



Department of Environmental Conservation

INITIAL ENVVEST PROGRESS REPORT

ELMENDORF AIR FORCE BASE

**A Partnering Agreement
Between
Elmendorf Air Force Base
The Alaska Department of Environmental Conservation
And
Region 10, Environmental Protection Agency**

24 March 2000

Table of Contents

1.0	Introduction	1
1.1	Regulatory Background	1
1.2	ENVVEST Overview	1
1.3	Elmendorf Participation in ENVVEST	2
1.4	Elmendorf ENVVEST Pollution Prevention (P2) Projects	2
2.0	Alternative-Fuel Vehicle P2 Project	3
2.1	Introduction	3
2.2	Progress to Date	3
2.3	Planned Activities	4
3.0	Hazardous Air Contaminant P2 Project	6
3.1	Introduction	6
3.2	Progress to Date	6
3.3	Planned Activities	7
4.0	Future P2 Projects	9
4.1	Introduction	9
4.2	Additional P2 Projects under Consideration	9

1.0 Introduction

1.1 Regulatory Background

On March 16, 1995, the President announced, as part of his National Performance Review Regulatory Reinvention Initiative, that the United States Environmental Protection Agency (USEPA) would develop a set of pilot projects that provide the flexibility to test alternative strategies to achieve environmental protection goals. The initiative gives a limited number of regulated entities an opportunity to demonstrate excellence and leadership (hence Project XL). Sponsors will be given the flexibility to develop alternative strategies that replace or modify specific regulatory requirements on the condition that they produce "superior" environmental results. In exchange for greater flexibility, regulated entities will be held to a higher standard of accountability for demonstrating project results.

Project XL has been broken down into three specific regulatory reinvention programs that coincide with the President's alternative performance-based strategies: the XL program for commercial facilities; the industry-wide or sector-based XL program; and XL programs dealing with government agencies regulated by the USEPA.

1.2 ENVVEST Overview

ENVVEST (Environmental Investment) is the Department of Defense (DoD)-specific program for XL projects for government agencies. Jointly sponsored by the Department of Defense (DoD) and the USEPA, the program was formally indoctrinated on November 1995, when the DoD and USEPA signed a Memorandum of Agreement (MOA) on Regulatory Reinvention Pilot Projects. This MOA established a framework for developing ENVVEST pilot programs at 3-5 selected DoD facilities.

ENVVEST seeks to accomplish many of the same goals and objectives as Project XL. It defines performance goals and creates optimal approaches to achieve those goals. However, it will test budgeting processes while combining compliance with the unique pollution prevention and technology resources available to DoD.

ENVVEST differs from Project XL in the following primary areas: funds originally programmed for "relieved" compliance actions remain at the installation for reinvestment over the duration of the ENVVEST project's investment period; and both installations and regulators agree on alternative use of funds - typically pollution prevention projects with high environmental return on investment.

1.3 Elmendorf Participation in ENVVEST

Elmendorf Air Force Base (Elmendorf) and Vandenburg Air Force Base are currently leading the Air Force as pilot ENVVEST initiatives.

In December 1997, the USEPA approved Elmendorf's ENVVEST proposal for implementation. A Public Outreach Plan was approved. The USEPA Region X, the State of Alaska Department of Environmental Conservation (ADEC), and Elmendorf, commonly referred to as the Parties, developed and signed an Interim Project Agreement (IPA) in August 1998. The process continued by soliciting public comment and involvement while negotiating the framework of the project. Comments received during a series of ENVVEST public meetings were incorporated into a draft Final Project Agreement (FPA), which was published in the Federal Register in November 1999 for additional public comment. Minor revisions to the draft FPA were made based on comments received during this final comment period. All parties signed the revised FPA on December 15, 1999.

With the ENVVEST program, Elmendorf proposed and has received regulatory flexibility under the Title V permitting process. Elmendorf requested that the ADEC and the USEPA apply relevant Clean Air Act policy guidance to Elmendorf. Specifically, the USEPA's policy document *Major Source Determinations for Military Installations under the Air Toxics, New Source Review, and Title V Operating Permit Programs for the Clean Air Act*, dated August 2, 1996. The flexibility granted by the application of the EPA guidance results in Elmendorf having only one major emission source, the central heating and power plant. The ENVVEST agreement allows simplification of the application, implementation, management, and renewal processes of Title V permitting and management.

1.4 Elmendorf ENVVEST Pollution Prevention (P2) Projects

As a result of the above stated flexibility, Elmendorf has estimated that total monitoring, recordkeeping, reporting, and overall management costs will decrease by about 80 percent, yielding about \$1.5 million in savings. These realized cost savings are being directed toward pollution prevention (P2) opportunities.

As part of the FPA, Elmendorf has agreed to implement an alternative-fuel vehicle program, a hazardous air contaminant (HAC) reduction program, and other possible P2 opportunities. These efforts are discussed in detail in the following sections.

2.0 Alternate-Fuel Vehicle P2 Project

2.1 Introduction

Elmendorf's primary P2 project is the introduction of a compressed natural gas (CNG) fleet and fueling program. These alternate fuel vehicles and the supporting infrastructure should reduce levels of carbon monoxide (CO) on the base, and support the State of Alaska's efforts to reduce CO levels in the Anchorage urban area which is classified as a "non-attainment area" for CO.

Furthermore, the use of alternate-fuel vehicles by Elmendorf will assist the Municipality of Anchorage and the State of Alaska in their efforts to demonstrate and promote the feasibility of CNG technology.

The Elmendorf CNG program will be phased in over a six-year period. The development of the program consists of two primary activities:

- design and construction of the CNG fueling station, and
- conversion of gasoline and/or diesel-fired vehicles to CNG-burning vehicles.

These activities are briefly discussed below, in the context of the progress-to-date and planned activities in each development area.

2.2 Progress to Date

CNG Fueling Station

Elmendorf obtained the services of USKH, a local engineering firm for the design of the on-base CNG fueling station. The design effort was completed in September 1998, at a total cost of approximately \$31,000. As designed, the CNG station will consist of a 250 cubic feet per minute (CFM) compressor, a series of cascading storage tanks and two 3600 pound per square inch (PSI) fill stands. The station will also contain a computerized fuel tracking and management system.

The contract for the construction of the CNG fueling station was awarded to Palmerco Construction Incorporated of Anchorage in March 1999 for approximately \$494,000. Construction is expected to begin in May 2000.

Vehicle Conversions

The total number of vehicles to be converted to CNG has yet to be determined. The budget for conversions during this fiscal year is \$100,000. The actual number of conversions will depend on the per vehicle cost. Also, during this first year of the program, six Elmendorf mechanics will be trained and certified in CGN conversion, resulting in significant cost savings in future years.

Based on information available to-date, Elmendorf expects that between 13 and 15 vehicles can be converted with this year's available funds.

Currently, the following vehicles have been scheduled for conversion:

- 4X4 Suburban (1)
- 4X4 Ranger Pickups (6)
- Telephone Maintenance Trucks (remainder)

These vehicles were chosen based on their engine type (EPA-approved CNG conversion kits are not available for all engine families), useable cargo space (ability to carry CNG tankage), frequency of use (high use vehicles are given priority) and availability at Elmendorf.

2.3 Planned Activities

CNG Fueling Station

With the design of the CNG fueling station complete and the construction contract awarded, work at the site is scheduled to begin by the middle of May. Provided construction begins as planned, the station should be complete in late July or early August of this year. The facility's operation will then be verified for 2-3 weeks, and barring any unforeseen complications, official full-time use of the station will begin following a ribbon-cutting ceremony sometime around the end of August.

The station will be located on base at the southwest corner of the 9th Street and Jerstad Avenue intersection.

Vehicle Conversions

A Statement of Work (SOW) for the CNG vehicle conversions will be solicited locally, and award of the contract is expected sometime in May. The SOW will include equipment, installation, and warranty specifications, and will also require post-conversion CO, hydrocarbon (HC), and nitrogen oxides (NO_x) emissions testing to validate expected emission levels of these

air contaminants. The vehicles converted will be chosen based on their on-base usage (fleet vehicles are preferred pending functional cargo limitations) and the availability of EPA-approved conversion packages.

As noted above, Elmendorf mechanics will be trained and certified in the CNG conversion process, and will handle vehicle conversions in subsequent years. Elmendorf expects that performing the conversions in-house will lower the per vehicle cost of CNG conversion over time. Additionally, Elmendorf will pursue procurement of manufactured dual fuel and dedicated fuel CNG vehicles.

The ENVVEST parties anticipate a budget of \$100,000 per year through 2004 for the CNG program. This money will be used for operation, maintenance, and other costs associated with the facility and conversions. Additional slow fill hook-up may also be added to locations across the base if warranted.

3.0 Hazardous Air Contaminant P2 Project

3.1 Introduction

In addition to the alternate-fuel vehicle P2 project, Elmendorf is actively pursuing a base-wide HAC emissions reduction program. This program has been ongoing for several years and Elmendorf has made significant strides towards reducing air emissions while maintaining operational capability and flexibility. Nevertheless, further emissions reductions are possible.

In the summer of 1999, Elmendorf contracted the Air Quality Branch of the Institute for Environment, Safety and Occupational Health Risk Analysis (IERA/RSEQ) to conduct a comprehensive HAC emissions reduction survey for the base. The results of the survey, delivered in July 1999, provided Elmendorf with a list of project initiatives to further reduce actual and potential HAC air emissions. Several of these initiatives are now being carried out under the ENVVEST program and others are being pursued independently as valid pollution prevention projects.

3.2 Progress to Date

Under the IERA/RSEQ survey, the base's existing Air Emission Inventory (AEI) and Title V Permit Application were reviewed to determine those processes responsible for the greatest actual and potential HAC emissions, and those processes that would benefit the most from projects designed to reduce emissions.

The survey identified initiatives for the following source-groups: surface coating operations, internal combustion engines, incinerators, gasoline distribution, and aircraft engine testing. Of these source-groups, surface coating operations are a large contributor to the base's HAC emissions, and have received the greatest attention to date.

The intent of the HAC reduction process is to minimize HAC emissions with the available funds. Elmendorf received relief from the Aerospace NESHAP, with the permit scheme that was developed under the ENVVEST negotiations. The EPA expressed concern for this outcome and lead Elmendorf to develop a comprehensive list of HAC reduction projects. The Parties intent is to reduce base-wide HAC emissions to the maximum extent possible without focusing on any subset of sources.

Surface Coating HAC Reduction Strategy

The majority of Elmendorf's surface coating operations involve the application of paints and primers at the Corrosion Control, Transportation, Aerospace Ground Support Equipment, and Civil Engineering Vertical Repair Shops. Elmendorf's surface coating HAC reduction strategy is based on implementing the following changes at these areas:

- switch to high solids/low VOC paints,
- personnel training to increase paint transfer efficiencies
- use carbon adsorption units in paint booths,
- switch to high volume/low pressure paint application, and
- installation of automatic paint gun washers.

High solids/low VOC paints contain significantly lower levels of HAC solvents such as toluene, xylene and methyl ethyl ketone (MEK). Carbon adsorption units remove approximately 85% of these solvents from paint booth vent streams. High volume/low pressure (HVLP) paint application and personnel training improves the transfer efficiency of the operation, reducing the amount of paint required per unit of coverage. Automatic paint gun washers recycle cleaning solvents, which are otherwise released to the atmosphere.

Recent Implementations

Through its Hazardous Materials Management Process (HMMP) Team, Elmendorf has implemented an across-the-board switch-over to high solids/low VOC paints where technically feasible. The base hazardous materials/hazardous waste management plan (O Plan 19-3) provides links to websites that list environmentally friendly substitutes for paints and other hazardous materials. Shop level personnel are required to consult these lists before requesting approval to purchase any paint or other hazardous material. Additionally, ENVVEST funds have been used to purchase an automatic paint gun washer for the Corrosion Control Shop and new HVLP spray guns (12 total) for both the Corrosion Control and Transportation Shops.

3.3 Planned Activities

Planned activities include a training program for Elmendorf technicians in HVLP painting techniques. The training program will also provide an audit of the overall surface coating operations in place at Elmendorf. The contractor will inspect the equipment used, the infrastructure in place and provide a list of recommendations for improvements designed to increase the transfer efficiency of surface coating operations.

Elmendorf will continue purchasing additional automatic washers and HVLP spray guns for use in all shops that perform surface coating operations.

In response to the IERA report, Elmendorf proposed to replace several of the existing shop paint booths with new booths equipped with carbon adsorption units. These efforts, which require funding for both design and construction, will be phased in over the next several years. Project design and construction funds are tentatively allocated according to the following schedule:

<u>Area</u>	<u>Design</u>	<u>Construction</u>
Corrosion Control	FY2001	FY2002
Transportation	FY2002	FY2003
Aerospace Ground Support Equipment	FY2003	FY2004
Civil Engineering Vertical Repair	FY2003	FY2004

Other HAC reduction options identified in the IERA/RSEQ HAC survey are also being considered.

4.0 Future P2 Projects

4.1 Introduction

In addition to the alternate fuel and surface coating P2 projects identified in Sections 2.0 and 3.0, Elmendorf is also considering other P2 projects under the ENVVEST program. The projects being considered are based on the IERA/RSEQ survey findings discussed above, proactive U.S Air Force initiatives, and comments/recommendations received on the ENVVEST FPA from public participants such as the Trustees for Alaska.

4.2 Additional P2 Projects under Consideration

The following additional P2 projects are currently under consideration:

- Clean Cam Technology Systems
- Block or headbolt heaters combined with a Green Light replacement
- Medical waste disposal unit replacement
- Takeoff and landing emissions inventory

Clean Cam Technology Systems

The Clean Cam Technology Systems (CCTS) technology is a proven, non-intrusive method for emissions reduction in older, in-service diesel-powered engines. This emission reduction technology uses replacement parts requiring very little change in the structural appearance of the engine, and the modification does not have a significant impact on operations or maintenance.

The U.S. Air Force has recently initiated the Comprehensive Aerospace Ground Support Equipment Emission Reduction Program (CAGSEERP). As part of this effort, CCTS is being validated as a reduction technology for A/M32A-86 (-86) generators, which are used widely for Aerospace Ground Support at Air Force installations nation-wide. Based on limited testing at Brooks Air Force Base, Texas, the CCTS modification reduces hydrocarbon emissions by 44%, CO emissions by 43%, NO_x emissions by 77%, and particulate emissions by 52%.

To assist in the evaluation of the effectiveness of CCTS in cold weather duty, Elmendorf has recently proposed the use ENVVEST funds to install CCTS on at least one of the base's -86 generators. Elmendorf has developed a draft SOW and cost estimate but is still working on collecting additional information. Actual work may begin by the end of this fiscal year (FY 2000) if funds became available.

Block or Headbolt Heaters

A recent study presented at the 1997 Society of Automotive Engineers' International Fall Fuels & Lubricants Meeting & Exposition shows a sizeable reduction in both CO and VOC emissions with the use of a headbolt or block heater during cold weather starts. At minus 15 degrees Celsius, the researchers report a reduction in CO and VOC emissions of 60% and 65%, respectively with the use of a block heater.

In addition, The Municipality of Anchorage has conducted emissions testing to determine the CO reductions with the use of block heaters. The Municipality's tests, conducted in 1998 and 1999, show a reduction in cold-start CO emissions ranging from 45% to 87% with the use of block heaters.

The suggestion was made that increased energy use by operation of the heaters could be offset by the replacement of existing florescent lights with high efficiency "green" florescent lights at locations where the heater infrastructure is installed. More study will be necessary to determine feasibility but the possibility of the project intrigued the parties present at the last ENVVEST public meeting.

Elmendorf may propose the use of ENVVEST funds to pursue the installation of headbolt or block heater infrastructure. No timetable has been established for this project and its implementation is pending, based on the expected availability of funds over the course of the ENVVEST Program and perceived P2 benefits relative to other potential and planned P2 projects.

Medical Waste Disposal Unit Replacement

This project was tabled by the ENVVEST Parties as it was the intention of Elmendorf to replace the medical waste disposal unit regardless of the ENVVEST project.

Takeoff and Landing Emissions Inventory

The Trustees for Alaska (Trustees) expressed concern about emissions from aircraft operations at Elmendorf to the ENVVEST Parties in a letter dated December 17, 1999, a day after the last ENVVEST public meeting. The Trustees appear to be requesting that Elmendorf use ENVVEST funds to quantify the air emissions from airfield operations. A project for a takeoff and landing emissions inventory could be developed. These inventories are routinely performed at Air Force installations when required by more stringent air quality regulation provisions. The Parties will continue to seek input from the Trustees to determine their preferences.