

SUCCESS STORY

Elmendorf AFB - APRIL 2001



PRO-ACT

A Base-level Pollution Prevention Resource sponsored by HQ Air Force Center for Environmental Excellence



Spotlight On: Elmendorf Air Force Base

Introduction

Elmendorf Air Force Base (AFB) is home of Headquarters Alaskan Command (ALCOM), Alaskan NORAD Region (ANR), Eleventh Air Force (11th AF), and the 3rd Wing. The base contains 13,103 acres of land, including approximately 1,592 acres of wetlands, and is located immediately north of Anchorage. Elmendorf AFB occupies a unique position as a wildlife habitat preserve situated in the middle of Alaska's largest metropolitan area. Through an aggressively applied natural resources program, the base supports healthy populations of moose, brown and black bears, bald eagles, wolves, and five species of Pacific salmon.

Commitment to Excellence

Elmendorf AFB is committed to environmental restoration, protection of the environment, and preservation of natural resources. This was evidenced in 1999 when the base was selected as the recipient of the Air Force's General Thomas D. White Award for Environmental Restoration, and subsequently the 1999 Secretary of Defense Environmental Security Award for Environmental Cleanup. In addition to Elmendorf AFB's outstanding restoration successes, this article features highlights from other excellent programs in the base's environmental flight, which indicate the overall excellence of the installation's environmental efforts. A brief summary of the initiatives instituted by the Elmendorf AFB environmental staff is presented below.

Innovative Restoration Technology

The Restoration element of the Environmental Management Flight is composed of six personnel, each passionate and dedicated to their individual programs and causes. Leading this dedicated group of professionals is Mr. Joe Williamson, currently dual-hatted as Chief of Restoration and Environmental Flight

Elmendorf AFB Success Stories

Introduction	1
Commitment to Excellence	
Innovative Restoration Technology	1
Engineered Wetland	
Groundwater Presumptive Remedy	
High Vacuum Extraction	
Bioventing	
Cleanup Initiatives	3
Four Million Gallon Hill	
Landfill Debris	
PCB Removal	
Pollution Prevention Activities	4
ENVVEST	
Recycling & Composting	
Natural Resource Protection	5
Conservation Program	
Team Building & Leadership	5

Chief, 3 CES/CEV, DSN (317) 552-2875. Mr. Williamson explains that the success of the restoration efforts at Elmendorf AFB revolves around a "Team Building Concept." The team is composed of highly skilled and motivated individuals at Elmendorf AFB, the Environmental Protection Agency (EPA), and the Alaska Department of Environmental Conservation (ADEC). The restoration team relies heavily on advice from the community, Restoration Advisory Board (RAB) members, and native tribes to formulate cleanup plans and decisions. Other members of the base restoration team include experts from 3rd Wing Public Affairs and the 11th Air Force Judge Advocate's Office.

Elmendorf AFB is considered the environmental leader within Pacific Air Forces (PACAF) and the base's commitment to environmental restoration is evidenced by its selection as the recipient of several other awards:

- ✦ The Air Force Environmental Restoration Award in 1993
- ✦ The PACAF Environmental Restoration Award five times since 1993
- ✦ Commander-in-Chief's Special Recognition for Installation Excellence in 1998
- ✦ The Air Force Public Affairs Director's Excellence Award 1998
- ✦ The Pentagon Crystal Award in 1997

Engineered Wetland

In 1997, the base completed construction and began operation of a truly unique engineered wetland system - the "centerpiece" of the base's groundwater cleanup strategy. Successful partnering with the community and regulatory agencies secured the optimum location for the system, efforts that saved millions of dollars in construction costs. The wetland complex is designed to capture and treat groundwater seeps contaminated with benzene and other solvents. Studies have shown that approximately 90 percent of the groundwater flow on the base is treated through the engineered wetland; in the event of a future upgradient spill, the wetland would act as a "safety net" able to treat additional groundwater contamination.

The wetland uses naturally occurring organisms and well-established principles of microbiology to achieve significant reductions in contaminants, allowing for discharge into sensitive ecological habitats without additional treatment. This innovative wetland complex captures and treats contaminated groundwater at one-fifth the cost of conventional "pump and treat" systems. It effectively processes over 129,000 gallons of water per day and, to date, has successfully treated over 170 million gallons of water to below cleanup levels. The engineered wetland system currently operates at a minimal cost of \$209,000 per year (44 cents per 100 gallons of water treated), with minimal manpower requirements.



Engineered Wetland

The engineered wetland treatment system is an international showcase for innovative technology to treat contaminated groundwater, including the ability to operate efficiently in harsh sub-arctic conditions. For additional information or details regarding this system, contact Ms. Valerie Payne, 3 CES/CEVR, DSN (317) 552-7111.

Groundwater Presumptive Remedy

There are three distinct geological features on Elmendorf AFB, with the majority of contamination being contained in the glacial outwash plain, which also contains two underground water sources: a small unconfined aquifer; and a large confined aquifer.

Beginning in 1991, the base conducted extensive monitoring to characterize regional groundwater flow. This groundwater data was analyzed to determine the extent of contamination in the aquifers as well as the surface water from Ship Creek. From this characterization, the base showed that contamination from Elmendorf AFB is confined to the shallow aquifer. The base used this knowledge regarding groundwater flow, interaction with geological features, contaminant migration, and past effective remediation methods to demonstrate the benefit of a pre-approved remedial action plan for petroleum, oil, and lubricant (POL) spills to the ADEC. After review of the hydrological and geological data, the ADEC agreed to a Memorandum of Understanding (MOU) with Elmendorf AFB to apply "presumptive remedies" for certain POL spills in the glacial outwash plain portion of the base. The MOU permits Elmendorf AFB to use natural attenuation as a "presumptive remedy." The base has successfully demonstrated to the ADEC that the area supports this method and that it remediates hydrocarbon residuals associated with POL spills in a reasonable time period.

Please note that at the time of this publication, the MOU was undergoing review and not signed by Elmendorf AFB or ADEC. Additional information regarding this groundwater initiative can be obtained from Mr. John Mahaffey, 3 CES/CEVR, DSN (317) 552-7415.

High Vacuum Extraction

Elmendorf AFB discovered gasoline and solvent-type contaminants, including benzene and trichloroethylene, in the soil and groundwater at a site in 1994. After a thorough evaluation of site conditions, it was decided to use an innovative technology called "high vacuum extraction" (HVE) to remove the contaminants. The HVE system removes and treats contaminated groundwater while leaving the soil in place by applying a vacuum to the ground through specially modified wells and pumps. The system efficiently removes soil vapors and groundwater by drawing air through the contaminated soil, bringing contaminants to the surface for additional treatment.

The HVE system was installed in 1996 and is expected to obtain established cleanup goals in 2003. The base

is experimenting with initiatives to further optimize the HVE system, such as creating pathways to isolated pockets of contamination by fracturing subsurface soils to accelerate remediation. During the first four years of operation, more than 9,813 pounds of contaminants were removed, and more than 246,750 gallons of contaminated groundwater was treated to safe drinking water levels. For more information concerning the HVE system, contact Mr. Claude Mayer, 3 CES/CEVR, at DSN (317) 552-7507.

Bioventing

Bioventing, a process that enhances natural bioremediation by the addition of oxygen to the soil, was initially tested at Elmendorf AFB under a Headquarters Air Force Center for Environmental Excellence pilot study. The study indicated bioventing is an effective remediation method for petroleum, oil, and lubricant (POL) contaminated soil. Elmendorf AFB is currently using bioventing at ten sites. Soil sampling in 1997 and 1999 confirmed dramatic decreases in POL contamination at these sites since the bioventing systems were put in place. Based on 1999 respiration test data and historical soil gas data, certain monitoring activities were recommended to enhance the system. All sites are expected to reach cleanup goals by 2004 with closeout of all sites to be completed in 2005. For additional information on bioventing at Elmendorf AFB contact Mr. Claude Mayer, Remedial Project Manager, 3 CES/CEVR, DSN (317) 552-7507.

Cleanup Initiatives

For additional information on the cleanup initiatives at Elmendorf AFB, summarized below, contact Mr. Larry Underbakke, 3 CES/CEVR, DSN (317) 552-1829.

Four Million Gallon Hill

Four underground storage tanks (USTs), each capable of containing one million gallons of aviation fuel, were used from the early 1940's until the 1990's. In 1991, the tanks were taken out of service because it was believed that they were leaking. In 1993 the base installed a pump and treat system to clean up the site, which was to remain operational until 2017. Upon removing and demolishing the tanks in 1996, it was found that none of the four USTs were leaking. There were actually only four specific areas of contamination, all associated with the design of the tanks' drainage system, which appeared as seeps from the hillside. Based on this new information, a new conceptual model was developed. Elmendorf AFB demonstrated to the EPA and the ADEC that the original estimated contamination of over a million gallons of aviation fuel

was much lower and that the current pump and treat system was no longer effective at removing contaminants. By this time, the recovery rate of fuel from the treatment system had fallen to zero and the base was able to take the pump and treat system off line eleven years earlier than originally planned. The early shut down of the system saved Elmendorf AFB an estimated \$1.1 million. While in operation, the system recovered approximately 400 gallons of fuel and processed over 700,000 gallons of water. To complete remediation objectives, the base is using a passive recovery system in conjunction with monitored natural attenuation, which has collected less than one gallon of contaminants.

Landfill Debris

Elmendorf AFB operated a landfill, located atop a bluff on the Knik Arm overlooking Cook Inlet, from the 1940's to the early 1960's. Due to tidal action within the Inlet, the base of the bluff is eroding at a rate of 1.5 to 3 feet per year, causing the "bottom" to fall out of the landfill and strewing debris on the beach and in the water. Since 1997, Elmendorf AFB has conducted annual cleanup activities or "beach sweeps," collecting and disposing of over 214 tons of debris.



"Beach Sweeps"

The base is presently evaluating the site to verify whether the annual beach sweeps are sufficient for dealing with the current risk to human health and the environment. If this evaluation indicates there is an unacceptable increased risk, then other alternatives that would stabilize or remove the landfill altogether will be considered. In addition to collecting and disposing of debris, Elmendorf AFB works closely with the Dena'ina Team, a group of Alaskan Natives, to identify suspected cultural resources in the vicinity.

PCB Removal

Through historical documentation, Elmendorf AFB identified three buildings that were used until the late 1960's to store and maintain polychlorinated biphenyl (PCB) containing transformers. With initial site investigations indicating limited PCB contamination, the base tested the feasibility of bioremediation as a potential alternative to soil extraction; however, field results demonstrated this method was not suitable for the area. Upon proceeding with soil excavation, it was found the PCB contamination was more extensive than initially expected. Despite the extensive PCB soil contamination, groundwater in the area was not contaminated. Elmendorf AFB negotiated a contract with the Defense Reutilization and Marketing Office (DRMO) for a reduced cost for the disposal of the PCB contaminated soil, which also relieved the base of any further liability. In total, over one million pounds of PCB contaminated soil was excavated and no deed restrictions were placed on the property.

Pollution Prevention Activities

ENVEST

The Environmental Investment (ENVEST) Program provides flexibility in the application of environmental regulations, effectively shifting focus from investing money to comply with these regulations to investing the money in identifying alternatives and innovations to improve the environment by preventing pollution at the source. Elmendorf AFB, chosen to participate in the pilot ENVEST Program, is focusing the program's application to Clean Air Act regulations and requirements. Due to the ENVEST Program, Elmendorf AFB has been able to reduce recordkeeping and reporting requirements, as well as monitoring and management costs associated with Title V by approximately 80%, saving an estimated \$1.5 million over six years. The estimated savings are being reinvested to develop an alternative fuel vehicles program, address hazardous air pollutants (HAPs), and identify other air quality pollution prevention initiatives. The ENVEST program also serves as a demonstration of how alternative fuels can be used in a northern environment, which may be of benefit to Alaska communities, as well as other Air Force bases. For more information regarding ENVEST contact Ms. Paula Fowler, 3 CES/CEVQ, DSN (317) 552-2760.

➤ Alternative Fuel Vehicle Program

To date, the base has invested over \$600,000 in developing the infrastructure necessary to support

a Compressed Natural Gas (CNG) station, for the design and construction of the station, and on vehicle conversions. In September 2000, Elmendorf AFB officially opened the CNG Station and has plans to convert 15 vehicles within its first year of operation.

➤ HAPs Reduction Initiative

Elmendorf AFB has switched to low VOC paints (where feasible), and invested over \$40,000 in an automatic paint gun washer and high volume-low pressure spray guns. These initiatives have reduced the use of solvents, the amount of HAPs being released into the atmosphere, and has improved painting operations.

Recycling and Composting

Elmendorf AFB has established a successful recycling program that focuses on capturing the largest waste streams on base: cardboard, wood, metals, paper, and compostables. The program features convenient, regular collection of recyclables from work centers and family housing. In fiscal year (FY) 2000, approximately 240 tons of corrugated cardboard, 227 tons of paper, 36 tons of aluminum cans and other metals, 4 tons of plastic, 31 tons of glass, 86 tons of food items, and 387 tons of wood was recycled on base. One of only eight Air Forces bases with a composting program, Elmendorf AFB diverted much of this material to its composting operation.



Collection of Recyclables

Between recycling and composting, Elmendorf successfully diverted 32 percent (the goal for FY00 was 20 percent) of its recyclables from the landfills, saving \$74,800 in landfill tipping fees. Composting is a challenge in Elmendorf's subarctic location but the

base has exceeded expectations to set the benchmark for Alaska and the military. The simple windrow process turns scrap wood, mixed paper, food waste and horse manure into a useful soil amendment that takes the place of purchased topsoil. About 600 tons of finished product were produced in 1999 from 1,100 tons of raw materials, and 900 tons is expected from 1,700 tons of raw material that was composted in 2000. Elmendorf also recycled 71 percent of white paper used on base and 37 percent of corrugated cardboard, in FY99.



Composting at Elmendorf AFB

In March 2001, a solid waste contract covering the recycling, composting and waste hauling on base was awarded. The Small Business Administration contract includes an incentive clause for the contractor, who will receive the landfill-tipping fee savings if the Air Force waste-reduction goals are exceeded. The Integrated Solid Waste Management incentive-based contract is the first of its kind in the Air Force.

The program and the efforts of Ms. Cheryl Paige, who until recently served as pollution prevention coordinator, were recognized in 1999 when she received honorable mention in the Air Force's General Thomas D. White Recycling Award for Individual Excellence. For further information about Elmendorf's recycling program, contact Mr. Jim Miller, 3 CES/CEVQ, at DSN (317) 552-1967.

Natural Resource Protection

Conservation Program

A close, cooperative working relationship with the Alaska Department of Fish and Game has aided the

base in gaining recognition throughout the state as having a premier wildlife management and conservation program. Elmendorf AFB has developed the Military Conservation Program, an innovative natural resource protection initiative. The program calls for active duty personnel to enforce natural resource regulations and monitor wildlife on base. Volunteers receive over 100 hours of training, conducted in cooperation with the Alaska State Troopers Fish and Wildlife Protection Department (Troopers) and the U.S. Fish and Wildlife Service (USFWS). The training covers fish and game laws, officer safety and wildlife control, as well as certification in enforcing those laws.

Currently, the program has 32 volunteers who monitor 13,000 acres, serving approximately 14,000 active duty personnel and their families. Volunteers are only authorized to enforce state and federal environmental laws, and monitor outdoor recreational areas on military property. In addition, selected volunteers are members of the Joint Bear Response Team, which is called upon to assist in bear handling or monitoring incidents in the Anchorage area. This natural resource conservation initiative earned individual recognition for the program's non-commissioned officer in charge (NCOIC), TSgt Mark Sledge, in the PACAF level competition for the 1999 General Thomas D. White Natural Resources Conservation Award. For more information on the program, contact TSgt Sledge, 3 CES/CEV, DSN (317) 552-2436.

Team Building and Leadership

The "Team Building Concept" has had unforeseen benefits to the base. With the majority of the restoration work well underway, Elmendorf AFB has expanded the RAB's focus to include pollution prevention, environmental quality, and natural resources projects. Doing so has enhanced the public awareness and appreciation of the base's efforts and to date, the base has never had a contentious RAB meeting. Elmendorf AFB has always been on the leading edge with innovations. The base was a leader in developing institutional controls as protective measures on its property and the first to conduct technical review committees/workshops. Elmendorf AFB developed the prototype document that the USAF eventually adopted as the Management Action Plan (MAP). The Elmendorf AFB Environmental Handbook has been widely imitated and the base's Hazardous Waste, Used Oil and Hazardous Material Management Plan (OPLAN 19-3) is considered a new standard for such plans.

The AFCEE Team - Recognized as a customer-oriented leader and the preferred provider of environmental, planning, design, and construction services.

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Need more information? Contact PRO-ACT at DSN 240-4214, (800) 233-4356, or pro-act@hqafcee.brooks.af.mil.



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