UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUN 9 1997

OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

MEMORANDUM

TO: Chris Knopes, Acting Director
Emerging Sectors and Strategies Division,
Office of Policy Development, OPPE

FROM: Craig Hooks, Acting Director
Federal Facilities Enforcement Office, OECA

SUBJECT: DoD ENVVEST/XL Submission

Attached is the Department of Defense ENVVEST/XL submission for Air Force Plant 4 in Texas. We are forwarding this proposal for placement in the XL project review process. The Plant 4 proposal was developed by Lockheed Martin, the contractor operating Plant 4 for the Air Force. My staff will be in contact with your staff regarding the review process for this proposal. If you have any questions regarding the Plant 4 proposal, please contact Jim Edward (564-2462) or Will Garvey (564-2458) of my staff.

cc: Lisa Lund
Walter Walsh
George Wyeth, OGC
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Air Force Plant #4
EnvVest Proposal

Executive Summary

Air Force Plant Number 4 in Fort Worth, Texas proposes an ENVVEST program that provides a substantial reduction in ozone precursor emissions in exchange for relief from a hazardous air pollutant control device. Specifically, they propose to install two new industrial boilers (replacing three 1940s era boilers), eliminating the potential for more than 800 tons of nitrogen oxide emissions, in exchange for not installing two-stage paint booth particulate filters required by the Aerospace National Emission Standards for Hazardous Air Pollutant (NESHAP) regulation. The $1.6 Million of Air Force funds needed to install the new filters will instead be spent on the new industrial boilers.

The new filters required by the regulation are intended to reduce paint booth generated airborne emissions of inorganic hazardous air pollutants such as chrome. Filter installation alone will only provide about a 51% reduction of the total plant-wide chrome airborne emissions. In return for the ENVVEST regulatory flexibility, Air Force Plant Number 4 proposes to eliminate 72% of the total plant-wide chrome airborne emissions from three different processes.

This proposed source reduction extends beyond the regulatory required paint booth controls to several processes including chromic acid anodizing and a chrome-containing cleaning process. A greater airborne chrome emission reduction (191 pounds) is proposed versus that resulting from compliance with Aerospace NESHAP regulation (110 pounds). An even greater benefit will be a reduction of over 18,000 pounds of chrome in their hazardous waste sludge that is currently land-filled.

1.0 Background

Air Force Plant Number 4 (AFP4), located in Fort Worth, Texas, is owned by the Air Force Materiel Command (AFMC) and operated by Lockheed Martin Tactical Aircraft Systems (LMTAS). This seven-million square foot facility provides design, fabrication, assembly, and testing capabilities necessary to produce advanced aircraft such as the F-16 Fighting Falcon and the F-22 Advanced Tactical Fighter. AFP4's commitment to environmental excellence, implemented through a formal program to minimize environmental impacts through pollution prevention and proactive hazardous waste management, has been recognized by several prestigious awards including the 1995 EPA Region 6 Administrator's Environmental Excellence Award for Excellence in Hazardous Waste Minimization Program Development and the 1995 Texas Governor's Award for Environmental Excellence.

The credibility of the AFP4 ENVVEST pollution prevention proposal is strengthened by the historical success of previous pollution prevention efforts such as a 99.6% reduction in Toxic Release Inventory (TRI) compound off-site transfers since 1987, 99.8% reduction in Ozone Depleting Compound (ODC) use since 1987, 99% reduction in 'EPA 33/50' compound use since 1988, and a 98% reduction in effluent heavy metal discharges since 1987.

Fort Worth, Texas is located in an ozone non-attainment area which is currently classified as moderate severity. Due to several standard exceedances the area may be reclassified to serious severity within the next several years. This reclassification will impose additional emission reduction requirements and force aggressive reduction of ozone precursor and criteria pollutant emissions such as oxides of nitrogen (NO_x), carbon monoxide (CO), and volatile organic compounds (VOCs).

AFP4 is also a major source for hazardous air pollutants (HAP) due to the high number of specialty coatings and processes necessary to produce high-performance aircraft. Being a HAP major source imposes additional regulatory burdens like Maximum Achievable Control Technology (MACT) regulations such as the *National Emission Standards for Aerospace Manufacturing and Rework Facilities* 40CFR§63.740 (Aerospace NESHAP). The Aerospace NESHAP imposes strict physical and administrative requirements on AFP4. Physical changes will include new higher efficiency air filters on any paint booth where inorganic-HAP (chrome) containing paints are sprayed. New administrative requirements include increased amounts of monitoring, recordkeeping, inspections, and reporting over the life of the facility.

2.0 Proposal Overview

AFP4 is proposing an ENVVEST program that would concentrate on reducing nitrogen oxide emissions in exchange for not installing two-stage air filters in existing paint booths as required by the Aerospace NESHAP. The nitrogen oxide emission reduction will be realized by installation of two new natural gas fired industrial boilers that will replace three 1940s era boilers. In addition to the nitrogen oxide emission reductions obtained through this regulatory flexibility, AFP4 proposes to exceed regulatory required emission reductions by eliminating several source of chrome airborne and waste emissions from several production processes. The specific reductions are:

- Substitution of chromic acid anodize and sealing with the Lockheed Martin Sulfuric Acid Anodize (LMSAA) and Low Chrome Seal (LCS) process, thereby eliminating 11 pounds of air emissions and 13,900 pounds of chrome containing sludge,
- Elimination or reduction of chromium compounds from two of the highest environmental impact coatings in use at AFP4, thereby eliminating 90 pounds of air emissions and 1,000 pounds of chrome containing sludge,
- Elimination of chromic acid from two cleaning process tanks, thereby eliminating 90 pounds of air emissions and 3,600 pounds of chrome containing sludge.

These reductions of over 190 pounds of airborne chrome emission are even greater than the 110 pound reduction that would result from installing the new filters under the Aerospace NESHAP. Appendix A provides further details on the proposed projects.

2.1 Required Regulatory Relief

AFP4 requests Aerospace NESHAP regulatory relief from the two-stage filter installation requirement [40CFR§63.745(g)(2)(iii)] and related monitoring, recordkeeping and reporting requirements for all existing paint booths at AFP4. This relief would not apply to new applicable sources constructed after 1997. See Appendix B for the specific 40CFR§63 sections requiring relief.

2.2 Near Term Agreement

The Aerospace NESHAP compliance date of September 1998 requires that facility modifications associated with installing the new two-stage air filters begin in October 1997. To avoid starting construction on these installations, AFP4 requests an eighteen month delay to the Aerospace NESHAP compliance date specifically for the two-stage paint filters [40CFR§63.749(a) as it specifically

applies to 40CFR§63.745(g)(2)(iii)] for AFP4 during the negotiation/regulatory implementation phase of this program. Without this agreement, construction on the filters must begin. Commencement of actual filter implementation eliminates the funding source for the new boilers proposed in this ENVVEST initiative.

In the event that a final project agreement cannot be completed by the end of this delayed compliance date, AFP4 will negotiate a final compliance date for installation of the two-stage filters.

3.0 Compliance with Project XL Criteria

The following sections address the eight specific Project XL selection criteria.

3.1 Environmental Results

AFP4 has already made substantial contributions to environmental excellence by reducing their community impact through substantial emissions decreases across all media by slashing several key environmental emissions such as ODC use, 'EPA 33/50' chemical use, hazardous waste generation and disposal, and non-hazardous waste disposal. Under this program, further environment benefits will be realized such as the potential for an over 800 ton reduction in NOx and 191 pound reduction in chrome airborne emissions as well as an over 18,000 pound reduction in chrome containing hazardous waste sludge. These overall plant-wide emission reduction represent a 91% NOx reduction, a 72% airborne chrome reduction, and a 50% reduction in chrome containing sludge.

Figure 1 summarizes the emission reductions from replacing four 1940s era boilers with three new boilers. Boiler emission calculations are based on maximum potential-to-emit which is used to authorize their construction. Estimating actual emissions for a major project such as replacing boilers is difficult due to unknown operational parameter changes. Nevertheless, it is expected that the new boilers will provide overall combustion efficiency of about 80% as compared to the existing boilers which are about 30-70% efficient (depending on operational parameters). Using these estimated efficiencies, actual NOx emissions should decrease from the current 195 tons per year to below 100 tons per year. The overall boiler replacement program consists of a phase one (new building and one new boiler replacing one old boiler) and a phase two (two new boilers replacing three old boilers). Phase one funding has been received but funding is not available for phase two. Phase two will be funded using the money saved from two-stage filter cost avoidance from ENVVEST regulatory relief. Since this program will facilitate installation of the last two boilers only, the emissions reduction credit for this program is the difference between the phase one and phase two emissions, or 833 tons. Boiler

construction schedules are still preliminary and based on best available information as of April 1997. It is assumed in the table and figure that, without ENVVEST, only one new boiler will be on-line in 1999 and three of the old boilers will remain on-line indefinitely. With ENVVEST, two new boilers would be on-line in 1999 paired with two old boilers. The last new boiler would be on-line in 2000 and the remaining old boilers will be scrapped.

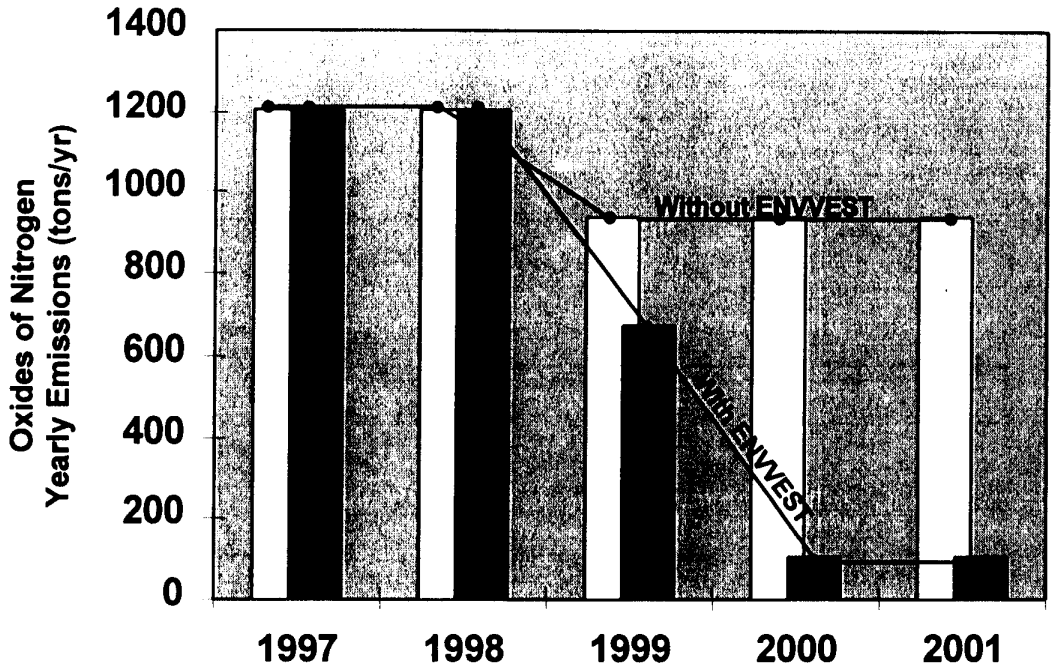

Figure 1: Summary of Boiler Emission Reductions

Figure 2 summarizes the airborne chrome emission reductions and the chrome containing sludge reduction resulting from the three chrome elimination projects over the five year period of 1997-2001, when compared to a baseline year of 1994. 1994 was chosen as a baseline year because it represented a time period when production of F-16s was at or close to a maximum production rate that will be experienced in succeeding years. This figure, along with Figure 1, demonstrates the superior environmental performance required of an ENVVEST program by illustrating the dramatic reduction in chrome containing sludge and the fact that the airborne chrome reduction will exceed the regulatory required emission reduction.

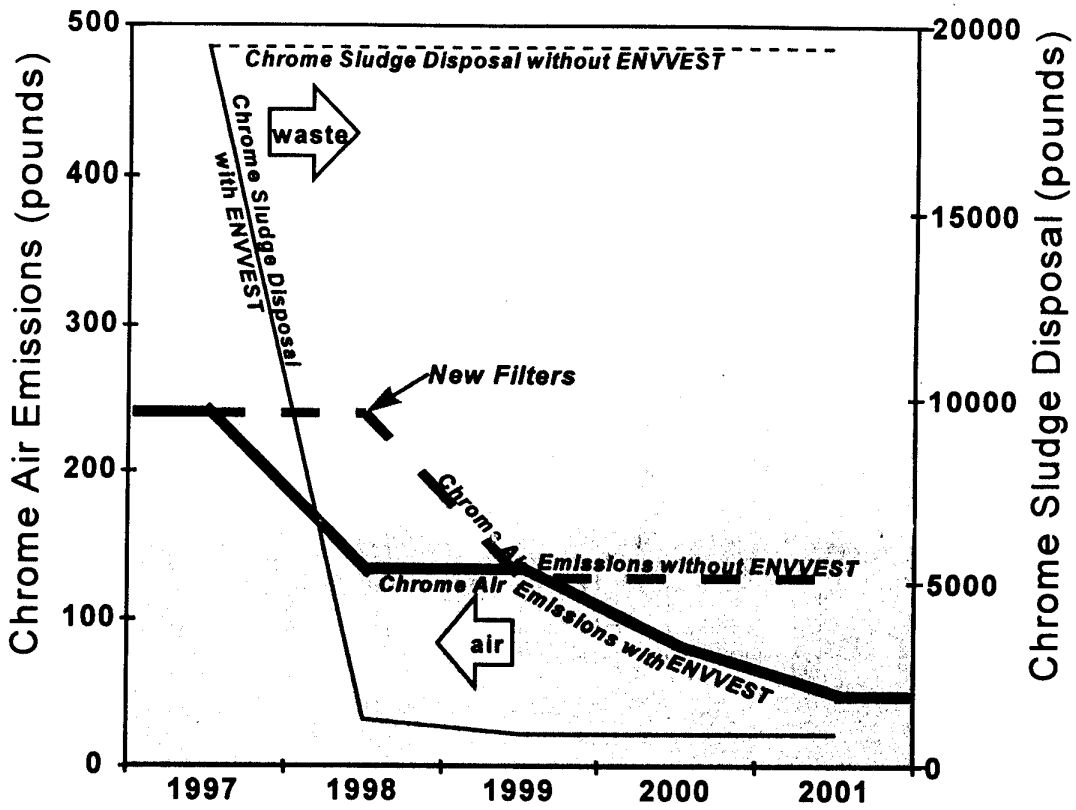

Figure 2: Summary of Chrome Emission Reductions

3.2 Cost Savings and Paperwork Reduction

The Aerospace NESHAP contains substantial monitoring, reporting, and recordkeeping (MRR) costs from the standpoint of labor, materials, and written documentation. These costs contribute no environmental benefit to the facility or surrounding community. Monitoring and recordkeeping associated with the new two-stage paint filters consists of daily inspections of the pressure drop across the paint filters. At a large facility such as AFP4, this will consume close to twelve hours per day or up to three thousand hours per year. Required reporting will consist of semi-annual compliance certifications of AFP4 compliance with the two-stage filter monitoring and recordkeeping.

The detailed costs associated with the two-stage paint filters required by the Aerospace NESHAP can be broken down to include:

- the initial installation cost of $1.569 Million of Air Force funds and $400,000 of LMTAS funds to install the new filters on twenty-four paint booths, and
- a yearly cost of at least $214,000 to regularly replace the more expensive filters, perform daily inspections, record inspection data, and increased waste

disposal volume due to the increased physical size of the two-stage filters compared to the older one-stage paint arrestor filters.

Eliminating these requirement through the ENVVEST regulatory flexibility for the existing paint booths is a substantial cost savings in terms of both personnel and recordkeeping costs. This will allow AFP4 to concentrate resources on pollution prevention associated with the other three chrome reduction projects instead of compliance, resulting in long-term cost savings, reduction in paperwork burdens, and improved environmental performance.

Figure 3 summarizes the cumulative cost profile associated with this program. It demonstrates the saving results from regulatory flexibility allowing the two-stage air filter installation cost ($1.569 Million) to be used to fund installation of the last two of three new boilers. After this initial investment, the decreased annual cost resulting from not having two-stage air filters provides immediate cost savings on a yearly basis.

Once aircraft complete production at AFP4 and enter military active duty, they are commonly painted once or more per year forcing Air Force bases and depots to use chrome containing coatings and also install two or three-stage filters. Reducing chrome from these coatings therefore benefits other DoD facilities. The life cycle cost benefits associated with this filter installation avoidance extend to other production programs such as F-22 and F-2 and has the potential to be substantially greater than those realized by the F-16 program.

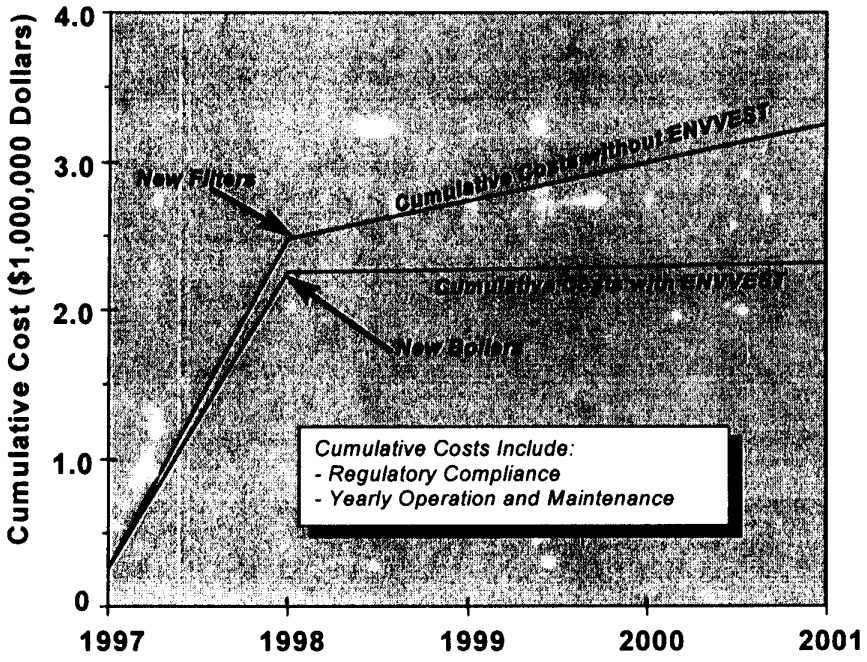

Figure 3: ENVVEST Cumulative Cost Savings

3.3 Stakeholder Support

AFP4 has an excellent history of dialogue with local and state regulators and members of their community. They believe their facility is an integral part of the community in which they do business. AFP4 needs the support of these stakeholders to be productive, flexible, and competitive.

AFP4 has reviewed this proposal with the Fort Worth Environmental Council (FWEC) which is a joint effort of the city's environmental management group, industrial facilities, professional associations, academia, environmental organizations, and concerned citizens. The following table lists the current membership of the FWEC. FWEC supports the program and sent a recommendation letter to Mr. David Gardner, Assistant Administrator of the EPA in July 1996 (see Appendix C).

	Membership	
Tarrant County Environmental Alliance	Society of Texas Environmental Professionals	Texas Christian Univ. Environmental Department
Univ. Of North Texas Health Sciences Center	Business/Industry Representatives	Fort Worth Industrial Waste Department
Fort Worth Geological Society	Sierra Club	Audobon Society
Senior Citizens Alliance	Fort Worth Star-Telegram	League of Women Voters
Homeowners Association	Citizens at large	Fort Worth Clean Cities, Inc

Similarly, AFP4 reviewed and received support of the Texas Natural Resource Conservation Commission (TNRCC), the State of Texas' environmental regulatory agency. A copy of their support letter is also enclosed in Appendix C.

AFP4 also reviewed the proposal with EPA Region 6 representatives in Dallas and received preliminary comments generally supporting the technical objectives and the requested regulatory relief.

Due to the quick project resolution required by this proposal, AFP4 is ready to aggressively pursue 'direct participants' and 'commentors' stakeholders as discussed in the 23 April 1997 Federal Register XL Notice. AFP4 has already begun contacting regional entities (Southern Methodist University and Texas Christian University) who have regular contact with concerned citizen groups. These contacts should provide a large list of individuals and groups for preliminary discussions concerning their desired involvement. AFP4 intends to disseminate project announcements through local media outlets to involve as many potential stakeholders and the 'general public' as possible up front so that program issues and concerns can be addressed quickly and efficiently.

3.4 Innovative/Multi-media Pollution Prevention

Chrome is the widely used material-of-choice for corrosion prevention on advanced military hardware subject to marine environments (humid salty air) so source reduction as offered through this proposal, offers pollution prevention possibilities across all environmental media. As explained in Appendix A, chrome anodize, chrome based coatings, and the chrome containing cleaning process generate small quantities of airborne emissions and larger quantities of chrome waste which must be disposed as land-filled hazardous waste sludge. Chrome based paints generate air emissions during spray application and waste emissions from cleaning painting areas. The chrome anodize process generates large quantities of hazardous waste sludge due to periodic tank replenishments and small quantities of air emissions during operation. The cleaning process generates chrome containing mist due to air sparging of the tank. Elimination of both the anodize process and chrome based cleaning operation and reduction in chrome based paints provides innovative/multi-media pollution prevention benefiting both air emissions and hazardous waste sludge generation and disposal. The innovativeness comes from being able to reduce both air and waste emissions through reductions in all three processes.

3.5 Transferability

AFP4 also believes in the moral obligation of transferring all pollution reduction technology development to the world community. They have been granted several patents for new products, published several detailed technical presentations and papers, and hosted numerous visitors from various regulatory agencies, associated manufacturing facilities both corporate and competitive, and a large United Nations contingent. On 30 March 1995, a conference was held at AFP4 to host the United Nations Environment Programme Technical Options Committee on Solvent Substitution to present detailed information on their efforts to replace wipe solvents, vapor degreasing, and miscellaneous products. AFP4 has also provided detailed case studies for publication in a UNEP guidance publication describing the ODC elimination process.

Both projects in this proposal offer technology developments that can be transferred to other Department of Defense GOCO/COCO, depot facilities, and other aerospace companies that perform similar fabrication or rework operations. Chromic acid anodize is widely performed at many facilities including the Air Force depots. Implementing the new LMSAA/LCS process on the F-16, F-22, and F-2 aircraft would allow the Air Force depots to reduce or eliminate their chromic acid anodize process which would positively contribute to Air Force base and depot source reduction activities. Since the LMSAA/LCS process will be developed under Air Force funding, there are no proprietary or licensing data issues so the process is available for use at any facility nationwide.

Eliminating chrome from several of the most commonly used coatings in the Air Force inventory might also allow Air Force bases and depots avoid the cost of two-stage filters at their paint booths. Beyond that, the reduction in chrome contaminated paint filters will reduce landfill use and other similar benefits as AFP4 will experience. F-16s are in service on almost every continent around the world and are often repainted more than once a year using tens of thousands of gallons of chrome based coatings. This usage translates to several thousand pounds of airborne chrome emissions and air filter waste generation throughout the world. Eliminating chrome from two of the most commonly used primers will have an additive positive impact on Air Force base and depot chrome usage in succeeding years.

3.6 Feasibility

AFP 4 has been expending internal R&D funds for the past 7 years researching a chromic acid anodize replacement. After studying several processes, they have developed a unique LMSAA process which meets the demanding performance criteria of the F-16. The process has completed initial qualification including small coupon coating and corrosion resistance tests. The next step is to expand to larger, more intricate parts; check their basic corrosion resistance, then move to installation into an aircraft under actual operational conditions. Replacement of the current chrome seal with a new low chrome seal is considered feasible due to its use at similar aerospace manufacturing facilities, although it must still pass the rigorous F-16 performance criteria. Based on similar replacements at other aerospace facilities and AFP 4 technical expertise, they believe implementation of the LMSAA/Low Chrome Seal process is very feasible.

Chrome free cleaning processes are commonly used throughout aerospace and non-aerospace manufacturing facilities. For this reason, this substitution is considered very low risk.

Several other aerospace companies are researching chrome-free coatings for their hardware, although few have the successful corrosion resistance history of the F-16. This project must be approached deliberately and carefully to avoid overlooking any key performance details and requirements. Although AFP4 believes chrome-free coatings are feasible, it is impossible to completely guarantee that all studied coatings will be totally chrome-free at the end of the three year project. They do believe that based on extensive in-house technical expertise, a significant portion of this project will be accomplished. A potential obstacle to widespread implementation may be reluctance in the Air Force technical community to commit to new coating implementation without several years of testing on fielded aircraft. AFP4 is aggressively working this issue.

The new boilers utilize proven low NOx burner technology and better design and construction practices to achieve lower overall emissions than the 1940s era boilers currently operating. There are no known technical difficulties associated with implementation of this phase of the program.

3.7 Monitoring, Reporting and Evaluation

Evaluation of the progress and results during execution of this program will consist of quarterly status reports distributed to stakeholders, TNRCC, and EPA, annual meetings open to the public, and posting of status reports on the Internet. Annual meetings will also be used to evaluate the progress of the overall program to the stated objectives and evaluate the need, if required, for program modifications.

Other MRR requirements required under various regulations (Aerospace NESHAP, boiler Federal and State permitting) will remain unchanged by this program. For example, the new boilers will have substantial operational requirements including monitoring and recordkeeping of oxides of nitrogen, carbon monoxide, oxygen and opacity. Plant-wide emission quantities and boiler emissions will be reported yearly to TNRCC through the emission inventory program for the Dallas/Fort Worth non-attainment area.

3.8 Shifting of Risk Burden

A significant advantage of these projects, due to the elimination of chrome based processes, is an overall improvement in workplace environmental quality. These projects will not shift pollution from or between media, but will completely eliminate the source. This will ensure that there is no shifting of risk burden from the facility to the workers, the community, or economically disadvantaged areas. The new boilers NOx reduction beneficially reduces ozone precursor emissions for AFP4's non-attainment area and other down-wind areas.

4.0 Implementation of Proposed EnvVest Program

The following is a proposed implementation schedule for the ENVVEST Program as shown in Figure 4.

- The 'Compliance Delay Agreement' as discussed in Section 2.2 must be completed or substantially completed by October 1997 to avoid two-stage filter construction initiation for compliance with the Aerospace NESHAP compliance date of September 1998.
- 'Project Development' will begin immediately upon notification from EPA Region 6 that the project is acceptable for development. Activities will include stakeholder identification, differentiation between direct participants and commentors, public notice announcing project development and stakeholder

identification, a kick-off meeting, organization of an executive committee, training of the executive committee in the technical details of the source reduction projects, bi-weekly meetings of the executive committee, monthly meetings for general public input, development of a draft final project agreement (FPA), and negotiations between AFP4, EPA, and TNRCC. AFP4 desires to move to formal public notice and comment periods in the first quarter of 1998.

- 'Final Project Agreement' is anticipated to be signed by the end of 1998. Yearly status meetings as well as quarterly status updates on the Internet will begin at this time and last throughout the five year FPA time-frame.
- The source reduction projects listed have various implementation periods depending on their technical complexity. They are all anticipated to be complete by the end of 2001.

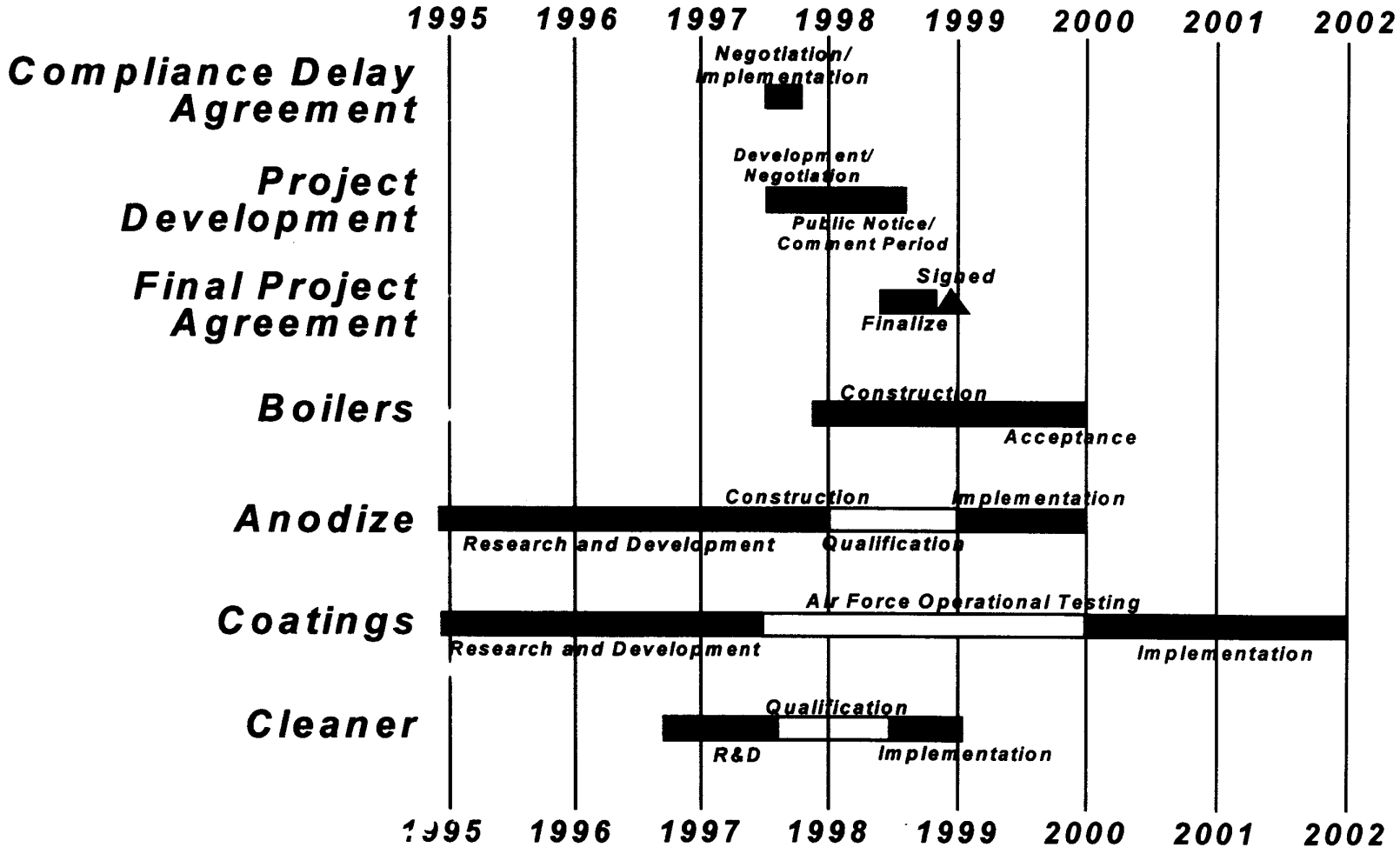

Figure 4: ENVVEST Project Schedule

5.0 Conclusion

Due to the health risks associated with chromium, its reduction has a high priority with the EPA and Air Force. Qualifying an alternative for some of the uses of chromium in the aircraft industry would be a major milestone for environmental quality and workplace safety.

This ENVVEST proposal offers the elimination of chromic acid anodizing, the elimination or reduction of chromium compounds from several aircraft coatings and the elimination of chrome from a cleaning process. It allows an opportunity to reinvest compliance funding into actual ozone precursor chemical reductions. This proposal will result in improved environmental performance at less cost. All technological advances in pollution prevention accomplished as a result of this effort will be shared across DoD, as well as industry.

As with any research and development project there is a potential risk of failure to solve the intended problem within the schedule and cost as proposed. AFP4 possesses the technological expertise and experience to minimize program risk due to current research efforts on the associated technologies and a long successful history of similar source reduction innovations.

List of Acronyms

AFP4	Air Force Plant No. 4 in Fort Worth, Texas
COCO	Contractor Owned/Contractor Operated facility
DoD	Department of Defense
EPA	The United States Environmental Protection Agency
GOCO	Government Owned/Contracted Operated facility such as AFP4
HMMPO	Hazardous Materials Management Program Office
IRAD	Internal Research and Development
IWTF	Industrial Waste Treatment Facility
LCS	Low Chrome Seal
LMSAA	Lockheed Martin Sulfuric Acid Anodize
LMTAS	Lockheed Martin Tactical Aircraft Systems
MP&M	Metal Products and Machinery rule
MRR	Monitoring, Recordkeeping, and Reporting requirements associated with most NESHAPs
NESHAP	National Emission Standards for Hazardous Air Pollutants
ODC	Ozone Depleting Compound
TNRCC	Texas Natural Resource Conservation Commission
WPS	Work Practice Standards associated with most NESHAPs

Appendix A

Detailed Discussion of Emissions Generation and Reduction

Detailed Discussion of Emissions Generation and Reduction

This appendix provides detailed discussion concerning processes and emissions generation and reduction for the three projects which comprise this program:

1. Substitution of the chromic acid anodize and high chrome seal process with the Lockheed Martin Sulfuric Acid Anodize (LMSAA) process and a low chrome seal (LCS) process, and
2. Elimination or reduction of chromium compounds from the two highest environmental impact coatings in use at AFP4.
3. Elimination of chromic acid from two cleaning process tanks.

Project 1: LMSAA/LCS Process Implementation

LMTAS has been spending Internal Research & Development (IR&D) funds for the past several years researching a chromic acid anodize replacement. After studying several processes (including boric-sulfuric acid, phosphoric acid, and others) we have developed our own unique LMSAA process which meets the demanding performance criteria of the F-16. The process has completed initial qualification including small coupon coating and corrosion resistance tests but has yet to make the critical transition to large scale parts processing. The LCS process, while still containing chromium, reduces its concentration from 5% to 0.5%. Project 1 would consist of transitioning the complete LMSAA/LCS process to a larger pilot scale demonstration project, possibly qualifying the new processes on actual in-service aircraft, then constructing a new full-scale process line. During this transition, both chromic and LMSAA/LCS processes will be maintained to minimize actual production impact.

The existing chromic acid anodize process generates two types of environmental emissions, air and waste.

- The air emissions are generated by hydrogen and oxygen bubbling up to the surface of the anodize solution which releases a chrome containing mist. The Chrome NESHAP compliance method is to add a mist suppressant which lowers the solution surface tension, resulting in much less formation of mist and an associated reduction in air emissions. Before the addition of the mist suppressant, the AFP4 anodize tank generated about 428 pounds of airborne chrome. After compliance with the NESHAP by adding the mist suppressant, the airborne chrome emissions are about 11 pounds. The chrome seal process does not generate airborne chrome emissions because it is not an electrolytic

process. After completion of Project 1, due to the complete removal of the chrome anodize process, there will be no airborne chrome emissions.

- Chrome-containing hazardous waste is generated by the periodic dumping of the anodize tank solution (usually every six months) and the dumping of the chrome seal solution (usually once per year) into the industrial treatment plant. This currently results in about 14,200 pounds of chrome sludge generation per year. After completion of Project 1, there will be no chrome sludge generation from the LMSAA and only 350 pounds of chrome sludge generation from the LCS process.

AFP4 has complied with the Chrome NESHAP by incorporation of a mist suppressant and preparation of work practice standards (WPS) which outline monitoring, recordkeeping, and reporting (MRR) requirements. Completing Project 1 will allow disposal of the chrome anodize process and remove AFP4 from applicability under the Chrome NESHAP, saving the costs associated with the MRR activities.

Project 2: Elimination/Reduction of Chromium Based Coatings

AFP4 determined the total weight of chromium used for the baseline year of 1994 for each coating and chose the two coatings with the best short-term implementation feasibility and chrome reduction potential. In 1994, AFP4 used coatings containing about 5,000 pounds of chrome and the two coatings chosen for this project account for 3,245 pounds or about 65% of the total. These coatings are:

- Mil-P-85582, a waterborne primer, is applied to virtually all surfaces of the airframe and accounts for over 52% of the chrome coating usage. AFP4 has completed laboratory qualification of a chrome-free replacement for this primer, and it is reasonable to assume that this replacement will be acceptable to the F-16 requirements, although field testing will be required The new formulation substitutes molybdenum for strontium chromate.
- Mil-P-23377 compatible substrate primer is used specifically as a primer for certain critical coatings used in various airframe locations. AFP4 has also begun work on a chrome-free replacement material. This coating has stricter performance demands due to its use as a coating providing a compatible surface between dissimilar coatings.

Using chrome based coatings generates two types of environmental emissions, air and waste.

- The air emissions are generated by spraying through coating atomizing nozzles on paint guns. Efficient nozzles and competent operators result in only a 35% overspray, which means that 65% of the coating exiting the nozzle is generally applied to the part surface. The overspray coating mist is passed through paint arrestor filters or waterwash walls and exhausted to the atmosphere. In 1994, the chrome air emissions associated with all aircraft painting was 138 pounds. If the two-stage paint filters were installed in accordance with the Aerospace NESHAP, the emissions would be reduced to about 28 pounds. After completion of Project 2, assuming the two-stage paint filters were not installed, the emissions would be about 48 pounds.
- The waterwash wall storage tanks are periodically dumped to the IWTF. This, along with rinsing the paint booth floor, generates chrome sludge. It is estimated that about 1600 pounds of sludge is generated yearly from these activities. After completion of Project 2, about 560 pounds of chrome sludge will still be generated from the remainder of the chrome coatings.

Since there will still be another six coatings responsible for the remaining 1755 pounds of airborne chrome in use in most of the booths, the Aerospace NESHAP would still require installation of the two-stage filters. Therefore, AFP4 is requesting regulatory relief from the two-stage filter installation requirement for all paint booths and in return will provide a 65% reduction in chrome emissions and additional chrome air emissions from Project 1 and Project 3.

Project 3: Elimination/Reduction of a Chrome Containing Cleaner

During fabrication, aluminum parts typically accumulate hard scale and oxidation on their surfaces. This accumulation must be thoroughly cleaned before the part can be either chrome or sulfuric acid anodized. This cleaning process is currently performed in Tanks 531 and 532 at AFP4. Both tanks contain a mixture of nitric, hydrofluoric, and chromic acid. The nitric and hydrofluoric acid serve as aggressive etchants to remove all impurities from the surface of the part. The chromic acid serves as a binder to prevent copper which is leached from the aluminum from plating back onto the surface. The solution is agitated by a system of bubbler tubes along the bottom of the tank where air is blown to keep the solution homogeneous and to ensure complete coverage of the parts surface. This process is commonly called air sparging.

During this project, the chromic acid will be completely replaced with ferric sulfate using a commercially available material.

As with the other two projects, there are two types of environmental emissions, air and waste, associated with this cleaning process:

- The air emissions are generated by air bubbles rising to the surface of the solution and bursting, thereby releasing the surface of the bubble into the air as a fine mist. EPA provides a calculation method for this type of emissions in their AP-42 guidance Section 12.20. This calculation shows the air sparging will generate about 45 pounds of chrome air emissions per tank. After completion of Project 3, due to the complete removal of the chrome portion of the cleaning solution, there will be no airborne chrome emissions.
- Chrome-containing hazardous waste is generated by the periodic dumping of the cleaning tank solution (usually every six months) into the industrial treatment plant. This currently results in about 3,600 pounds of chrome sludge generation per year. After completion of Project 3, due to the complete removal of the chrome portion of the cleaning solution, there will be no chrome sludge generation from this process.

Summary of Emission Reductions

Table 1 summarizes the emission reductions resulting from the three chrome elimination projects over the five year period of 1997-2001, when compared to a baseline year of 1994. 1994 was chosen as a baseline year because it represented a time period when production of F-16s was at or close to a maximum production rate that will be experienced in succeeding years. Project 1 chrome air emissions will decrease from the current 11 pounds per year (ppy) to zero ppy since they will totally eliminate chromic acid anodize from the production process. Project 2 emissions are currently about 138 ppy and would decrease to about 28 ppy as a result of installing the two-stage air filters. By eliminating chrome from the proposed coatings under this program, chrome air emissions will decrease to about 48 ppy. Under project 3, emissions would be completely eliminated from the cleaning process tanks, a savings of about 90 ppy. Note that there will be an increase in air emissions of 20 ppy under Project 2 compared to the regulatory requirement since the two-stage air filters will not be installed. However, this increase is completely offset by the chrome air emission reductions of 11 ppy from Project 1 and 90 ppy from Project 3. Table 1 also summarizes the substantial chrome sludge reductions from eliminating the anodize process in project 1, reducing the coating's chrome content from project 2, and eliminating chrome from the cleaning process tanks under project 3. The total savings is about 18,490 ppy or a reduction of about 50% of the current chrome sludge disposal.

Table 2 summarizes the emission reductions from replacing four 1940s era boilers with three new boilers. Boiler emission calculations are based on maximum potential-to-emit which is used to authorize their construction. Estimating actual emissions for a major project such as replacing boilers is

difficult due to unknown operational parameter changes. Nevertheless, it is expected that the new boilers will provide overall combustion efficiency of about 80% as compared to the existing boilers which are about 30-70% efficient (depending on operational parameters). Using these estimated efficiencies, the NOx emissions should decrease from the current 195 tons per year to below 100 tons per year. Since the ENVVEST regulatory flexibility will facilitate installation of the last two boilers only, the emissions reduction credit for this program is the difference between the 'without ENVVEST' and 'with ENVVEST 2000' emissions from Table 2 or 833 tons. Boiler construction schedules are still preliminary and based on best available information as of April 1997. It is assumed in the table and figure that, without ENVVEST, only one new boiler will be on-line in 1999 and three of the old boilers would remain on-line indefinitely. With ENVVEST, two new boilers would be on-line in late 1998 paired with two old boilers, then the last new boiler would be on-line by 1999 and the remaining old boilers scrapped.

Table 1: Summary of Chrome Emission Reductions

			Year				
			1997	1998	1999	2000	2001
Chrome Air Emissions	Project 1	Before ENVVEST	11	11	11	11	11
		After ENVVEST	11	0	0	0	0
	Project 2	Before ENVVEST	138	138	28*	28*	28*
		After ENVVEST	138	138	138	79	48
	Project 3	Before ENVVEST	90	90	90	90	90
		After ENVVEST	90	0	0	0	0
Chrome Sludge Waste Disposal	Project 1	Before ENVVEST	14200	14200	14200	14200	14200
		After ENVVEST	14200	350	350	350	350
	Project 2	Before ENVVEST	1600	1600	1600	1600	1600
		After ENVVEST	1600	1600	1600	912	560
	Project 3	Before ENVVEST	3600	3600	3600	3600	3600
		After ENVVEST	3600	0	0	0	0

Note: All data in pounds and all data are yearly summaries
* Emissions assume installation of two-stage air filters

Table 2: Summary of Boiler Replacement Emission Reductions

		Criteria Pollutant (tpy)[1]			
	Capacity	NOx	CO	TSP[2]	VOC[3]
Existing Boilers (4 old)	4@125MMBTU/hr	1204	88	27	3.1
Without ENVVEST(1 new + 3 old)	1@132.2+3@125	938	87	24	3.0
With ENVVEST 1999 (2new +2old)	2@132.2+2@125	672	86	22	2.9
With ENVVEST 2000 (3 new)	3@132.2MMBTU/hr	105	63	12	2.8

Note 1: Emission estimates are Potential to Emit based on continuous year-round operation
Note 2: Total Suspended Particulates includes PM10
Note 3: Non-methane Volatile Organic Compounds

Appendix B

Itemized Regulatory Relief

We request regulatory relief from the following Aerospace NESHAP requirements that are directly related to installation, monitoring, recordkeeping, and reporting for the two-stage air filters:

40CFR§63.745(g)(2)(iii)
40CFR§63.749(a) as it specifically applies to 40CFR§63.745(g)(2)(iii)
40CFR§63.751(c)(1)
40CFR§63.752(d)(1)
40CFR§63.752(d)(3)
40CFR§63.753(c)(1)(vi)
40CFR§63.753(c)(2)

Appendix C

Copies of Stakeholders Support Letters

Barry R. McBee, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
Dan Pearson, *Executive Director*

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

July 24, 1996

Mr. David Gardner
Assistant Administrator
Office of Policy, Planning & Evaluation
U.S. Environmental Protection Agency
401 M Street, SW
Washington, D.C. 20460

Dear Mr. Gardner:

The TNRCC has reviewed and supports the Project XL proposal submitted by Lockheed Martin Tactical Aircraft Systems (TAS) which operates Air Force Plant 4 (AFP4) located in Fort Worth, Texas. The project seeks regulatory flexibility from the proposed Aerospace NESHAP Standards and the Metal Products and Machinery Effluent Standards, in exchange for investment in development of process changes which would decrease or eliminate discharges or emissions of chromium.

The proposed projects have the potential to significantly impact coatings processes at aerospace and metal parts finishing industries across the country. A common problem faced by metal finishers is ensuring that metal products will not corrode under extreme conditions. Lockheed Martin TAS has been researching a replacement for its chromic acid anodizing process for several years. However, the process has yet to make the transition to large scale parts processing. In addition, Lockheed Martin TAS proposes to reformulate two coatings to eliminate chromium content, while satisfying the requirements of F-16 production. Lockheed Martin has made a commitment to the TNRCC that if the projects are successful, the company would make information available to other facilities and to private industry, so that the benefits of this pollution prevention project can be transferred.

Lockheed Martin TAS Fort Worth has won numerous awards for its efforts, including, most recently, the Fort Worth Clean City Inc. Star Award, the Texas Governor's Award for Environmental Excellence, and the EPA Region VI Administrator's Environmental Excellence Award for Excellence in Hazardous Waste Minimization Program Development. In addition, Lockheed Martin TAS is a member of Texas' voluntary waste reduction program, CLEAN INDUSTRIES 2000, and has committed to reductions in TRI releases and transfers of 94%, and hazardous waste reductions of 91% by the year 2000. Lockheed Martin also contributes to the

community by participating in community household hazardous waste collections and educating students about the Trinity River.

The TNRCC appreciates the opportunity to work together with Lockheed Martin towards overall environmental stewardship. We would recommend EPA's approval of Lockheed Martin's Project XL proposal. Please feel free to contact Ed Clark of my staff at 512/239-3900 for any additional information or assistance.

Sincerely,

Dan Pearson
Executive Director

cc: Rob Lawrence, Region VI EPA
Scott Fedders, Lockheed Martin

July 19, 1996

Mr. David Gardner
Assistant Administrator
Office of Policy, Planning, and Evaluation
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

Ref. Lockheed Martin Tactical Aircraft Systems and United States Air Force XL Project

Dear Mr. Gardner:

The Fort Worth Environmental Council encourages your consideration of Lockheed Martin Tactical Aircraft Systems' XL Project for Air Force Plant 4 (AFP4) located in Fort Worth, Texas.

The Fort Worth Environmental Council is an outreach of the City of Fort Worth Department of Environmental Management and is composed of members from industry, business and commerce, professional associations, academia, environmentally concerned organizations, and citizens of the Fort Worth and Tarrant County areas. It is our understanding that the proposed project could have potential impact on the aerospace and metal parts finishing industries across the country. While we appreciate that the Project XL proposal will divert AFP4 from immediate compliance with the proposed Aerospace NESHAP Standards and the Metal Products and Machinery Effluent Standards, its successful implementation could bring about significant changes to a long time problem – chromium discharges and emissions. The XL Project proposal offers a reasonable approach to an otherwise very expensive regulation, reflecting AFP4's commitment to pollution reduction.

It is also our understanding that should the project be unsuccessful AFP4 will implement all immediate actions necessary to comply with the above cited regulations. We commend Lockheed Martin Tactical Aircraft Systems and the United

States Air Force for their proactive attitude in undertaking this commitment, and we are confident of your careful consideration of their proposal.

Sincerely,

Dr. Edward Sierra
Chairman

OFFICE OF THE UNDER SECRETARY OF DEFENSE

3000 DEFENSE PENTAGON
WASHINGTON, DC 20301-3000

ACQUISITION AND
TECHNOLOGY

2 JUN 1997

Mr. Craig Hooks
Acting Director, Federal Facilities Enforcement Office
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, DC 20460

Dear Mr. Hooks:

Enclosed is the ENVVEST proposal for Air Force Plant 4, Ft. Worth, TX. Lockheed Martin, as the operator of Air Force Plant 4, has worked with the Texas Natural Resource Conservation Commission and other local stakeholders in the development of this proposal. As this proposal goes through the XL process, if any questions or concerns arise, please contact this office or the Air Force and we will work with your office to respond.

If you have any questions, my point of contact is Ms. Maureen Sullivan, (703) 604-0519. The Air Force points of contact are Lt Col John Garland, (703) 697-1019, and Maj Bryan Bodner, (703) 697-3360.

Sincerely,

Curtis Bowling
Acting Assistant Deputy Under Secretary of Defense
(Environmental Quality)

Enclosure

cc:
SAF/MIQ