

Background

The Project Sponsor: The City of Denton, Texas, has a rapidly growing population of more than 72,867 (1998) and is located approximately 30 miles north of Dallas/Fort Worth. The City of Denton has a publicly owned treatment works (POTW) that collects wastewater from homes, commercial buildings, and industrial facilities and transports it via a series of pipes, to the Pecan Creek Water Reclamation Plant. Here, the reclamation plant removes harmful organisms and other contaminants from the sewage so the resulting effluent can be discharged safely into Pecan Creek. The City of Denton Department of Water Utilities is responsible for water quality in the city, including the water that enters the reclamation plant. The City of Denton Environmental Services Division is responsible for implementing the pretreatment program.

Generally, POTWs are designed to treat domestic sewage only. However, POTWs also receive wastewater from industrial users. The industrial flow entering the Pecan Creek Water Reclamation Plant in Denton represents approximately 9 percent of the average total daily flow (1.0 million gallons per day of 11.1 million gallons per day, total flow). The City of Denton currently provides wastewater services to 12 significant industrial users (SIUs); seven are “major” users, and five are classified as “categorical industrial users” under the Clean Water Act because they are metal finishing and electric power generating facilities. Denton will reduce its monitoring and annual inspections for certain individually approved facilities and focus on pollutants in the urban stormwater drainage.

The Experiment: The City of Denton, through the XL program, is exploring the potential of integrating publicly accessible, near-real-time monitoring, a pilot pretreatment project, and an early warning system for stormwater drainage into a state-of-the-art integrated monitoring system and watershed protection program. This project tests

an innovative and comprehensive system that will provide the capability to detect contaminants with the potential to impact water quality and ultimately the aquatic environment and drinking water reservoir for the City of Denton. The City of Denton also plans to create buffer zones in undeveloped drainage basins within the boundaries of the watershed. These creek-side buffer zones or conservation easements will help reduce the runoff of agricultural and suburban pollutants.

Discharge permits are issued to all SIUs. The discharge permit application requires the industrial user to provide a description of the manufacturing processes, water consumption, and the volume and potential pollutant concentration in wastewater discharged from the facility. Each permitted industrial user is inspected, and its wastewater discharge is sampled and analyzed annually. For this XL project, the City of Denton will modify the industrial user inspection and monitoring schedule required by issued National Pollutants Discharge Elimination System (NPDES) permits. This XL project will test reducing the frequency of inspections and monitoring for SIUs that have consistently met NPDES permit standards. Inspection of industrial users that have demonstrated compliance will be conducted biennially (every two years), instead of annually. The four-day monitoring period required under standard NPDES monitoring schedules will be reduced to two days during unannounced randomly scheduled visit. Annual efforts to inspect small quantity generators (SQGs) will be reduced from 10 percent of SQGs to less than 5 percent. The SQGs will be selected for inspection based on their potential to contribute contaminants to the POTW.

Through this inspection and monitoring program, the city plans to ensure environmental compliance with fewer resources expended by the city. Resources are primarily in the form of city staff time and activities. As a result, City of Denton Environmental Services personnel can redirect their efforts to addressing issues at problem sites such as recycling centers, junk yards, and salvage yards, which have a greater potential to contribute pollutants directly to receiving streams through stormwater runoff and non-point source pollution.

City personnel can also direct their efforts toward identifying previously undetected contributors to influent loading. To identify the sources, the city will have to backtrack from the POTW to local lift stations to potential source contributors. Both of these activities satisfy components of the stormwater management plan being developed in Denton and will result in a significant environmental improvement over current conditions.

The city estimates that the most significant environmental benefit associated with the project will be derived from the implementation of a watershed protection program including modified elements of the NPDES Phase II Storm Water compliance activities. The NPDES Phase II Storm Water Program requires the implementation of best management practices (BMPs) to measure and control the runoff of pollutants from parking lots, recycling centers, junkyards, and salvage yards, which should improve the water quality of receiving streams. The stormwater program also requires installation of erosion control measures at construction sites. The city will recommend the BMPs to developers. The city is also establishing creek-side buffer zones or conservation easements, which should reduce the concentration of nitrogen and phosphorus fertilizers, pesticides, and herbicides contributed by runoff. Additional resources can be directed to public education, including outreach on the proper use and disposal of pesticides, herbicides, and automotive fluids. Finally, this XL project will enable the City of Denton to develop its watershed protection program years earlier, and much more effectively, than would have occurred otherwise.

The Flexibility: In order to achieve these objectives, the City of Denton will modify the industrial user inspection and monitoring schedule required by issued NPDES permits. According to the approved NPDES permit schedule, all SIUs and minor users are inspected once per year and the wastewater discharged from the facilities is sampled and analyzed at least once per year. Sampling at each industrial user is performed during a four-day period. This XL project will test reducing the frequency of inspections and monitoring for SIUs that have consistently met NPDES permit standards in the past. Inspection of industrial

users that have demonstrated compliance will be conducted biennially (every two years), instead of annually. The four-day monitoring period will be reduced to two days during an unannounced randomly scheduled visit. Annual efforts to inspect SQGs will be reduced from 10 percent of SQGs to less than 5 percent. The SQGs will be selected for inspection based on their potential to contribute contaminants to the POTW. The City of Denton is requesting flexibility from Clean Water Act regulations to reduce the frequency of industrial user compliance inspections and monitoring. This project is being implemented under a policy application contained in a memo titled, "Revision to Inspection Coverage and Frequency Criteria of Clean Water Act Permittees," signed by Elaine Stanley and Bob Van Heuvelen, dated September 11, 1995. This policy allows for the reduction of inspections to a less than annual basis to allow the Agency and states to shift inspection resources from lower risk sources to higher risk sources. The Texas Natural Resources Conservation Commission (TNRCC) will promulgate a rule adopting the site-specific measures granted by EPA. This will allow Denton to redirect resources to the development of a comprehensive watershed protection program, resulting in the support of site-specific watershed protection activities.

Other Innovations: (1) *Effectively Targeting Monitoring and Inspection Schedules to Maintain Environmental Quality.* Only SIUs and minor users that have been in compliance will qualify for less frequent inspections and monitoring by city personnel. (2) *Generating Greater Environmental Benefit by Reducing Programmatic Burdens.* By reducing the frequency of inspections and monitoring on those industrial users who are already in compliance, this project aims to make more resources available to city personnel to work to achieve greater environmental results through focused activities. (3) *Remote Monitoring and Watershed Protection.* This project will test the application of real-time, remotely deployed monitoring devices that will provide continuous, publicly accessible water quality data while creating minimal demand on personnel. Monitoring and annual inspection will be reduced, while greater focus will be placed on reducing non-point source pollutants in urban storm water drainage. Resource

savings from regulatory flexibility will be reapportioned to watershed protection activities.

The Superior Environmental Performance:

This project tests an innovative and comprehensive system, which will provide the capability to detect contaminants with the potential to impact water quality and ultimately the aquatic environment and drinking water reservoir for the City of Denton. The City of Denton also plans to create buffer zones in undeveloped drainage basins within the boundaries of the watershed. These creek-side buffer zones or conservation easements will reduce the runoff of agricultural and suburban pollutants. The three main areas addressed to achieve superior environmental performance are:

1. The pretreatment program;
2. Wastewater collection system monitoring; and
3. Watershed protection.

The resources saved by the flexibility and the experiment will be used in watershed protection activities, including inspections of vehicle maintenance facilities, recycling centers, junkyards, salvage yards, municipal and school district fleet service operations, and construction sites; establishment of a remote creek monitoring network; and incorporation of pollution prevention best management practices into the local code of ordinances.

Progress in Meeting Commitments *(As of October 2001)*

The City of Denton FPA includes the following commitments:

- EPA expected to promulgate a site-specific rule, amending 40 CFR 403. EPA will work with TNRCC to issue the necessary permits, orders, or other actions to be undertaken to implement this project.
 - On October 3, 2001, EPA promulgated a rule amending the National Pretreatment Program regulations to allow POTWs that have completed the Project XL selection

process, including FPA development, to modify their approved local pretreatment programs. These POTWs will be allowed to modify their programs, and implement the new local programs as described in their FPAs.

- TNRCC has committed to promulgating a rule adopting the regulatory flexibility granted by EPA. The agency will work with EPA to issue the necessary permits, orders, or other actions to be undertaken to implement this project, and propose for public comment any permit or permits needed by the City of Denton under this project.
- The City of Denton will request a modified Phase II stormwater permit from the TNRCC (issued on effective date of Phase II program) that takes into account the watershed protection efforts being put forth through this project.
- The City of Denton will collect and analyze environmental data from the area being monitored and submit periodic reports tracking the progress of the project. The city will continue to submit regulatory reports on the non-waived requirements of its pretreatment program.
- Along with other watershed protection activities, the City of Denton will either purchase property or encourage the implementation of protective practices in predominantly undeveloped drainage areas within the city boundaries.
- As one activity to reduce pollutant loading in the POTW influent, the City of Denton will attempt to backtrack from lift stations to potential source contributors in an attempt to identify the sources of nickel and lead in the wastewater.

Benefits for the Environment

- City of Denton personnel will be able to redirect their efforts to those sites that have a greater potential to contribute pollutants directly to receiving streams through runoff and non-point source pollution.

- City personnel can also direct their efforts toward identifying previously undetected contributors to influent loading and address high levels of lead and nickel in the influent wastewater.
- Water quality in Denton streams will be improved by watershed protection activities, ranging from real-time monitoring, to establishing stream buffers, to enhancing public education, all of which are facilitated by this pilot project.

Benefits for Stakeholders

- Increased monitoring efforts in association with the development of a watershed management plan, the Environmental Condition Online DFW Metroplex (ECOPLEX) project, will allow the public to track water quality throughout the watershed online (<http://www.ecoplex.unt.edu>).

Benefits for the Sponsor

- Reduced requirements for conducting inspections and monitoring at industrial user facilities will allow the City of Denton to redirect its personnel resources toward other projects, including developing a modified Phase II Storm Water Management Program, and a watershed protection plan.

Information Resources: The information used to develop this progress report were (1) City of Denton Pilot Pretreatment Program FPA, signed February 22, 2000; and (2) *Project XL Comprehensive Report, Volume 1: Directory of Regulatory, Policy, and Technology Innovations, and Volume 2: Directory of Project Experiments and Results*, November 2000.

City of Fort Worth

PHASE 1 MONITORING PLAN AGREEMENT SIGNED SEPTEMBER 29, 2000

Background

The Project Sponsor: The City of Fort Worth was established in 1849 in north-central Texas as an Army outpost. It is now a home rule municipality and the seat of Tarrant County with an estimated population of 471,125. Historically, the city's industry was primarily cattle ranching, which has given way to the more manufacturing, distribution, and technology-related industries of today. The flux of business in the urban areas has created blight in Fort Worth, and in recent years the city has become concerned with these areas and has begun taking tangible steps towards redeveloping and reusing many abandoned and substandard properties. In 1999, the city was awarded an EPA Brownfields Assessment Demonstration Pilot² to assist with redeveloping and reusing some of the city's blighted, or brownfields, properties. Fort Worth has also been granted numerous national and regional awards for its stormwater and wastewater programs. The city has the premier household hazardous waste collection center in the state of Texas and is recognized for its strides in environmental education.

The Experiment: Fort Worth seeks to demolish substandard, abandoned structures using an alternative method in lieu of the current Asbestos National Emissions Standards for Hazardous Air Pollutants (NESHAPs) requirements. As part of its attention to blight and attendant crime and public safety issues, the city has identified a number of structures for demolition that contain asbestos-bearing materials and are subject to demolition requirements specified in an asbestos emission standard issued by EPA under the Clean Air Act

(CAA). Currently, the city follows the requirements established by the Asbestos NESHAPs to demolish substandard structures that are not in danger of imminent collapse. Through the XL project, the city is attempting to demonstrate that using an alternative demolition method can protect human health to the same degree as the method specified in the Asbestos NESHAPs under the CAA, while also reducing demolition costs. The alternative "Fort Worth Method" integrates "wet" demolition methods, air monitoring, and proper handling/disposal techniques. In a recent example, the city demonstrated that demolition using the Fort Worth Method achieved a nearly \$20,000 savings over the traditional method of abatement under the Asbestos NESHAPs. This project will test whether using the Fort Worth Method reduces abatement contractors' personnel costs, material costs, and personnel time.

To use the Fort Worth Method in place of the traditional method described in Asbestos NESHAPs legally, the city must prove that its method is equivalent to the one specified in the NESHAPs. The City of Fort Worth and EPA will execute two agreements for this project to accommodate a three-phased approach under this XL project. The first agreement, the Monitoring Plan Agreement, was signed in September 2000 and lays out the phased approach for the project and the asbestos monitoring plan for Phase 1. The second agreement, the FPA, will be developed using stakeholder input and will address the last two phases of the project. The development of the FPA and initiation of the Phase 2 demolition is anticipated in the next six months.

Phase 1 consists of monitoring asbestos emissions from the demolition of a structure containing asbestos but not subject to the federal asbestos standard because of its residential classification (residential buildings containing four or fewer dwellings are not subject to the Asbestos NESHAPs). Phase 2 consists of demolishing two additional structures and monitoring asbestos emissions while comparing the federally mandated method to the alternative method. If testing in Phases 1 and 2 is successful, the city will be permitted to conduct a specific number of demolitions using its alternative method during Phase 3.

²EPA's Brownfields Assessment Demonstration Pilots seek to assess brownfields sites and to test cleanup and redevelopment models. Communities are awarded grants up to \$200,000 to implement their Pilot, usually over a two-year period. This pilot program is intended to provide EPA, states, tribes, municipalities, and communities with useful information and strategies as they continue to seek new methods to promote a unified approach to brownfields site assessment, environmental cleanup, and redevelopment.

The Flexibility: Fort Worth seeks relief from the requirements of the Asbestos NESHAPs and the Texas Asbestos Health Protection Rules to the extent that these regulations require the removal of regulated asbestos-containing building materials (ACBM) from substandard structures prior to demolition. In general, demolishing a structure containing asbestos requires federal compliance with the Asbestos NESHAPs, as provided under section 112(h)(3) of the CAA, and state compliance with the Texas Asbestos Health Protection Act.

The structure demolished in Phase 1 was not a regulated structure (i.e., not subject to the Asbestos NESHAP due to its residential classification); and therefore, the city only requires regulatory flexibility to conduct Phases 2 and 3.

Other Innovations: *Wet Demolition of Structures with ACBM.* The primary innovation in the Fort Worth Method is the wet demolition method used in handling structures containing ACBM. In the traditional method, ACBM is removed from the structure prior to demolition. In the Fort Worth Method, ACBM remains in place. It is believed that through proper handling and wetting of this demolition debris, the city can control asbestos fiber release at least to the level of the existing Asbestos NESHAP.

The Superior Environmental Performance: Implementation of the proposed Fort Worth Method will provide environmental performance superior to that which is realized under traditional approaches and will serve to improve the community at large. The Fort Worth Method aims to maintain the level of environmental protection currently dictated by the Asbestos NESHAPs, as well as worker protection dictated by the Occupational Safety and Health Administration, while reducing the costs of demolition of substandard structures. In a recent example, the city demonstrated that demolition using the Fort Worth Method achieved a nearly \$20,000 savings over the traditional method of abatement under the Asbestos NESHAPs because of the reduced personnel time and material costs for abatement contractors.

Progress in Meeting Commitments (As of August 2001)

- In Phase 1, the city committed to demolish a structure that was within city boundaries and contains asbestos-bearing materials, but one that was not subject to Asbestos NESHAPs.
 - The first structure selected for the Phase 1 demolition was a two-unit residential structure located at 2615 Ennis Avenue, in the City of Fort Worth (see Figure 5). Because the regulated asbestos-containing materials levels were low at this structure, it was considered a good test case for the alternative Fort Worth Method. It was a vacant building of approximately 1,126 square feet, with a long history of code violations dating back to the 1980s. The Fort Worth Building Standards Commission declared the structure to be substandard at a hearing on November 27, 2000. The owner was given 30 days to fix the structure or to demolish it, but failed to do so. The City of Fort Worth Code Compliance Division chose to move forward with the demolition, the Department of Environmental Management performed an asbestos survey, and the site was approved as a test structure for a Phase 1 demolition. The property was demolished in April 2001. The city monitored asbestos emissions during the demolition process according to a monitoring plan, which was approved by all those involved in this XL project.
- The city committed to perform asbestos monitoring specified in a detailed Quality Assurance Project Plan during demolition and demolition debris removal.



Figure 5
The first structure demolished under Phase 1 of the City of Fort Worth XL Project at 2615 Ennis Avenue.

- The structure was successfully demolished over a two-day period using the Fort Worth Method. Asbestos monitoring occurred during the demolition, and sampling was taken for water, soil, moisture, and air and produced only minor detection. Water (e.g., from the hose at the structure) was non-detect for asbestos. The soil before the demolition was non-detect for asbestos and contained trace amounts (i.e., not quantifiable) after demolition. Moisture samples of demolition debris ranged from 39 percent to 147 percent.
- Air samples were taken at both the demolition site and the landfill site, in an upwind/downwind configuration. The Fort Worth Method monitors airborne concentrations of asbestos upwind (comparative environmental background) and downwind of the site and compares the samples to determine if the project is successful. For each demolition, the city collected one sample at each corner of the demolition area, one sample per heavy equipment unit, and one personal sample (at a minimum) on workers in the work area that are not dedicated to a piece of machinery. The city also performed air monitoring while landfilling demolition debris. They collected samples at 10 locations for two to three consecutive days during landfilling of the demolition debris from each of the facilities. Five sampling locations were established upwind and downwind from the landfill. Most of the air samples showed a reading below detection limit for asbestos; there was one asbestos fiber found at the landfill and one at the demolition site.
- The Phase 2 demolitions will involve two identical structures that are subject to the Asbestos NESHAPs. One structure will be demolished using the Fort Worth Method and one using the method prescribed by the Asbestos NESHAPs.
- The city has committed to monitoring asbestos emissions for each demolition, and these data will provide a basis for EPA to determine

whether Fort Worth's alternative method is equivalent to the NESHAPs method for the purpose of demolishing the remaining structures identified by the project sponsors. In order to proceed to Phase 3, EPA must find that the Fort Worth Method is equivalent to the NESHAPs method. Phase 3 will consist of using the Fort Worth Method on a number of additional buildings.

Benefits for the Environment

- Using the alternative method in buildings with ACBM will protect the environment from the release of asbestos during the demolition.

Benefits for Stakeholders

- Stakeholders such as the local residents, businesses, chambers of commerce, government entities, and organizations benefit from the reduction in blighted properties in their community. Through working to rid the city of its abandoned, substandard structures, the city will become more beautified, property values will rise, and in some cases public safety will be restored.
- The reduction in demolition costs will allow the city to accelerate urban renewal, thereby eliminating havens for drug use and other criminal activities and reducing safety hazards often associated with the abandoned structures.

Benefits for the Project Sponsor

- The alternative method may create significant cost savings for performing environmentally sound proactive nuisance demolitions. This allows Fort Worth and other local municipalities to tackle the problem of urban blight more successfully by being able to perform more demolitions.

Information Resources: The information in this summary comes from the following sources: (1) the Phase 1 Monitoring Plan Agreement for the City of Fort Worth, signed September 29, 2000; and (2) the *Project XL Comprehensive Report, Volume 2: Directory of Project Experiments and Results*, November 2000.

Clermont County

XLC³ FINAL PROJECT AGREEMENT SIGNED SEPTEMBER 6, 2000

Background

The Project Sponsor: Clermont County is a transitional community east of Cincinnati and one of Ohio's fastest growing counties. The county is experiencing significant changes in population density and rural demographics. In 1990 the population was 150,000; it is expected to reach 255,000 by 2020. The county is particularly concerned about the impacts of rapid development on its surface water resources. The Clermont County Project focuses on the East Fork of the Little Miami River (EFLMR) watershed. The specific waters within the county considered under this agreement include the EFLMR mainstream and tributaries and Harsha Lake, which is located centrally within the EFLMR basin. The EFLMR is a major tributary to the Little Miami River, which is a designated State and National Scenic River and is the State of Ohio's largest Exceptional Warmwater Habitat stream.

The Experiment: The Clermont County XLC project seeks to create a comprehensive watershed management plan for the EFLMR. The watershed plan will address environmental management of the county's watershed resources with an aggressive and innovative community-based approach so that the county can maintain that necessary balance between economic growth and the preservation of its rural character and environment and, where possible, strive to improve the environment and protection of the area's resources. Due to its comprehensive scope, the plan will also encompass other development issues closely tied to water quality, including land use, development procedures, open space and farmland preservation, and economic development. It is expected that this approach will achieve more environmental objectives and meet more performance standards than

could be achieved using current federal and state standards. The development of such a holistic plan will empower the local community to work with the Ohio Environmental Protection Agency (OEPA) on reviewing current water quality standards and establishing meaningful measures of environmental conditions that are based on the specific characteristics of the EFLMR and its tributaries. The plan involves the following key components: development of a Watershed Quality Management Plan (QMP), collaborative goal setting, sampling and monitoring, development of a computer-based set of watershed monitoring tools, development of a County Environmental Protection Plan, and the development of a community framework for local permitting and public policy formulation that improves the quality of the local watershed.

To develop this innovative watershed management plan Clermont County has developed an ongoing, multiphased approach. Phase I of the project comprises the agreement between Clermont County, OEPA, and EPA for this XLC project. The primary goal of Phase I is to focus on the overall planning aspects of the project, including (1) setting conditions and criteria for assessing the project's successes, milestones and schedules, and reporting requirements and (2) establishing the involvement and commitments of Clermont County, EPA, OEPA, and other participants and stakeholders in the watershed development process. Phase I of the project is near completion and involves implementing the Watershed QMP and developing watershed modeling tools.

The Flexibility: For Phase I, the initial planning phase, no regulatory flexibility is needed. As the project moves to subsequent phases, more specific details regarding necessary regulatory flexibility will be identified.

Although no specific regulations have been identified, the following potential areas that focus on managing and protecting water resources may need regulatory flexibility in the future:

- Implementation of a pollution trading system within the watershed;

³Project XLC, eXcellence and Leadership for Communities, encourages local public sector and community organizations to come forward with new approaches to demonstrate community-designed and directed strategies for achieving greater environmental quality consistent with community economic goals.

- Management of land use and development regulations;
- County and state oversight of local water quality objectives and standards;
- Operation rules for the Harsha Lake Reservoir; and
- Discretion in allocation of funding to support implementation of control measures.

Other Innovations: (1) *Innovative Watershed Management Approaches.* Innovative watershed management approaches include those that prevent pollution in the first place, such as small diameter gravity sewers, seasonal discharging/non-discharging small community wastewater sewage systems, creative farming practices, or alternative small business operations to help manage the amount of pollution entering the watershed. (2) *Increasing County Responsibility for Monitoring.* By adopting monitoring standards that meet or surpass the state standards, the county will take greater responsibility for the protection of its own watershed and the state will become more focused on oversight. (3) *Transferring Lessons Learned to Other Communities.* The transfer of power from state to county will put the county in a better position to make informed decisions about how best to protect water quality. Sharing the lessons learned may assist other communities facing the similar challenge of balancing economic growth with environmental quality. (4) *Community-based Environmental Decision Making.* The project brings community-planning efforts related to wastewater management and land use planning/zoning together under water quality protection. Ultimately, the county hopes to achieve collaborative goal setting for its water resource management by placing decision-making responsibility at the local level.

The Superior Environmental Performance: A major goal of this XLC project is to achieve superior environmental performance through greater local responsibility and management of point and non-point sources of water pollution. Further, this project is comprehensive in scope and includes development issues closely tied to water quality

such as land use, development procedures, open space and farmland preservation, and economic development. Most importantly, the county is being proactive—investing in watershed management controls not currently regulated by National Pollutant Discharge Elimination System permits and much sooner than would otherwise be required under a waste load allocation and total maximum daily load developed by OEPA.

Clermont County committed to the following four project environmental performance goals in order to achieve superior environmental performance with this project: (1) no adverse trends in water quality indicators; (2) maintenance of flow regime; (3) support of high-quality fishery; and (4) improvement in trophic state of Harsha Lake.

The baseline used to measure superior environmental performance of this project will be comparing the goals mentioned above to projected water quality conditions if this project were not implemented—current control measures, unchecked development, and reasonably anticipated future regulations. Given the current rate of development in the county, it is likely that if no new measures or controls are developed for the watershed, the water quality will decline over time. Consequently, this innovative project should result in enhanced environmental benefits sooner than would be realized under current and anticipated regulations.

Progress in Meeting Commitments (As of October 2001)

- Many of Clermont’s commitments are ongoing activities. Clermont is working with EPA and OEPA to (1) implement the QMP, (2) identify and describe potential watershed modeling management options, (3) identify and verify monitoring and sampling methodologies, and (4) develop and implement watershed modeling tools.
- Clermont is also working with stakeholders and the appropriate local, regional, and state agencies.
- Clermont will work with EPA and OEPA to identify and describe potential rules, permits,

or other mechanisms that will be implemented when necessary.

- To date, no regulatory requirements have been needed, but Clermont will comply with all necessary requirements when they are needed.

Benefits for the Environment

- The Clermont XLC project will help improve the EFLMR aquatic habitat through implementation of a comprehensive watershed management plan that will improve surface water quality throughout the county.

Benefits for Stakeholders

- Stakeholders and project sponsors are working to identify problems, establish goals, determine data needs, review monitoring results, and identify potential management actions. One project goal is to involve the local community in establishing a relevant and specific watershed management plan for the EFLMR and place decision making at the local level. Clermont County's Stakeholder Involvement Program fosters a collaborative goal-setting environment for water resources management.

Benefits for the Project Sponsor

- The development of the watershed management plan will empower Clermont County to work with OEPA on reviewing current water quality standards and establishing meaningful measures of environmental conditions that are based on the specific characteristics of the EFLMR and its tributaries.
- Clermont County will benefit through the development of a computer-based set of watershed monitoring tools, a County Environmental Protection Plan, and a community framework for local permitting, and through collaborative goal setting, sampling and monitoring, and public policy formulation that improves the quality of the local watershed.

- The development of the QMP is significant to Clermont County because it provides a blueprint for the Clermont XLC process that describes how they can select from a combination of optimum watershed management options and establishes a basis of sufficient information for their decision making. It identifies how decisions will be made, how data will be managed, how situations will be evaluated, and how information will be fed back into the system, making the entire process collaborative and specific to the EFLMR.

Information Resources: The information in this summary comes from the following sources: (1) the FPA for the Clermont County Project, signed September 6, 2000; and (2) the *2000 Project XL Comprehensive Report, Volume 2: Directory of Project Experiments and Results*, November 2000.

Crompton Corporation Sistersville Facility (formerly Witco)

FINAL PROJECT AGREEMENT SIGNED OCTOBER 17, 1997

Background

The Project Sponsor: Crompton Corporation's Sistersville facility (formerly Witco) is a specialty chemical manufacturer. This project focuses on Crompton's 50-acre chemical manufacturing plant located six miles south of Sistersville, West Virginia, where Crompton produces a broad range of silicone and silane products, including surfactants, emulsions, antifoams, and oils. The facility is located along the east side of the Ohio River in a rural setting near the border of Tyler and Pleasants Counties. Crompton employs nearly 600 residents of these two and other nearby West Virginia and Ohio counties at the Sistersville plant.

The Experiment: The Crompton project tests whether regulatory flexibility will lead to reductions in air emissions and waste greater than what would be achieved by otherwise required emissions controls for the two wastewater surface impoundments located onsite. The project strives to reduce pollution through a combination of air pollution control, waste minimization, and pollution prevention (P2) activities.

The Flexibility: EPA and the State of West Virginia have agreed to a deferral of Resource Conservation and Recovery Act (RCRA) organic air emission standards through a site-specific rule applicable to two Crompton surface impoundments. EPA is in the process of promulgating National Emission Standards for Hazardous Air Pollutants (NESHAPs) under the Clean Air Act (CAA). EPA plans to propose NESHAPs applicable to miscellaneous organic processes in the first quarter of fiscal year 2002; this standard is called "the MON." Production activities at the Sistersville facility will be regulated under the MON. The MON is anticipated to require process vent controls similar to the vent incinerator installed by Crompton under

the XL project. Therefore, the project will provide superior environmental performance only until the MON is in effect. The project provides for a reevaluation following the proposal of the MON. Crompton will prepare a project reevaluation report within 90 days following the close of the comment period for the new standards. If EPA, West Virginia, and other stakeholders agree to continue the project, the FPA will be amended to achieve superior environmental performance in a different way and to go beyond the MON requirements.

Other Innovations: (1) *Waste Minimization and Pollution Prevention.* Crompton committed to conducting a waste minimization/pollution prevention (WM/PP) study to identify opportunities for additional reductions in waste generated by the facility. (2) *Case-by-Case Deferrals.* EPA and West Virginia consider the WM/PP initiatives to be an important contribution to the superior environmental performance offered by the Crompton project. The applicability of the WM/PP initiatives could be limited if they are subject to the requirements proposed in CAA Subpart YYY. Subpart YYY, as proposed, would apply to a process unit that generates wastewater and produces one or more of the chemicals listed as a product, co-product, byproduct, or intermediate product. If promulgated, CAA Subpart YYY would apply if Crompton begins recovering substances listed in the proposed CAA Subpart YYY. If Crompton starts recovering these substances, EPA and West Virginia will then consider issuing a limited scope "allowable exclusion/allowable increase" deferral of the regulations on a case-by-case basis. This deferral would be issued with the provision that EPA and West Virginia find that it will not cause an increase in actual emissions of volatile organic compounds or cause a net adverse environmental impact. Further, Crompton must remain in compliance with the provisions of the XL project. If such a deferral is granted, EPA and West Virginia will consider proposing regulations implementing the deferral.

The Superior Environmental Performance: Crompton has realized significant decreases in methyl chloride, dimethyl ether, and methanol emissions, as well as decreases in wastewater

treatment sludge generated at the Sistersville facility. Crompton has installed a process vent incinerator that destroys 98 percent by weight of “capper unit” air emissions. The performance test has shown that the oxidizer is reducing total organics in the vent stream by 99.99 percent. Approximately 602,484 pounds of methyl chloride, dimethyl ether, and methanol emissions have been reduced as a result. Since 1998, 100 percent of methanol collected from the capper unit has been reused, a total of 1,292,834 pounds of methanol. As a result of Crompton’s methanol recovery and reuse efforts, the amount of sludge generated by the wastewater treatment system from capper operations, and disposed of in an onsite hazardous waste landfill, has been reduced by 1,914,873 pounds. Finally, WM/PP activities at the facility have resulted in 400 identified opportunities for waste minimization and pollution prevention. Twenty-two of these are currently being implemented. Eighty-seven implemented projects since 1998 have resulted in a reduction of 5,200,000 pounds of wastes generated, as well as a cost savings to the facility of \$3,651,000.

Progress in Meeting Commitments (As of July 2001)

- Crompton is required to purchase, install, test, and monitor a process vent incinerator on its methyl capper unit that will reduce the organic compounds in the process vent streams by 98 percent.
 - The unit has been installed and is reducing the total organics in the waste stream by 99.99 percent (see Figure 6). This exceeds the 98 percent control efficiency requirement.
- Crompton is required to implement a methanol recovery operation and ensure that a minimum of 95 percent by weight of the methanol collected is utilized for reuse, recovery, or thermal recovery/treatment.
 - The 95 percent methanol reuse, recovery, or thermal recovery/treatment has been exceeded, as 100 percent of the methanol collected has been reused (see Figure 7).

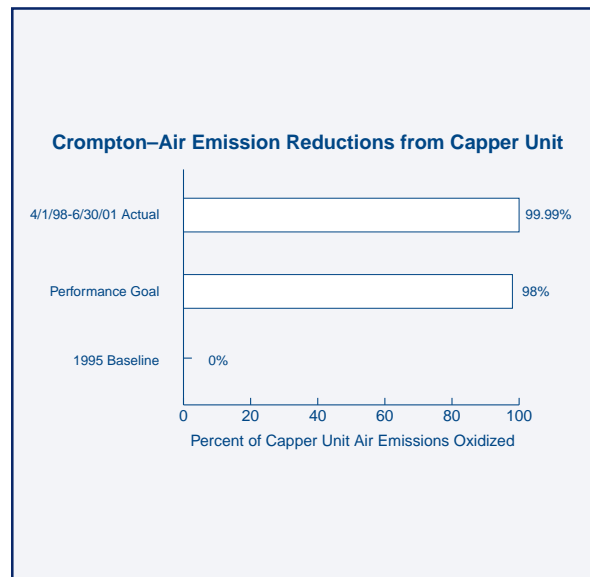


Figure 6
Crompton air emission reductions from capper unit.

- Crompton is required to implement a WM/PP project, conduct a WM/PP study, deliver a final report on the study, and implement the technically and economically feasible WM/PP opportunities identified in the study.
 - Crompton completed the final report for the WM/PP study on December 11, 1998.
- In addition to the progress reported above, Crompton has achieved the following environmental benefits since 1998:
 - Total emissions have been reduced by more than 600,000 pounds. Wastewater treatment sludge generated has been reduced by nearly 2 million pounds. Nearly 1.3 million pounds of methanol have been reused (see Table 4).
 - A total of 602,000 pounds of methanol was generated from July 2000 to June 2001, of which 321,000 pounds were reused.
- The Sistersville plant undertook two major P2 efforts to develop P2 opportunities in 2001.
 - First, an Energy Conservation Team was formed in Spring 2001 to identify and implement ideas and methods that will reduce the plant’s energy use and expenses. The Team is focusing on use of electricity, natural gas, nitrogen and water. The Team is trying to increase awareness of the costs of unnecessary electricity usage and leaks. Several focus groups gathered

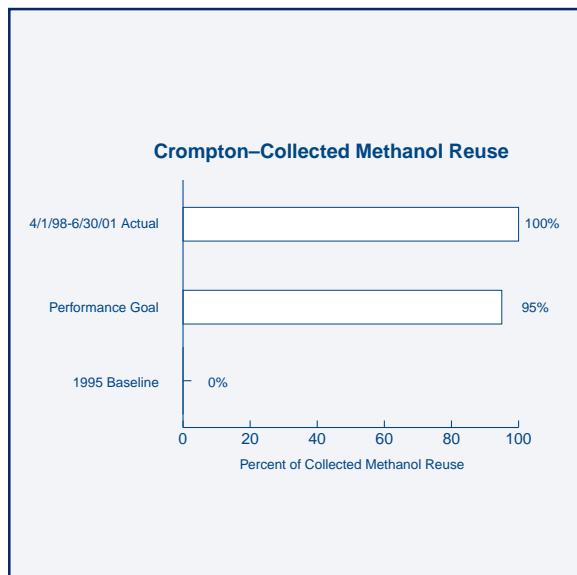


Figure 7
Crompton collected methanol reuse.

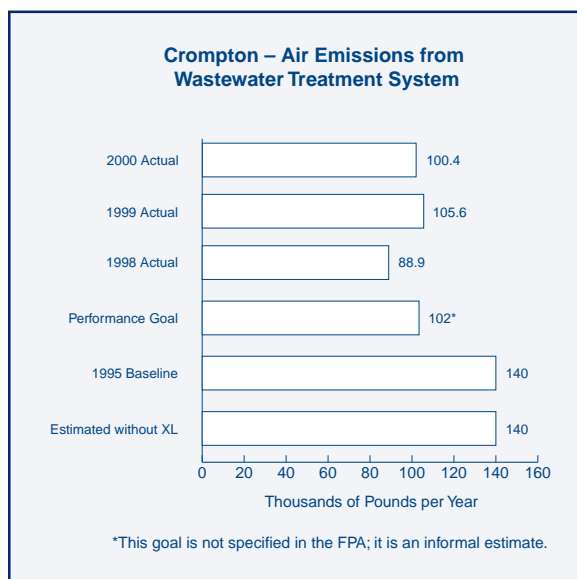


Figure 8
Crompton air emissions from wastewater treatment system.

Table 4: Annual Total Emissions Analysis

Emissions Analysis	1998	1999	2000
Total Air Emissions Reductions (pounds)	152,217	205,350	244,917
Wastewater Treatment Sludge Reductions (pounds)	542,783	676,930	695,160
Methanol Reused (pounds)	424,254	428,520	440,060
Total Reductions In Emissions And Waste (pounds)	1,119,254	1,310,800	1,380,137

- to discuss ways to increase energy efficiency and developed more than 200 ideas for energy conservation in the four following areas: (1) conservation, (2) waste recovery, (3) process energy reduction and improvements, and (4) operating efficiency improvements. The Energy Conservation Team is reviewing these ideas and categorizing and prioritizing them. The next steps for the Team are to implement those ideas where possible and then to share them more broadly with those who can more adequately address the suggestions.
 - Second, the plant convened an Innovation Workshop in July 2001 to help gather ideas for improving business. Participants were organized into four subject areas, one of which was dedicated to waste minimization, management, and treatment. Over 50 ideas from that group were identified and prioritized. Crompton has begun pursuing the most attractive ideas.
- Table 5 highlights the P2 opportunities implemented and the associated environmental and cost savings benefits accrued by P2 activities. As a main part of the XL project and its WM/PP study, Crompton implemented air emissions and sludge reduction plus methanol recycling. The environmental benefits and cost savings of these two efforts for the 2000 calendar year are displayed in the first row of Table 5. In addition to these two efforts, Crompton has implemented a number of other waste management and P2 opportunities from the time that the project has been in implementation.
- Key focus areas for successful implementation of the FPA over the next six months include the fourth semiannual project report due January 31, 2002; the fourth annual project report due July 31, 2002; and the ongoing implementation of options identified in the WM/PP. EPA is expected to propose new MON standards in the first quarter of 2002. As per the FPA, Crompton will prepare a project reevaluation

**Table 5: Crompton Corporation Sistersville Facility
WM/PP Study Results***

Year Opportunity was Implemented	Number of New P2 Opportunities Implemented	Recurring Wastes Prevented, Latest Estimates, lbs/yr	Recurring Cost Savings*, Latest Estimates, \$/yr
Air Emissions and Sludge Reduction Plus Methanol Recycle (excludes capital savings from XL project) Actual for Calendar Year 2000	2	1,380,137	\$17,000
1997	9	376,000	\$228,000
1998	10	111,000	\$25,000
1999	34	1,698,000	\$1,179,000
2000	21	529,000	\$1,262,000
Jan.-June 2001	11	1,138,000	\$940,000
Total	87	5,232,137	\$3,651,000

Data presented are based upon information found in Crompton Sistersville Plant Project XL Annual Report, July 2001.

*Note that these savings do not consider the expense of implementing them. Hence net savings will be less. It is often difficult to assign that expense. For example, a totally new process unit may cost millions of dollars to construct. If that new process produces less waste, how much of the design and construction expense ought to be assigned to the P2 benefits? In the case of a process change being done explicitly for P2 reasons, the expense is more easily determined.

report within 90 days following the close of the comment period for the new standards. If EPA, West Virginia Division of Environmental Protection (WVDEP), and other stakeholders agree to continue the project, the FPA will be amended to include new approaches to providing superior environmental performance.

Benefits for the Environment

- In 1998, Crompton reduced air emissions by 152,217 pounds, reduced wastewater treatment sludge by 542,783 pounds, and recovered for reuse 424,254 pounds of methanol. In 1999, Crompton reduced air emissions by 205,350 pounds, reduced wastewater treatment sludge by 676,930 pounds, and reused 428,520 pounds of methanol. In 2000, Crompton reduced air emissions by 244,917 pounds, reduced wastewater treatment sludge by 695,160 pounds, and reused 440,060 pounds of methanol. (See Figures 8 and 9.)
- The final report of the WM/PP study (December 11, 1998) states that of the 290 P2 options identified, 19 have been deemed “not feasible,” 87 “are feasible,” and 184 still have their “feasibility undetermined.” The report includes 51 recent P2 initiatives that are in various phases of implementation from “scoping” to “complete.” The P2 options that have already been determined to be technically and economically feasible are underway. To date, 400 P2 options have been identified, of which 22 are at some stage of study and 87 have been implemented. The implemented “P2” opportunities have prevented a total of 5,232,137 pounds of waste and provided \$3,651,000 of cost savings.

Benefits for Stakeholders

- A Sistersville plant Project XL contact at the facility has been appointed to serve as a resource for the community, as well as to answer community inquiries about the XL project.

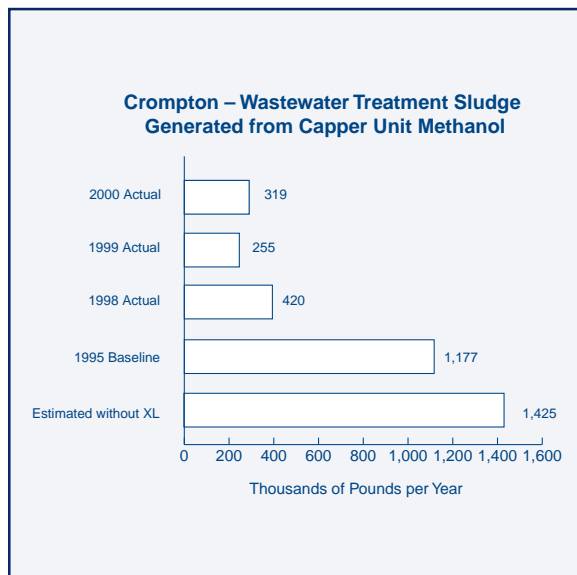


Figure 9

Crompton wastewater treatment sludge generated from capper unit methanol.

- Public files on the project have been established at both the Sistersville Public Library and the EPA Region 3 (Philadelphia) office.
- Crompton participated in a workshop sponsored by EPA, WVDEP, and the West Virginia Manufacturers' Association, where they led a roundtable discussion and presented a paper entitled "Waste Minimization for the 21st Century: A Dialogue with West Virginia Business and Industry Leaders."
- Crompton continues to keep stakeholders informed of project status by providing copies of semiannual and annual project reports.

Benefits for the Project Sponsor

- As a result of WM/PP efforts, Crompton saved \$228,000 in 1997, \$25,000 in 1998, \$1,179,000 in 1999, \$1,262,000 in 2000, and \$940,000 in the first half of 2001 and identified potential future cost savings of over \$1 million per year.
- As a result of the RCRA deferral, Crompton expects savings of about \$700,000 over the life of the project.

Information Resources: The information in this summary comes from the following sources: (1) *Project XL Second Annual Report*, July 31, 2000; (2) *Project XL Stakeholder Involvement Evaluation—Final Draft Report*, May 2000; (3) the December 1999 *Project XL Progress Report—CK Witco Corporation* (EPA 100-R-00-009); (4) the March 1999 *XL Project Progress Report—OSi Specialties* (EPA-100-F-99-009); (5) Witco's January 31, 1999, and July 30, 1999, reports; (6) focus group discussions in December 1998 with representatives of the federal and state regulatory agencies, Witco, and public stakeholders involved in the project; (7) the final report from Witco's WM/PP study dated December 1998; (8) *Project XL Third Annual Report*, July 31, 2001; and (9) EPA OAQPS Web site: Air Toxics Web site: Upcoming 10 year MACT Standards, <http://www.epa.gov/ttn/atw/mactupd.html>.

Department of Defense Elmendorf Air Force Base

XL/ENVVEST⁴ FINAL PROJECT AGREEMENT SIGNED DECEMBER 15, 1999

Background

The Project Sponsor: Elmendorf Air Force Base (AFB) is located just north of Anchorage, the largest city in Alaska. Elmendorf AFB covers approximately 13,000 acres; it has more than 800 buildings, two runways, 150 miles of roads, and more than 7,500 personnel from all branches of the United States and Canadian armed forces. With civilian workers, retirees, and their families, the number of people associated with Elmendorf rises to nearly 25,000. The southern boundary of the base borders the Anchorage nonattainment area for carbon monoxide (CO) under the Clean Air Act (CAA) National Ambient Air Quality Standards. Elmendorf is not included in the nonattainment area, and therefore reductions in pollution levels for Elmendorf AFB are not required under Title V requirements, a national permit system that applies to major stationary sources of air pollution. Nevertheless, one of the goals of this project is emission reductions on the base, including CO emission reductions.

The Experiment: The Elmendorf AFB project aims to promote pollution prevention (P2) activities by using cost savings and paperwork reduction associated with simplified Title V requirements. Under the simplified requirements, the Elmendorf AFB central heating and power plant (CH&PP) will be permitted as the base's only major stationary source, based on its emissions of nitrogen oxides (NO_x) and CO. The statutory pro-

grams affecting the Elmendorf XL/ENVVEST project are the CAA programs administered by EPA's Office of Air Quality Planning and Standards and regulations of Alaska Department of Environmental Conservation (ADEC). ADEC and EPA will approve potential to emit (PTE) limits for Elmendorf AFB's remaining sources of emissions of NO_x and CO. In total, these administrative changes are expected to result in savings of approximately \$1.5 million over a six-year period. These savings will be invested in P2 activities on base, with an emphasis on hazardous air contaminant (HAC) emissions reduction. This XL/ENVVEST project will demonstrate the feasibility of alternative-fuel vehicles in the Anchorage area and reduce air pollution base-wide through pollution prevention at multiple minor sources.

The Flexibility: The XL/ENVVEST project will provide Elmendorf AFB with relief from ADEC's operating permit program for major stationary sources. The traditional Alaska operating permit program would treat the entire Elmendorf AFB installation as a single air contaminant emission source, with 106 sources of regulated contaminants addressed in its Title V permit. Under these circumstances, the costs of obtaining and maintaining a Title V permit would be substantial. Under this XL project, the Title V permit would apply to only a small segment of Elmendorf AFB, including one source that is a major stationary source, the CH&PP, and several others that are subject to new source performance standards. ADEC will establish PTE limits for the other sources at Elmendorf AFB to ensure that they are not considered major sources. To enable the regulatory changes under this XL/ENVVEST project, ADEC will work toward inclusion of the major source guidance for Elmendorf AFB into the Alaska Air Quality Control regulations.

Most of the flexibility provided by this project could have been obtained without Project XL through an August 2, 1996, policy guidance document entitled, *Major Source Determinations for Military Installations under the Air Toxics New Source Review, and Title V Operating Permit Programs for the Clean Air Act*, and with the imposition of PTE limits on Elmendorf AFB. However, by participating in this project, Elmendorf AFB

⁴EPA and the Department of Defense (DoD) signed a Memorandum of Agreement in 1995 that established how the two agencies would interact during implementation of DoD's Environmental Investment (ENVVEST) program. The ENVVEST program emphasizes regulatory compliance through pollution prevention and provides an alternative to prescriptive regulatory requirements through a performance based environmental management system designed to attain superior environmental results.

obtains the flexibility to redirect money that would have been spent on Title V costs into P2 projects. Elmendorf AFB has agreed to invest the expected savings of \$1.5 million into projects that will result in actual emission reductions. Without the XL/ENVVEST project, those programs probably would not have occurred.

The Superior Environmental Performance:

Elmendorf AFB is committed to spending the savings derived from streamlining its environmental management costs on P2 opportunities. The activities undertaken by Elmendorf AFB thus far are detailed in the Progress in Meeting Commitments section. A supplemental agreement setting forth the specific additional P2 opportunities to be implemented will be developed with the assistance of stakeholders.

Other Innovations: (1) *Federal Budget Process.* ENVVEST is testing new approaches to the federal budgeting process. In the past, DoD's budgeting process allowed resources meant for environmental protection to be used only for meeting legally mandated environmental protection levels. New approaches are being tested to create a budget process that allows DoD to spend resources on P2 programs, innovative technologies, and other approaches that will cost-effectively reduce emissions below legally mandated levels.

Progress in Meeting Commitments
(As of August 2001)

- Elmendorf's primary P2 project is the introduction of a compressed natural gas (CNG) fleet and fueling program. The program is being phased over a six-year period and has two primary activities: (1) design and construction of the CNG fueling station and (2) conversion of gasoline and/or diesel-fired vehicles to CNG-burning vehicles.
 - The construction of a CNG fueling station was completed in summer 2000 and was celebrated with a ribbon-cutting ceremony in September 2000 (see Figures 10 and 11). The station is located on the southwest corner of the base, and canopies for the dispenser island and compressor/storage units will be constructed in fiscal year

2002 to provide protection from the elements. Elmendorf has earmarked \$100,000 for construction of the canopy for the CNG station. Additional slow-fill hookups may also be added to locations across the base if warranted.

- Elmendorf AFB purchased CNG conversion kits for 15 vehicles in 2000. The total number of vehicles to be converted to CNG is not defined as it depends upon per vehicle cost of conversion, which varies based on vehicle make and model. The approximate per vehicle cost for conversion is \$9,000. In 2001, Elmendorf AFB converted nine additional vehicles and has a contract in place to install conversion kits on 20 more vehicles. Fiscal year 2001 added another \$100,600 to the conversion program. ENVVEST has allocated \$30,000 for conversion of a 28-passenger bus from diesel to CNG. Elmendorf



Figure 10
Construction of the CNG fueling station at Elmendorf AFB.



Figure 11
Fueling a vehicle at the CNG fueling station at Elmendorf AFB.

- mechanics are trained and certified in the CNG conversion process.
- In addition to using alternative fuel vehicles, Elmendorf AFB is pursuing other P2 measures. Elmendorf AFB has assembled a list of the following other feasible P2 opportunities available at the base, along with the estimated costs and environmental benefits of each opportunity.
 - Clean cam technology systems (CCTSs);
 - A base-wide HAP emissions reductions program;
 - Block or headbolt heaters/plug-ins; and
 - Road paint truck replacement.
 - Elmendorf AFB is considering the implementation of CCTSs. By replacing engine parts in diesel-powered engines, CCTS can dramatically reduce air emissions, including CO, NO_x, and particulate matter (PM).
 - The CCTS was tested on a limited basis at Brooks Air Force Base, Texas, where the CCTS modifications resulted in a reduction of hydrocarbon emissions (HC) by 44 percent, CO emissions by 43 percent, NO_x emissions by 77 percent, and PM emissions by 52 percent.
 - A CCTS demonstration project will be conducted at Elmendorf AFB during the winter of 2002.
 - In 1999, Elmendorf contracted the Air Quality Branch of the Institute for Environment, Safety and Occupational Health Risk Analysis to conduct a comprehensive HAP emissions reduction survey for the base. The survey identified a number of initiatives for source-groups on the base that include surface coating operations, internal combustion engines, incinerators, gasoline distribution, and aircraft engine testing.
 - Surface coating operations, which involve the application of paints and primers at the Corrosion Control facility, are a large contributor to the base's HAP emissions, and have received the greatest attention to date.
- Elmendorf AFB purchased a spray gun parts washer and seven high-volume/low-pressure spray guns for the Corrosion Control facility. These two technologies mean that lower levels of HAC solvents, such as toluene, xylene and methyl ethyl ketone, are released to the environment. A training class for all shop personnel was provided. In addition, Elmendorf AFB has allocated \$150,000 for construction of three-stage filtration and carbon adsorption equipment in corrosion control paint booths. The construction will be complete in fiscal year 2002.
- In 2001, Elmendorf AFB installed a steam and pressure sterilization unit at the base hospital. The new system replaces a medical waste incinerator and produces no HAP emissions. After treatment in the sterilization unit, waste can be handled as solid waste, instead of the hazardous waste it was before treatment.
 - Public comments submitted by the Trustees for Alaska requested ENVVEST funds be used to quantify the air emissions from airfield operations. A takeoff and landing emissions inventory was completed in July 2001. The study was based on actual 1999 flying data and included aircraft stationed at Elmendorf as well as transient aircraft (see Table 6).
- In the future, Elmendorf may propose the use of ENVVEST funds to pursue the installation of headbolt or block heater infrastructure. A study presented in 1997 demonstrated a sizeable reduction in both CO and volatile organic compound (VOC) emissions with the use of a headbolt or block heater during cold weather starts. At minus 15 degrees Celsius, the researchers reported a reduction in cold-start CO and VOC emissions ranging from 45 percent and 87 percent with the use of block heaters.
 - Road and airfield painting operations are a significant source of HAPs for Elmendorf AFB. A HAPs Emission Inventory prepared in December 2000 documented that actual emissions during the 1998 season was nearly six tons. New paint and application technologies are

Table 6: Calendar Year 1999 Takeoff and Landing Emissions for Elmendorf AFB

	NO _x (tons/year)	CO (tons/year)	HC (tons/year)	PM-10 [particulate matter less than 10 microns in size] (tons/year)	SO ₂ [sulfur dioxide] (tons/year)
Winter mixing height (952 feet)	332.16	519.42	172.56.	100.94	46.1
Summer mixing height (1908 feet)	372.10	527.49	172.68	104.77	48.08

available that would allow Elmendorf AFB to drop these emissions to nearly zero. Water-based paints with low to no VOC content are available and require new application trucks that are estimated to cost \$225,000.

- If Elmendorf is not successful in obtaining funds through federal Air Force P2 programs, ENVVEST stakeholders approved the purchase of a new truck with ENVVEST funds in the last stakeholder meeting in August 2001. The purchase of an aqueous road paint truck is estimated to reduce HAP emissions by six tons per year.

Benefits for the Environment

- The use of CNG-powered vehicles in place of gasoline-powered vehicles will contribute to reduced CO, NO_x, non-methane organic gases, PM, and CO₂ emissions for Elmendorf. Vehicles will be tested before and after conversion to ensure that emissions are reduced.
- Elmendorf AFB has implemented a base-wide switchover to high-solids/low-VOC paints where technically feasible. These paints have significantly lower levels of HAC solvents, such as toluene, xylene, and methyl ethyl ketone.
- Elmendorf AFB has purchased an automatic paint gun washer that recycles cleaning solvents otherwise released to the atmosphere.
- Elmendorf AFB is undertaking a number of P2 opportunities with the cost savings associated with this project.

Benefits for Stakeholders

- The use of CNG-powered vehicles at Elmendorf AFB will demonstrate to the general public that this level of technology is achievable and beneficial. Elmendorf AFB has also had discussions with Anchorage and the State of Alaska about the possibility of the two governments’ CNG vehicles using the CNG infrastructure on the base.
- Regular meetings of the Restoration Advisory Board inform community members of pollution prevention activities resulting from this project.

Benefits for the Project Sponsor

- Elmendorf AFB will experience \$1.5 million in cost savings as a result of the regulatory flexibility that decreases total monitoring, record keeping, reporting, and overall management costs by about 80 percent.
- Elmendorf AFB is able to leverage the construction of a CNG fueling station on base for the acquisition of additional new CNG-capable vehicles.

Information Resources: The information in this summary comes from the following sources: (1) the FPA for the Elmendorf AFB XL/ENVVEST project, December 1999; (2) supplementary proposal materials; (3) the *Initial ENVVEST Progress Report*, March 24, 2000; (4) the *ENVVEST Annual Report*, September 2001; and (5) the *2000 Project XL Comprehensive Report, Volume 2: Directory of Project Experiments and Results*, November 2000.

Department of Defense Naval Station Mayport

XL/ENVVEST⁵ FINAL PROJECT AGREEMENT SIGNED MAY 30, 2000

Background

The Project Sponsor: The Naval Station (NS) Mayport is located in Jacksonville, Florida, and encompasses more than 3,400 acres on the northern end of a peninsula bounded by the Atlantic Ocean to the east, the St. John's River to the north, and the Intracoastal Waterway to the west. The station is a home port for more than 14,000 sailors and civilians, making it the third largest fleet concentration in the United States, and serves as a base for Navy ships, airplanes, and helicopters, as well as a training and repair station for the Atlantic fleet of the U.S. Navy. NS Mayport has nearly 1 mile of beachfront and 4.5 miles of river shoreline, and almost half of its 3,400 acres are classified as wetlands, brackish marshlands, or beaches. The Navy shares the area with numerous animal species, some being threatened or endangered (e.g., manatees, sea turtles, and northern right whales).

NS Mayport has been designated as the East Coast Navy Environmental Leadership Program base to help lead the Navy by developing innovative technologies and management practices to protect the environment and natural resources.

The Experiment: Every 18 to 24 months, NS Mayport dredges 600,000 cubic yards of silt and sand from the mouth of the channel into the St. John's River and the facility's turning basin in order to maintain adequate depths for the passing of naval ships. Historically, the dredged material was

stored in two upland holding sites; however, the space in the holding sites was eventually depleted, resulting in the need for another disposal location. Since 1993, ocean disposal for the dredged material has been approved under the Naval Station's current U.S. Army Corps of Engineers (USACE) permits.

NS Mayport is investigating and demonstrating two innovative methods for beneficially reusing dredged material: (1) producing construction building blocks from dredged material and (2) producing artificial reef material from dredged material. Reuse of the dredged material would eventually eliminate the need for ocean disposal of the material and/or permanent upland storage. NS Mayport will also test to see if excess fly ash, a coal combustion byproduct that can be used as a substitute for Portland cement, from the City of Jacksonville's Electric Authority serves as a good solidification material for the construction blocks. By recycling fly ash, the landfill needs of the Electric Authority will be reduced.

This project will proceed in phases that will allow NS Mayport to demonstrate and evaluate that the dredged material finished products are safe to human health and the marine environment. Implementation will include (1) collecting samples of dredged material and ensuring it meets all federal, state, and local building requirements; (2) researching the cost and benefits analysis to support long-term commercial and/or public use of the new materials; and (3) evaluating the need and cost-effectiveness of mobilizing portable equipment to manufacture products at or near the upland storage sites. If it is determined that the finished products present any risk to human health or the marine environment, implementation will stop.

The Flexibility: In return for testing possible beneficial uses for dredged material, EPA, under the XL/ENVVEST process, will create a partnership with the USACE, the Florida Department of Environmental Protection (DEP), the City of Jacksonville, and other interested stakeholders that will facilitate streamlining the permitting process. NS Mayport is currently required to obtain three permits, with three different time lines, to dredge and dispose of its dredged material. The USACE

⁵EPA and the Department of Defense (DoD) signed a Memorandum of Agreement in 1995 that established how the two agencies would interact during implementation of DoD's Environmental Investment (ENVVEST) program. The ENVVEST program emphasizes regulatory compliance through pollution prevention and provides an alternative to prescriptive regulatory requirements through a performance-based environmental management system designed to attain superior environmental performance.

permits require that chemical, biological, and physical analyses on the dredged material be performed and approved by EPA every three years.

EPA, USACE, Florida DEP, and the City of Jacksonville believe that providing NS Mayport with flexibility on permit renewals would allow them to focus more on the issues that stem from dredging and ocean disposal and less on the paperwork and renewal deadlines. Dredging and disposal are costly processes, but through Project XL, extending the frequency of permit renewals to the maximum extent by law would lower costs and help to improve the environment and marine habitat.

Other Innovations: (1) *Pollution Prevention: Using dredged materials for constructing building blocks and artificial reef materials.* The goal of the NS Mayport project is to minimize and eventually eliminate the ocean disposal of dredged maintenance materials by way of innovative technologies that reuse dredged materials for the creation of construction building blocks and artificial reef material. In addition, NS Mayport has proposed using excess fly ash from Jacksonville's Electric Authority as a solidification material for the construction blocks (not for reef material). (2) *Federal Budget Process.* ENVVEST is testing new approaches to the federal budgeting process. In the past, DoD's budgeting process allowed resources meant for environmental protection to be used only for meeting legally mandated environmental protection levels. New approaches are being tested to create a budget process that allows DoD to spend resources on pollution prevention programs, innovative technologies, and other approaches that will cost-effectively reduce emissions below legally mandated levels.

The Superior Environmental Performance: The NS Mayport XL/ENVVEST project provides a mechanism for EPA, NS Mayport, USACE, Florida DEP, and City of Jacksonville to explore options for streamlining and synchronizing permit application and processing required for the maintenance of dredging and ocean disposal permits. This reorganization will promote superior environmental outcomes by allowing NS Mayport to focus on developing two innovative methods for beneficially reusing dredged material: (1) producing construc-

tion building blocks from dredged material and (2) producing artificial reef material from dredged material. Use of the dredged material would eventually eliminate the need for ocean disposal of the material and/or permanent upland storage. Reduced ocean disposal of dredging material reduces the potential for negative impacts on water quality and benthic communities. A restriction on reef placement to outside the endangered northern right whale calving areas will eliminate the crossing of vessels carrying dredged materials through this habitat. NS Mayport will also test to see if the excess fly ash from the City of Jacksonville's Electric Authority serves as a good solidification material for the construction blocks. If it is suitable, this will reduce the disposal of fly ash in local landfills.

Progress in Meeting Commitments (As of October 2001)

- NS Mayport committed to identify alternative uses for dredged materials.
 - A pilot study to manufacture 1,000 decorative bricks for on-site projects is projected to begin in December 2001.
- NS Mayport committed to conduct tests and determine if dredged material and/or fly ash contain any contaminants.
 - Preliminary test results from bricks formed from one of the dredged material cells were submitted to EPA on March 2, 2001. Due to solid waste and hazardous waste concerns involving the use of dredged material, EPA and Florida DEP requested additional sampling be performed of the dredge material before and after the brick forming process. The contract to perform that sampling was awarded in September 2001 with sampling expected to begin in early December 2001.
 - The screening test results indicated that high-quality bricks/blocks could be manufactured from NS Mayport dredged material with appropriate additives. The study, conducted by a technical consultant, recommended two possible brick construction

- techniques out of the dredged material and additives that would produce brick/blocks that meet building specifications and codes for the State of Florida.
- The study also completed toxicity characteristic leachate procedure (TCLP) testing, required under the Resource Conservation and Recovery Act, on specimens of earthen block made with dredged material. EPA has established threshold levels for certain testing parameters, and all samples tested during the TCLP were determined to be less than EPA thresholds. During the duration of the project, EPA must approve data collected prior to any maintenance dredging, currently scheduled for September 2002, 2004, and 2006.
 - NS Mayport committed to concurrently obtain a Rivers and Harbors Act Section 10 permit for the dredging from the USACE; Environmental Resources Permit (ERP) from Florida DEP; and a Marine Protection Research and Sanctuaries Act Section 103 Permit for the disposal.
 - The current NS Mayport Section 10 permit expires in January 2002, the Section 103 permit expires January 2002, and the ERP permit expired October 2001. Permits will be issued concurrently in summer 2002.
 - NS Mayport committed to obtain from Florida DEP a Clean Water Act Section 401 Water Quality Certification (WQC) and a Coastal Zone Management (CZM) certification prior to the issue of a Section 10 permit.
 - The certification will be issued once the ERP permit has been obtained. The issuance of an ERP by Florida DEP satisfies the WQC and CZM requirements.
 - NS Mayport committed to issue annual summary reports as outlined in the FPA starting one year following its signing, through June 2009. Each report will be due the same time of each year during the life of the FPA.
 - The first annual summary report is scheduled to be submitted by December 30, 2001, in order to include results of additional sampling. Annual reports will be submitted each December through 2009.
 - NS Mayport committed to begin using dredged material from the two existing inland holding sites for construction blocks and artificial reef materials until one site has been depleted.
 - NS Mayport will construct a pilot plant for test production of building block materials beginning in December 2001.
 - NS Mayport committed to hold public meetings June of each year from 2001 through 2009.
 - The first public meeting was held on November 18, 1999. A public meeting will be held in January 2002 following the issuance of the first annual report.

Benefits for the Environment

- Ocean dumping of dredged materials generated by NS Mayport will be minimized and eventually eliminated.
- An additional reef ecosystem in the surrounding areas will be created through the use of dredged materials.
- Testing the reuse of dredged materials and using fly ash may drastically reduce the amount of waste needing to be landfilled and if successful, may be a potential reuse option for similar dredging operations.

Benefits for Stakeholders

- The City of Jacksonville could benefit financially from the introduction of an artificial reef. Artificial reefs have proven to be effective tools that augment and enhance recreational opportunities (fishing and diving).
- The City of Jacksonville's Electric Authority may benefit financially from the use of fly ash in building blocks versus typical disposal costs.

Benefits for the Project Sponsor

- NS Mayport should realize considerable direct cost savings through the synchronization of permits. This project will bring about a significant reduction in paperwork, cost, and time spent on permit renewals. This streamlining will allow NS Mayport to focus on the issues that stem from dredging and ocean disposal.
- In setting an environmental management standard for all Navy installations, this project will allow NS Mayport to disseminate its lessons learned from this project throughout the Navy and DoD.

Information Resources: The information sources used to develop this project summary include: (1) the FPA for the NS Mayport XL Project, May 30, 2000; (2) March 2, 2001 report by Norman Murray & Associates to NS Mayport entitled, “*Evaluation of Building Block Manufacture of Dredged Material from U.S. Naval Station Mayport Confined Disposal Facility*”; and (3) the *2000 Project XL Comprehensive Report Volume 2: Directory of Project Experiments and Results*, November 2000.

Department of Defense Puget Sound Naval Shipyard

XL/ENVVEST⁶ FINAL PROJECT AGREEMENT SIGNED SEPTEMBER 25, 2000

Background

The Project Sponsor: Puget Sound Naval Shipyard (PSNS) is a 750-acre, \$1.5 billion industrial facility located in Bremerton, Washington. Surrounded by evergreen trees and salmon runs, PSNS's six dry docks, seven piers, and 382 buildings are located on Sinclair and Dyes Inlets in the heart of the Puget basin. PSNS is the workplace of approximately 7,700 civilian and 50 permanently assigned military employees, with up to 3,000 additional military personnel, depending on the number of ships being overhauled at any one time. In continuous operation since it was founded in 1891, the shipyard serves as the full-service home port for several U.S. warships and performs repair, overhaul, conversion, refurbishment, refueling, decommissioning, dismantling, and recycling of Navy submarines and surface ships. Types of facilities include manufacturing, research, development, and testing.

Repair and maintenance activities commonly carried out at shipyards include hull cleaning, repair, and painting, electrical and machine work, carpentry, steel fabrication, pipe fitting, and sand blasting of parts. While smaller vessels can be worked on beneath shop roofs, larger vessels must be worked on out of doors in dry docks or hoisted out of the water on marine railways. In both cases, hulls are typically cleaned and stripped with high- and low-pressure water guns and/or dry, abrasive grit blasting. Painting is done mostly with spray

guns. Painting and stripping are significant sources of pollution from shipyards, and their waterfront locations increase the potential for pollutants to reach bodies of water.

The Experiment: This XL/ENVVEST project aims to develop and demonstrate an alternative strategy for protecting and improving the health of surface waters by identifying the stresses and corresponding point sources and non-point sources that are adversely affecting the Sinclair Inlet aquatic ecosystem. Pollution prevention strategies will then be developed for those sources for which the Shipyard is responsible in a comparative risk reduction approach.

Through this XL project, PSNS will develop, test, and demonstrate an alternative, long-term, and cost-effective strategy for protecting and improving the ecological health of the Sinclair Inlet through the use of sound ecological science and risk-based management techniques consistent with the EPA Ecological Risk Assessment Guidelines (EPA defines an ecological risk assessment as the process of evaluating the likelihood that adverse ecological effects may occur or are occurring as a result of exposure to one or more stresses), national Clean Water Act (CWA), and State Water Quality Standards. Specifically, this project will include a comprehensive watershed assessment that will provide the technical basis to implement the most cost-effective strategies to maintain and/or improve surface water quality.

The project involves two main phases. The first phase is an extensive research/study project to develop a comprehensive environmental database and a "watershed contaminant fate and transport" model. In the second phase, PSNS and stakeholders will use data gathered in the first phase to develop and then propose innovative compliance approaches within the regulatory framework.

The Flexibility: In Phase I of this project, no compliance flexibility is needed. Rather, PSNS will conduct a study that may result in a request for compliance flexibility in Phase II. This "umbrella FPA" established the fundamental criteria for ascertaining and evaluating the existing health of Sinclair and Dyes Inlets so that the parties can make

⁶EPA and the Department of Defense (DoD) signed a Memorandum of Agreement in 1995 that established how the two agencies would interact during implementation of DoD's Environmental Investment (ENVVEST) program. The ENVVEST program emphasizes regulatory compliance through pollution prevention and provides an alternative to prescriptive regulatory requirements through a performance-based environmental management system designed to attain superior environmental performance.

informed decisions and make recommendations for proposed compliance flexibility.

In Phase II, the proposal may seek to reallocate CWA National Pollutant Discharge Elimination System (NPDES) leads through consideration of CWA total maximum daily load (TMDL) analysis, pollutant load allocation options, and pollutant trading potential. Requests for compliance flexibility (such as establishing a pollutant-trading program for the Sinclair Inlet watershed) will be addressed when PSNS and the stakeholders identify instances where such flexibility would be beneficial. Such requests will be negotiated with EPA and the Washington Department of Ecology (WDOE).

Other Innovations: (1) *Transferability of an Integrated Marine Environmental Compliance Program.* The project will create a process that will, over time, allow a transition from piecemeal regulatory controls to a system of more effective and integrated pollution prevention and compliance system for the Sinclair and Dyes Inlets, with documented results. If proven successful, the tools developed for this project are anticipated to turn into a model that would be transferable to shipyards, both Navy and civilian, or to any governmental or civilian shoreside industrial facility or stakeholder community having past or present discharges into a marine environment. (2) *Testing Risk Assessment Concepts and Methodologies.* PSNS is testing the use of ecological risk assessment to focus and prioritize pollution prevention strategies on those waste streams that have the highest potential of adversely affecting the Sinclair and Dyes Inlets aquatic ecosystem. (3) *Relevant Measures of Ecological Effects.* The project will investigate and consider proposing alternative measures of ecological effects and/or surrogates of compliments to identified TMDL parameters. (4) *Cooperative TMDL Development Program.* This project is testing a new approach to TMDL development by partnering government with a private entity (the Navy) that will be impacted by the outcomes of the TMDL. In addition, participants have worked closely with the regulated community to help develop a strategy to create basin wide TMDLs. The goal of this approach is to bring as many local re-

sources to the table so that the TMDLs are as accurate and defensible as possible. (5) *Federal Budget Process.* ENVVEST is testing new approaches to the federal budgeting process. In the past, DoD's budgeting process allowed resources meant for environmental protection to be used only for meeting legally mandated environmental protection levels. New approaches are being tested to create a budget process that allows DoD to spend resources on pollution prevention programs, innovative technologies, and other approaches that will cost-effectively reduce emissions below legally mandated levels.

The Superior Environmental Performance: The PSNS's commitment to developing basin and watershed scale investigations, considered and conducted in a broader ecosystem context, is expected to produce results that will far exceed less informed and more piecemeal-type approaches. In addition, this project seeks to develop information, tools, and analyses to help regulators more readily link NPDES permit decisions to protecting aquatic uses through the development and implementation of TMDLs. Such an approach, coupled with PSNS's commitment to partner with other federal, tribal, state, and local entities, will help build the overall capacity of resource managers and the public alike to efficiently improve the water quality of the Sinclair and Dyes basin.

Progress in Meeting Commitments (As of August 2001)

- PSNS and stakeholders are currently gathering data and developing the comprehensive environmental database and watershed contaminant fate and transport models that will be used to analyze watershed data using an environmental risk assessment approach. Based on the findings, an alternative regulatory approach will be developed and proposed for consideration by both EPA and WDOE.
- PSNS committed to developing a strong outreach program, establishing a Technical Working Group (TWG) composed of representatives from various governmental agencies, educational institutions, and research groups and a

Community Working Group (CWG) composed of public and private interest groups and interested citizens.

- PSNS established a TWG on July 20, 2000 to develop, analyze, review and/or advise on issues within the ENVVEST Project and within more formal program and decision review processes.
- PSNS is in the process of determining the full scope of CWG involvement in this project, but it is anticipated that the CWG will conduct several major reviews of documents prepared by the TWG. These reviews include the Technical Master Plan, the TMDL Work Plan, and the Watershed Monitoring Plan.
- EPA, PSNS, and WDOE will work together to draft a report outline within 90 days of the signature of the FPA outlining stakeholder activities, important announcements, and a schedule of activities through the next reporting period.
 - Following the signing of the FPA, it became apparent that the various partners in the project had different expectations regarding the technical steps that needed to be undertaken to realize the goals and objectives of the project. At that point, it was decided that a Technical Master Plan should be developed outlining the technical scope of the project. The Technical Master Plan was drafted distributed for joint review and comment by EPA, PSNS, WDOE, and various working groups in March 2001. It is anticipated that following incorporation of EPA and WDOE comments, currently scheduled for December 2001, the CWG will review the plan.
- PSNS committed to provide an annual summary report to EPA and WDOE and, upon request, to stakeholders. Each annual report will provide a summary of environmental performance and will describe PSNS's progress toward completing the project as outlined in the FPA. During the first two years of implementation, PSNS will also submit a written report at six-month intervals.
 - The first semiannual report was originally due in March 2001. However, due to difficulties in initially coordinating the efforts and expectations of county, state, and federal entities regarding the project, reporting has been delayed until after the Technical Master Plan has been finalized, which is expected in early 2002. These semiannual reports will provide a summary of the status of the various technical studies being conducted under this project.
- PSNS committed to develop and implement a comprehensive environmental database.
 - PSNS staff and contractors have been developing information and entering it into a comprehensive environmental database. The database is currently in use by the TWG and access will eventually be provided to a broader array of users, including the CWG.
- PSNS committed to develop an integrated watershed/surface water contaminant fate and transport model.
 - Hydrodynamic models for receiving waters included in this study have been completed and linked with water quality modules. No more work can be done on this portion of the model until pollutant loading terms for major creeks and point sources have been determined using the watershed monitoring plan and the watershed models. Modeling of the major creeks in the study area is ongoing as well as development of the linkages between the watershed and surface water models. The best estimate for when completion of these modeling efforts would occur is fiscal year 2004.
- PSNS committed to utilize the information obtained from the database and modeling efforts to perform ecological risk assessment on the Sinclair Inlet.
 - Development of an ecological risk assessment framework is still in the problem formulation phase. In order to finish the

problem formulation and move forward, more water quality data and further definition of the objectives by our community and technical working groups will be needed. Both of these efforts are ongoing.

Benefits for the Environment

- This project seeks to develop tools that can provide information on the ecological health of the Sinclair and Dyes basin. This information can be integrated with TMDL development to help prioritize implementation activities that most benefit the water quality and natural function of the basin as a whole.
- The strategies developed as a result of this project will focus on utilizing a whole picture of the ecosystem, rather than addressing environmental aspects and problems in a piecemeal approach.

Benefits for Stakeholders

- Building partnerships among local stakeholders will ensure that all stakeholders have increased access to and input into the environmental decision-making process. This project involves a high level of integration and coordination between all involved stakeholders, located both on and off federal lands within the watershed, and has taken great strides to include community-level coordination, communication, and representation.
- An integrated monitoring, data collection, and analysis effort will avoid duplication of effort and efficiently focus monitoring programs carried out by stakeholder organizations, which now independently gather marine environmental data.
- It is hoped that this project will provide guidelines for the minimum data and criteria necessary to define what all local jurisdictions must define in respect to TMDLs: data, format, and analysis needed.

Benefits for the Project Sponsor

- This pilot project could result in at least \$135,000 savings annually through reduced end-of-pipe sampling, revised analytical methods, more efficient record keeping and reporting and better targeting of permit limitations. A portion of these savings would be used to implement the integrated monitoring and data management elements of the proposed project. The remainder would be used in targeted marine pollution prevention initiatives.

Information Resources: The information sources used to develop this project summary include: (1) the Phase I FPA for the Puget Sound Naval Shipyard, signed September 25, 2000; (2) “Large Shipyards in Washington: P2 & BMP Opportunities: A Northwest Roundtable Report,” November 6, 1997 (http://www.pprc.org/pprc/sbap/shipyard/wash/rt_rept.html); and (3) *The 2000 Project XL Comprehensive Report, Volume 2: Directory of Project Experiments and Results*, November 2000.

Department of Defense Vandenberg Air Force Base

XL/ENVVEST⁷ FINAL PROJECT AGREEMENT SIGNED NOVEMBER 3, 1997

Background

The Project Sponsor: The 30th Space Wing at Vandenberg Air Force Base (AFB) conducts and supports space and missile launches, operates the Western Test Range, and responds to worldwide military contingencies. Vandenberg AFB covers more than 98,000 acres and is the Air Force's third-largest installation. It is located in Santa Barbara County on the central coast of California, 150 miles northwest of Los Angeles.

The Experiment: Through this XL/ENVVEST project, Vandenberg AFB will use money to achieve superior environmental performance that otherwise would be spent complying with the administrative requirements of Title V of the Clean Air Act (CAA)—permitting, record keeping, monitoring, and training. Vandenberg AFB will apply advanced emission control technologies to stationary sources to reduce annual emissions of ozone precursors. In the first two years of the project, Vandenberg AFB focused on obtaining reductions from boilers, furnaces, and process heaters. Since then, Vandenberg AFB has focused on pollution prevention opportunities from a variety of other sources of ozone precursors, including internal combustion engines and solvent and surface coating applications. Details of the program are specified in an enforceable emission reduction plan prepared by Vandenberg AFB and in the annual and semiannual status reports prepared by Vandenberg AFB.

⁷EPA and the Department of Defense (DoD) signed a Memorandum of Agreement in 1995 that established how the two agencies would interact during implementation of DoD's Environmental Investment (ENVVEST) program. The ENVVEST program emphasizes regulatory compliance through pollution prevention and provides an alternative to prescriptive regulatory requirements through a performance based environmental management system designed to attain superior environmental results.

The Flexibility: Vandenberg AFB, like other military installations, differs from civilian or industrial stationary sources in that the base hosts and supports a unique and wide variety of functions and activities. These activities include residential housing, schools, recreational parks, wildlife reserves, shopping centers, industrial maintenance facilities, airfield operations, and various other mission-related activities. Therefore, Vandenberg AFB creates criteria pollutants normally associated with residential, commercial, and light industrial operations. Boilers, furnaces, process heaters, and internal combustion engines produce most of the stationary source ozone precursor emissions, primarily nitrogen oxides (NO_x). For purposes of permitting under Title V of the CAA, EPA and the Santa Barbara County Pollution Control District (the District) historically have considered Vandenberg AFB and all of its individual emission units to be a single stationary source. However, Vandenberg AFB does not fit the single stationary source definition as generally applied to civilian or industrial sources. Vandenberg AFB, in cooperation with the District and EPA Region 9, determined that if the actual emissions that are used to make a major stationary source determination for the base could be reduced to minor source levels, then Vandenberg AFB would be eligible to comply with rules that entail significantly less of an administrative burden. Together, the District, EPA Region 9, and Vandenberg AFB applied EPA's "Guidance for Major Source Determinations at Military Installations under the Air Toxics, New Source Review, and Operating Permit Programs of the Clean Air Act" (memorandum issued on August 2, 1996, by John Seitz, Director of EPA's Office of Air Quality Planning and Standards) to group different base activities as separate stationary sources for purposes of Title V applicability only. This guidance states that certain personnel-related activities at military installations (e.g., base amenities like grocery stores, gas stations, housing, theaters, shopping centers, etc.) may be considered not to be support facilities, and therefore can be considered separate sources. In addition, the District amended its regulations to exclude from its major source determination emissions that meet EPA's definition of "non-road engine," including equipment used for tactical support, infrastructure, and maintenance. The District's Rule

370, Potential to Emit—Limitations for Part 70 Sources, allows stationary sources that emit minor source levels of criteria pollutants to comply with Rule 370 requirements rather than having to obtain a Title V operating permit, thereby decreasing the permit administrative requirements for Vandenberg AFB.

The Superior Environmental Performance: Vandenberg AFB will improve the air quality of Santa Barbara County by using innovative technologies and pollution prevention to reduce annual emissions of ozone precursors by 10 tons or more by November 30, 2002.

Other Innovations: (1) *Administrative Burden Reduction.* A number of XL projects are testing different approaches to reducing the administrative permitting requirements imposed by federal, state, and local regulations. The Vandenberg AFB project is a test bed for sector-wide burden reduction for federally regulated entities. EPA is undertaking a coordinated permitting reform effort. Lessons learned from the Vandenberg AFB XL/ENVVEST permit approach will be used to influence the Permit Reform Action Plan. (2) *Federal Budget Process.* ENVVEST is testing new approaches to the federal budgeting process. In the past, DoD's budgeting process allowed resources meant for environmental protection to be used only for meeting legally mandated environmental protection levels. New approaches are being tested to create a budget process that allows DoD to spend resources on pollution prevention programs, innovative technologies, and other approaches that will cost-effectively reduce emissions below legally mandated levels.

Progress in Meeting Commitments (As of October 2001)

- Vandenberg AFB met its commitments to achieve the following milestones: (1) complete an initial assessment and cost feasibility study of emission reduction planning and permitting; (2) complete an evaluation of 24 pre-selected candidate boilers to determine their feasibility for retrofit or replacement with low-NO_x technology; (3) implement the boiler retrofit and replacement program; (4) submit a Rule 1301 emission reduction plan to the District; (5) implement a program to reduce emissions from solvents, surface coatings, and other sources of volatile organic compounds (VOCs); (6) implement a program to reduce mobile source emissions of NO_x and VOCs by replacing cars and trucks with electric vehicles (EVs); and (7) prepare progress reports every six months.
- In addition to the milestones, the FPA identified the need for a program plan. Source selection criteria, baseline emission protocols, technology options, emission measurement protocols, and emission reduction reporting protocols were to be included in the plan.
 - An initial plan was submitted to the District on November 26, 1997. The plan was partially approved with the understanding it would be revised and resubmitted to demonstrate compliance with Milestone 5. The document was completed on October 31, 2001, and will demonstrate that the conditions of all milestones were met.
- Vandenberg AFB committed to reducing annual emissions of ozone precursors (NO_x and VOCs) by 2 tons per year by April 30, 2000, and by 10 tons per year or more by November 30, 2002. As of April 2000, Vandenberg AFB had achieved 2.29 tons of emissions reductions through implementation of the boiler retrofit and replacement program. An additional 1.92 tons of emissions had been reduced by April 2000 through the implementation of zero-VOC paint and coating substitution (1.27 tons of VOC emissions), paint booth consolidation

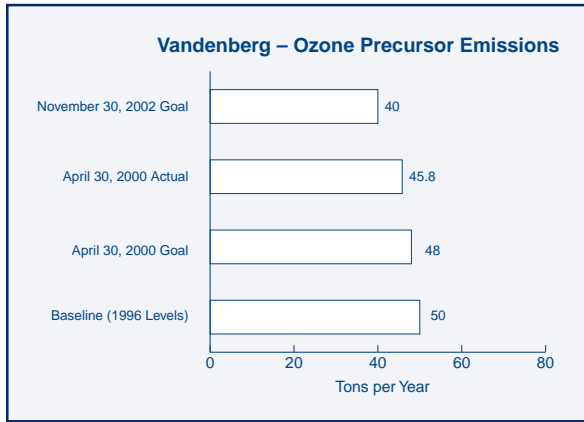


Figure 12
Vandenberg AFB's emissions of zone precursors.



Figure 13
Cars charging at one of the sites of the current 29 charging stations installed around Vandenberg AFB. This particular site supports 12 charging stations along with 10 Ford Ranger EV truck applications for the 30th Civil Engineering Squadron.



Figure 14
The parking island and charging stations that were constructed to accommodate Vandenberg AFB's SUVMS.



Figure 15
The SUVMS electrical equipment enclosure, which provides power to the SUVMS and EVs charging stations at Vandenberg AFB.

(0.50 tons of VOC emissions), and construction of a wastewater reclamation system adjacent to a satellite launch facility (0.15 tons of NO_x and VOC emissions). When these 1.92 tons of emissions are combined with the 2.29 tons of emissions reductions achieved through implementation of the boiler retrofit and replacement program, this results in a total of 4.21 tons of real and quantifiable emission reduction credits (see Figure 12).

- However, only the boiler retrofit and replacement program emission reductions are considered surplus, sustainable, and therefore, enforceable for purposes of the ENVVEST Program. Realizing this, Vandenberg AFB re-evaluated the technical approach and implemented economically viable and sustainable initiatives and found that the goals of the program would not be achieved with the remaining budget and milestone schedule. Therefore, on August 25, 1999, Vandenberg AFB presented an alternative proposal to purchase 12 tons of registered NO_x emission reduction credits (ERCs) from another source located in Santa Barbara County in order to achieve Milestone 5. The ERCs were purchased from Grefco Minerals, Inc., located in Santa Barbara County and within the same north country air basin. As a result, the purchased ERCs are permanently removed from Santa Barbara County's emission bank, given up for the benefit of clean air, and credited to the ENVVEST program. The application of purchased and ENVVEST achieved ERC's provides a net air quality benefit of 17.8 tons per year—consisting of the 12 tons of purchased ERCs, combined with the 4.21 tons of emissions achieved thus far, and an additional 1.6 tons of emissions reductions with the implementation of EV pilot program. Approximately 14.2 tons per year are considered surplus emissions—consisting of the 12 tons of purchased ERCs and approximately 2.2 tons from the boiler retrofit and replacement program.
- Even though all milestones have been met, Vandenberg AFB has obligated the balance of the ENVVEST funds, approximately \$1 million, to implement a Mobile Source Reduction

Program. The District approved this revised approach to the program in November 1999. As a result, Vandenberg AFB implemented a series of Mobile Source Reduction initiatives.

- The Mobile Source Reduction Measures were evaluated in a three-part technical approach to an EV pilot program, the purpose of which was to assess EV applications on base. (1) The first part involved establishing an EV loaner program. To date, the EV loaner program has reached out to 40 organizations at 17 locations on base. Nearly 300 base personnel have received EV user training. (2) The second step was obtaining a pilot-scale fleet of four EVs from a Base Realignment and Closure installation and the installation of the necessary support infrastructure. (3) The third step required that Vandenberg AFB assess the applicability of phasing in long-term EV use on the base. Now, with full program implementation, Vandenberg AFB has 29 charging stations and a fleet of 26 cars and plans to purchase 20 additional EVs and 10 compressed natural gas vehicles for use in 2002 (see Figure 13). The new vehicles will be part of Vandenberg AFB's shared-use vehicle management system (SUVMS) (see Figures 14 and 15). The SUVMS is an electronic system for easier use and sharing of the EV fleet. Vandenberg AFB anticipates saving over \$96,000 over three years with the EV fleet in the SUVMS (see Table 7). Applying clean technology vehicles such as EVs within a shared vehicle system framework will further lower emissions, fuel consumption, the fleet size of Vandenberg AFB, and save money.
- The estimated Title V program costs, ENVVEST program costs, and overall cost savings to Vandenberg AFB are presented in Table 8. Although the financial offsets during the past five years are difficult to measure, it is estimated that over \$1 million was saved. Vandenberg AFB has reduced record keeping and reporting, monitoring, and management costs associated with Title V compliance by approximately 30 percent. In return, \$2,500,000 was reinvested into this program.

The key focus areas for continued successful implementation of the FPA over the next six months will be the following:

- Continue stakeholder meetings.
- Procure 30 new alternative fuel vehicles for the SUVMS, beta test SUVMS, and continue enrollment into the SUVMS through the end of the calendar year.

Benefits for the Environment

- Emissions of the ozone precursor, NO_x , have been reduced by retrofitting or replacing those boilers with the highest potential for emission reductions.
- Emissions of the ozone precursors, VOCs, have been reduced by zero-VOC paint and coating substitution, paint booth consolidation, construction of a wastewater reclamation system adjacent to a satellite launch facility, and use of alternative fuel vehicles.
- Reduction of ozone precursor emissions may help to prevent Santa Barbara County from being reclassified as an ozone nonattainment area.

Benefits for Stakeholders

- Stakeholders have access to progress reports from the base and will be invited to public meetings.
- Vandenberg AFB personnel conduct briefings on a quarterly basis with the Vandenberg Citizens Advisory Board (CAB) and the Community Advisory Council (CAC), a panel consisting of citizens appointed by the Santa Barbara County Air Pollution Control District board members.
- Vandenberg AFB's innovative SUVMS program is a model that can be applied at other bases around the country. Vandenberg AFB representatives gave a presentation at the 6th Annual Joint Services Pollution Prevention and Hazardous Waste Management Conference held in August 2001 to inform other bases about the SUVMS project.

Table 7: Operations and Maintenance Cost Savings for the Vandenberg AFB EV Program

Operating Cost Factors	Ranger Electric Vehicle	Ranger Gasoline Vehicle
Total Miles Driven Per Year	10,000	10,000
Fuel Economy	2.52 miles/kWh	21.59 miles/gallon
Fuel Cost	\$0.07/kWh	\$1.99/gallon
Conversion Factors	3,412.13 Btu/kWh	115,400 Btu/gallon
Energy Consumption	1,355.10 Btu/mile	5,345.07 Btu/mile
Energy Cost	\$0.0000205/Btu	\$0.000173/Btu
Cost Per Mile	\$0.03/mile	\$0.09/mile
Total Energy Cost Per Year	\$278.00/vehicle	\$925.89/vehicle
Annual Operating Cost Savings (based on operating 26 electric v. gasoline vehicles)	\$16,197.33/year	
EV Pilot Program Cost Savings (based on 3-year lease period)	\$48,591.99	
Maintenance Cost Factors	Ranger Electric Vehicle	Ranger Gasoline Vehicle
Average Monthly Maintenance*	\$38.31/vehicle/month	\$91.21/vehicle/month
Annual Maintenance	\$459.70/vehicle/year	\$1,094.52/vehicle/year
Annual Fleet Maintenance	\$11,492.46/year	\$27,363.00/year
Annual Maintenance Cost Savings (based on maintaining 26 electric v. gasoline vehicles)	\$15,870.54	
EV Pilot Program Cost Savings (based on 3-year lease period)	\$47,611.62	

*Cost of gasoline vehicle maintenance is based on entire B200 fleet (59 quarter-ton trucks) serviced by Vandenberg AFB for calendar year 1999. Maintenance cost of EVs is based on Department of Energy (DOE) Field Operations Program report, *How Do Gasoline & Electric Vehicles Compare?*

Table taken from Vandenberg AFB's Presentation at the 6th Annual Joint Services Pollution Prevention and Hazardous Waste Management Conference.

Benefits for the Project Sponsor

- Vandenberg AFB will be able to use resources that otherwise would be spent complying with the administrative requirements of CAA Title V to upgrade combustion technologies to newer, low-NO_x emission technologies.
- Contingent upon meeting the milestones of the FPA and reducing annual emissions of ozone precursors by at least 10 tons by November 30, 2002, Vandenberg AFB will be classified as a minor stationary source rather than a major stationary source for purposes of CAA Title V. This will result in much less future administrative work (reporting, monitoring, record keeping, training) for the base.
- Vandenberg AFB negotiated a protocol for source testing and validation with the District that is cheaper (\$600 per test) than the standard EPA test (\$3,000 per test). Vandenberg AFB will also save \$96,000 over three years through implementation of the SUVMS.

Information Resources: The information in this summary comes from the following sources: (1) *Project XL Stakeholder Involvement Evaluation—Final Draft Report*, May 2000; (2) focus group discussions in January 2000 with representatives of the federal and local regulatory agencies, Vandenberg AFB, and TetraTech, Inc., a contractor for Vandenberg; (3) the March 1999 *XL Project Progress Report—Vandenberg Air Force Base—ENVVEST*, March 1999 (EPA-100-F-99-008); (4) the December 1999 *XL Project Progress Report—Vandenberg Air Force Base—ENVVEST* (EPA-100-R-00-007); (5) focus group discussions in January 1999 with representatives of EPA, DoD, the “District,” and Vandenberg AFB; (6) interviews with members of the CAB and a CAC about the stakeholder process, Spring 2000; (7) annual and semiannual status reports through October 31, 2001, prepared by Vandenberg AFB; and (8) the *2000 Project XL Comprehensive Report, Volume 2: Directory of Project Experiments and Results*, November 2000.

Table 8: Estimated Title V Program Costs, ENVVEST Program Costs, and Overall Cost Savings to Vandenberg AFB

Title V Program Requirement	Cost	Cost Element
Prepare Permit Application	\$300,000	Environmental Consultant Cost
Permit & Fee Administration	\$160,000	Regulatory Cost Reimbursement
Compliance Monitoring	\$100,000	Regulatory Inspection Cost
Total First Year Title V Cost	\$560,000	
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Permit Administration		
Permit & Fee Administration	\$125,000	Regulatory Cost Reimbursement
Environmental Contractor Support	\$250,000	Consultant Cost
Compliance Monitoring		
Regulatory Compliance Oversight	\$100,000	Regulatory Inspection Cost
Source Testing	\$150,000	Environmental Consultant
Parametric Monitoring	\$125,000	Equipment Cost
Annual Title V O&M Cost	\$750,000	
<hr/>		
Title V Program Cost	\$3,560,000	Compliance Cost Over Five-year Period
ENVVEST Program Cost	\$2,500,000	Pollution Prevention Cost Over Five-year Period
Vandenberg AFB Cost Savings	\$1,060,000	