combat-ready expeditionary aviation forces capable of short-notice worldwide deployment. 3rd MAW supports the operational squadrons and associated support activities. Headquarters squadrons for 3rd MAW include Marine Aircraft Group (MAG) 11, MAG-16, and Marine Air Control Group (MACG) 38. MAG-11 operates on fixed-wing airframes; MAG-16 operates on rotary wing airframes. For each MAG unit, there is a Marine Air Logistics Squadron (MALS) and Marine Wing Support Squadron (MWSS) because of the different support requirements for the varying types of airframes and required ground support. Operations include testing, storage, and maintenance repair on engines, cockpits, etc. Maintenance repair includes assembly, loading and unloading, painting, and blast booth efforts.

- **Marine Aviation Logistics Squadron:** MALS provides aviation logistics, including supply and maintenance associated with the aircraft. Each MALS has its own HW storage area for the waste generated by the squadron. HW pickup is coordinated through the Environmental Management Department of MCAS Miramar. HW transporters pick up the waste directly from the squadron's HW storage facility. Oily water, oily rags and shop towels, petroleum, oils, and lubricants (POLs), and absorbents are the main wastes generated. Applicable shop towels are collected in 55-gallon plastic or steel drums and are laundered in the station-wide shop towel laundering program.
- **Marine Wing Support Squadron:** MWSS provides aviation ground support, including, but not limited to, ground transportation, engineering support, life support, and ground supply. Major wastes generated by MWSS at MCAS Miramar include motor vehicle fluids from the heavy equipment and oil/water separator (OWS) sludge generated during the vehicle cleaning. Each MWSS has its own storage area for waste generated by the squadron

1.2 Contents of the P2 Plan

Section 2.0 of this P2 Plan (titled *P2 Management System*) presents the process that MCAS Miramar will use to establish P2 program objectives, identify, and assess P2 opportunities, implement P2 opportunities, and evaluate implemented P2 opportunities. It also assigns MCAS Miramar P2 program roles and responsibilities. It is the "plan, do, check, act cycle" that ensures that the MCAS Miramar P2 Program is working effectively. This process also ensures that the program is sustainable by continuously evaluating progress toward P2 objectives, and that corrective actions are taken if and when an implemented P2 opportunity proves ineffective.

Section 3.0 of this P2 Plan (titled *P2 Program Area Summaries*) presents data trends from the past several years for the following MCAS Miramar P2 program areas:

- Energy Use
- GHG Emissions
- Solid Waste Generation and Recycling
- HW Generation
- Vehicle Fleet Management
- Water Use

The trend data collected for these program areas were used to help identify P2 opportunities. P2 initiatives that have been successfully implemented in these areas at MCAS Miramar are also described.

Section 4.0 of this P2 Plan (titled *P2 Opportunity Identification*) describes eight P2 opportunities identified for technical feasibility evaluations and potentially implementation to help meet MCAS Miramar P2 Program objectives. From these eight opportunities, five were chosen for technical feasibility and cost evaluations.

Section 5.0 of this P2 Plan (titled *Current P2 Opportunities*) presents technical feasibility and cost evaluations of the five P2 opportunities from Section 4.0 selected for further assessment. A detailed description of each P2 opportunity is provided along with specific objectives, a listing of the facilities affected (when applicable), a cost/benefit analysis, a POA&M for implementation, and metrics used to track P2 impact.

The POA&Ms include the following:

- Actions necessary to implement the recommended opportunity
- Personnel responsible for implementing each action
- Personnel responsible for ensuring that the action has been completed
- Estimated start and actual completion date for each action

Section 6.0 is the Green Procurement Plan (GPP) for MCAS Miramar, which outlines goals, roles and responsibilities, and methods for prioritizing purchase of environmentally preferable products and services in accordance with federal-mandated “green” procurement preference programs.

This P2 Plan updates and replaces the MCAS Miramar P2 Plan from 2012. Also, the MCAS Miramar *Hazardous Waste Source Reduction Evaluation Review and Plan* (September 2019) is a separate, companion document focused on opportunities for reducing HW generation at the installation. It is a required document under the State of California Hazardous Waste Source Reduction and Management Review Act of 1989 (commonly referred to as Senate Bill [SB]14).

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2.0 P2 Management System

The P2 Management System is the process by which the MCAS Miramar P2 Program will be sustained. This process will be implemented primarily by the MCAS Miramar P2 Team, consisting of members from the MCAS Miramar Environmental Management Department. The P2 Management System is summarized in Figure 2-1, which depicts the steps in the process and the timing of each step.

The P2 Management System is designed to be a continuous and sustainable process. Efforts may begin at any step—executed locally by the responsible party or via contract. Section 2.1 provides detailed descriptions of each step (A through I) depicted in Figure 2-1. This description is followed in Section 2.2 by a summary of P2 Program roles and responsibilities as the P2 Team works to advance the P2 goals of the installation and, on a broader scale, the Marine Corps P2 Program.

Steps A and B of the process were executed during this update of the P2 Plan and the following MCAS Miramar P2 Program objectives were developed on the basis of the driving force of Executive Order (EO) 13834:

- Achieve and maintain annual reductions in building energy use and implement energy efficiency measures that reduce costs.
- Reduce GHG emissions.
- Prioritize solid waste management in the following hierarchy: (1) source reduction, (2) reuse, (3) donation, (4) recycling, (5) composting/mulching, (6) incineration for volume reduction with energy recovery, (7) other forms of volume reductions, and (8) landfilling.
- Manage hazardous, solid, and toxic wastes in accordance with all federal requirements through waste prevention and recycling measures.
- Increase efficiency and optimize performance of the vehicle fleet.
- Reduce potable and nonpotable water consumption and comply with stormwater management requirements.

These objectives will be pursued, in part, by executing the P2 opportunities presented in Section 5.0.

2.1 Identifying and Tracking P2 Program Objectives/Opportunities

This section describes actions to be taken during each step (A through I) of the MCAS Miramar P2 Management System depicted in Figure 2-1. Steps A through E are taken every four years, Steps F through H are taken quarterly (Step H is also taken annually with the Commanding Officer), and Step I is taken annually.

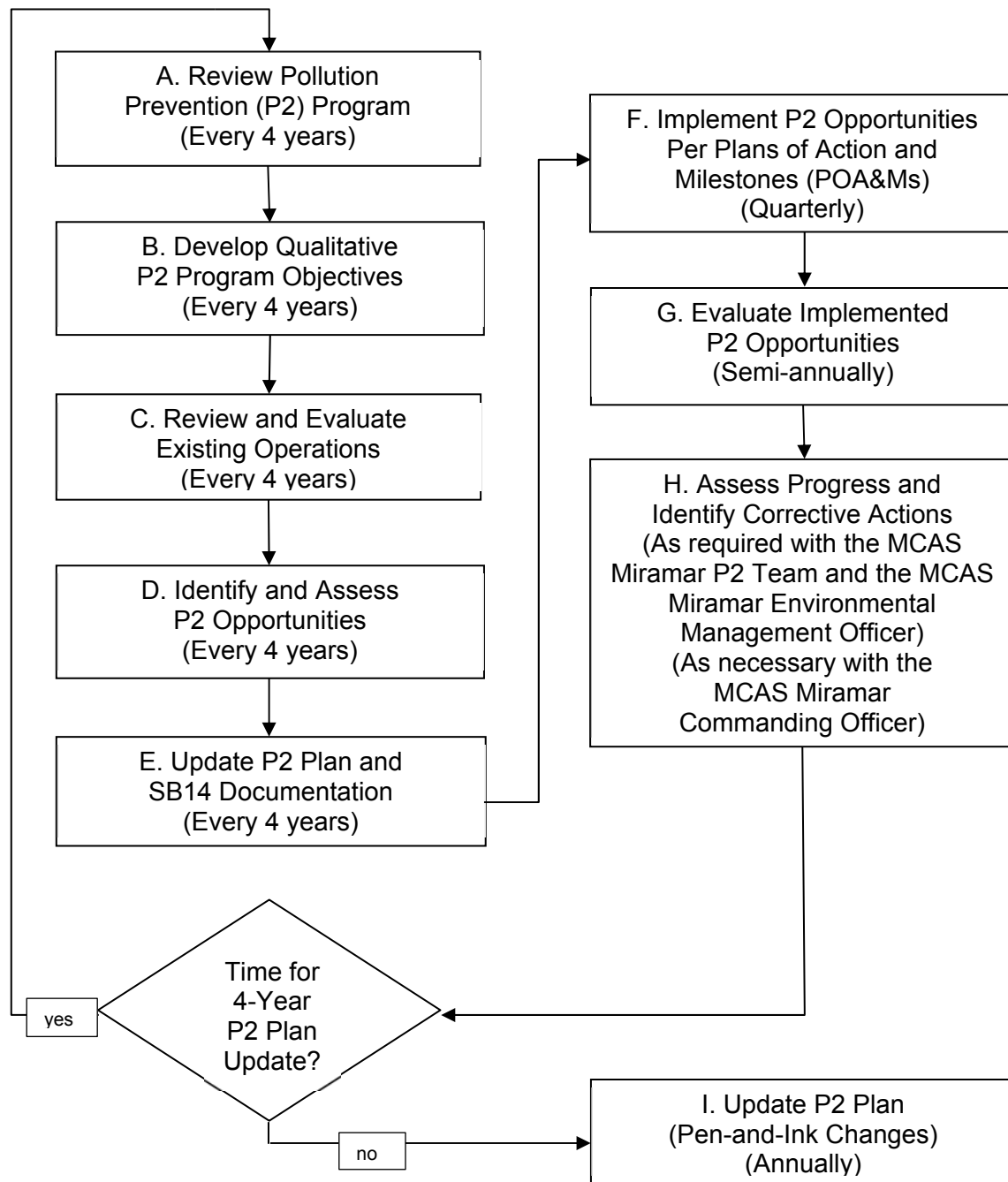


Figure 2-1: Pollution Prevention Management System, MCAS Miramar

A. Review P2 Program

The P2 Team will review the following documents to familiarize themselves with regulations and technical guidance pertaining to the MCAS Miramar P2 Program.

- EO 13834: Efficient Federal Operations (or any subsequent EOs that modify this order)
- Marine Corps Order (MCO) 5090.2
- California Health and Safety Code Sections 25244.12 through 25244.23 (i.e., SB14 requirements and associated guidance)

In addition, the P2 Team will review relevant site-specific documents prior to updating the P2 Plan to help define P2 objectives. This review will include multimedia environmental guidance and data (e.g., management plans, permits, surveys, environmental project requirements, inventories, and studies), including, but not limited to, the following items:

- EMS documents, assessments, and annual reviews
- Energy and water consumption annual summaries
- GHG emission reports
- HW and solid waste generation reports
- Spill Prevention, Control, and Countermeasures (SPCC) Plan
- Stormwater Pollution Prevention Plan
- Air emissions inventory
- Environmental Protection Community Right-to-Know Act (EPCRA) data and reports (especially Toxic Release Inventory [TRI] releases)

B. Develop Qualitative P2 Program Objectives

Every 4 years, the P2 Team will develop a matrix listing pertinent Marine Corps and Executive Order environmental goals. From this matrix, the team will identify qualitative objectives for the P2 Plan. These goals will be presented to the MCAS Miramar Environmental Management Officer for review, input, discussion, and approval.

C. Review and Evaluate Existing Operations

The P2 Team will conduct field visits to various MCAS Miramar Commands⁸ and evaluate their existing operations to (1) understand mission and operational needs;

⁸ The term "Command" is used broadly throughout this document to refer to MCAS Miramar organizations, units, squadrons, Tenant Commands, departments, work centers, and shops.

(2) document P2 progress to date; and (3) identify the potential for additional P2 opportunities. The following actions should be taken to complete this step:

- Determine the Commands to be evaluated in the current P2 Plan update, considering the following:
 - New operations
 - Significant changes in operation
 - Mission impact potential
 - Significant areas for potential release
 - Significant areas for worker exposure
 - Areas not reviewed during the last update of the P2 Plan
 - Any customer-requested areas
- Prior to field visits, compile the following information for each Command:
 - P2 documentation from the previous P2 Plan
 - Hazardous materials issued
 - Waste streams and quantities generated
- Develop a matrix listing the Commands, the large-volume waste streams for each Command, and a schedule of when the field visit is to occur prior to visiting the Command.
- Conduct Command field visits:
 - Seek P2 ideas from shop workers.
 - View P2 equipment and determine its effectiveness based on shop interviews.
 - Determine whether previous P2 recommendations have been implemented:
 - If so, capture as a success.
 - If not, determine whether recommendations are still valid. If recommendations are still valid, re-recommend.
 - Identify why recommendations were not previously adopted.
 - Determine whether quantitative goals have been met from the previous P2 Plan:
 - If so, record them as a success.
 - If not, determine why not and what can be done to ensure the new objectives are met.

D. Identify and Assess P2 Opportunities

Based on the review of MCAS Miramar operations (Step C), the P2 Team will identify and define new P2 opportunities. These opportunities will be briefly summarized in terms of targeted media; waste streams; current practices; technical or management practice changes; and potential to reduce waste quantities or hazards. These opportunities will be presented to the MCAS Miramar Environmental Management Officer for review, input, discussion, and selection of the most promising opportunities.

The P2 Team will then perform a more in-depth technical, logistical, and economic analysis of the most promising P2 opportunities. The analysis will consider the following items, as applicable:

- History of successful implementation at other Commands
- Approvals needed for implementation
- Cost of equipment and installation
- Life expectancy of equipment
- Other upfront or investment costs associated with the opportunity (e.g., training and awareness efforts)
- Reductions and/or increases in hazardous material procurement and waste management and disposal costs
- Reductions and/or increases in process labor and support labor costs
- Revenue generated from sale of recycled materials

The P2 Team will then develop a POA&M for each of the most promising P2 opportunities (see Section 5.0, *P2 Opportunities*, for current examples).

E. Update P2 Plan and Documentation Related to SB14

Every 4 years, the P2 Team will update the P2 Plan. The updated plan will contain the following information:

- P2 Management System (Section 2.0), revised as necessary.
- P2 Program Area Data Analysis (Section 3.0), for most recent full-year and trends from past years.
- A minimum of eight newly identified P2 opportunities for selection of further assessment (Section 4.0).
- Detailed descriptions and POA&M for each of at least five new P2 opportunities (Section 5.0).

- Updates and revisions (e.g., personnel and policy changes) to the GPP (Section 6.0).

F. Implement P2 Opportunities per POA&Ms

The P2 Team will lead the efforts necessary to implement the P2 opportunities identified in the P2 Plan. The team will examine the POA&M prepared for each P2 opportunity and see that each plan element is executed to the extent possible.

For example, the P2 Team may need to work with the following:

- Command-level personnel to procure a new piece of equipment or to modify an existing waste management practice
- Environmental compliance personnel to effect a change in waste management practices
- Vendors to obtain training or replacement parts needed to keep equipment operational

The P2 Team will update the POA&Ms quarterly by taking the following actions:

- Documenting that all actions that have been accomplished to date
- Noting any changes in the plan or schedule slippages of the estimated completion dates by pen-and-ink changes to the POA&Ms in Section 4

G. Evaluate Implemented P2 Opportunities

Semi-annually, or on an agreed-upon schedule, the P2 Team will visit the Commands where P2 opportunities have been implemented to ensure that the P2 recommendations are effective and working properly. If not, the P2 Team will attempt to determine the reason. For example:

- If the reason is lack of equipment maintenance, the P2 Team may provide the Command personnel with an owner's manual and any needed assistance in developing a preventive maintenance (PM) schedule. After the PM schedule is developed, the Command personnel should sign off on the document quarterly to ensure that PM is being conducted.
- If the reason is lack of training for a piece of equipment, the P2 Team may provide Command personnel with a training video, fact sheets, and/or an owner's manual.
- If the reason is broken equipment, the P2 Team may obtain support from the Procurement Agent, the manufacturer, or Public Works to correct the problem.

- If the reason is that the equipment is not appropriate for the P2 opportunity, the P2 Team may contact the Procurement Agent, the manufacturer, or Public Works to either relocate the equipment or procure the appropriate equipment for the Command.
- If a P2 opportunity is not equipment-related, the P2 Team will determine why implementation has not been effective and will develop a POA&M to correct the problem.

After determining that the implemented P2 opportunities are effective, the P2 Team will record the opportunities as successes, document the metrics, and report to the MCAS Miramar Environmental Management Officer during the next scheduled meeting (Step H).

H. Assess Progress and Identify Corrective Actions

The P2 Team will present a status report for each of the P2 opportunities selected for implementation to the MCAS Miramar Environmental Management Officer, as required. The report will include POA&Ms for each P2 opportunity; implementation progress; schedule slippages; successes; and problems encountered. Requests for any additional resourcing or management actions deemed necessary by the P2 Team should be presented at this time.

The P2 Program Manager and the MCAS Miramar Environmental Management Officer will meet with the MCAS Miramar Commanding Officer, as necessary, to assess the progress toward achieving the P2 objectives and identify any necessary corrective action measures. As a result, the following should occur:

- The P2 Team will develop a POA&M of the corrective measures that result from this meeting.
- The POA&Ms will be distributed to all parties involved in the corrective action with a cover letter from the Commanding Officer stressing the importance of meeting the dates and actions outlined in the POA&M.

I. Update P2 Plan (with Pen-and-Ink Changes)

Annually, the P2 Team will review the P2 Plan and make pen-and-ink changes to ensure that the plan is up to date, implemented opportunities have been documented, and progress toward goals has been tracked.

2.2 P2 Program Roles and Responsibilities

Specific P2 Program roles and responsibilities are listed in this section for the MCAS Miramar Commanding Officer, the MCAS Miramar Environmental Management Officer, and the P2 Team.

MCAS Miramar Commanding Officer

- Ensure that MCAS Miramar has an assigned MCAS Miramar P2 Program Manager who has sufficient resources and authority to implement this plan.
- Maintain a signed Environmental Policy Statement. A new Environmental Policy Statement should be issued by each new Commanding Officer of MCAS Miramar within 30 days after assuming command, or as soon as practicable.
- Sign and fully endorse the finalized P2 Plan.
- Stress the importance of P2 in helping accomplish the mission.

MCAS Miramar Environmental Management Officer

- Ensure that MCAS Miramar has an assigned P2 Team with sufficient resources and authority to implement this plan.
- Provide support to the MCAS Miramar P2 Team.
- Ensure that MCAS Miramar documents meet the requirements for the P2 Program in state, federal, and United States Department of Defense (DoD) regulations (Step A).
- Facilitate funding for MCAS Miramar P2 projects and equipment.
- Meet with the MCAS Miramar P2 Team, as required, to review status on POA&Ms for each P2 opportunity and identify any slippages in the program schedule (Step H).
- Meet with the MCAS Miramar Commanding Officer, as necessary, to assess the progress toward the P2 objectives and identify any necessary corrective actions (Step H).

MCAS Miramar P2 Program Manager

- Perform long-range planning to identify and meet P2 objectives (Steps A and B).
- Develop procedures to ensure that all Command personnel receive appropriate training relevant to P2 opportunities slated for implementation.
- Assign responsibilities, as required, to support P2 opportunity POA&Ms.

- Identify and request appropriate funding for P2 opportunities.
- Provide P2 management support to all MCAS Miramar Commands.
- Work with tenant and department points of contact (POCs) and/or Commands to identify and implement P2 projects.
- Promote awareness of ongoing and new P2 opportunities on station (Step D).
- Update the POA&Ms quarterly for the P2 opportunities (Step F).
- Visit selected Commands to ensure that the P2 recommendations and equipment are effective and working properly. If the equipment is not working properly, the P2 Team will determine whether the reason is lack of maintenance, lack of training, equipment needing repair, or inappropriate equipment in the Command (Step G).
- Assist the Command when a problem with equipment has been identified (Step G).
- Meet with the MCAS Miramar Environmental Management Officer, as required, to review status on POA&Ms for each P2 opportunity and to identify any slippages in the program schedule (Step H).
- Meet with the MCAS Miramar Environmental Management Officer and Commanding Officer, as necessary, to assess the progress toward achieving the P2 goals and to identify any necessary corrective action (Step H).
- Make pen-and-ink revisions annually to the P2 Plan in conjunction with the Region P2 Representative (Step I).
- Update the P2 Plan every 4 years:
 - Review P2-related state, federal, and DoD regulations.
 - Develop qualitative P2 objectives.
 - Conduct field visits to review and evaluate existing operations and any new processes or process changes.
 - Review Command operations to evaluate the effectiveness of the previous P2 opportunities.
 - Update/revise the P2 Plan.

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3.0 P2 Program Area Summaries

Initiatives to meet P2 goals at MCAS Miramar are categorized into the following environmental program areas:

- Energy Use
- GHG Emissions
- Solid Waste Generation and Recycling
- HW Generation
- Vehicle Fleet Management
- Water Use

3.1 Energy Use

Energy use, as discussed in this section, refers to electricity, natural gas, and photovoltaic use by buildings and activities at MCAS Miramar. According to the Implementing Instructions for EO 13834 Efficient Federal Operations Section 2(a), federal operations must aim to “*achieve and maintain annual reductions in building energy use and implement energy efficiency measures that reduce costs*”.⁹ Reductions are assessed at the agency level, not the building level, and under EO 13834, agencies should continue to identify reduction opportunities. Section 2b of EO 13834 Efficient Federal Operations establishes that a minimum of 7.5 percent of total energy use should originate from renewable sources.

MCAS Miramar works continuously to conserve energy and the following renewable energy systems are in place:^{10,11}

- Hundreds of solar-powered streetlights throughout the installation and three solar-powered carports (200 kilowatts [kW], 250 kW, 35kW).
- A 120-kW concentrated solar-powered heating system at the station training tank.
- Electricity use totaling 3.2 megawatts (MW) at the installation originating from landfill gas combustion.

⁹ Council on Environmental Quality Office of Federal Sustainability, “Implementing Instructions for Executive Order 13834 Efficient Federal Operations,” April 2019.

¹⁰ Email correspondence between Travis Richards, Resource Management for Utilities & Energy Management at MCAS Miramar, and Emmerie Schoolsky of MMEC Group on January 16, 2020.

¹¹ “Pollution Prevention Plan for Marine Corps Air Station Miramar San Diego, California,” September 2012.

MCAS Miramar currently uses the following conventional and renewable sources of energy throughout the installation.

- Electricity
- Natural gas
- Photovoltaic energy
- Biomass
- Solar thermal

MCAS Miramar stopped using propane and/or oil-based fuel in 2016. From 2014 to 2019, renewable energy sources have made up more than 25 percent of the total energy consumed. Table 3-1 summarizes renewable and conventional energy sources at MCAS Miramar.¹²

Table 3-1: Total Energy Consumed at MCAS Miramar

Energy Source	Total Energy Consumed (MBTU)					
	2014	2015	2016	2017	2018	2019
Conventional	176,212	154,250	240,363	231,444	231,802	239,0135
Renewable	90,021	100,534	96,141	96,124	100,438	102,950
Total	266,232	254,785	336,503	327,503	332,240	341,963
% Renewable	34	39	29	29	30	30

Notes:
 MBTU = million British thermal units

As outlined in Table 3-1, MCAS Miramar has consistently exceeded the goals established by EO 13834 in that greater than 7.5 percent of the total energy used is attributed to renewable sources. Table 3-2 provides the breakdown of renewable energy consumed at MCAS Miramar.

Table 3-2: Total Renewable Energy Consumed at MCAS Miramar

Energy Source	Total Energy Consumed (MBTU)					
	2014	2015	2016	2017	2018	2019
Photovoltaic	9,245	8,250	7,242	6,611	8,836	8,836
Biomass	76,915	88,424	85,038	85,653	87,741	90,253
Solar Thermal	3,861	3,861	3,861	3,861	3,861	3,861

Notes:
 MBTU = million British thermal units

¹² Email correspondence between Travis Richards, Resource Management for Utilities & Energy Management at MCAS Miramar, and Emmerie Schoolsky of MMEC Group on January 16, 2020.

3.2 Greenhouse Gas Emissions

Under EO 13834, federal agencies are required to track and report all GHG emissions and reductions. GHG emissions are divided into the following three scopes:¹³

- **Scope 1 emissions:** *Direct emissions from sources that are owned or controlled by the Federal agency such as vehicles and equipment, stationary sources, on-site landfills, wastewater treatment facilities, and fugitive emissions.*
- **Scope 2 emissions:** *Indirect emissions resulting from the generation of electricity, heat, or steam purchased by a federal agency.*
- **Scope 3 emissions:** *Emissions from sources not owned or directly controlled by a Federal agency, but related to agency activities, such as vendor supply chains, delivery services, and employee travel commuting.*

EO 13834 established that meeting GHG emissions reduction goals will benefit other program areas (e.g., efficiency of fleet, energy usage). GHG emissions are correlated to fuel, waste, and energy generation, and it is expected that proper management in these categories will reduce GHG emissions.

Specific GHG reductions have not been established under EO 13834. GHG emissions and reductions data are required to be submitted annually and compared with the data from the baseline year of 2008.

MCAS Miramar generates annual GHG emission reports. In accordance with the Federal Greenhouse Gas Accounting Guidance, the emission quantities are reported under each of the three scopes presented in Table 3-3 for fiscal year (FY) 2018.¹⁴ Figure 3-1 summarizes GHG emissions at MCAS Miramar from FY 2008 to FY 2018.

As shown in Figure 3-1, Scope 1 emissions have remained relatively constant, but Scope 2 and 3 emissions have varied over the past 10 years. The following factors contribute to the fluctuations observed in Scope 2 and 3 emissions:

- Scope 2 – The large increase in metric tons of carbon dioxide (CO₂) emitted after 2013 is attributed to the addition of biomass emissions in the Scope 2 calculations. MCAS Miramar began purchasing renewable energy generated from biomass in 2014. The GHG emission data incorporate anthropogenic (originating from humans) emissions and biogenic (originating from living organisms such as trees, plants, grass and wood) emissions. To increase renewable energy consumption, the installation began purchasing biomass energy in 2014, and this practice has led to the increase in GHG emissions. The

¹³ Council on Environmental Quality Office of Federal Sustainability, "Implementing Instructions for Executive Order 13834 Efficient Federal Operations," April 2019.

¹⁴ Email exchange between Amanda Mates of AECOM and Emmerie Schoolsky of MMEC Group on January 14, 2020.

incorporation of biomass energy has resulted in a smaller demand for purchased electricity.

- Scope 3 – GHG emission levels from employee commuting during 2012 were almost double those from 2011 (24,802 metric tons of CO₂ in 2011 versus 43,072 tons in 2012). More than 75 percent of the total GHG emissions for Scope 3 has been attributed to employee commuting from FY 2008 to FY 2018.

Table 3-3: Summary of MCAS Miramar GHG Emissions for FY18

Scope	Source Category	Total Quantity Emitted Anthropogenic (MT CO ₂ e)	Total Quantity Emitted Biogenic CO ₂ (MT)	Total Emitted (MT CO ₂ e)
Scope 1	Stationary Combustion	4	0	4
	Mobile Emissions	474	225	698
	Fugitive Gases (Refrigerants)	108	0	108
	Wastewater Treatment Plants	14	0	14
	Landfills	0	0	0
	Process Emissions	0	0	0
	Subtotal Scope 1	600	225	824
Scope 2	Purchased Electricity	6,334	0	6,334
	Purchased Renewable Energy Biomass Emissions	90	17,536	17,626
	Purchased Steam	0	0	0
	Subtotal Scope 2	6,424	17,536	23,960
Scope 3	Transmission and Distribution Losses	417	0	417
	Employee Commuting	34,768	0	34,768
	Contracted Wastewater Treatment	8	55	63
	Contracted Solid Waste Disposal	3,434	912	4,346
	Subtotal Scope 3	38,627	967	39,594
Total		45,651	18,728	64,378

Notes:
 MT = metric ton(s); CO₂ = carbon dioxide

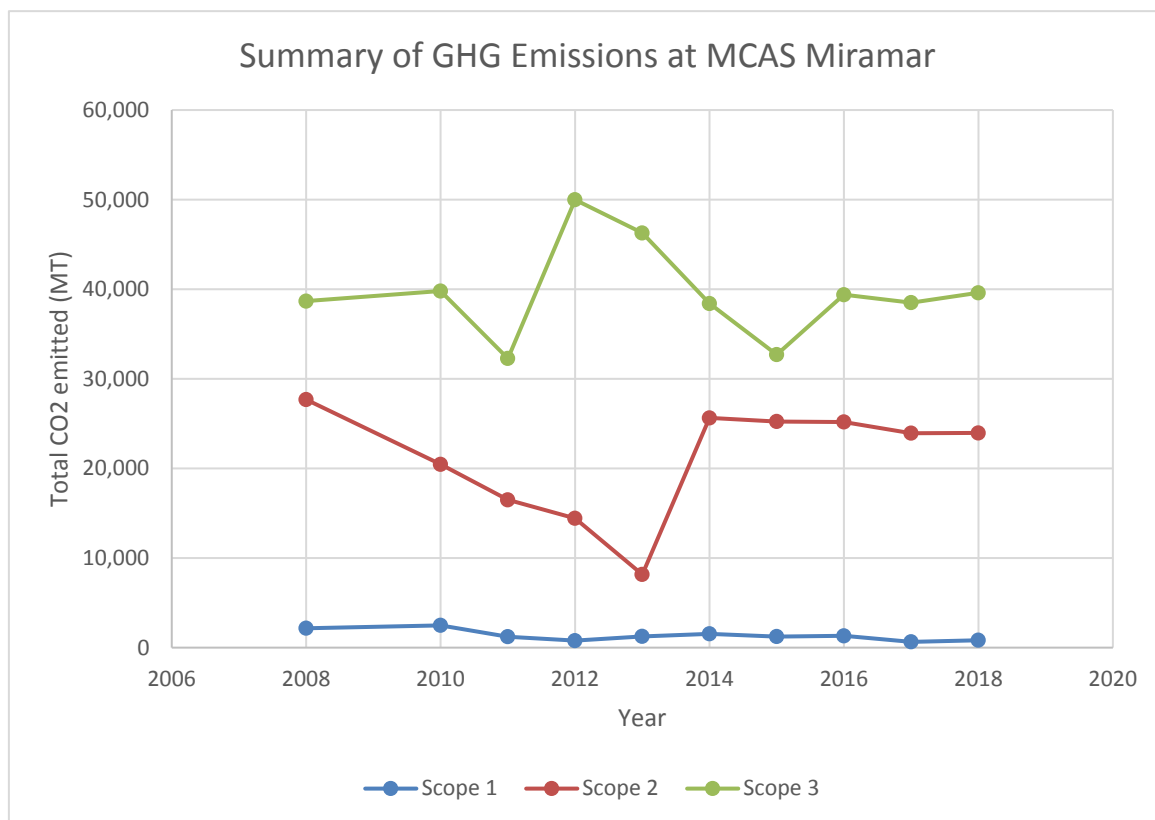


Figure 3-1: Summary of GHG Emissions at MCAS Miramar

3.3 Solid Waste Generation and Recycling

MCAS Miramar has implemented an Integrated Solid Waste Management (ISWM) program to manage non-hazardous solid waste (SW) that includes recycling, composting, waste prevention, and landfill disposal.¹⁵ According to the MCAS Miramar ISWM Plan of 2017, the installation uses the following hierarchy to prioritize SW disposition:

- (1) Source reduction
- (2) Reuse
- (3) Donation
- (4) Recycling
- (5) Composting/mulching
- (6) Incineration for volume reduction with energy recovery

¹⁵ United States Marine Corps, Marine Corps Air Station Miramar, "Integrated Solid Waste Management Plan," December 2017.

(7) Other forms of volume reduction

(8) Landfilling

SW generated by each Command is accumulated in recycling bins and refuse dumpsters. Dumpsters are serviced by a United States Department of the Navy (DON) Regional contractor and the contents transported to the City of San Diego Miramar Landfill for disposal. Personnel from the MCAS Miramar Recycling Center pick up the recycling bins weekly and more frequently when necessary. The recycling bins are delivered to the recycling yard at Building 6310 where the materials are sorted and stored pending sale through a Qualified Recycling Program (QRP). The MCAS Miramar QRP Manager obtains bids for a number of commodities, including paper (various types), cardboard, metals (e.g., steel, aluminum, copper), and pallets (wooden and plastic), and arranges for the items to be sold.

Table 3-4 summarizes the SW management quantities at MCAS Miramar from FY 2014 through FY 2019.¹⁶

Table 3-4: Solid Waste Management Quantities at MCAS Miramar (Tons)

Fiscal Year	Recycled	Composted	Landfilled	Total	Solid Waste Diversion Rate
2014	2,013	34	3,927	5,974	34%
2015	2,277	73	4,472	6,569	35%
2016	2,246	70	4,472	6,569	34%
2017	1,873	48	3,739	5,661	34%
2018	2,290	41	3,950	6,281	37%
2019	2,733	53	3,905	6,690	42%

Notes:

Data do not include construction and demolition debris; it is reported separately in accordance with EO 13834.

MCAS Miramar does not incinerate waste and has not incorporated waste-to-energy systems into SW management practices. Currently, mulch, wood clippings, and grass (primarily from the golf course) are composted at the City of San Diego Miramar Greenery (co-located with the Miramar Landfill); however, food waste/food scraps are landfilled. The installation has not incorporated composting efforts for dining halls, but is currently working to participate in the Miramar Greenery's program.

As directed by EO 13834, MCAS Miramar tracks construction and demolition (C&D) waste separately from other SW and reports to the Naval Facilities Engineering Service Center (NFESC). MCAS Miramar has maintained a diversion rate above 90 percent for C&D waste from FY 2014 to FY 2019, except for FY 2015. Construction contractors are

¹⁶ Email exchange between Brad Thomas, Solid Waste/Recycling Center Manager at MCAS Miramar, and Emmerie Schoolsky of MMEC Group on January 15, 2020.

required to recycle C&D waste when possible; nonrecyclable C&D waste is sent to the Miramar Landfill. Table 3-5 displays the C&D waste generation totals and respective diversion rates for these years.

Table 3-5: Construction and Demolition Waste Diversion Rates

Fiscal Year	C&D Generated (Tons)	C&D Disposed of at Landfill (Tons)	Diversion Rate	Diversion Revenue
2014	47,812	2,224	95%	\$105,974
2015	2,499	2,121	15%	\$92,901
2016	98,189	223	99%	\$77,184
2017	137	10	92%	\$92,542
2018	78,288	418	99%	\$93,393
2019	52	0	100%	\$147,576

Notes:
 C&D = construction and demolition

The DON Facilities Engineering and Acquisition Division (FEAD) office at MCAS Miramar is responsible for reporting C&D waste generated by contractors. Accurate C&D waste diversion information depends on the contractor reporting the data to the FEAD, which could explain the low diversion rate reported for FY 2015. In addition, a low diversion rate can be attributed to variations in the quantities of construction debris. New construction is not likely to result in high diversion rates; it is less likely to be sold/diverted.

3.4 Hazardous Waste Generation

Because MCAS Miramar creates more than 12,000 kilograms (26,400 pounds) of HW or 12 kilograms (26.4 pounds) of extremely hazardous waste per year, the installation qualifies as a large quantity HW generator. In accordance with SB14, MCAS Miramar maintains the following documents summarizing HW totals and source reduction opportunities:

- Source Reduction Evaluation Review and Plan
- Hazardous Waste Management Performance Report
- Summary Progress Report

MCAS Miramar is responsible for maintaining and operating combat-ready expeditionary aviation forces capable of short-notice worldwide deployment. As a result, most of the HW originates from aircraft support and maintenance activities, which include aircraft touch-up painting, vehicle and aircraft washing, and routine engine maintenance. These activities generate oily rags, paint related wastes, and toxic sludge/soil and oily water (remnants of sludge/soil from oil water separator cleanouts).

MCAS Miramar tracks HW generation using a Jasper Soft program. Figure 3-2 presents annual HW generation quantities at MCAS Miramar from 2014 to 2019 in terms of non-RCRA HW (i.e., California-only HW) and RCRA HW.

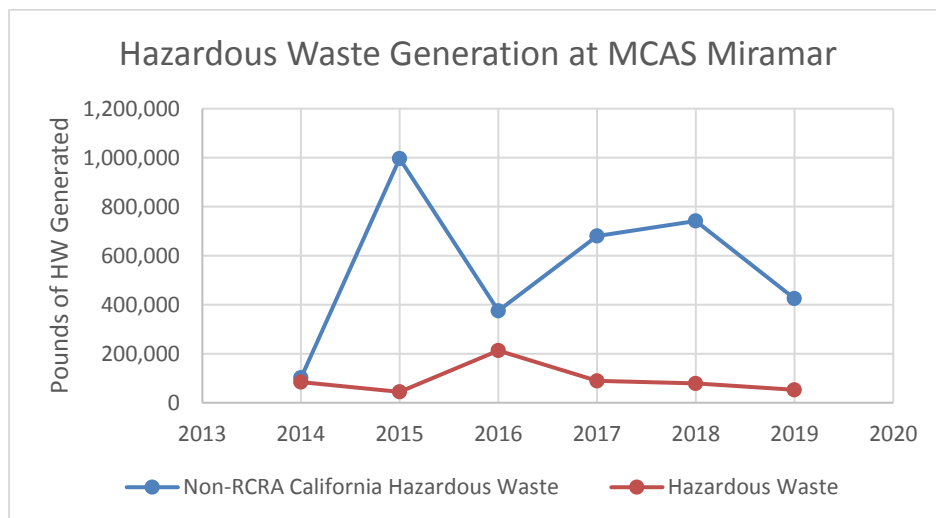


Figure 3-2: Summary of HW Generation at MCAS Miramar

The following are some of the HW reduction practices currently used at MCAS Miramar:

- Limiting OWS cleanouts to an as-needed basis (versus a monthly basis)
- Laundering shop towels
- Using mechanical wringers to facilitate reuse of rags and absorbent pads
- Draining used oil filters and aerosol cans onsite so that they can be recycled offsite as scrap metal
- Segregating and selling waste diesel fuel and hydraulic oils to an offsite vendor
- Segregating spent rechargeable and lead-acid batteries for offsite recycling
- Using lightweight plastic drums for HW destined for offsite disposal

Table 3-6 lists the largest MCAS Miramar HW streams for 2018, as identified in the most recent SB14 *Hazardous Waste Source Reduction Evaluation Review and Plan* (September 2019). A discussion of these four HW streams follows Table 3-6.

Table 3-6: 2018 MCAS Miramar Largest HW Streams

Description	Amount (pounds)	Percentage (%)
Oily Water (non-RCRA)	393,743	67
Dry Oily Debris, POL, Hoses, Canisters, Cartridges, and Absorbents (non-RCRA)	63,139	11
Toxic Sludge and Soil (non-RCRA)	29,530	5
Debris, Paint, Adhesives, Dry, Toxic, Not Listed	22,314	4

Notes:

RCRA = Resource Conservation and Recovery Act, POL = petroleum, oil, and lubricant

Oily Water (Non-Resource Conservation and Recovery Act [RCRA])

Oily water represented approximately 67 percent of the SB14 non-exempt HW generated at MCAS Miramar in 2018. In addition to oily waste generated by individual Commands, this waste stream consists of contaminated waste and rinse water generated during periodic servicing of OWS tanks throughout the installation. The 60 OWS tanks are inspected on a monthly basis by Black Gold Industries (BGI). Based on the monthly inspections, if needed, BGI cleans and empties the tanks; otherwise, each OWS is serviced annually. Limiting OWS cleanouts to an as-needed basis (versus a monthly or quarterly basis) has reduced quantities of this waste stream from previous levels.

Dry Oily Debris

Approximately 11 percent of the total HW generated at MCAS Miramar in 2018 consisted of rags, dry sweep, absorbent materials, grease, hoses, and tubes. This waste is generated during aircraft and other vehicle maintenance activities, and when necessary, includes materials used to clean up small spills and leaks. When the rags and absorbents are not recycled and are not used until saturated, they are classified as Dry Oily Debris.

Currently, a shop towel laundering program is in place at MCAS Miramar. Although personnel are strongly encouraged to use launderable shop towels and absorbent pads, these materials cannot be used in all applications.

The use of mechanical wringers to facilitate reuse of shop towels and absorbent pads is incorporated at most, but not all, maintenance shops. These wringers allow tenants to wring out the oil from recyclable pads and towels for reuse and minimize HW generation.

Toxic Sludge and Soil

This waste stream consists predominantly of sludge contaminated with POLs that have been removed from the bottom of OWS tanks during servicing. When ground support equipment, aircraft, and other vehicles are washed, the wash water (containing POLs, mud, and dirt) is routed to the OWS. The sludge and POLs are separated prior to discharge of the water to the sanitary sewers. The sludge, composed of oily solids, accumulates at the bottom of the OWS and is removed during servicing.

Debris and Paint Adhesives

Most of this waste stream is generated from the use of adhesives and sealants during repairs on aircraft cockpits, engines, and exterior components. The materials are purchased in bulk and mixed accordingly. Once the adhesives are mixed, they cannot be reused or saved for later. This waste stream consists primarily of unused adhesives, adhesive containers, and paper masking materials.

3.5 Vehicle Fleet Management

Under EO 13834, “agencies are instructed to meet statutory requirements related to energy and environmental performance of vehicles in a manner that increases efficiency, optimizes performance, and reduces waste and costs”.¹⁷ As specified by the Council on Environmental Quality Office of Federal Sustainability, agencies can meet EO 13834 fleet requirements by incorporating the following strategies:

- Right size the fleet.
- Reduce vehicle miles traveled.
- Replace inefficient vehicles with more fuel-efficient infrastructure.
- Align deployment of alternative vehicles with fueling infrastructure.

MCAS Miramar continues to manage and track all fleet data through the Federal Automotive Statistical Tool (FAST) database. Per California Air Resources Board requirements, MCAS Miramar maintains a vehicle emission program but does not keep a record of emissions generated from the fleet.

As of 2019, the MCAS Miramar ground vehicle fleet consisted of 372 vehicles, composed of alternative fuel and petroleum fuel vehicles. MCAS Miramar began incorporating hybrid vehicles into their fleet in 2009 and electric vehicles in 2010. Since that time, MCAS Miramar has worked strategically to increase the number of hybrid and electric vehicles used. The installation started with 5 hybrid and 25 electric vehicles in

¹⁷ Council on Environmental Quality Office of Federal Sustainability, “Implementing Instructions for Executive Order 13834 Efficient Federal Operations,” April 2019.

FY 2009 and FY 2010, respectively.¹⁸ The expansion of MCAS Miramar’s alternative fuel fleet is shown in Table 3-7.

Table 3-7: Alternative Fuel Vehicles at MCAS Miramar

Vehicle Type	2017	2018	2019	2020 (Projected)
Hybrid	11	11	11	11
Electric	98	98	82	82
CNG	3	3	2	2
Flex Fuel	136	136	141	141
LPG	50	50	42	42

Notes:

CNG = compressed natural gas; LPG = liquid petroleum gas

Flex Fuel vehicles operate on either E-85 fuel (85% ethanol and 15% gasoline) or gasoline

The hybrid and electric fleets consist of vans and small four-door vehicles that are used predominantly for traversing the installation and hauling equipment to other military installations. Electric vehicles are charged at one of the many charging stations on the installation. The hybrid vehicles use diesel fuel or gasoline but are considered alternate fuel vehicles because they offer more efficient fuel mileage.

Currently, compressed natural gas (CNG) vehicles are refueled at the San Diego Gas & Electric (SDG&E) fueling station approximately 5 miles offsite. MCAS Miramar has CNG fueling stations onsite, but they have been reported as ineffective because of the amount of time it takes to refill the vehicles. The installation has not expressed interest in upgrading or repairing the fueling station because they can successfully refill offsite.

Flex-fuel vehicles, which run on either E-85 fuel or gasoline, are refueled onsite.

Marines from MCAS Miramar frequently commute to Marine Corps Base (MCB) Camp Pendleton to support operations. Although the electric vehicles are able to complete the round-trip commute on a single charge, personnel have indicated a preference for diesel and gasoline vehicles because of concerns that the electric vehicles will not make the entire commute and that the vehicle size is insufficient for hauling equipment.¹⁹

The remaining vehicles in the fleet are powered by diesel fuel, gasoline, and biodiesel. The number of these vehicles has remained steady over the past 4 years, with 79 diesel/biodiesel and of 15 gasoline vehicles. Figure 3-3 presents the fuel purchases made by the Southwest Region Fleet Transportation (SWRFT) over the past several years.

¹⁸ "Pollution Prevention Plan for Marine Corps Air Station Miramar San Diego, California," September 2012.

¹⁹ Conversation between Hugo Molina, SWRFT Fleet Manager at MCAS Miramar, and Emmerie Schoolsky of MMEC Group on December 14, 2019.

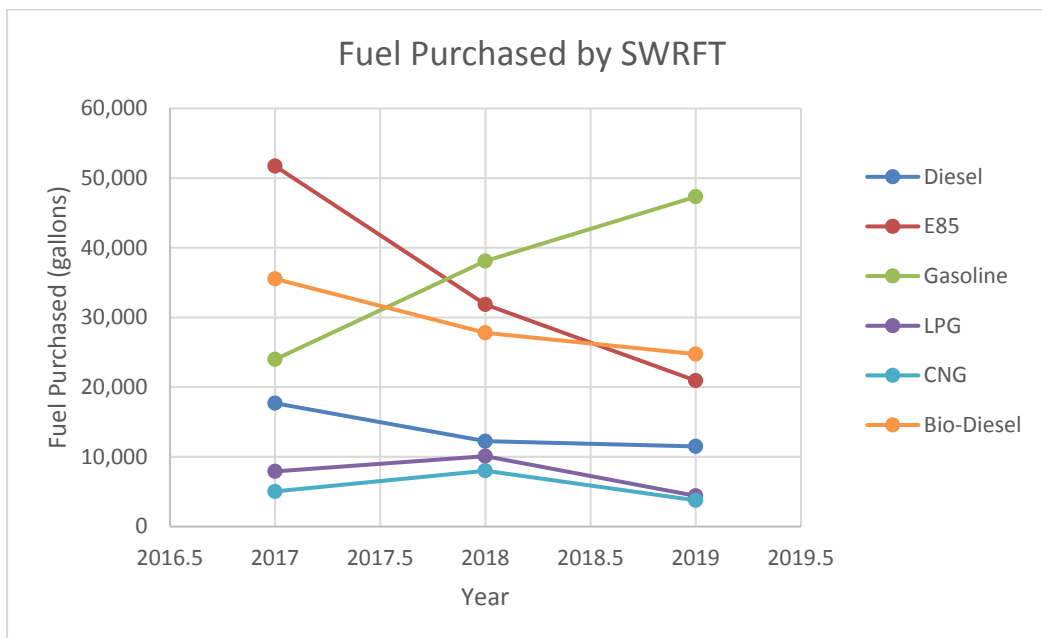


Figure 3-3: Fuel Purchased by SWRFT at MCAS Miramar

The purchase of gasoline and diesel fuel for the hybrid vehicles compared with nonhybrid vehicles is not tracked; all purchases are included in Figure 3-7. Although the number of diesel and gasoline vehicles has remained relatively constant, the amount of gasoline and diesel fuel purchased has increased. Additionally, the purchase of electricity by SWRFT spiked during FY 2018, but drastically dropped in FY 2019, as shown in the following datapoints:²⁰

- Calendar year (CY) 2017 – 22,377 KWH
- CY 2018 – 42,963 KWH
- CY 2019 – 13,389 KWH

All Marine Corps vehicles have a vehicle identification link (VIL) key that allow drivers to purchase biodiesel, diesel, E85, and gasoline from Defense Logistics Agency (DLA) fueling facilities. SWRFT covers the fuel costs. Marine Corps-owned CNG vehicles have credit cards assigned to purchase fuel from the SDG&E fueling stations; SWRFT covers this fuel cost. E85- and gasoline-powered vehicles, leased through the General Services Administration (GSA), have assigned fuel cards that allow drivers to purchase E85 and gasoline from any fueling facility. GSA bills the customers for all purchases. MCAS Miramar manages and charging stations and absorbs the costs associated with charging an electric vehicle.

²⁰ Conversation between Hugo Molina, SWRFT Fleet Manager at MCAS Miramar, and Emmerie Schoolsky of MMEC Group on December 14, 2019.

3.6 Water Use and Stormwater Management

According to EO 13834, agencies should “*reduce potable and non-potable water consumption and comply with stormwater management requirements*”.²¹ MCAS Miramar complies with the water consumption portion of this goal by using reclaimed water. In 2019, MCAS Miramar was awarded the Water Innovation and Efficiency Award from the San Diego County Water Authority for reducing potable water use and implementing a highly successful eight-phase recycled water distribution system. In addition to the eight-phase recycled water distribution system, MCAS Miramar’s efforts to use recycled water for playing fields, dual-plumed buildings, and green spaces, have contributed to savings of more than 100 million gallons of potable water each year.^{22,23}

Table 3-8 displays water usage data from FY 2014 to FY 2019.²⁴ Water consumed per square foot of building space is defined as potable water intensity.

Table 3-8: Water Usage at MCAS Miramar

Category	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019
Reportable Area (KSF)	5,786	5,786	7,767	7,767	7,767	7,767
Potable Water (KGAL)	276,900	232,283	215,668	154,279	224,856	209,803
Potable Water Intensity (GAL/SF)	47.86	40.15	27.77	19.86	28.95	27.01
Non-Potable Water (KGAL)	122,401	108,327	94,387	78,619	107,754	75,928

Notes:

FY = fiscal year; GAL/SF = gallons per square foot; KSF = thousand square feet; KGAL = thousand gallons; potable water intensity = reportable area/potable water

MCAS Miramar has a robust stormwater management program that includes monthly stormwater best management practice (BMP) inspections at 17 industrial facilities. Throughout the year, stormwater samples are collected during qualifying storms. Field inspection and stormwater sampling results are analyzed to improve stormwater pollution prevention plans (SWPPPs). In accordance with the National Pollutant Discharge Elimination System (NPDES) General Permit for Small Municipal Separate Storm Sewer Systems (MS4s), MCAS Miramar manages and updates 37 MS4 facility SWPPPs yearly.

²¹ Council on Environmental Quality Office of Federal Sustainability, “Implementing Instructions for Executive Order 13834 Efficient Federal Operations,” April 2019.

²² San Diego County Water Authority. “Marine Corps Air Station Miramar Receives Water Efficiency Award.” October 02, 2019.

²³ “Pollution Prevention Plan for Marine Corps Air Station Miramar San Diego, California,” September 2012.

²⁴ Email correspondence between Travis Richards, Resource Management for Utilities & Energy Management at MCAS Miramar, and Emmerie Schoolsky of MMEC Group on January 16, 2020.

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4.0 P2 Opportunity Identification

Step C of the P2 Management System is review and evaluation of existing operations. This review includes obtaining and analyzing data from each of the P2 program areas addressed in Section 3.0 for the installation. Multi-Media Environmental Compliance Group (MMEC Group) coordinated with each of the MCAS Miramar P2 Area Program Leads to obtain, review, and discuss data originating from 2014 through 2019, as available (Section 3.0).

Eight new P2 opportunities were identified through this review and are summarized in this section. Table 4-1 identifies the HW streams at MCAS Miramar likely to be reduced from implementation of these P2 opportunities.

The eight P2 opportunities were reviewed by the MCAS Miramar Team and narrowed down to five for detailed technical and economic evaluation. These five opportunities are listed in Table 4-2. Subsequently, Section 5.0 of the P2 Plan presents the detailed technical and economic evaluation of the five P2 opportunities selected.

The eight identified P2 opportunities are as follows:

- (1) **Use a Transportable Treatment Unit (TTU) to Reduce OWS and Wash Rack Cleanout Waste.** As discussed in Section 3.0, 60 OWSs are inspected monthly and cleaned as necessary at MCAS Miramar. In 2018, more than 390,000 pounds of oily water, predominantly from OWS servicing, were transferred offsite as HW. According to MCAS Miramar personnel, the average annual operation and maintenance (O&M) and disposal cost associated with one OWS is \$3,700.

Under this option, a contractor-operated TTU would be used to execute each OWS cleanout. Instead of transferring the contaminated water and sludge removed from the OWSs offsite as a HW, the TTU would provide onsite removal of contaminants from the waste and allow the treated water to be returned to the OWS. This practice would reduce OWS cleanout waste by over 90 percent. An ancillary benefit of this option is reducing potable water use for refilling each OWS after cleaning.

TTUs are in use at Naval Air Weapons Station (NAWS) China Lake and other military installations to treat wastewater generated from OWS cleanouts. Further assessment of this P2 opportunity would include (1) identifying TTU regulatory restrictions; (2) reviewing available information regarding OWS cleanout waste quantities and characteristics; (3) identifying treatment technologies required, and (4) estimating TTU contractor costs versus the status quo.

(2) Investigate Smaller, Single-Use Packaging for Adhesives and Sealants.

Extensive aircraft maintenance is conducted at MCAS Miramar, which resulted in more than 22,000 pounds of debris/paint and adhesive-related HW in 2018. Different adhesives and sealants are used during repairs of cockpits, engines, and aircraft exterior components based on bond and smoothness requirements.

MCAS Miramar's use of adhesive and sealant should be investigated to determine whether individual materials can be provided in kits or packages sized for specific tasks to minimize waste. "Right-sizing" saves time and labor by providing aircraft maintenance personnel with prepared sealants and adhesives instead of mixing, metering, or downloading chemicals into a secondary container or package. Premixed sealants are likely to improve the quality of seals and bonds with proper ratios, without contaminants, and in a package optimal for product application. However, material unit costs will likely increase with smaller packaging and these costs may (or may not) be offset by overall material use reduction and/or waste disposal savings. Further assessment of this P2 opportunity would include (1) identification and review of adhesives used by MCAS Miramar squadrons; (2) identification of several candidate adhesives for right-sizing; and (3) contact with adhesive manufacturers to identify packaging options.

(3) Implement an Incentive Program for Use of Hybrid and Electric Vehicles.

As discussed in Section 3.0, over half of the MCAS Miramar installation support fleet consists of alternative fuel vehicles, with 82 electric, 11 hybrid, 141 E-85, 42 LPG, and 2 natural gas vehicles, as compared with 94 diesel and gasoline vehicles. However, Marine Corps personnel are reluctant to use the alternative fuel vehicles. For example, MCAS Miramar personnel frequently commute to MCB Camp Pendleton. Although the electric vehicles are able to complete the round-trip commute to MCB Camp Pendleton on a single charge, personnel prefer to use the diesel, gasoline, and flex-fuel vehicles. Marines that check out the vehicles are hesitant to drive the hybrid and electric vehicles, claiming they are insufficient for hauling equipment.²⁵

An incentive program that encourages MCAS Miramar personnel to use the hybrid or electric vehicles will reduce gasoline purchases and associated emissions. It will also help recoup the investment that the installation has made in alternative-fuel vehicles. Further investigation of this P2 opportunity would include identification of: (1) squadrons and other organizations that use the vehicles; (2) candidate incentives through review of practices at other military

²⁵ Conversation between Hugo Molina, SWRFT Fleet Manager at MCAS Miramar, and Emmerie Schoolsky of MMEC Group on December 14, 2019.

installations; and (3) a suggested POA&M for implementing an incentive program.

- (4) **Expand Ground Vehicle Fleet to Include Electric Trucks.** A stigma associated with driving a small electric or hybrid vehicle by Marine Corps personnel contributes to the lack of use of electric and hybrid vehicles at MCAS Miramar. Many automobile companies are expanding their fleets to include large electric pickup trucks by the fourth quarter of 2020. Ford is currently prototyping an all-electric F-150 truck that is expected to travel at least 300 miles on a single charge.²⁶ Other companies, such as Rivian and General Motors, are incorporating electric trucks into their fleets. Many of these vehicles are expected to debut in 2021.

Electric trucks might minimize the stigma associated with driving electric vehicles, and more MCAS Miramar personnel might be willing to use electric trucks to commute to MCB Camp Pendleton. Further investigation of this P2 opportunity would include (1) an in-depth review of the vehicles available from companies selling electric trucks; (2) identification of associated costs and incentives available; and (3) development of a suggested POA&M.

- (5) **Expand Composting Efforts to Food Waste.** MCAS Miramar currently participates in composting efforts for landscaping waste. Grass clippings and tree waste, primarily from the golf course, are mulched and taken to the nearby Miramar Greenery and are composted onsite.²⁷ The MCAS Miramar 2017 ISWM Plan identified increasing composting activities to reduce yard and food waste as an important goal.²⁸ Currently, all food waste generated from housing areas, the commissary, restaurants, and other food services is disposed of as solid waste.

Expanding composting efforts to include food waste would help meet MCAS Miramar solid waste diversion goals established by the DoD. Further investigation of this P2 opportunity would include identification of (1) key food waste locations; (2) required changes in operation and maintenance procedures; (3) estimated food waste quantities and costs to implement the program, and (4) a suggested plan of implementation.

- (6) **Implement a Micro-Auto Gasification System (MAGS) for Oily Rags, Oils, and Sludges.** MCAS Miramar performs maintenance on aircraft, vehicles, and additional machinery that generate oily rag and debris waste. Some of the oily

²⁶ Inside EVs. Ford F-150 Electric Pickup Truck: Everything We Know – Launch Specs. Eric Loveday. 19 October 2019. <https://insideevs.com/reviews/377328/ford-f150-electric-truck-details/>.

²⁷ The Miramar Greenery is operated by the City of San Diego in conjunction with the Miramar Landfill.

²⁸ MCAS Miramar Station Order 6280.1C, Integrated Solid Waste Management Plan, p. 2-3, December 11, 2017.

rags are laundered and reused, but a significant portion end up as HW that must be transferred offsite for disposal. More than 63,000 pounds of oily debris, POLs, and absorbents contributed to HW disposal totals at MCAS Miramar in 2018.

MAGS is a patented pyrolysis technology (superheated incineration in the absence of oxygen) that thermally breaks down hydrocarbons into solid carbon and synthesis gas and uses the synthesis gas to fuel the process.²⁹ A MAGS unit converts all organic waste, such as plastics, papers, food, cardboards, textiles, wood, used oil, and sludge, into energy (100 kW), bio-char (less than 5 percent), and water. Units are relatively small (9 feet by 5.9 feet by 6.6 feet) and can process from 37 to 110 pounds of waste per hour.

A MAGS unit could be stored and operated onsite by MCAS Miramar personnel. This device has the potential to eliminate most if not all offsite transfers of oily debris and other HW from MCAS Miramar.

Further investigation of this P2 opportunity would include (1) an in-depth review of the process; (2) identification of HWs that can be treated; (3) comparison of process costs versus the status quo; (4) identification of required permits; and (5) development of a POA&M.

(7) Recover Usable Jet Fuel for Beneficial Use in Ground Support Equipment.

Currently, MCAS Miramar transfers unwanted jet fuel, hydraulic oil, and diesel fuel to World Oil Environmental Services (WOES) for recycling or reuse. MCAS Miramar receives a small fee for the material. Because of safety concerns, the unwanted jet fuel is drained from aircraft prior to maintenance activities and cannot be placed back into any aircraft. Each squadron is responsible for storing the unwanted fuel until it is collected by WOES and transferred offsite. The squadrons comingle unwanted jet fuel with other fluids such as hydraulic oil and diesel fuel. WOES accepts mixed compositions and, as a result, the squadrons continue to comingle these fluids.

This P2 opportunity involves collection of the unwanted jet fuel in a bowser and subsequent use to fuel ground support equipment (GSE). This practice would reduce fuel purchase costs. Further assessment of this P2 opportunity would include identification of (1) bowsers designed for removing and storing unwanted fuel from aircraft and transferring the fuel directly to GSE or a designated storage tank; (2) steps needed to keep the jet fuel segregated from other petroleum-based items, (3) applicable HW regulations regarding

²⁹ Terragon Environmental Technologies Inc. Energy from Waste – MAGS. 2020. <https://terragon.net/resource-recovery-solutions/energy-from-waste/>.

salvaging of usable material, and (4) costs of reusing the unwanted jet fuel compared to selling it.

- (8) **Send Oily Rags for Beneficial Reuse at Temarry.** As discussed previously in this section, MCAS Miramar generates a large quantity of oily rags, many of which are lint-free and cannot be processed through the rag laundering program used by numerous organizations at the installation. Currently, these lint-free oily rags are sent out as HW for landfill disposal. Temarry, located in Tecate, Mexico, accepts non-RCRA HW, including oils, oily water, antifreeze, and latex paint. Temarry processes these wastes through their closed-looped solvent recycling and energy recovery system.

This P2 opportunity provides for beneficial reuse of this waste stream and diverts it from landfill disposal. Further assessment of this P2 opportunity would include identification of (1) Temarry's requirements for accepting HW (e.g., composition of rags, volume accepted, etc.); (2) required changes to MCAS Miramar HW management procedures (e.g., directing DLA Disposition Services to transfer the waste rags to Temarry); and (3) HW management costs versus the status quo.

Table 4-1: MCAS Miramar Largest HW Streams

Waste Stream	HW Generated (pounds)	Generator (Squadron)	P2 Opportunity
Oily Water (Non-RCRA)	393,743	Station S-4 and 90-Day Site	#1
Fuel Water Mix	195,716	Station S-4	
Dry Oily Debris, POL, Hoss, Canisters, Cartridges, and Absorbents (Non-RCRA)	63,139	90-Day Site, VMGR-352, MALS-11 Airframe, MVV-165, MALS-16, and VMM-163,	#3 #7 #9
Toxic Sludge and Soil (Non-RCRA)	29,530	Station S-4 and Fuel Farm	#2 #7
Toxic Sold, Asbestos	24,001	Station S-4 and MALS-11 PP	
Debris, Paint, Adhesives, Dry, Toxic, Not Listed	22,314	VMFAT 101, MALS-16 Airframes, MALS 16 53 Reset, MHM-465, and VMFAT 101	
Liquids with State Regulated Metals LD50 Criteria	11,584	MALS-16 Airframes, 90-Day Site, MALS-16 Airframes, and MALS-11 Airframes	
Wet Jet Sand	10,079	90-Day Site	
Aerosols, Ignitable	9,730	90-Day Site	
Debris, POLS, Non-RCRA, Containing Free Flowing Liquids from Leaks	7,708	HMH-361, VMM-161, 90-Day Sites, MALS-11 Airframe, MWSS-373, and MH-462	
POL, Fuel, Combustible (JP5, Diesel, PD680).	900	HMH-465, MALS-16 Airframes, and VMM-362	#8

Table 4-2: P2 Opportunities Selected for Detailed Analysis

P2 Opportunity Number	P2 Opportunity Selected for Technical Feasibility Evaluation
#1	Use a Transportable Treatment Unit (TTU) to Reduce Oil/Water Separator (OWS) and Wash Rack Cleanout Waste
#3	Incentivize Hybrid and Electric Vehicle Use
#4	Expand the Ground Vehicle Fleet to Include Electric Trucks
#5	Expand Composting Efforts to Food Waste
#7	Recover Jet Fuel for Beneficial Use in Ground Support Equipment

5.0 P2 Opportunities

The MCAS Miramar P2 Team will manage the implementation and tracking of P2 opportunities identified in this MCAS Miramar P2 Plan. Implementation and tracking of P2 opportunities span Steps F and G of the P2 Management System depicted in Figure 2-1. As presented in Section 4.0, of the eight opportunities investigated, the following five opportunities were selected by the MCAS Miramar P2 Team in terms of meeting overall P2 Program objectives:

- Use a TTU to Reduce OWS and Wash Rack cleanout waste.
- Incentivize Hybrid and Electric Vehicle Use.
- Expand the Ground Vehicle Fleet to Include Electric Trucks.
- Expand Composting Efforts to Food Waste.
- Recover Jet Fuel for Beneficial Reuse in Ground Support Equipment.

This section contains detailed technical and economic evaluation of each of the five P2 opportunities, along with a POA&M for implementation. When available, the following information is provided for each P2 opportunity:

- P2 objective
- Commands affected
- Detailed description
- Cost comparison
- Recommendations
- POA&M for implementation
- Metrics (for tracking impact of implementation)

5.1 Use of Transportable Treatment Unit to Reduce OWS and Wash Rack Cleanout Waste

Objective

Use a TTU to reduce the quantity of oily water that is generated from OWS cleanouts and transferred offsite as HW.

Commands Affected

- Station S-4

Detailed Description

TTUs are mobile systems (typically operated by a contractor) that perform onsite treatment of HW using proven processes. TTU contractors are permitted to use their systems under the California Environmental Protection Agency (CalEPA) Department of Toxic Substances Control (DTSC) Permit by Rule if the waste stream and treatment method is listed in the California Code of Regulations (CCR) Section 67450.11. The TTU treatment of OWS waste is covered under the following portion of this regulation:

Used oil, as defined in Health and Safety Code Section 25250.1, unrefined oil waste, mixed oil, oil mixed with water and oil/water separation sludge may be treated by the following technologies:

(A) Phase separation by filtration, centrifugation, or gravity settling, but excluding super critical fluid extraction.

Enviremedial Services, Inc. (ESI) owns and operates TTUs specifically for OWS servicing that they make available to their customers for a fee. The TTU arrives in a truck and provides treatment through a combination of gravity separation and media filtration. The TTU separates the OWS cleanout waste into oil (which can be recycled offsite as a non-RCRA HW), treated water (which can be returned to the OWS for reuse), and sediment (which can be landfilled offsite). Typically, more than 95 percent of the OWS waste is contaminated water. Treating the OWS waste onsite and returning the treated water to the OWS eliminates the need to use potable water to refill the unit prior to returning it to service (which is required for proper OWS operation). More importantly, there is a sharp reduction in HW generation and disposal, because the water is not shipped offsite.

ESI TTUs have been used extensively for treating OWS cleanout waste at NAWS China Lake, Naval Air Station North Island (NASNI), MCB Camp Pendleton, and Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms.^{30,31} The following benefits have been documented:

- OWS HW disposal volumes were reduced by 97.4 percent at MCB Camp Pendleton in the first year of use of the ESI TTU service. In addition, the installation was able to beneficially reuse the OWS water and reduce potable water costs.³²
- At NAWS China Lake, the oil recovered from the treatment process is not considered a HW because it is taken offsite as a “feed stock” by ESI through a bill of landing.
- Both MCB Camp Pendleton and MCAGCC Twentynine Palms dry and reuse the sediment generated from the treatment process onsite, eliminating the need to pay for offsite disposal of the material.

In 2018, 393,743 pounds of oily water (non-RCRA) waste were transferred offsite as HW from MCAS Miramar. As discussed in Section 3.4, this waste stream is a combination of waste from the 60 OWSs located across the installation and additional oily waste streams generated by the Commands. It is believed that most of the waste is from OWS cleanouts; however, the ratio is unknown. For the purposes of this analysis, it is assumed that 360,000 pounds of the oily water (non-RCRA) waste were generated from OWS cleanouts.

The OWSs are inspected monthly and cleaned as deemed necessary by BGI. According to ESI, typical OWS cleanout waste contains 95 percent water, 1 to 2 percent recoverable oil/fuel, and 3 to 4 percent soil/sediment. Breaking the 360,000-pound quantity down using this composition yields the following:

- 342,000 pounds of water that can be used to refill the OWSs to operational capacity after servicing/cleanout
- 5,400 pounds of oil/fuel that can be recovered
- 12,600 pounds of soil/sediment for landfill disposal

Using these estimates, MCAS Miramar could substantially reduce their largest HW stream through a TTU program.

³⁰ Enviremedial Services, Inc., Waste Minimization Opportunities report 2016, edicleanwater.com.

³¹ Conversation between Eileen Miller, Enviremedial Services Inc. Executive Vice President, and Emmerie Schoolsky of MMEC Group on October 11, 2019.

³² CH2M Hill, A WMA Paper on OWS Recycling Exemption for MCB Camp Pendleton, 2002.

Cost Comparison

Currently, cleanout and disposal of HW from the OWSs at MCAS Miramar is contracted by BGI with a price of \$3,774 per OWS per year.³³ This price includes all OWS O&M activities, including inspection, cleaning, and offsite disposal of fluids as HW by BGI.

ESI provided a cost estimate of \$0.72 per gallon for the 60 OWSs to be serviced through their TTU system.³⁴ This estimate requires the resulting oils and sediment to be drummed onsite and managed by MCAS Miramar. ESI would also need a small parking area to complete cleaning operations in the most efficient way. Each OWS has a different capacity, and the amount of liquid that would need to be treated would be determined by ESI inspections.

The total capacity of the 60 OWSs is 156,365 gallons.³⁵ Assuming that the entire capacity of each OWS would need to be cleaned yearly, the average ESI cost per OWS would be \$1,876:

$$\frac{156,365 \text{ gallons}}{60 \text{ OWS}} = 2,606 \frac{\text{gallons}}{\text{OWS}}$$
$$2,606 \frac{\text{gallons}}{\text{OWS}} \times \$0.72 \text{ per gallon} = \$1,876 \text{ per OWS}$$

Currently, BGI charges \$3,774 per OWS per year (cost includes O&M and disposal of liquids as HW). Transitioning from BGI to ESI services would result in an estimated savings of \$1,898 per OWS, which translates in a potential savings of \$113,880 per year for servicing all OWSs at MCAS Miramar.

Recommendations

Pursue the use of a TTU contractor to service OWSs at MCAS Miramar. This option would substantially reduce HW totals. Use of a TTU represents a more sustainable method for managing OWS cleanout wastes because the treated waste is used to refill each OWS after servicing, reducing potable water use and waste hauling. It is recommended that the following actions be taken to further investigate and implement this P2 opportunity:

- Contact NAWS China Lake environmental personnel to discuss the successes and logistics of the TTU program implemented there.
- Arrange to have ESI conduct a survey of the MCAS Miramar OWSs to determine a more accurate estimate of annual cost for establishing a TTU program and to identify contracting options.

³³ Email exchange between Herb Baylon, MCAS Miramar Stormwater Manager, and Emmerie Schoolsky of MMEC Group, May 27, 2020

³⁴ Email exchange between Eileen Miller, Executive Vice President of ESI, and Emmerie Schoolsky of MMEC Group on October 15, 2020.

³⁵ Email exchange between Herb Baylon, MCAS Miramar Stormwater Manager, and Emmerie Schoolsky of MMEC Group, May 27, 2020.

POA&M for Use of Transportable Treatment Units

Action	Responsibility	Estimated Start	Actual Start	Estimated Completion	Actual Completion
Consult with NAWS China Lake personnel to discuss the successes and logistics of the TTU program implementation at the installation	MCAS Miramar P2 Team	April 2021		May 2021	
Work with ESI to conduct a survey of the MCAS Miramar for a more accurate estimate of the annual cost for establishing a TTU program to identify contracting options	MCAS Miramar P2 Team	June 2021		August 2021	
Establish a contract for TTU servicing of OWSs	MCAS Miramar Environmental Management Department	September 2021		December 2021	
Maintain operating records for the TTU as required by CCR, Title 22 67450.3(a)(10)	MCAS Miramar Environmental Management Department	January 2022		Ongoing	

Metric for Use of Transportable Treatment Units

- Quantity of OWS cleanout waste transferred offsite as HW annually.

5.2 Incentivize Hybrid and Electric Vehicle Use

Objective

Encourage Marine Corps personnel to use MCAS Miramar electric and hybrid vehicles more frequently and reduce gasoline and diesel fuel consumption, which in turn will reduce GHG emissions.

Commands Affected

- SWRFT

Detailed Description

The MCAS Miramar ground fleet includes 82 electric and 11 hybrid vehicles. As discussed in Section 3.0, these vehicles are used to transport equipment and personnel to other installations and provide transportation around MCAS Miramar. Although these vehicles represent approximately 25 percent of the ground fleet, they are not used as frequently as the sport utility vehicles (SUVs) and trucks that run on gasoline or diesel.

Additionally, 141 of the ground fleet vehicles (nearly 38 percent) are flex-fuel vehicles that can run on E-85 fuel or gasoline. Based on the data summarized in Figure 3-7, use of E-85 usage has dropped by nearly 50 percent since 2017, while gasoline usage has doubled.

MCAS Miramar has incorporated electric and hybrid vehicles into their ground fleet, but personnel are reluctant to use them, likely because of the stigma associated with the electric/hybrid vans or small four-door models. In addition, personnel are concerned that these vehicles will typically not be able to complete a round-trip commute on a single charge or tank.

The longest commute made by the MCAS Miramar ground vehicle fleet is to MCB Camp Pendleton (80 to 100 miles round trip). That distance is within the range of the current hybrid and electric vehicles, eliminating the concern that these vehicles cannot make the required commute.³⁶

Increasing the use of the electric and hybrid vehicles will decrease CO₂ emissions from the MCAS Miramar ground vehicle fleet and will decrease the amount of fossil fuels purchased. Other installations' ground vehicle fleets, including Naval Weapons Station (NAVWPNSTA) Seal Beach and Naval Base San Diego (NBSD), consist primarily of electric vehicles. These electric vehicles are used frequently to traverse the installations and travel to other military installations in the area.

³⁶ Conversation between Hugo Molina, SWRFT Fleet Manager at MCAS Miramar, and Emmerie Schoolsky of MMEC Group on December 14, 2019.

Because it has been proven through trial runs that the electric and hybrid vehicles can make the round-trip commute from MCAS Miramar to MCB Camp Pendleton, there is no reason that these vehicles should not be used. To increase use while still considering personnel preferences, MCAS Miramar could develop a program to incentivize electric and hybrid vehicle with some or all of the following components:

- Provide the first five checkouts of electric or hybrid vehicles at no charge to Command personnel. This incentive could be limited to trips outside of MCAS Miramar to substantiate, by word of mouth, the effectiveness of the electric and hybrid vehicles.
- Institute a new SWRFT vehicle check-out policy that requires personnel to use an electric or hybrid vehicle three times prior to using a diesel or gasoline vehicle. This policy would require an in-house tracking system to monitor the types of vehicles checked out by MCAS Miramar personnel and their Commands. These data could be monitored using Microsoft Excel spreadsheets or a Microsoft Access database. The option would not cost more for SWRFT, but would require SWRFT to monitor and track the types of vehicles checked out by personnel. Marine Corps Commands and personnel should be provided a one-month notification period prior to instituting this policy.
- Provide maps in SWRFT vehicles that identify onsite and offsite locations of electric vehicle recharging stations and E-85 fueling locations (for flex-fuel vehicles). A number of electric vehicles charging stations are located at MCAS Miramar and in the regions along the routes most traveled by Marine Corps personnel.
- Provide a pamphlet in each SWRFT flex-fuel vehicle explaining that use of E-85 fuel is acceptable and encouraged.

Recommendations

Develop and institute a program to incentivize the use of electric and hybrid vehicles and E-85 fuel consisting of some or all of the components identified in this section and any others developed by SWRFT and the MCAS Miramar P2 Team.

POA&M for Incentivizing Hybrid and Electric Vehicle Use

Action	Responsibility	Estimated Start	Actual Start	Estimated Completion	Actual Completion
Develop an incentive program using the four suggestions listed above and/or additional ideas	MCAS Miramar P2 Team and SWRFT	May 2021		June 2021	
Gain CO approval for the incentive program	MCAS Miramar P2 Team and SWRFT	June 2021		July 2021	
Develop a tracking system to monitor electric and hybrid vehicle check-outs associated with the incentive program	SWRFT	July 2021		August 2021	
Provide notice to Marine Corps personnel of the incentive program and any changes to the vehicle check-out policy	SWRFT	September 2021		October 2021	
Initiate the incentive program and any changes to the vehicle check-out policy	SWRFT	October 2021		Ongoing	

Metric for Incentivizing Hybrid and Electric Vehicle Use

- Gallons of gasoline and diesel purchased by SWRFT.

5.3 Expand the Ground Vehicle Fleet to Include Electric Trucks

Objective

Reduce gasoline and diesel use in, and GHG emissions from, the ground vehicle fleet at MCAS Miramar.

Commands Affected

- SWRFT

Detailed Description

As discussed in Section 5.2, the MCAS Miramar ground vehicle fleet includes numerous electric and hybrid vehicles; these vehicles are not used as frequently as gasoline and diesel vehicles in the fleet. MCAS Miramar personnel have shown a preference for driving gasoline and diesel vehicles rather than electric and/or hybrid vehicles because of their smaller size and limited range on a single charge or tank of gasoline. The ability of the vehicles to make the round trip commute to MCB Camp Pendleton is a common concern

The use of diesel and gasoline to fuel SWRFT vehicles contributes to GHG emissions and has increased since 2017, as shown in Figure 5-1.

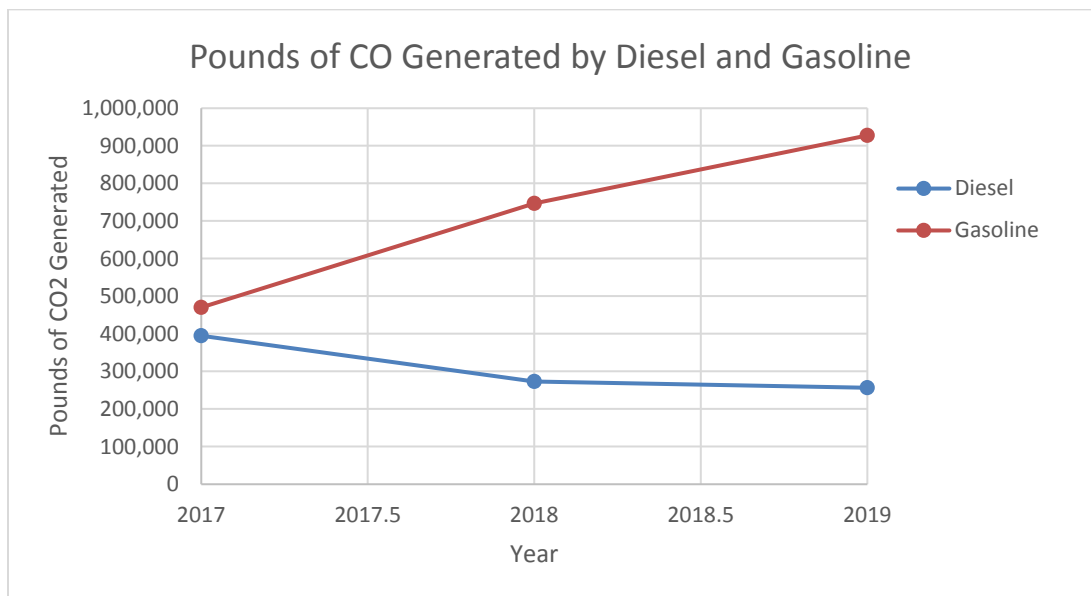


Figure 5-1: CO₂ Generated by SWRFT Ground Vehicles

Electric trucks could eliminate the stigma associated with the smaller electric and hybrid vehicles, and MCAS Miramar personnel may be more inclined to drive them than other vehicles in the ground fleet.

A variety of automobile companies are adding electric trucks to their product offerings. Ford, Rivian, General Motors, and Tesla have plans to release electric trucks starting in late 2021. These companies are still working on their respective vehicles, but some specifications have been made available to the public, as summarized in Table 5-1. As the release dates for these trucks approach, additional information will be provided to the public.

Table 5-1: Electric Truck Specifications

Company	Truck Name	Anticipated Release Year	Range (miles) ¹	Towing Capacity	Estimated Starting Price
GMC ³⁷	Hummer EV3X	2022	300+	Data Not Released	\$99,995
Ford ³⁸	Electric Ford F-150	2021	300	Data Not Released	\$100,000
Rivian ³⁹	Rivian R1T	2021	230, 300, and 400	11,000 pounds	\$69,000–\$72,000
Tesla ⁴⁰	CyberTruck	2021	250, 300, and 500	7,500 pounds, 10,000 pounds, and 14,000 pounds	\$39,900

Notes:

1. Distance is associated with range capability on a single charge.

Cost Comparison

Table 5-1 summarizes the estimated purchase cost of each electric truck. Table 5-2 provides purchase and fuel cost estimates for GMC and Ford conventional and electric vehicles.

Table 5-2: Cost Comparison for Electric and Conventional Trucks

Company	Conventional		Electric	
	Estimated Purchase Price	Estimated Yearly Fuel Cost ²	Estimated Purchase Price	Estimated Yearly Electricity Cost ¹
GMC	\$29,700 ³	\$1,523	\$99,995	\$796
Ford	\$28,940 ⁴	\$1,523	\$100,000	\$796

1 = Electric eGallon costs \$1.83 per gallon⁴¹

2 = 10,000 miles driven per year and an average gasoline price of \$3.50 per gallon

3 = Cost is for a 2021 GMC Sierra 1500 with an estimated fuel efficiency of 20-23 miles per gallon⁴²

4 = Cost for a 2021 F-150 with an estimated fuel efficiency of 23 miles per gallon⁴³

³⁷ GMC. The World's First All-Electric Supertruck Hummer EV. gmc.com/electric-truck/hummer-ev.

³⁸ Loveday, Eric. InsideEVs. Ford F-150 Electric Pickup Truck: Everything We Know – Launch, Specs. June 11, 2020. insideevs.com/reviews/377328/ford-f150-electric-truck-details

³⁹ Reid, Alex. Driving. Rivian's electric trucks may be cheaper than we thought. January 27, 2020. driving.ca/ford/auto-news/news/rivians-electric-trucks-may-be-cheaper-than-we-thought.

⁴⁰ Hawkins, Andrew and O'Kane, Sean. The Verge. Telsa Cybertruck will get up to 500 miles of range and start at \$39,900. theverge.com/2019/11/21/20975475/tesla-cybertruck-announcement-musk-electric-truck-pickup-features-range-price-release-date

⁴¹ Energy.gov. eGallon. energy.gov/maps/eGallon.

⁴² GMC Sierra 1500. <https://www.gmc.com/trucks/sierra/1500>.

⁴³ Ford F-150. ford.com/trucks/f150/.

The estimated yearly fuel cost for GMC and Ford conventionally fueled trucks is estimated as follows:

$$10,000 \frac{\text{miles driven}}{\text{year}} \div 23 \frac{\text{miles}}{\text{gallon}} = 435 \frac{\text{gallons}}{\text{year}}$$

$$435 \frac{\text{gallons}}{\text{year}} \times \$3.50 \text{ per gallon} = \$1,523 \text{ per year}$$

The estimated yearly electric cost is based on the most recent electric vehicle price per gallon, or eGallon, as established by the United States Department of Energy for California. The estimated fuel efficiency of the Ford and GM electric trucks has not been released. For the purposes of this estimate, it is assumed that these electric trucks will have the same efficiency as their conventional counterparts. The estimated yearly cost for each electric vehicle is calculated as follows:

$$435 \frac{\text{gallons}}{\text{year}} \times \$1.83 \text{ per eGallon} = \$796 \text{ per year}$$

Based on these estimates, an electric truck will reduce fuel costs by approximately \$700 per year. Assuming a 12-year life expectancy for the trucks, this equates to a \$8,400 in savings, which is much less than the differential in purchase price between the electric and conventional vehicles (approximately \$70,000). This analysis does not take into consideration any differences in truck maintenance and repair costs over their useful lives.

Recommendations

Continue to monitor the development of electric trucks. As additional models become available and purchase costs decrease, review options and consider which truck(s) may be beneficial to add to the MCAS Miramar ground fleet.

POA&M for Expanding Ground Vehicle Fleet to Include Electric Trucks

Action	Responsibility	Estimated Start	Actual Start	Estimated Completion	Actual Completion
Continue monitoring GMC, Ford, Rivian, and Tesla for development of electric trucks	MCAS Miramar P2 Team and SWRFT	Ongoing		Ongoing	
Determine the electric truck that is best suited for MCAS Miramar	SWRFT	Pending Release Date		Pending Release Date	
Request purchase of selected electric truck	SWRFT	Pending Release Date		Pending Release Date	

Metric for Expanding Ground Vehicle Fleet to Include Electric Trucks

- Gallons of gasoline and diesel purchased by SWRFT.

5.4 Expand Composting Efforts to Include Food Waste

Objective

Reduce landfill disposal of food waste generated by dining halls and food establishments at MCAS Miramar by diverting this waste to a composting facility.

Commands Affected

- Marine Corps Community Services (MCCS)
- Naval Consolidated Brig

Detailed Description

As discussed in Section 3.0, MCAS Miramar currently composts yard waste (mulch, wood clippings, and grass), generated primarily from the golf course. The waste is taken to the nearby City of San Diego Miramar Greenery (co-located with the Miramar Landfill), where it is transformed into mulch, wood chips, and certified compost.

All food waste generated at MCAS Miramar is currently disposed of as solid waste at the Miramar Landfill.⁴⁴ According to the ISWM Plan, the solid waste disposed of from MCAS Miramar is predominantly food waste and associated packaging. The installation offers multiple food outlets, including those listed in Table 5-3.

Table 5-3: Key Food Waste Sources at MCAS Miramar

Food Outlet Name	Location
Enlisted Dining Facility (Gonzales Mess Hall)	Building 5500
Officer's Club	Building 4472
Marine Corps Exchange Food Court	Building 2660
Flight Line Exchange/Food Service	Building 8600
Flight Line Mini Mart	Building 8675
The Hub	Building 5305
Chipotle	Building 2570
Denny's and Rockers Staff Noncommissioned Officer's Club	Building 3750
Jamba Juice and Starbucks	Building 2672
McDonalds	Building 2666
Naval Consolidated Brig	Building 7684

⁴⁴ United States Marine Corps, Marine Corps Air Station Miramar, "Integrated Solid Waste Management Plan," December 2017.

Expanding composting to MCAS Miramar food service outlets listed in Table 5-1 has the potential to minimize landfilling of food waste and increase the solid waste diversion rate. According to the United States Department of Agriculture (USDA), the average American wastes 219 pounds of food per year.⁴⁵ Table 5-4 lists the estimated food waste generated per MCAS Miramar population type per year based on this value.

Table 5-4: MCAS Miramar Population and Estimated Food Waste Generation

Fiscal Year	Military Residents	Military Nonresidents	Civilian	Total	Estimated Food Waste Generated (Tons)
2014	4,154	7,373	1,844	13,371	1,464
2015	4,177	7,623	1,868	13,668	1,497
2016	4,525	7,859	2,105	14,489	1,587
2017	4,777	10,669	2,505	17,951	1,966
2018	4,656	8,452	1,821	14,929	1,635
2019	4,656	8,472	1,821	14,949	1,637

Notes:

Estimated Food Waste Generated (tons) = [Total Population X 219 pounds] / 2,000 tons; Civilians = government employees/contractors. MCAS Miramar population data obtained from Solid Waste Annual Data Summaries (SWADS) for MCAS Miramar.

The results in Table 5-6 indicate that approximately 1,600 tons of food waste per year are transferred offsite from MCAS Miramar for landfill disposal. This waste could be composted at the Miramar Greenery, which accepts food waste generated from commercial venues that have been preapproved by the City of San Diego Environmental Services Department. Food wastes are delivered to the Miramar Greenery by a licensed hauler, unloaded, and processed into a nutrient-rich compost. To be approved for the composting program, the participant must complete the following steps:⁴⁶

- (1) *City staff meet with facility administrator, kitchen manager, and/or maintenance supervisor.*
- (2) *City staff provide technical assistance for onsite logistics.*
- (3) *City staff train kitchen maintenance and administration staff.*
- (4) *Facility starts a "Pilot Program Phase" in which a facility representative is required to accompany City staff to inspect and evaluate the first three loads at the Miramar Greenery.*
- (5) *After successfully completing the Pilot Program Phase, the facility becomes a regular program participant.*

⁴⁵ Food Waste in America in 2020. <https://www.irs.com/resources/guides/food-waste-america/>.

⁴⁶ City of San Diego, Environmental Services. Commercial Food Scraps Composting. 2020. [sandiego.gov/environmental-services/recycling/foodwaste](https://www.sandiego.gov/environmental-services/recycling/foodwaste).

In addition to a variety of San Diego area hotels, restaurants, and retail dining facilities, NASNI, Naval Amphibious Base Coronado (NAB), and the Marine Corps Recruit Depot have all completed the Pilot Program Phase and are among the 2019 Commercial Food Scraps Composting Participants at the Miramar Greenery.^{47,48}

Diverting food waste will require that MCAS Miramar develop a program to segregate and accumulate food waste at points of origin (e.g., galleys and restaurants) and collect and transfer this waste to the Miramar Greenery. This process will require extensive coordination with food waste generators (Table 5-5) and solid waste transporters.

Cost Analysis

Based on information in the Solid Waste Annual Data Summaries (SWADS) from 2014 through 2019, the cost of solid waste disposal at MCAS Miramar is estimated to be approximately \$80 per ton. However, the disposal cost data in the SWADS include transportation and disposal of the solid waste; landfill charges (i.e., tipping fees) are not included. Assuming that 1,600 tons per year of food waste are generated, the \$80 per ton value translates to a cost of \$128,000 per year.

The City of San Diego's published cost for food waste disposal (presumably at the Miramar Greenery) is \$33 per ton.⁴⁹ The published cost for general refuse disposal at the Miramar Landfill is \$58 per ton (including the City of San Diego standard disposal fee, recycling fee, and refuse collector business tax). Thus, theoretically, diverting food waste to the Miramar Greenery would save \$25 per ton. Assuming that 1,600 tons per year of food waste are generated, this value translates to a savings of \$40,000 per year.

However, the City of San Diego Miramar Landfill Fee Schedule indicates that DON waste (including MCAS Miramar waste) is exempt from the standard disposal fee. It is uncertain whether MCAS Miramar would be exempt from the food waste disposal fee at the Miramar Greenery as well.

The cost to implement food waste segregation and transportation to the Miramar Greenery is unknown, but could be greater than the theoretical reduction in waste disposal costs calculated in this exercise.

Recommendations

Although there are many uncertainties regarding the costs and potential savings from implementing a food waste diversion and offsite composting program at MCAS Miramar, based on the success of these programs at NASNI and NAB, MCAS Miramar will take

⁴⁷ The City of San Diego. 2019 Commercial Food Scraps Composting at Miramar Greenery Program Participants.

⁴⁸ Naval Base Coronado – Sustainability Team. FY2016 Chief of Naval Operations Environmental Award Competition Award Category: Sustainability Individual/Team, Large Installation.

⁴⁹ City of San Diego Fee Schedule and Regulations for the Miramar Landfill, Effective July 1, 2020, page 3.

the steps outlined in the following POA&M to further investigate and implement a food waste composting program.

POA&M for Expanding Composting Efforts to Food Waste

Action	Responsibility	Estimated Start	Actual Start	Estimated Completion	Actual Completion
Meet with NAB and NASNI solid waste personnel to review their experience and success with food waste composting at the Miramar Greenery	MCAS Miramar P2 Team and Solid Waste Lead	May 2021		May 2021	
Meet with City of San Diego personnel to discuss participation in the food composting at the Miramar Greenery	MCAS Miramar P2 Team and Solid Waste Lead	--		--	January 2020
Prioritize locations of significant food waste generation at MCAS Miramar	MCAS Miramar P2 Team and Solid Waste Lead	--		--	January 2020
Discuss options with current solid waste collection contractors for coordinating the accumulation and transfer of food waste to the Miramar Greenery	MCAS Miramar P2 Team and Solid Waste Lead	April 2021		July 2021	
Develop a food composting implementation plan	MCAS Miramar P2 Team and Solid Waste Lead	April 2021		July 2021	
Win approval of the implementation plan with MCAS Miramar CO and other solid waste stakeholders	MCAS Miramar P2 Team and Solid Waste Lead	August 2021		September 2021	
Submit an application to complete the Pilot Program Phase through the City of San Diego	MCAS Miramar Solid Waste Lead	October 2021		November 2021	
Purchase bins and signage to indicate where food waste should be accumulated	MCAS Miramar Solid Waste Lead	November 2021		December 2021	
Participate in a Pilot Program Phase with the City of San Diego	MCAS Miramar Solid Waste Lead	January 2022		Pending City Approval	
Establish MCAS Miramar as a participant in City of San Diego food composting program at the Miramar Greenery	MCAS Miramar Solid Waste Lead	Pending City Approval		Pending City Approval	
Continue regular composting efforts with the City of San Diego at the Miramar Greenery	MCAS Miramar Solid Waste Lead	Ongoing		Ongoing	

Metrics and Tracking for Expanding Composting Efforts to Food Waste

- Tons of food waste diverted to composting annually.

5.5 Recover Jet Fuel for Beneficial Reuse in Ground Support Equipment

Objective

Use jet fuel removed from aircraft to fuel GSE rather than managing the fuel as a HW.

Commands Affected

- HMH-465
- MALS-16 Airframes
- VMM-362
- S-4 Fuels

Detailed Description

The MCAS Miramar Fuels Division operates mobile fuel bowsers (portable tanks) to collect jet fuel removed from aircraft during bulk defueling operations. Aircraft defueling is performed under the direction of S-4 Fuels. When full, the bowsers are emptied using a defueling truck and the fuel is transferred to the salvaged fuel storage tanks at the Fuel Farm Area D. The salvaged fuel is offered for beneficial use to several entities at MCAS Miramar, including the jet engine test cell and GSE maintenance. Salvaged fuel that cannot be beneficially reused is transferred offsite by the DLA for sale as a product (rather than a waste).⁵⁰

Additionally, before any aircraft maintenance can occur, residual jet fuel from defueled aircraft must be drained. This task typically takes place in squadron hangars. This fuel is comingled with used oil, hydraulic fluid, and other POL waste generated by the squadron. Approximately every 2 weeks, WOES collects this accumulated waste from the individual hangars and other generators of POL waste (e.g., vehicle maintenance shops and the jet engine test cells) and transfers it offsite as a HW for recycling. WOES reimburses MCAS Miramar \$0.13 per gallon of POL waste collected. Approximately 1,800 to 2,000 gallons of POL waste are collected every 2 weeks, which equates to approximately 50,000 gallons per year and \$6,500 per year in reimbursements.⁵¹

Comingling the residual jet fuel removed from aircraft prior to maintenance with other POL wastes diminishes the value of the fuel. If segregated, the fuel could be beneficially reused at MCAS Miramar along with the salvaged fuel managed by S-4. Additionally, it would not be considered a waste and therefore would not be subject to HW management requirements.

⁵⁰ Conversation between Erick Osorio, MCAS Miramar HW Manager, and Dan Perrin of MMEC Group, November 5, 2020.

⁵¹ Conversation between Erick Osorio, MCAS Miramar HW Manager, and Emmerie Schoolsky of MMEC Group, August 3, 2020.

A convenient means of segregating the residual fuel is through the use of a SealVacPlus® Fuel Drain System (Figure 5-2), which has the following capabilities:

- Rapidly remove residual fuel from aircraft by vacuum (reducing the time needed for fuel draining prior to maintenance).
- Dispense filtered fuel for reuse (e.g., to GSE and emergency generators).
- Transfer filtered fuel to the S-4 salvaged fuel tanks.

These units have distinct advantages over gravity-powered fuel bowzers. More information is available at: <http://www.spokaneindustries.com/stainless-steel/aircraft-fuel/sealvac-fuel-bowser/documents/sealvac-plus+-brochure.pdf>.



Figure 5-2: SealVacPlus® Vacuum Fuel Drain Bowser and Recovery System

Cost Comparison

Currently, MCAS Miramar is reimbursed approximately \$6,500 per year by WOES to recycle approximately 50,000 gallons per year of POL waste. Assuming that residual jet fuel comprises 20 percent of the POL waste (10,000 gallons per year), then this fuel currently yields \$1,300 per year in revenue.

By segregating and beneficially reusing the residual jet fuel, the government saves the expense of purchasing virgin fuel. Assuming a cost of \$3.00 per gallon for virgin fuel, segregating and reusing 10,000 gallons per year of residual jet fuel would save \$30,000 per year.

The cost for purchasing a 400-gallon SealVacPlus[®] to facilitate segregation of the residual jet fuel is approximately \$7,100.⁵² It is assumed that separate units would be needed for each of the eight MCAS Miramar hangars, yielding a cost of \$56,800 for purchase of the units. Operation of the units is expected to require no more effort than the current practice of comingling the residual fuel with other POL wastes at the hangars and managing them as a HW. In fact, the SealVacPlus[®] would reduce the labor time needed to drain the residual fuel from an aircraft and would allow personnel to begin aircraft maintenance more quickly.

Summarizing the preceding costs and benefits yields the following:

- Net savings from segregating and beneficially reusing the residual jet fuel = \$30,000 - \$1,300 = \$28,700 per year
- Purchase cost of the 8 SealVacPlus[®] units = \$56,800
- Payback period for the 8 SealVacPlus[®] units = (\$56,800 ÷ \$28,700/year) ≈ 2 years

Recommendations

This cost comparison indicates that the SealVacPlus[®] will bring value to the government by reducing virgin fuel purchases. However, the comparison relies on several assumptions, including the amount of residual fuel available for recovery (10,000 gallons per year) and the subsequent ability to reuse the fuel at MCAS Miramar or sell it with the fuel salvaged by S-4 Fuels. These assumptions will need to be verified. Also, coordination among the MCAS Miramar squadrons, S-4 Fuels, and Waste Management Division will be needed to implement this P2 opportunity if it is determined to be viable.

The following actions are recommended based on the preceding analysis:

- Discuss the residual jet fuel removal process and estimated quantities with the squadrons and get their feedback on the potential usefulness of the SealVacPlus[®].
- Discuss outlets for the recovered fuel with personnel from S-4 Fuels.
- Develop a residual jet fuel recovery plan among the MCAS Miramar squadrons, S-4 Fuels, and Waste Management Division.
- Purchase one SealVacPlus[®] unit to test its functionality and usefulness.

⁵² General Services Administration Authorized Federal Supply Schedule Price List Contract Number GS-30F-1050D, period covered June 1, 1996 –June 30, 2016, updated July 2013.

- Review labels on the existing bowsers operated by S-4 Fuels and ensure that they indicate that the fuel salvaged from bulk defueling operations is not a waste, but rather a hazardous material, contaminated petroleum product, or a retrograde material.
- Determine whether the POL waste can be managed as a contaminated petroleum product or a retrograde material, rather than an HW.
- Include a discussion within the MCAS Miramar Hazardous Waste Management Plan addressing the waste or nonwaste status of the jet fuel removed from aircraft and the POL waste collected by WOES.

POA&M for Recovering Residual Jet Fuel for Beneficial Reuse

Action	Responsibility	Estimated Start	Actual Start	Estimated Completion	Actual Completion
Meet with squadrons to discuss residual jet fuel quantities and potential usefulness of the SealVacPlus®	MCAS Miramar P2 Team	May 2021		July 2021	
Discuss outlets for recovered fuel with personnel from S-4 Fuels	MCAS Miramar P2 Team	May 2021		July 2021	
Develop a residual jet fuel recovery plan	MCAS Miramar P2 Team, S-4 Fuels, Squadron Representatives	May 2021		July 2021	
Pilot test the SealVacPlus®	MCAS Miramar P2 Team, S-4 Fuels, Squadron Representatives	June 2021		September 2021	
Review labeling of S-4 salvaged fuel bowsers and tanks	MCAS Miramar P2 Team and Waste Management Division Lead	May 2021		June 2021	
Determine whether POL waste can be managed as a contaminated petroleum product or a retrograde material, rather than an HW	MCAS Miramar Waste Management Division Lead	May 2021		June 2021	
Update the MCAS Miramar Hazardous Waste Management Plan with regard to jet fuel	MCAS Miramar Waste Management Division Lead	Oct 2021		January 2022	

Metric for Recovering Residual Jet Fuel for Beneficial Reuse

- Quantity of POL waste transferred offsite as HW.

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6.0 Green Procurement Plan

As presented in Section 1.0, one of the goals of P2 is to increase procurement of environmentally preferable items.⁵³ This practice, known as “sustainable procurement” or “green procurement,” gives preference to products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. This comparison may consider raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, or disposal of the product or service.⁵⁴

For United States military installations, this goal is achieved by participating in the DoD Green Procurement Program and purchasing environmentally preferable products and services in accordance with federal-mandated green procurement preference programs.⁵⁵ Under MCO 5090.2, the Marine Corps has established the procurement of sustainable goods and services (when technically feasible, available, and economically justifiable) at the top of the solid waste management hierarchy. MCO 5090.2 specifies that installations give procurement preference to goods and services in the following seven green procurement categories:⁵⁶

- (1) Recycled content products
- (2) Environmentally preferable products and services
- (3) Biobased products
- (4) Energy- and water-efficient products
- (5) Alternative fuel vehicles and alternative fuels
- (6) Products using renewable energy
- (7) Alternatives to hazardous or toxic chemicals

Green procurement applies to all procurement actions by Marine Corps Commands, operations, and systems except military tactical vehicles and equipment.⁵⁷ Procurement of goods and services at MCAS Miramar is performed by numerous Commands and

⁵³ United States Marine Corps, Environmental Compliance and Protection Program Volume 2, Chapter 3, 030506 A. (Practices and Pollution Prevention), June 11, 2018.

⁵⁴ United States Marine Corps, Environmental Compliance and Protection Program Volume 2, Glossary, Sustainable Procurement, June 11, 2018.

⁵⁵ The Under Secretary of Defense. Updated Green Procurement (GPP) Strategy. 02 December 2008. acq.osd.mil/dpap/cpic/cp/docs/USA001967-08-DPAP.pdf

⁵⁶ United States Marine Corps, Environmental Compliance and Protection Program Volume 17, Chapter 3, 030402 (Sustainable Procurement of Goods and Services), June 11, 2018.

⁵⁷ United States Marine Corps, Environmental Compliance and Protection Program Volume 2, Chapter 3, 030506 A. (Practices and Pollution Prevention), June 11, 2018.

much of it is done through MCB CPEN Commands and Marine Corps Installations (MCI) West.

The Environmental Management Department will support the implementation of green procurement at MCAS Miramar through sustained training and awareness efforts. Section 6.1 describes methods that the Environmental Management Department will use to train MCAS Miramar personnel on green procurement. Section 6.2 describes how awareness of green procurement will be maintained through annual EMS audits. Section 6.3 presents resource information to help individual Commands purchase goods and services within the seven green procurement categories identified in MCO 5090.2 (i.e., items 1 through 7 listed in Section 6.0).

6.1 Integrating Green Procurement into MCAS Miramar Environmental Training

Green procurement training will be included in overall environmental awareness training for personnel new to MCAS Miramar and in annual “back-in-the saddle” environmental refresher training given to individual MCAS Miramar Commands.

Appendix A contains updated green procurement slides and talking points to be used during initial and annual refresher environmental training given to MCAS Miramar personnel. Key topics for the green procurement section of the environmental training include the following:

- Meaning of green procurement
- Benefits of green procurement
- Examples of green procurement
- The general requirement for green procurement within the Marine Corps
- Resources to assist in green procurement

Additionally, it is recommended that the information presented in Section 6.3 and Appendix A be summarized in a brief pamphlet or desktop reference that can be distributed to MCAS Miramar personnel to assist in identifying green products and services and executing green procurement.

Finally, a 2-hour training class on green procurement for federal agencies provided by the United States Department of Energy (DOE) Federal Energy Management Program (FEMP) can be accessed at <https://www.wbdg.org/continuing-education/femp-courses/femp44> (see Figure 6-1).



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FEMP Federal Energy Management Program

Figure 6-1: Federal Energy Management Program Green Procurement Course Offering

6.2 Maintaining Green Procurement Awareness through Periodic EMS Inspections

Green procurement awareness will be maintained through annual EMS audits of Commands on station. The MCAS Miramar EMS is designed to improve environmental performance on station by specifying repeatable steps that the Environmental Management Department implements to help achieve installation-wide environmental goals and objectives. It is also designed to create an organizational culture that reflexively engages in a continuous cycle of self evaluation, correction, and improvement of operations and processes through heightened employee awareness and management leadership and commitment. In short, it is the MCAS Miramar environmental business plan.

The Environmental Management Department monitors conformance with the MCAS Miramar EMS and regulatory compliance status through annual self-audits and the Marine Corps Environmental Compliance Evaluation (ECE) program. The ECE program evaluates the overall environmental compliance of Marine Corps installations and the Commands operating on them. Every third year, in lieu of a self-audit, Headquarters Marine Corps conducts a “Benchmark ECE” to assess installation environmental compliance and EMS conformance from an external point of view.

Annually, a self audit plan is released that identifies a monthly schedule of MCAS Miramar Commands to be audited throughout the year. An Environmental Compliance Checklist is used to guide the audit. Currently, the checklist does not address green procurement; however, it will be amended with the questions and issues listed in Figure 6-2 to assess green procurement practices within individual MCAS Miramar Commands.

Additionally, EMS inspectors will remind MCAS Miramar Commands of green procurement resources by distributing hardcopies of the slides presented in Appendix A.

MCAS Miramar Sustainable (“Green”) Procurement – Inspection Checklist			
Date:	Time:		
Installation:	Work Center:		
Inspector’s Name:	Signature:		
Inspection Items	Yes	No	Comments
1. Are there designated personnel within the Command/work center responsible for procurement of goods and services? (provide names)			
2. Are these personnel familiar with the concept of sustainable or green procurement?			
3. Have these personnel received any training in sustainable procurement practices?			
4. Are these personnel familiar with the DoD Green Procurement Program?			
5. Are hazardous materials for the Command/work center acquired through the HazMin Center			
6. During procurement efforts, is preference given to products and services in the following categories?			
(a) Recycled content products			
(b) Environmentally preferable products & services			
(c) Biobased products			
(d) Energy- and water- efficient products			
(e) Alternative fuel vehicles and alternative fuels			
(f) Products using renewable energy			
(g) Alternatives to hazardous or toxic chemicals			
7. Are procedures in place to track sustainable procurement efforts?			

ADDITIONAL COMMENTS:

CORRECTIVE ACTION TAKEN:

Environmental Compliance Coordinator

Name: _____

Signature: _____ Date: _____

Figure 6-2: Environmental Management System Inspection Checklist for Green Procurement

6.3 Green Procurement Resources

To assist federal contracting personnel and program managers in procuring green products and services, the United States GSA established a Green Procurement Compilation (GPC) purchasing program.⁵⁸ The GPC is a comprehensive resource that helps identify green products and services and applicable green purchasing requirements by consolidating and organizing information from various federal environmental programs in a single location. It also lists products for which the United States Environmental Protection Agency (USEPA), DOE, USDA, or other agencies have issued designations or otherwise provided guidance for products with environmental or energy attributes.

The GPC allows the following actions by federal contracting personnel:⁵⁹

- Quickly identify federal green purchasing requirements for products and services.
- Search by keyword or browse by category to find products and services.
- Obtain sample contract clauses and provisions addressing green procurement.
- Identify procurement options available to federal buyers, including applicable GSA Multiple Award Schedules (MAS), Federal Strategic Sourcing Initiative (FSSI) solutions, and GSA Global Supply.
- Learn more about federal environmental programs such as WaterSense and BioPreferred.
- Discover optional environmental programs and additional procurement guidance that will help contractors meet sustainability goals.

The GPC provides a catalog of green purchasing options and requirements spanning the 27 product and 9 service categories listed in Table 6-1. Within each product category, specific procurement options and information for numerous subcategories are provided. For example, the Appliance category is subdivided into 21 specific subcategories such as Dishwashers, Refrigerators, etc. The GPC also provides direct product links to the GSA Advantage website to facilitate procurement.

Table 6-2 provides links to the GPC and GSA Advantage websites, along with links to other helpful sites for the seven green procurement categories.

⁵⁸ GSA.gov. SF Tool. United States Department of Defense (DoD) Sustainable Product Purchasing. sftool.gov/greenprocurement/about

⁵⁹ GSA.gov. Green Procurement Compilation. gsa.gov/tools-overview/buying-and-selling-tools/green-procurement-compilation

Table 6-1: Green Procurement Compilation Product and Service Categories

Products (number of subcategories)		
Appliances (21)	Biomedical Equipment and Supplies (17)	Building Finishes (18)
Building Furnishings (7)	Cafeteria Products (28)	Cleaning Products (52)
Construction Materials (17)	Contracted Printing Products (8)	Doors and Windows (4)
HVAC/Mechanical (24)	Landscaping Products (17)	Lighting and Ceiling Fans (16)
Lube, Oil, Hydraulic Fluid, and Grease (20)	Miscellaneous (36)	Non-Paper Office Products (11)
Office Electronics (29)	Paper Office Products (10)	Park and Recreation (12)
Personal Care (18)	Plumbing Systems (6)	Refrigeration Systems (2)
Renewable Energy (9)	Roadway Construction (11)	Shipping, Packaging & Packing Supplies (8)
Special Construction Products (6)	Traffic Control (8)	Vehicles and Vehicle Products (20)
Services		
Cafeteria & Food Services	Electronic Leasing	Fleet Maintenance
Janitorial Services	Landscaping Services	Laundry Services
Meeting & Conference Services	Pest Management	Transportation Services

Table 6-2: Resource Links for Green Procurement

Category	Link(s)
All	<ul style="list-style-type: none"> • https://sftool.gov/greenprocurement
Recycled Content Products	<ul style="list-style-type: none"> • CalRecycle.calrecycle.ca.gov/BuyRecycled/Manufacturers/Directory/ • sftool.gov/gpcsearch?query=recycled+content
Environmentally Preferable Products and Services	<ul style="list-style-type: none"> • www.epeat.net/ • CalRecycle.calrecycle.ca.gov/BuyRecycled/Manufacturers/Directory/ • https://www.epa.gov/greenerproducts/recommendations-specifications-standards-and-ecolabels-federal-purchasing
Biobased Products	<ul style="list-style-type: none"> • https://www.biopreferred.gov/BioPreferred/faces/catalog/Catalog.xhtml
Energy and Water Efficient Products	<ul style="list-style-type: none"> • https://www.energy.gov/eere/femp/search-energy-efficient-products • www.energystar.gov/products • www.energy.gov/eere/femp/best-management-practices-water-efficiency • www.epa.gov/watersense
Alternative Fuel and Electric Vehicles	<ul style="list-style-type: none"> • https://sftool.gov/greenprocurement/green-products/18/vehicles-vehicle-products/1485/alternative-fuel-vehicles/0?addon=False&active=details • https://www.gsa.gov/buying-selling/products-services/transportation-logistics-services/fleet-management/vehicle-leasing/alternative-fuel-vehicles • https://afdc.energy.gov/ • https://gem.polaris.com/en-us/
Products Using Renewable Energy	<ul style="list-style-type: none"> • https://sftool.gov/greenprocurement/green-products/15/renewable-energy/0
Alternatives to Hazardous or Toxic Chemicals	<ul style="list-style-type: none"> • https://www.epa.gov/saferchoice/products

6.3.1 Recycled Content Products

Products that are derived from previously used materials (e.g., plastic bottles, refurbished oil, etc.) qualify as “recycled content products.” These products are not created using crude/raw materials, and any percentage of the final product may consist of recycled content to qualify as “recycled.”

Purchasing products made from recovered materials increases solid waste diversion rates, reduces waste disposal in landfills, and reduces the need to extract raw materials for product manufacture. Additionally, they reduce GHG emissions from product manufacture, and ultimately from product disposal and degradation.

The following procurement practices should be followed to maximize use of recycled content products:

- Look for labels that indicate the highest percentage of post-consumer recovered material content. This information is present for any product listed in the GPC and can be located on the information tab.
- When placing service orders or working with outside contractors, include recycled or recovered material content as a requirement for all materials used (e.g., new carpet installed must meet a 25 percent recovered material requirement).
- Refer to the Recycled Content Product Manufacturers (RCPM) tool offered through California Recycle (CalRecycle) to search for California-based manufacturers that make products from recovered materials.⁶⁰

6.3.2 Environmentally Preferable Products and Services

“Environmentally preferable” refers to products and services that have a reduced effect on human health and the environment when compared with competing products that serve the same purpose. For example, purchasing products from manufacturers based in California rather than an overseas manufacturer (through the RCPM tool) reduces GHG emissions from shipping and transport, and supports businesses local to MCAS Miramar.

USEPA has developed standards and ecolabels to guide purchasers toward environmentally preferable products and services. Included is an Environmentally Preferable Purchasing (EPP) program that helps federal government purchasers identify environmentally preferable products. In addition, USEPA has developed a tool called the Electronic Product Environmental Assessment Tool (EPEAT) to help

⁶⁰ CalRecycle.calrecycle.ca.gov/BuyRecycled/Manufacturers/Directory/

government personnel with purchases of electronic devices. EPEAT is an ecolabel for the information technology sector that helps purchasers, manufacturers, resellers, and others buy and sell environmentally preferable electronic products.⁶¹

The following procurement practices should be followed to help ensure that products and services are environmentally preferable:

- Look for ecolabels recognized by the USEPA EPP Program (Figure 6-3).
- Use the USEPA EPEAT tool when purchasing electronic products.
- Look for products and services that are within the county or state through the RCPM tool.
- Develop a selection criteria in Requests for Proposals (RFPs) that provide preferential consideration to qualified suppliers who provide locally sourced products and services.
- Select long-lasting products that will reduce the need to refurbish or replace equipment in the near future.

⁶¹ USEPA. Electronic Product Environmental Assessment Tool (EPEAT). epa.gov/greenerproducts/electronic-product-environmental-assessment-tool-epeat



Figure 6-3: Recommended Standards and Ecolabels from USEPA’s Environmentally Preferable Purchasing Program

6.3.3 Biobased Products

Biobased refers to products or industrial goods that are composed entirely or partially of biological products, forestry materials, or renewable domestic agricultural materials, including plant, animal, or marine materials. Purchasing biobased products can help reduce carbon footprint, support American farmers and sustainable forests, and reduce hazardous waste generation.

These are products that consist primarily of a substance (or substances) derived from living matter (biomass) and either occur naturally or are synthesized. The term may refer to products made by processes that use biomass.⁶² These products generally provide an alternative to conventional petroleum-derived products and include a diverse range of offerings such as lubricants, detergents, inks, fertilizers, and bioplastics.⁶³

The USDA has launched a program called BioPreferred[®] that identifies classes of products with biobased content. Once an item is approved as a BioPreferred[®] product, the manufacturer has the option to label the products with the USDA Certified Biobased Product label (Figure 6-4).⁶⁴ For the purposes of the BioPreferred program, biobased products do not include food, animal feed, or biofuels. The GPC provides information on a product's biobased content if it has been certified by the USDA.



Figure 6-4: USDA Biobased Product Label (sample)

The following procurement practices should be followed to help incorporate biobased products into purchasing efforts:

- Refer to the product details in the GPC to determine the percentage of biobased content and look for the USDA Certified Product label when shopping for products.
- Visit the USDA website for updates to biobased product categories that may apply to MCAS Miramar. For example, adhesives are commonly used at the installation, and a variety of these items have been USDA-certified as biobased.

⁶² USEPA. Biobased Materials. cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NRMRL&dirEntryId=231873. 2011.

⁶³ USDA, What is BioPreferred? <https://www.biopreferred.gov/BioPreferred/faces/pages/AboutBioPreferred.xhtml>

⁶⁴ <https://www.biopreferred.gov/BioPreferred/faces/catalog/Catalog.xhtml>

- When placing service orders or developing RFPs, establish a percentage requirement for any wood that is used to be derived from a sustainably managed forest.

6.3.4 Energy- and Water-Efficient Products

Products that conserve or reduce water and/or energy use qualify as energy- and water-efficient products. Energy- and water-efficient products decrease dependency on fossil fuels, reduce GHG emissions, and limit air pollution. Energy- and water-efficient products have continued to advance with technology and many common products already qualify as efficient because of consumer demand.

Several key programs encourage the use of energy- and water-efficient products. The DOE FEMP works with federal agencies to meet energy-related goals and identify affordable solutions.⁶⁵ Additionally, the FEMP provides information on energy-efficient products in the following categories: appliances, commercial and food service equipment, electronics and information technology, heating and cooling, lighting, office and industrial equipment, and facility energy controls.

USEPA's Energy Star[®] Program identifies products that meet energy efficiency and performance standards.⁶⁶ Product categories include appliances, building products, commercial food service equipment, data center equipment, electronics, heating and cooling, lighting, office equipment, water heaters, and other. The Energy Star[®] label is shown in Figure 6-5.



Figure 6-5: Energy Star[®], WaterSense[®], and WaterWise[®] Product Labels

⁶⁵ Office of Energy Efficiency and Renewable Energy. Federal Energy Management Program. energy.gov/eere/femp/federal-energy-management-program

⁶⁶ <https://www.energystar.gov/>

USEPA's WaterSense® and WaterWise® programs identify products that meet high-performance water efficiency goals. Product categories include residential toilets, showerheads, bathroom faucets, commercial toilets, urinals, irrigation controllers, spray sprinkler bodies, and pre-rinse spray valves. WaterSense® and WaterWise® certifications are easily recognizable by their labels (included in Figure 6-5) and are identified in the GPC. In addition to water-efficient products, simple housekeeping practices such as setting timers for sprinkler systems, not washing down pavement with hoses, and using vehicle wash racks to their full capacity may be incorporated to reduce water use.

The following procurement practices should be followed to help incorporate energy- and water-efficient products into purchasing efforts:

- Research FEMP for energy- and water-efficient products and solutions for larger projects.
- Look for the Energy Star® label when procuring new lightbulbs, appliances, electronics, etc.
- Look for WaterSense® or WaterWise® labels when purchasing new toilets, showerheads, and faucets, and establish requirements to meet these standards for any future building construction, renovation, or repair.
- Incorporate native or drought-tolerant plants in stormwater BMPs and landscaping design specifications to reduce water demand.

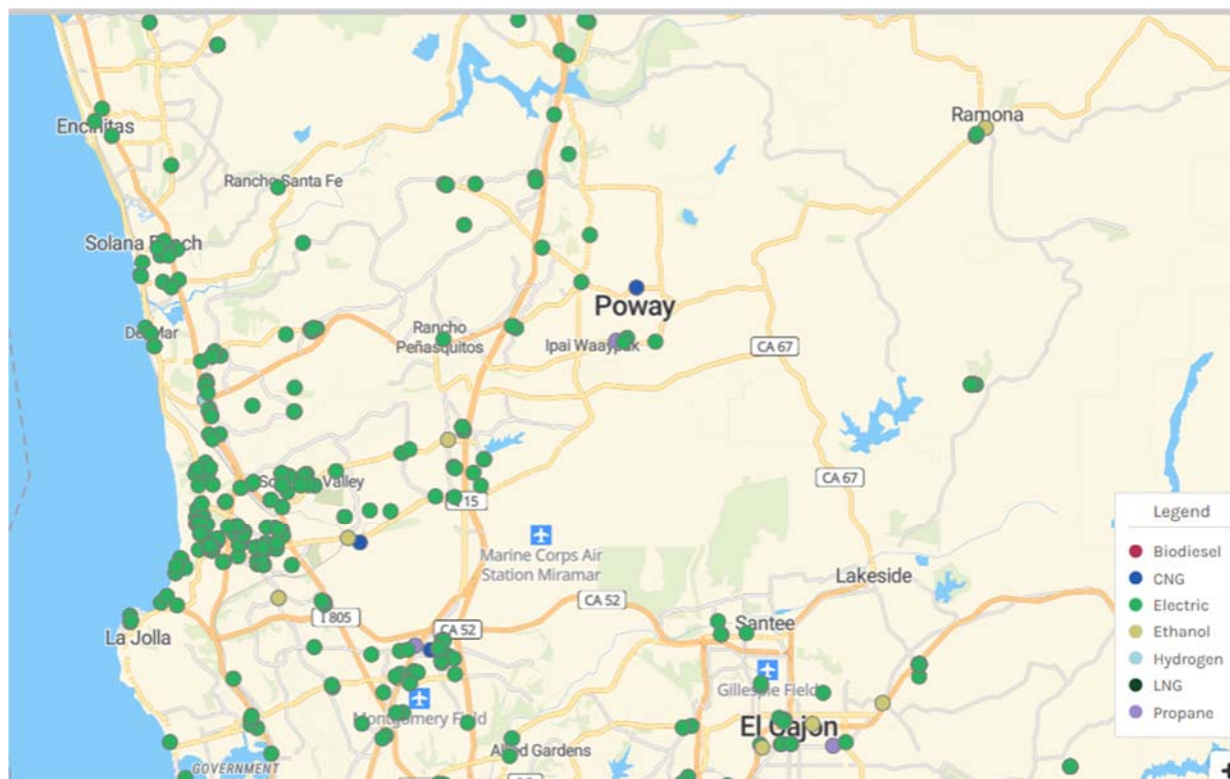
6.3.5 Alternative Fuel Vehicles and Alternative Fuels

An alternative fuel vehicle is a vehicle that runs on a fuel other than traditional petroleum fuels (i.e., gasoline or diesel fuel). The term also refers to any technology of powering an engine that does not involve solely petroleum (e.g., electric car, hybrid electric vehicles, solar powered). Federal agencies are mandated by the Energy Policy Act and the Energy Independence and Security Act to purchase alternative fuel vehicles, increase consumption of alternative fuels, and reduce petroleum consumption.⁶⁷

As outlined in Sections 3.5, 5.2, and 5.3, MCAS Miramar currently is equipped with a variety of alternative fuel vehicles including hybrid, electric, CNG, Flex Fuel (E-85), and LPG vehicles. The GPC provides a gateway to alternative fuel vehicle purchasing or leasing through GSA. It also provides a gateway to the DOE Alternative Fuels Data Center, which provides detailed information regarding various alternative fuel vehicles

⁶⁷ <https://sftool.gov/greenprocurement/green-products/18/vehicles-vehicle-products/1485/alternative-fuel-vehicles/0?addon=False&active=additional-guidance>

and hosts an alternative fueling station locator. Figure 6-6 presents a screenshot from this locator for the area near MCAS Miramar.⁶⁸



Note: Fueling stations identified as "Ethanol" represent those carrying E-85 fuel.

Figure 6-6: Alternative Fueling Stations Near MCAS Miramar

The following procurement practices should be followed to help incorporate alternative fuel vehicles and alternative fuels into purchasing efforts:

- Use the GPC alternative fuel vehicle page to access vehicle purchase and leasing options through GSA.⁶⁹
- Use the DOE Alternative Fuels Data Center to identify fueling options.
- Consider nontraditional electric vehicles as substitutes for trucks in various functions around the installation, such as public works maintenance activities. GEM® electric carts are used for a variety of purposes at numerous military installations.⁷⁰

⁶⁸ <https://afdc.energy.gov/stations/>

⁶⁹ <https://sftool.gov/greenprocurement/green-products/18/vehicles-vehicle-products/1485/alternative-fuel-vehicles/0?addon=False&active=details>

⁷⁰ <https://gem.polaris.com/en-us/>

6.3.6 Products Using Renewable Energy

As discussed in Section 3.1, approximately 30 percent of MCAS Miramar energy use is from renewable sources, including photovoltaic, biomass, and solar thermal. The installation operates solar-powered streetlights and carports and uses electricity generated from offsite photovoltaic and landfill gas combustion systems. EO 13843 stipulates that federal facilities should obtain a minimum of 7.5 percent of total energy use from renewable sources. Should MCAS Miramar choose to expand renewable energy efforts, personnel should refer to the GPC Renewable Energy Tab for guidance and links to biomass, geothermal, hydroelectric, municipal solid waste, ocean, photovoltaic, and wind energy products.

6.3.7 Alternatives to Hazardous or Toxic Chemicals

Hazardous and toxic chemicals are most commonly those identified under RCRA, EPCRA, and/or the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the list is very long. The use of materials with lesser quantities of these chemicals has long been a goal of the Marine Corps and the MCAS Miramar Hazardous Material Minimization Center (HazMin Center). The benefits of reducing hazardous and toxic chemical use include improved personnel health and safety, reduced hazardous waste generation, reduced toxic air emissions, improved wastewater and stormwater quality, and improved environmental compliance in general.

The GPC provides a gateway for identifying and procuring materials containing less hazardous and toxic chemicals in numerous product categories (Table 6-1), including cleaning products; lube, oil, hydraulic fluid, and grease; vehicle and vehicle products; construction materials; cafeteria products; landscaping products; and miscellaneous products. Additionally, the USEPA Safer Choice website identifies less hazardous and toxic products for more than 40 product categories.⁷¹ More than 2,000 products carry the Safer Choice label (Figure 6-7).

⁷¹ <https://www.epa.gov/saferchoice/products>



Figure 6-7: Safer Choice Label

The following procurement practices should be followed to help incorporate alternatives to hazardous and toxic chemicals into purchasing efforts:

- Make all hazardous material purchases through the MCAS Miramar HazMin Center at Building 8672.
- Identify safer products through the GPC and USEPA Safer Choice websites.
- Per MCO 5090.2, Volume 9, Chapter 3, 030209, Marine Corps units shall consider sustainable (“green”) products first in all hazardous material procurement.

Appendix A: MCAS Miramar Green Procurement Orientation Training Slides

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