

Ensuring That a Managed Waste Stream Produces Viable Resources

Introduction

Vandenberg Air Force Base (AFB) is located on the central coast of California, approximately 150 miles north of Los Angeles. The installation covers 99,100 acres of land, and has approximately 42 miles of coastline. This geographic location allows Vandenberg AFB to carry out its unique mission of launching DoD, scientific, and commercial space satellites into polar orbits and testing Intercontinental Ballistic Missiles. In every way, Vandenberg AFB is a small city.

Like many other Air Force installations throughout the world, Vandenberg Air Force Base provides recycling services to facilities, residents, and tenant organizations. The base has successfully implemented reuse, recycling, and diversion programs for many of the obvious waste streams including paper, cardboard, plastic, concrete, asphalt, and metals. These waste streams are typical of any federal facility and are generally considered recyclable in any market. The Recycling Team's ultimate goal is to create a zero waste environment.

For the past 6 years, the Recycling Team has excelled at diverting recyclable materials with a 92 percent waste diversion rate—the highest in the entire Air Force! The Recycling Team; however, not satisfied with recycling what is typical and expected, proactively pursues more complex and challenging waste streams that others would overlook and most likely bury as trash. Their philosophy is “*ensure that a managed waste stream can produce a viable resource.*” This “out of the box” mentality has motivated Vandenberg AFB to actively pursue recycling opportunities for other obscure and unique waste streams. The Recycling Team's continual improvement and aggressive resource management program has made it a model for the Department of Defense!

Unique Materials

Many materials generated throughout Vandenberg AFB were never considered for recycling because they were too difficult and time consuming to manage. What is difficult and complex for some became an opportunity for Vandenberg AFB to divert and recycle. The following recurring obscure and unique materials never became a waste because of the efforts of Vandenberg AFB's Recycling Team:

Styrofoam

Styrofoam is a material that is generally not recyclable due to its low density and costly handling procedures. Even though the material is widely used for packaging, there is no recycling program available in the current market. The Base Commissary and Base Exchange (BX) receive extensive amounts of Styrofoam as part of a product's packing material on a daily basis. Without the intervention and ingenuity of the Recycling Team, this material would simply be disposed of as trash.

After extensive research and coordination with Styrofoam manufacturing representatives, the Recycling Team purchased an Expanded Poly Styrene Foam Densifier (e.g., Densifier) machine to effectively eliminate this waste stream, making it a high density product that is easy and cost effective to recycle. The ramification of recycling Styrofoam is that it reduces waste hauling

costs by 80 percent, and saves approximately 65,000 square feet per year of valuable landfill space, a mission-critical resource for Vandenberg.

Cooking Oil and Greases

Cooking oil and greases are generated on base at several locations: bowling alley, dining halls, food court, fast food restaurants, and eating establishments. This material is prohibited from waste disposal at the base landfill. Therefore, an alternative to disposal was required. Most of the time, this was accomplished by pouring the oil and grease down the drain, resulting in clogged sewer systems and damaged piping. A better solution for this material is to reuse or recycle it. The Recycling Team discovered that a local tallow firm would collect the material free of charge and reuse it to produce other products. Twenty-five percent of Vandenberg AFB's cooking oil and grease is recycled into biodiesel fuel, and 75 percent is used for poultry feed. In 2008, 16.44 tons of cooking oil and grease were reused and/or recycled.

Plastic Bags

Plastic bags are commonly provided by retail establishments to carry out merchandise. They pile up quickly in every household, and then typically get thrown in the trash. Vandenberg AFB has several retail businesses that issue plastic bags for purchased items. Until recently, there was no option to recycle the material, and plastic bags were either reused or disposed of as trash. Once disposed of, on any given day, the landfill would receive hundreds of bags that were easily taken by the wind and dispersed throughout the area.



Winds at Vandenberg AFB typically blow at 30 to 40 knots, making it difficult to manage this debris. Therefore, plastic bags became a litter problem at the landfill. During monthly landfill inspections by local regulators, a solution to the litter was frequently recommended. To effectively remove the littered plastic bags, assigned landfill personnel had to collect them by hand—a labor intensive effort. However, the Recycling Team met this challenge by implementing a plastic bag recycling program at the BX and Commissary. This program also assisted our retail establishments in meeting new requirements for State of California Assembly Bill 2449. The bill mandates all retail establishments who provide plastic bags to customers to also provide an in-store recycling program.

Plastic bag recycling bins were procured by the Recycling Team and placed in the BX and Commissary for all Vandenberg AFB residents to recycle their shopping bags, grocery bags, plastic newspaper bags, plastic dry-cleaning bags, and all clean and clear bags. As a result of this successful program, approximately 520 pounds of plastic bags are now being properly managed, rather than becoming a debris problem. Additionally, over 2,000 cloth grocery bags with a customized logo and slogan were provided at the 2008 Earth Day event to encourage residents to reduce plastic bag usage. The reusable grocery bags were such a hit, that the Recycling Team constantly receives requests for additional bags.

Electrical Transformer Carcasses

Spent electrical transformers are brought to the Vandenberg AFB Materials Diversion Center (MDC) where they are drained of mineral oil and eventually sold to an off-base recycling company for their scrap metal value. The transformer carcasses end up in a smelter where they are melted, and subsequently reused, as another metal product. For 2008, 29 tons of spent electrical transformer carcasses were sold as recycled metal for a total of \$55,000. All received monies were placed into the Qualified Recycling Program (QRP) reimbursement account to offset the costs of various environmental programs.

Wooden Pallets



In the past, wooden pallets were required to be taken to the base landfill where they were ground up and used as mulch or landfill cover. The Recycling Team found a solution to retrieve the pallets from the landfill and instead, collect them from the base and sell them under the Qualified Recycling Program to a local company that reuses the materials.

Base personnel were made aware of this effort through newsletters and a base newspaper article. Wooden pallets in good overall condition are stockpiled at the Materials Diversion Center. This closed loop system resulted in approximately 24 tons of wooden pallets being reused by a local vendor.

Consumer Batteries

The Consumer Battery Recycling Program was implemented to address the problem of small household batteries being disposed of into the landfill. Consumer batteries contain many harmful materials, including mercury and cadmium. The goal of the program was to prevent contamination to the surrounding groundwater aquifers. Consumer battery recycling stations, like the one shown to the right, were placed in strategic locations throughout the installation. The recycling stations were designed to attract attention and encourage participation.



Various methods of public outreach—fact sheets, newsletters, Internet, subcommittee meetings, etc. encourage base residents to bring used batteries to the assigned locations. Every week, a trained hazardous waste technician collects the batteries from each recycling station, segregates

the different types of batteries and transports them to a 90-day hazardous waste collection site on Vandenberg AFB. For 2008, 5,812 pounds were collected and disposed of properly.

Used Oil

In April 2008, Vandenberg AFB registered as an approved Industrial Generator with the California Integrated Waste Management Board Used Oil Recycling Program. This program offers a recycling reimbursement incentive for every gallon of oil that is properly recycled. In 2008, Vandenberg AFB generated 9,174 gallons of recyclable oil resulting in a total reimbursement of \$1,467.

Toner Cartridges

The MDC serves as the focal point for the collection of spent toner cartridges. The toner cartridges are stockpiled for several months and eventually shipped to a recycling firm. In 2008, Vandenberg AFB recycled 5.4 tons of spent toner cartridges, resulting in a reimbursement of over \$1,200 dollars.

In Hot Pursuit of More Recycling Opportunities

Food Waste

The results of a recent waste characterization study confirmed that food waste was a significant waste stream at Vandenberg AFB, representing approximately 23 percent of all incoming solid wastes. In an effort to increase recycling and reduce incoming landfill waste, the Recycling Team solidified funding to implement a food composting program at the landfill.

Greenhouse Gases

Recycling efforts resulted in reducing transportation, manufacturing, raw material acquisition and waste disposal. These are all critical steps in decreasing greenhouse gases and mitigating the adverse affects of climate change. According to the National Recycling Coalition (NRC) greenhouse gas calculations, Vandenberg AFB contributed to the decline in air emissions by 4, 611 tons and saved 1,638 per household equivalent units of energy.

Recycling efforts of this magnitude also placed Vandenberg AFB at the forefront of greenhouse gas reduction initiative and in compliance with State of California Assembly Bill 32 (The Global Warming Solutions Act of 2006).

Conclusion

The philosophy of the Vandenberg AFB Recycling Team “*ensure that a managed waste stream can produce a viable resource*” propels them to pursue “out of the box” innovation and implementation. These approaches reversed the trend of a mass consumption and throw away mentality and resulted in diverting an unprecedented 92 percent of materials from disposal. The Recycling Team continues to explore opportunities to further increase the diversion rate by focusing on smaller and unique waste streams. These waste streams included: Styrofoam, cooking oil and greases, plastic bags, electrical transformer carcasses, wooden pallets, consumer batteries, used oil, and toner cartridges. The Recycling Team’s relentless pursuit of obtaining a zero waste environment is viable and within reach.