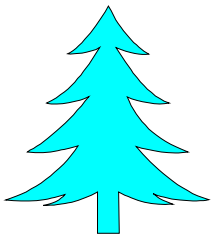
FAA Mike Monroney Aeronautical Center

POLLUTION PREVENTION PLAN

Prepared by: Environmental, Safety and Emergency Mgt. Division, AMP-100

October 3, 1996

Contents



1. Introduction

The Federal government is the Nation's largest consumer of raw materials, power, water and products. In recognition of this and the potential that the Government has to reduce its consumption, Executive Order 12856, issued on August 3, 1993, requires that applicable facilities develop pollution prevention plans. The Mike Monroney Aeronautical Center (MMAC), as the FAA's primary training and supply support facility, contributes substantially to the Government's material and energy consumption. The purpose of this plan is not only to comply with the Executive Order, but to establish a policy and direction for the Aeronautical Center's pollution prevention efforts which shows leadership and emphasizes reduction at the source rather than treatment and disposal, which has characterized environmental protection efforts in the past. This plan is a vital component of the Aeronautical Center "Strategic Plan for Environmental and Safety Compliance" which was adopted in 1994 and represents a significant step toward going beyond mere compliance to adopting a pro-active role in addressing environmental concerns.

2. Current Waste Disposal and Recycling Efforts

Significant waste disposal and recycling efforts at MMAC are as follows:

- Hazardous Waste - The Aeronautical Center generates a variety of hazardous wastes from its operations. These include such things as solvents, laboratory chemicals, paint waste, plating waste and others. During 1995, approximately 81,000 pounds of this waste were transported off site for disposal or recycling. In addition, 450,000 pounds per year of hazardous wastewater are treated on site in the industrial wastewater pretreatment system. Because of the ability to treat these wastes on site, the amount of hazardous waste which must be transported off site was reduced in 1993 approximately 44% from the average of the previous four years (see Figure 2-1). In spite of this reduction in off-site disposal, amounts have climbed from approximately 43,000 pounds in 1993 to 81,000 pounds in 1995. This upward trend is a result of a number of factors, including improved classification and identification of waste which brings new wastes into the system, and turn in of excess, unused materials, resulting from building renovations or general housecleaning. Improved employee awareness resulting from training in waste identification and turn in procedures has also contributed. While it is desirable for all wastes to be properly identified and turned in for appropriate disposal, the increase in off-site disposal is more costly and requires more

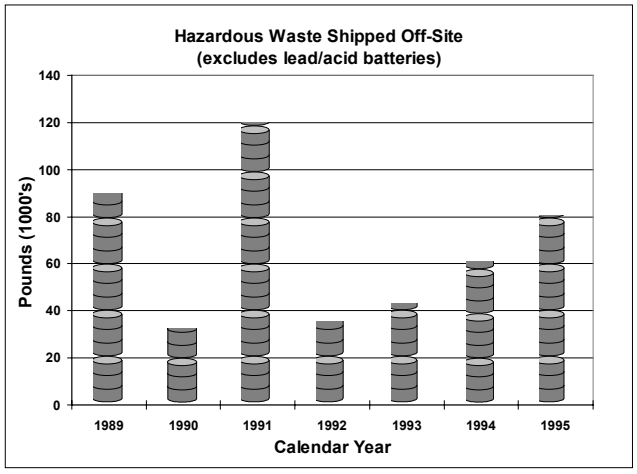


Figure 2-1 Hazardous Waste Shipped Off-Site

staff time for processing of waste materials. Off-site disposal costs are approximately $100,000 per year. This does not include the cost of staff time needed for waste testing and administration.

- Wastewater - Since the installation of a new industrial wastewater pretreatment system in September, 1992, the Aeronautical Center has been able to treat up to 10,000 gallons per day (gpd) of contaminated wastewater from various shop areas. Actual utilization has been approximately 4500 gpd. This includes non-hazardous wastes such as aircraft and vehicle wash water as well as hazardous wastes from electroplating and metal finishing operations. Wastewater treatment amounts for the last three years are shown in Figure 2-2.

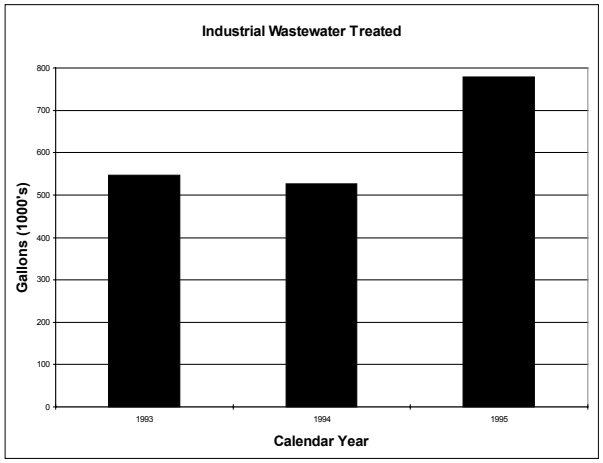


Figure 2-2 Industrial Wastewater Treated

This on-site treatment capability also enables the Center to cost-effectively treat unusual or one-time wastes which would ordinarily have been shipped off site for disposal at enormous cost, such as foam generated during response of building fire suppression systems and investigation-derived wastewater generated in the course of well drilling and sampling related to site cleanup investigations.

The wastewater pretreatment system affords the Center with large pollution reduction benefits that should continue for many years to come

- Air Pollution - The most significant air pollution activities have been in the areas of asbestos abatement and control of chlorofluorocarbon (CFC) releases in conjunction with stratospheric ozone protection laws.

  + The Aeronautical Center needs to continue asbestos management efforts since a large number of buildings still contain asbestos containing materials (ACM). Asbestos management includes not only removal when necessary but control measures to ensure that employees and other personnel are not exposed to ACM which is left in place.

  + The phaseout of CFC's in January of 1996 could impact the Aeronautical Center's air conditioning capability if not properly addressed. Twenty-five chillers will need to be retrofit to accept a substitute refrigerant at an estimated cost of $3.5 million. Currently, two chiller replacements have been funded. Also, AMP-300 is maintaining a stockpile of about 6000 pounds of R-11 refrigerant. This is being used at a rate of about 500-600 pounds per year. All refrigerants captured during on-site equipment maintenance are recycled in accordance with EPA regulations.

Refrigerant (R-12) used in the FAA's aircraft fleet is the responsibility of AVN-300, with a current usage rate of around 150 pounds per year.

- Recycling and Conservation Efforts - The Aeronautical Center is involved in a number of recycling and conservation efforts. Some of these efforts are relatively new, while others have been in place for several years. Materials for which significant recycling activities are taking place include waste paper, lead/acid batteries, used oil, refrigerants and scrap metal. These materials are all being recycled off-site, except for small amounts of refrigerant which are recycled during maintenance of refrigeration equipment. Amounts recycled for the past three calendar years are shown in Table 2-1.

Table 2-1 Recycled Material Amounts

Material (units)	*1993*	*1994*	*1995*
Waste Paper (tons)	180	194	162
Lead/acid Batteries (lbs)	124,700	70,686	33,538
Used Oil (gallons)	2130	3386	3273
Refrigerants (lbs)	4450	1200	3000
Scrap Metal (lbs)	76,000	368,200	136,300

While it is not clear whether there are any ongoing trends regarding amounts of recycled materials generated (except with regard to lead/acid batteries), Table 2-1 indicates that there may be substantial opportunity to reduce the amounts of these materials being sent off-site. Although the materials are being recycled, a reduction in these amounts would reduce the amount of money and staff hours spent to process the materials. Just because off-site recycling is being done, it is easy to overlook the potential for source reductions in these areas.

Energy and water conservation also present opportunities for pollution prevention. Amounts spent for consumption of electricity, natural gas and water are shown in Table 2-2.

Table 2-2 Energy and Water Consumption Costs
(costs shown are in $ millions)

	FY 93	*FY 94*	*FY 95*
Electricity	3.9	3.4	3.1
Natural Gas	0.74	0.85	0.56
Water/Sewer	0.29	0.23	0.24

With a reduction in the MMAC operations budget for FY 96, proper energy management has received elevated attention and importance. The Optimum Run Time energy conservation program was initiated to save energy and reduce electricity expenditures. Also, as part of the MMAC energy management program overseen by AMP-400, as

funding permits, various energy management projects have been or will be initiated. These include performing comprehensive energy and water conservation audits, installation of motion detectors to turn off lights when not in use, evaluation of the use of frame and plate heat exchangers, retrofitting of buildings with energy saving lighting, expansion of the MMAC energy management monitoring system and installation of new, energy efficient cooling towers. It is imperative that in a time of reduced budgets, these and other energy efficiency projects be implemented to reduce electrical costs.

3. Policy

The Aeronautical Center pollution prevention policy is the foundation of the pollution prevention effort. This policy was signed by the Aeronautical Center Director and distributed to all Aeronautical Center program offices and tenants on September 7, 1995. The policy states:

The Mike Monroney Aeronautical Center (MMAC) is committed to excellence and leadership in protecting the environment. In keeping with this policy, our objective is to reduce waste and emissions. We strive to minimize adverse impact on the air, water, and land through pollution prevention and energy conservation. By successfully preventing pollution at its source, we can achieve cost savings, increase operational efficiencies, improve the quality of our products and services, maintain a safe and healthy workplace for our employees, and improve the environment. MMAC's environmental guidelines include the following:

- ***Environmental protection is everyone's responsibility. It is valued and displays commitment to the FAA. Furthermore, managers are expected to serve as role models to their employees in the area of environmental compliance.***

- ***We will commit to including pollution prevention and energy conservation in all aspects of MMAC operations.***

- ***MMAC is committed to identifying and implementing pollution prevention opportunities through encouraging and involving all employees. Preventing pollution by reducing and eliminating the generation of waste and emissions at the source is a prime consideration in all aspects of our business.***

- ***MMAC seeks to demonstrate its responsible corporate citizenship by showing leadership in preventing pollution. We promote community involvement toward a shared vision of environmental protection.***

This policy makes it clear that environmental protection and pollution prevention is the responsibility of each employee, and that it will take the combined efforts of the entire Aeronautical Center work force to ensure success.

4. Pollution Prevention Team

In October, 1995, a pollution prevention team was organized with representatives from each program office and tenant located at the Aeronautical Center. It was determined that each organization would need to be represented since even office functions consume material and energy and would need to be included in any Center-wide efforts impacting

office type operations, such as paper recycling and electricity conservation efforts. Naturally, industrial operations generating wastewater and hazardous waste are represented also.

The team was briefed on the pollution prevention program and their role, which is to guide the pollution prevention effort and to serve as a catalyst to implementation. In addition, organization representatives are charged with the following responsibilities:

- Being informed about pollution prevention and the Aeronautical Center pollution prevention program.

- Assisting with:

  - Employee awareness.

  - Identification and evaluation of pollution prevention opportunities and suggestions.

  - Preparation/review of the Aeronautical Center Pollution Prevention Plan.

- Being a pollution prevention resource and promoter for their organization.

Upon identification of pollution prevention opportunities, detailed assessment teams will be assigned to conduct detailed assessments of each project. The detailed assessment teams will consist of small groups who are knowledgeable of the processes involved and interested in implementing pollution prevention ideas. The composition and size of the teams will vary depending on the complexity of the project and functional skills needed. Augmentation of the teams by contract personnel who can assist with the assessment is also a possibility, depending on funding availability. A typical team may consist of a process manager or supervisor, process engineer, environmental staff member, budget analyst, etc. Team members will be assigned by the applicable program directors as requested by AMP-100. The team will be responsible for collecting the information needed to perform an accurate, objective assessment; analyzing the environmental, mission and economic impacts (see Section 7); and reporting the results to the MMAC pollution prevention coordinator (AMP-100).

5. Opportunity Assessment and Baseline Evaluation

In October 1995, the firm of Booz·Allen & Hamilton, Inc. (Booz·Allen), under contract with the FAA's Office of Environment and Energy (AEE-200) conducted a Pollution Prevention Opportunity Assessment of various MMAC processes. The purpose of the assessment was to develop a Center-specific pollution prevention baseline of toxic pollutant releases and transfers, to identify where pollution prevention opportunities exist, and to identify pollution prevention activities that could reduce the Center's environmental impact. The final report, entitled "Pollution Prevention Assessment of the Federal Aviation Administration's Mike Monroney Aeronautical Center" is incorporated into this plan by reference. It quantifies the Center's total releases and transfers of toxic pollutants and makes recommendations for actions and projects which will reduce toxic emissions as well as improve water and energy conservation efforts. The executive summary of the report is shown in Appendix A. Copies of the full report may be obtained by contacting the Environmental, Safety and Emergency Management Division, AMP-100, at ext. 43503.

6. Pre-Screening Assessment

Following completion of the opportunity assessment and baseline evaluation, team members were asked to assess the applicability and implementability of the recommended projects within their organizations. The results of the assessment are shown in the table in Appendix B.

It is clear from the table that most actions have not been fully implemented in all organizations and that organizations believe further evaluation of the projects will be needed to determine whether they can be implemented or not. The wide disparity in recycling of toner cartridges and use of recycled paper probably indicates a lack of consistent policy at MMAC regarding purchase of these products, but, at least with regard to recycled paper, it could also indicate inconsistency in what is meant by "recycled" since virtually all paper products available through GSA contain some recycled content.
At any rate, implementation of the actions will need to begin with a detailed evaluation as to cost effectiveness, process compatibility and other factors as described in the following chapter, "Ranking Criteria."

7. Ranking Criteria

The actions shown in Appendix B and any additional actions which are identified later, will be evaluated and ranked with regard to priority. This ranking is necessary since the vast majority of pollution prevention actions are not necessary for compliance and should, therefore, be evaluated on a similar basis as other FAA projects with regard to mission impact and cost effectiveness. Moreover, the evaluation should include an analysis of other factors which are difficult to quantify but that may have strategic significance. A project's impact on public image, financial liability or stakeholder relations can dwarf strict economic criteria in the decision-making process, and the analysis should not under-

emphasize so-called "qualitative" or "intangible" factors simply because they are outside the quantitative domain.[1] The areas to be evaluated for each action are:

1. Environmental Impact

An evaluation of the environmental impact of an action would include a determination of such things as:

- The effect on the number and toxicity of waste streams (benefits or liabilities associated with increases or reductions in air, wastewater and hazardous waste emissions).
- The risk of transfer to other media.
- The environmental impact of alternate input materials.
- Energy and water consumption.
- Impact on improving the facility's overall environmental compliance status or demonstrating leadership in going beyond compliance (pro-active environmental strategy).
- Environmental justice considerations.

2. Mission Impact

This includes an evaluation of such things as:

- Process compatibility.
- Effect on worker safety and health.
- Effect on product or service quality.
- Availability of space and utilities.
- Impact on labor requirements.
- Training requirements.
- Shop downtime needed for installation.
- Vendor service capability.
- Public image.
- Stakeholder relations.
- Potential liability.
- Psychological burden.

3. Cost Effectiveness

[1] An excellent discussion of a capital budgeting approach which includes qualitative factors is found in the training program entitled "Improving Your Competitive Position: Strategic and Financial Assessment of Pollution Prevention Projects," by the Northeast Waste Management Officials' Association (NEWMOA) and Massachusetts Office of Technical Assistance, 1994.

This includes an analysis of quantitative cost factors using traditional capital budgeting techniques which analyze such things as net present value, internal rate of return, payback period, etc.

The above factors can be charted using a mapping framework which identifies the strategic and quantifiable aspects of pollution prevention projects. The assessment map developed by NEWMOA[1] could be used for this purpose.

8. Implementation

Following completion of the ranking process, the previously identified opportunities will be implemented. Implementation includes establishing teams for project coordination; acquiring project funding, if needed; project initiation, tracking and measurement; and communication about the program to employees and the general public. If needed, F&E funding will be requested through the annual call for estimates process. Implementation teams or points of contact will be designated to ensure that implementation proceeds in a timely fashion.

Following project initiation or construction, each project will be tracked to determine its success as defined by project goals and objectives. Projects will be measured against the three criteria described in Section 7, i.e., environmental impact, mission impact and cost effectiveness.

Managers and selected employees will receive training in pollution prevention through the on-site environmental and safety training contractor. Currently, the training consists of one hour of information about what pollution prevention is and is not, why pollution prevention is important, and what employees can do to identify and implement pollution prevention projects. The training will be upgraded and modified as needed to keep pace with pollution prevention developments and technology.

Successes and disappointments of pollution prevention efforts, as well as applicable new technologies, will be communicated to MMAC employees through existing communication mechanisms. These include articles in the “Intercom”; cc:Mail messages and postings on the Environmental, Safety and Health electronic bulletin board; Environmental Protection Working Group meetings; briefings to management and other means as appropriate. This plan and updates on specific projects will be made available to employees and the general public through Internet access to the Aeronautical Center home page located on theWorld Wide Web at “http://www.mmac.jccbi.gov.”

The Environmental, Safety and Emergency Management Division, AMP-100, is responsible for oversight of this plan and for pollution prevention program management, including budgeting for projects. Organizations will commit such staff resources as are appropriate for support of the Pollution Prevention Team and for evaluation and implementation of the pollution prevention opportunities which apply to them. They will

seek to promote pollution prevention within their organizations and to encourage their employees to continually seek new opportunities to prevent pollution in their jobs.

9. Conclusion

This plan has been prepared in accordance with Executive Order 12856 and recognizes the need for all MMAC employees, whether tenant or host organization, to incorporate pollution prevention, particularly source reduction, into all aspects of their activities. Senior management supports the principles of pollution prevention as outlined in the policy statement. The implementation of this plan represents a significant step toward going beyond mere compliance to adopting a pro-active role in addressing environmental concerns. It will benefit MMAC through reductions in reporting requirements, compliance costs and evironmental liability. Savings could also be realized in expenditures for raw materials, waste disposal, transportation, handling and storage, training, management overhead and emergency response. It will result in a cleaner environment, more efficient operations and a safer workplace and will demonstrate environmental stewardship which will benefit the Federal government and the nation as a whole.

Appendix A

Executive Summary of Report:
Pollution Prevention Assessment of the Federal Aviation Administration's
Mike Monroney Aeronautical Center

POLLUTION PREVENTION ASSESSMENT OF THE FEDERAL AVIATION ADMINISTRATION'S MIKE MONRONEY AERONAUTICAL CENTER

DRAFT

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March 15, 1996

EXECUTIVE SUMMARY

Federal facilities are responsible for complying with all applicable environmental statutes, Regulations, and presidential directives. These requirements strictly control how federal agencies manage and dispose of their hazardous materials and wastes. Recent federal requirements direct federal agencies to reduce hazardous waste generation by preventing pollution at the source. The Federal Aviation Administration (FAA) has two facilities that generate most of its hazardous waste, the Mike Monroney Aeronautical Center and the FAA Technical Center. The Mike Monroney Aeronautical Center is the FAA's largest consumer of hazardous materials, and generates many hazardous wastes. The Center managed the disposal of approximately 124,000 pounds of hazardous waste at a cost of $l65,OOO during 1995, not including the waste managed by the on-site wastewater treatment facility.

This report documents the results of a Pollution Prevention Opportunity Assessment of the FAA Mike Monroney Aeronautical Center located in Oklahoma City, Oklahoma. This review was conducted by the FAA' s Office of Environment and Energy (AEE-200) with technical assistance from Booz·Allen & Hamilton Inc. (Booz·Allen) from October 23 through October 27, 1995. AEE-200 and Booz·Allen (the team) conducted the opportunity assessment to develop a Center-specific pollution prevention baseline of toxic pollutant releases and transfers, to identify where pollution prevention opportunities exist, and to identify pollution prevention activities that could reduce the Center's environmental impact. in addition, the team provided recommendations for implementing the pollution prevention reduction activities.

POLLUTION PREVENTION ASSESSMENT

AEE-200 and Booz·Allen began this assessment with an on-site review of the Mike Monroney Aeronautical Center. The Center's pollution prevention baseline represents a “snapshot" of the Center's hazardous materials releases and transfers and energy and water consumption. This baseline provides the Center with a quantifiable measurement of its environmental impact. The Center can develop performance metrics for measuring the progress of its efforts to reduce its overall environmental impact. To develop the Center's pollution prevention baseline, the team attempted to gather data on the raw materials used in each Center process to determine how much of the raw materials are consumed by the process, how much of the materials are released or transferred from the process, and where these releases and transfers go. To obtain these data, the team toured each process, interviewed staff, reviewed inventory and use records, reviewed waste generation and disposal data, and reviewed waste stream characterizations. The baseline presented in this report represents the most quantifiable baseline possible with the data made available for this assessment.

During the baseline data gathering efforts, the team discussed the intricacies of each process and noted any potential pollution prevention opportunities associated with reducing the process's contribution to the baseline. This information provided the basis for the recommendations on implementing pollution prevention.

THE REPORT

This report is organized into three sections. Section one, Pollution Prevention, provides the reasons behind the Center's compliance with pollution prevention. This section highlights the statutes, regulations, and presidential directives that require the Center's compliance and other justifications for implementing a pollution prevention program, such as the economic benefits.

Section two, Pollution Prevention Assessment, documents the data collected during the on-site assessment, describes all processes at the Center, describes the releases and transfers associated with each process, and lists the possible opportunities identified. This section reviews hazardous materials usage, energy and water consumption, and solid and hazardous waste generation and disposal amounts. An overall material balance was calculated from the data that are presented.

Section three, Implementing Pollution Prevention, summarizes the recommended reduction activities and describes a strategy and methodology for implementing pollution prevention at the Center. This section provides examples for ranking and conducting economic assessments of individual pollution prevention projects.

The Appendix to this document provides the individual hazardous materials balances used to calculate the Center's overall mass balance.

CONCLUSIONS AND RECOMMENDATIONS

This report completes the first step of a pollution prevention program, quantification of the Center's total releases and transfers of toxic pollutants. The Center can use the potential list of pollution prevention opportunities and the approach for implementing pollution prevention presented in this report to develop and achieve pollution prevention goals that reduce the environmental impact of its operations, lessen the burden of environmental compliance, realize economic benefits from reducing quantities of raw materials and disposal costs, and lessen the stress on natural resources.

The team identified four processes that offered significant pollution prevention reduction potential: painting, degreasing, circuit board repair, and inventory management. The team

suggested reduction activities ranging from simple substitutions for aerosol ozone-depleting cleaners and solvent degreasers to paint reformulation. By implementing these and the other reduction activities summarized in the following table. the Center can expect to raise its contribution toward achieving the agency's overall toxic pollutant reduction goal.

Summary of Aeronautical Center Pollution Prevention Opportunities

Process	Opportunity
Plating/Metal Finishing	• Implement automatic parts loading and unloading to reduce dragout. • Install drip bars and redesign racks to reduce dragout. • Substitute non-cyanide-based solutions for current cyanide-containing baths (possible substitution includes a sulfuric acid/hydrogen peroxide dip). • Enclose process tanks to minimize evaporation and prevent contamination. • Clean work areas to minimize airborne particles. • Use de-ionized water to minimize degradation of baths.
Metal Working	• Monitor pH of working fluids. • Use high-quality water to minimize bacteria growth. • Maintain proper coolant to water ratios. • Remove chips and fines routinely from machines.
Painting	• Convert current paint formulas to water-based formulas where possible. • Substitute paints with nonhazardous pigments for paint with cadmium, chromium and other hazardous pigments. • Implement high-efficiency spray equipment such as vacuum and HVLP systems.
Degreasing	• Convert immersion tanks and ultrasonic cleaners to aqueous, terpene-based solvents or less hazardous hydrocarbon solvent.
Circuit Board Repair	• Convert all freeze sprays, electronics cleaners, anti-static, and corrosion-preventive aerosol compounds to non-ozone-depleting formulations. • Convert to water-based solder fluxes.
Shop Operations	• Minimize formulations used at individual shops. • Create a chemical exchange system for shops to obtain materials. • Implement standard operating procedures for all shops explicitly describing the raw materials needed.
Solid Waste	• Recycle toner cartridges from copiers and laser printers. • Purchase recycled paper. • Implement site-wide recycling program that includes cardboard, aluminum cans, and plastic packaging material in addition to paper. • Track solid waste generation rates by organization and create incentive programs to minimize generation.
Energy and Water	• Monitor energy and water consumption by organization. • Implement Green Lights. • Install low-flow faucets and toilets. • Landscape with native plants to reduce watering.

Summary of Aeronautical Center Pollution Prevention Opportunities (cont.)

Logistics Inventory System	• Use management code to restrict availability of certain hazardous products and suggest replacements. • Develop a single catalog for the in-house inventory that contains the current information from each supplier. • Create a list of environmentally preferred products.
Product Purchasing	• Develop real time inventory system for each shop to track both the quantities of haz. mat. purchased by credit card and quantities ordered through LIS • Develop a list of products authorized for purchase with a credit card. • Require all contractor-operated shops to obtain pre-approval for the process raw materials from the gov't before initiating any procurements.
Print Shop	• Print with soy-based inks. • Replace the deglazing solvent with a less hazardous formula.

Center Commitment

The Center has support from top management to develop a pollution prevention program. This commitment is evident in all organizations. A limited number of the recommendations discussed in this report depend on cooperation between the Center organizations and will require substantial research before implementation. The next steps for the Center include formalizing a pollution prevention plan, identifying target reduction goals and performance metrics, implementing reduction activities, and measuring the Center's progress. Although some of these steps may require an initial outlay of significant resources the Center should experience a decrease in the costs associated with managing hazardous waste, an improved working environment for employees, a decrease in the instances of noncompliance, an increase in the time and money available for the Center's primary mission operations, and an improved environment for future generations.

Extension to FAA Field Operations

The Mike Monroney Aeronautical Center is one of thousands of FAA facilities in the United States. The Center's mission is unique and requires operations not found at other FAA facilities, such as plating, metal finishing, and large-scale circuit board repair. Even though many operations are not similar in scale, many are similar in the chemicals used and acquisition practices. Therefore, many services initiated at the Center may be transferable to the field activities. These opportunities include:

- Converting all freeze sprays, electronics cleaners, anti-static aerosols, and corrosion preventive aerosol compounds to non-ozone-depleting formulations.
- Revising acquisition and inventory management systems.
- Developing standard operating procedures.

Appendix B
Pre-Screening Assessment Results

Table B-1 Results of Pollution Prevention Opportunity Pre-Screening Assessment

Item No.	Process	Title	BAH[1] page no.	Applicable To (orgn.):	Implementability Code[2]:	Cost Est. ($1000's[3])
1.	Plating/Metal Finishing	Implement automatic parts loading and unloading to reduce dragout.	14, 20	AML	E	
2.	Plating/Metal Finishing	Install drip bars and redesign racks to reduce dragout.	14, 20	AML	E	
3.	Plating/Metal Finishing	Substitute non-cyanide-based solutions for current cyanide-containing baths (possible substitution includes a sulfuric acid/hydrogen peroxide dip).	14, 20	AML	E	
4.	Plating/Metal Finishing	Enclose process tanks to minimize evaporation and prevent contamination.	14, 20	AML	E	
5.	Plating/Metal Finishing	Clean work areas to minimize airborne particles.	14, 20	AVN AML	C I	
6.	Plating/Metal Finishing	Use de-ionized water to minimize degradation of baths.	21	AML	E	
7.	Metal Working	Monitor pH of working fluids.	21	AML	E	
8.	Metal Working	Use high-quality water to minimize bacteria growth.	21	AML	E	
9.	Metal Working	Maintain proper coolant to water ratios.	21	AML	I	
10.	Metal Working	Remove chips and fines routinely from machines.	21	AVN AML	C I	
11.	Painting	Convert current paint formulas to water-based formulas where possible.	17, 28	AVN AML	E C	
12.	Painting	Substitute paints with nonhazardous pigments for paint with cadmium, chromium and other hazardous pigments.	17, 28	AMP-300 AVN AML	C E P	
13.	Painting	Implement high-efficiency spray equipment such as vacuum and HVLP systems.	17, 28	AVN	E	
14.	Degreasing	Convert immersion tanks and ultrasonic cleaners to aqueous, terpene-based solvents or less hazardous hydrocarbon solvent.	25, 31	AMP-300 AVN AML	C F E	18
15.	Circuit Board Repair	Convert all freeze sprays, electronics cleaners, anti-static, and corrosion-preventive aerosol compounds to non-ozone-depleting formulations.	25, 27, 28, 31	AMP-300 AMA AVN AML	C E E P	
16.	Circuit Board Repair	Convert to water-based solder fluxes.	25, 28	AMA AVN AML	E E P	
17.	Shop Operations	Minimize formulations used at individual shops.	22, 28, 30	AVN AML	E E	
18.	Shop Operations	Create a chemical exchange system for shops to obtain materials.	10	AVN AML	E E	
19.	Shop Operations	Implement standard operating procedures for all shops explicitly describing the raw materials needed.	10, 25, 27	AVN AML	E E	

Table B-1 (cont.)

Item No.	Process	Title	BAH[1] page no.	Applicable To (orgn.):	Implementability Code[2]:	Cost Est. ($1000's[3])
20.	Solid Waste	Recycle toner cartridges from copiers, fax machines and laser printers.	34	AMH AMB AML AMP-300 AMQ AMI AMA ATX AAD-30 AOS-200 AVN DTI AFS-700	C C E C O E E P C I C C C	
21.	Solid Waste	Purchase recycled paper.	30, 34	AMH AMB AML AMP-300 AMQ AMI AMA ATX AAD-30 AOS-200 AVN DTI	E E E P O N E P C E P C	
22.	Solid Waste	Implement site-wide recycling program that includes cardboard, aluminum cans, and plastic packaging material in addition to paper.	34	AMP-300 AFS-700 AML	P P P	
23.	Solid Waste	Track solid waste generation rates by organization and create incentive programs to minimize generation.	34	DTI AMP	C E	
24.	Energy and Water	Monitor energy and water consumption by organization.	32	DTI AMP	C E	
25.	Energy and Water	Implement Green Lights.	32	AMP	E	
26.	Energy and Water	Install low-flow faucets and toilets.	34	AMP	E	
27.	Energy and Water	Landscape with native plants to reduce watering.	34	AMP	P	
28.	Logistics Inventory System	Use management code to restrict availability of certain hazardous products and suggest replacements.	9	AVN AML	E E	
29.	Logistics Inventory System	Develop a single catalog for the in-house inventory that contains the current information from each supplier.	9	AVN AML	E E	

Table B-1 (cont.)

Item No.	Process	Title	BAH[1] page no.	Applicable To (orgn.):	Implementability Code[2]:	Cost Est. ($1000's[3])
30.	Logistics Inventory System	Create a list of environmentally preferred products.	9	AVN AML	E E	
31.	Product Purchasing	Develop real time inventory system for each shop to track both the quantities of haz. mat. purchased by credit card and quantities ordered through LIS	9, 10	AVN AML AMP	E E E	
32.	Product Purchasing	Develop a list of products authorized for purchase with a credit card.	9	AVN DTI AMP AML	E C E E	
33.	Product Purchasing	Require all contractor-operated shops to obtain pre-approval for the process raw materials from the gov't before initiating any procurements.	10	AMQ	O	
34.	Print Shop	Print with soy-based inks.	30	AMI	E	
35.	Print Shop	Replace the deglazing solvent with a less hazardous formula.	30	AMI	E	

Footnotes:

1. BAH = Booz-Allen and Hamilton report, "Pollution Prevention Assessment of the Federal Aviation Administration's Mike Monroney Aeronautical Center," March 15, 1996
2. Implementability codes are as follows:
   - I = Action is immediately implementable without further evaluation or special funding.
   - F = Action would be immediately implementable if funds were available. (Give cost estimate, if available, in the cost estimate column.)
   - C = Action already fully implemented in all applicable parts of the organization.
   - P = Action partially implemented.
   - E = Action may be implementable, but further evaluation is required.
   - N = Action is not implementable. (Explain why in remarks space, e.g., already evaluated in a prior study, would violate agency policy or procedures, etc.)
   - O = Other. Explain in remarks.
3. Cost Estimate is in thousands of dollars, if available, for projects having implementability code "F".