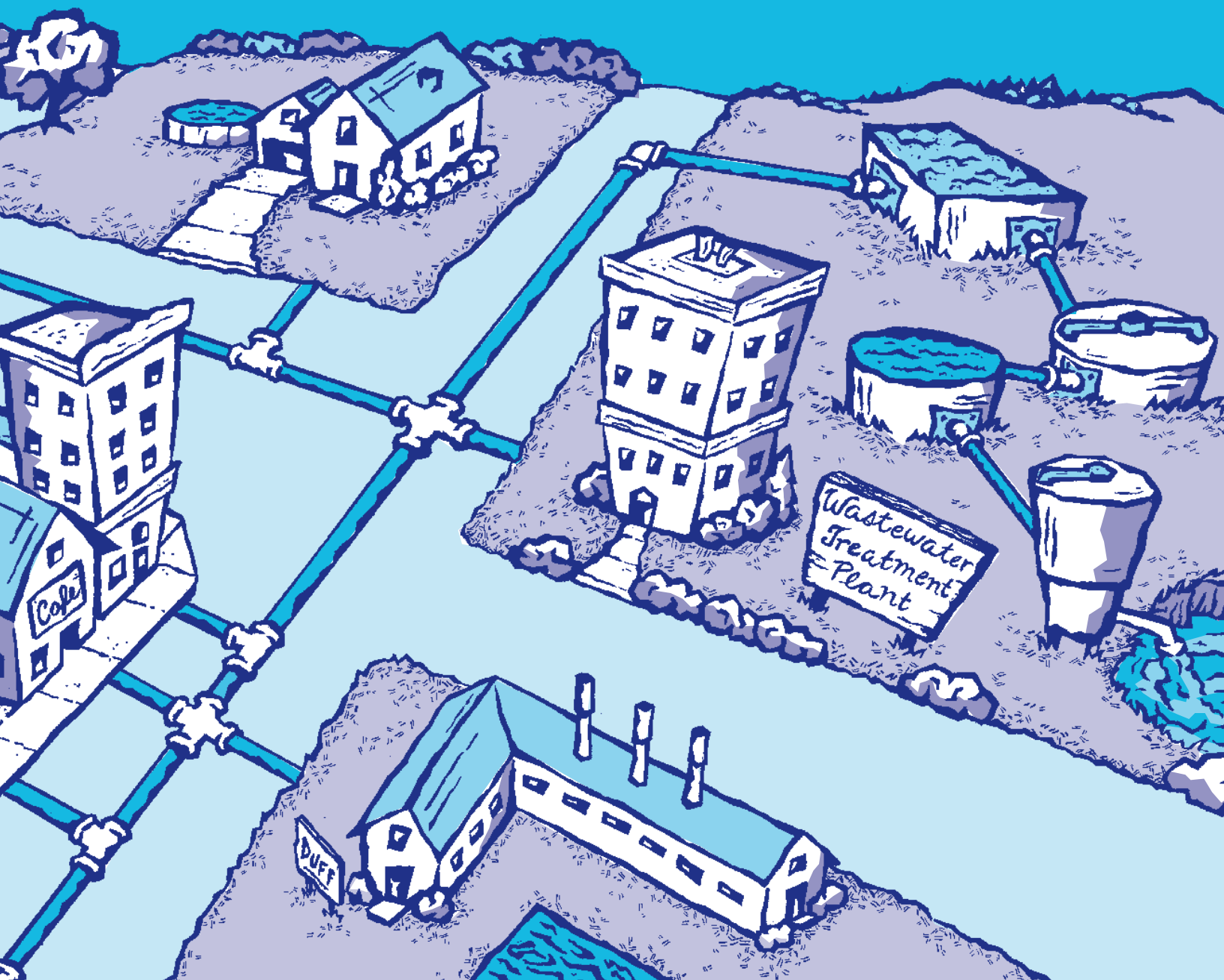




POLLUTION PREVENTION AT POTW's CASE STUDIES



POLLUTION PREVENTION IN PUBLICLY OWNED TREATMENT WORKS

EPA, states, and municipalities have made significant progress over the last 20 years in improving the quality of the environment through continuous investment in the nation's wastewater treatment infrastructure and implementation of the Clean Water Act. Today however, the nation faces increased challenges including municipal growth, newly regulated pollutants, and more stringent effluent limits. EPA encourages municipalities to meet these challenges through pollution prevention practices as the preferred approach to augment traditional treatment and control of wastewaters, and avoid or defer the expansion of a Publicly Owned Treatment Works (POTW).

As the federal government's role in funding municipal wastewater treatment declines, there is both the need and the opportunity to adopt pollution prevention measures to meet the expanding demands and to prepare for new federal and state requirements. Thus, a primary goal of EPA is to



encourage and support states and municipalities in developing pollution prevention programs.

To this end, the Office of Pollution Prevention and Toxics funded a pilot program in FY 1991 to demonstrate how municipalities can benefit from pollution prevention. EPA awarded grants of up to \$100,000 to five states to demonstrate how a municipal POTW, through its pretreatment program and its facility operations, can promote source reduction activities to industrial and business dischargers. Activities funded under this grant include:

- Outreach and technical assistance to industrial dischargers;
- Energy audits of specific POTWs; and
- Establishment of water conservation programs in the community.

This brochure presents case studies of the five projects carried out under the grant program. The case studies outline the goals and strategies employed by each of the grant recipients. In addition, they highlight program accomplishments and resolution of problems encountered by recipients, where possible.

For further information about any of the projects, please contact the project director listed at the end of each case study.

INTRODUCTION

The Massachusetts Office of Technical Assistance (OTA) used EPA grant funding to conduct its “Critical Parameters Project”. This pilot program assisted two POTWs reduce key pollutants that constitute “critical parameters” through pollution prevention assistance. Critical parameters are: (1) those pollutants for which loadings to the POTW are approaching or exceeding 85 percent capacity, necessitating capital expenditures to enlarge the system, and/or (2) those pollutant concentrations which, if exceeded, can prohibit the marketing of the sludge or cause the POTW to be in violation of its own NPDES permit. The project included an analytical sampling program of POTW influent to document pollutant reductions. The two projects targeted a different source of pollution in POTWs:

- Industry Toxic Effluent Reduction: Warren Wastewater Treatment Plant;
- Household/Small Business Hazardous Waste Reduction: Worcester Upper; and
- Blackstone Pollution Abatement District.

Originally, OTA planned to conduct a third project in Springfield that would target non-point source pollution received by the POTW. OTA cancelled this project as the project team had difficulty locating a suitable sampling point and State sludge classification regulations changed, which altered the parameters of the project.

GOALS

Industry Toxic Effluent Reduction

Massachusetts has many rural communities, each with a distinct identity and character. Most have fragile economies unusually dependant upon a sin-



gle industrial facility. Warren, with a population of 4,500, is such a town. The Warren Project sought to reduce, through pollution prevention practices, the toxicity of the effluent from a textile plant, the major industrial discharger. The plant normally contributes 40 to 60 percent of the Warren POTW influent. Therefore, any reduction in the waste's toxicity would make a major contribution to the town's pollution prevention efforts. In 1991 the POTW failed to meet two consecutive quarterly tests for toxicity. Without reductions in the toxicity of its effluent, the POTW faced costly regulatory measures in the future.

Household/Small Business Hazardous Waste Reduction

The Worcester Project sought to reduce loadings of several metals generated by households and small businesses that are very small quantity generators (VSQGs) in influent to the treatment works. The POTW targeted copper, cadmium, nickel, and zinc for reduction. The treatment plant feared that a new NPDES permit might contain stringent discharge limits for these metals. While Worcester's pretreatment program controls the metals discharged by industries to the district, little had been done in Massachusetts to reduce household and VSQG releases. Studies in other parts of the country (i.e., Seattle and San Francisco) have revealed that small (i.e., household and VSQG) discharges can significantly affect POTW influent and effluent.

STRATEGY

Industry Toxic Effluent Reduction

The project team developed a team approach to evaluate and reduce levels of toxins in effluent from the textile plant. Before carrying out the technical work of the project, the project team sought the support of the town, the POTW, and the management and employees of the textile plant.

The team believed that this support was paramount to the success of the project. The team planned to achieve its goals through three activities:

- Develop and implement a textile plant effluent sampling program to establish baseline levels, detect load reductions as they occur, and identify the type of toxicity affecting the plant (e.g., metal organics, surfactants).
- Develop a systemic approach to evaluating pollution prevention opportunities at the plant.
- Implement the easiest pollution prevention measures first.

Household/Small Business Hazardous Waste Reduction

The Worcester Project used a two-part approach to reducing household and VSQG hazardous waste loadings. First, the project team established a temporary collection site for waste oil, antifreeze, and photographic waste to provide a safe means for households and VSQGs to dispose of the wastes. Second, the project publicized the recycling center and educated the public about clean water issues to increase participation in the collection program and reduce releases of other pollutants.

To attract VSQGs and households to the center, familiarize them with the POTW, and educate them on the total impact of all wastes on the POTW, Worcester offered limited collection of used oil, antifreeze, and photographic wastes. The project team planned to measure and document the reductions in the concentrations of the metals in the treatment plant influent.

PROGRAM ACCOMPLISHMENTS

Industrial Toxic Effluent Reduction

At the outset, the project team held meetings with plant employees and management to encourage support for the project. The project team explained

the importance of reducing the toxicity of the effluent of the plant, both for the POTW and for the plant. In addition, the project team emphasized that the activities the employees perform every day in their work can influence the quality of the influent and effluent of the POTW. The team also explained the costs to the plant of pretreatment or other end-of-pipe regulatory requirements the plant would have to enact if the POTW continued to fail effluent toxicity tests. With this knowledge of pollution costs, regulatory requirements, and the potential costs to the significant industrial user (the textile plant), the plant's employees and management became supporters of the project. Throughout the project, management (especially middle managers from the dye house and the finishing room) and employees volunteered ideas and information they felt would be helpful and provided data and information requested by the project team.

To establish baseline toxicity concentrations and track changes, the project team sampled effluent from the textile plant and influent and effluent from the POTW. Sample analysis determined that while the textile plant was not the sole source of toxic contaminants, it was a large source that caused the POTW effluent to exceed toxins concentration standards. Sample analysis and a literature review pinpointed the two most significant toxins in the plant effluent: toxic surfactants and salt. The project team resolved these issues as follows:

Surfactants: With the help of the management and employees of the textile plant, the project team compiled a list of surfactants (cleaning agents) used at the plant. The project team researched dyes used in conjunction with lower amounts of the toxic surfactants and researched alternative dyeing methods. One company had developed several dyes that could be used with a non-toxic surfactant and would soon produce several more. The textile plant agreed to switch to the non-toxic surfactants after depleting its current stock of surfactants.

Salt: The project team found several ways to reduce salt effluent from the textile plant without reducing the quality of the textiles produced. The plant may reduce the use of salt with the current dyes or through revising dye batch formulations. As with surfactants, the project team researched new low-salt dyes, and found dyes that would result in a 30 to 70 percent reduction in salt use. Also, the project team continues to study ways to reclaim salt from textile plant wastewaters.

The project team and the textile plant employees continue to evaluate technologies and substitutes to reduce the toxic effluent from the plant. Working together, they study the economic feasibility and product performance of each alternative. Progress is ongoing as the project team continues to evaluate the effectiveness of the pollution prevention activities. Moreover, the interest in pursuing and the willingness to implement pollution prevention has continued to grow for all participants.

Toxicity at the POTW appears to have been reduced while production levels at the textile plant have increased steadily since the beginning of the project. In order to ensure that the toxicity remains abated after the project concludes, OTA is developing computer software tracking and electronic systems that will allow both parties to input respective data elements and generate graphs that will chart production, POTW loadings, and toxicity data over time.

Household/Small Business Hazardous Waste Reduction

The temporary recycling center opened in the Fall of 1992 and served as an education center in addition to a collection point for antifreeze, used oil, and photographic wastes. An educational poster board presented information, and Massachusetts Office of Technology Assistance staff members discussed recycling and POTW pollution issues with recycling center users. To ensure use of the center, the project planned an extensive publicity effort.

The public education program and the recycling center participation publicity worked in tandem. To advertise the recycling center, the project team placed advertisements in newspapers, on radio, and on local cable television. The project team made presentations about POTW pollution issues to civic groups and sponsored topic-specific workshops for the general public. The general presentations focused on the problems pollution causes POTWs and introduced the concept of pollution prevention versus pollution control. The project team also made presentations to a wide range of civic groups, ranging from the local chapter of the Appalachian Mountain Club to the local Rotary Club. In addition, the project team presented two topic-specific workshops, "Household Product Dangers," and "Green Tips for Weekend Mechanics," which instructed participants how to reduce toxic releases during specific activities. To learn which aspects of the public education programs were most valuable so as to improve the effectiveness of its education efforts, the project team surveyed participants in the educational activities and the recycling center users.

The project team also developed a curriculum for primary grade students that explores (through lectures and hands-on activities) how pollutants harm the operation of a POTW. The project team collected portions of existing curricula and included or modified them to best present information on POTWs. The curriculum consists of six lessons supported by handouts, presentation boards, and brief slide shows. As part of this curriculum, the project team created a cartoon character named "Roddy the Rotifer" to bring alive for students the importance of the biological processes upon which POTWs depend. The curriculum includes activities such as writing a cookbook of non-toxic household cleaners and holding a mock pollution prevention project grant application writing competition. The project team planned to donate a curriculum copy to up to 100 schools.

Over nine months, the project created several innovative lessons for the curriculum and collected over 1400 gallons of waste at the collection site

from 150 users. The team measured four pounds of the targeted metals in the 1400 gallons of waste.

While these four pounds of metals were diverted from the POTW, the concentrations of the metals in the influent of the POTW did not change during the duration of the project. Although the project did not meet its overall goal of reducing influent concentrations, it did accomplish several important intermediate goals that will help limit influent concentrations in the future and thus help it to meet future, more strict permit requirements for effluent.

The public education project reduced toxic releases and laid the groundwork for further educational activities. A survey of the users of the recycling center yielded a 65 percent response rate. The data show that: (1) half of the users knew nothing about wastewater treatment before using the center; (2) 71 percent understood the POTW better after using the center; (3) 60 percent wanted more information about the POTW; (4) 41 percent wanted a tour of the POTW; (5) 36 percent tried one or more of the source reduction suggestions from the center; and (6) all respondents wanted the service continued. Although difficult to quantify, the many newspaper articles and ads, radio advertisements, and other outreach efforts raised the awareness of thousands of people of the problems water pollution causes POTWs. In addition, the publicity about the POTW's efforts to implement low-cost, non-regulatory solutions to pollution problems will help to create ongoing goodwill between the community and the POTW.

PROBLEMS AND RESOLUTION

Household/Small Business Hazardous Waste Reduction

In addition to some common operational problems, the Worcester Project encountered two problems. Through flexible planning and an understanding of the project area, the project team resolved one of these problems and approached the project goals through alternative means.

- (1) **Low Turnout at Workshops:** The workshops offered to the general public suffered from lower-than-expected turnout. The project team surmised that the evening scheduling of the workshops and limited publicity contributed to the low turnout. To reach a wider audience, the team scripted, contracted, and filmed a one-half hour educational and instructional video that explains the effect of water pollution on the POTW. The video offers more detailed information, such as specific steps households can take to reduce pollutant releases. The team televised the video on a popular local-access cable channel.
- (2) **Limited Use of Recycling Center:** The recycling center received little use from VSQGs and moderate use from homeowners. Three factors may have limited its use. First, small businesses may have been dissuaded from using the recycling center because they would have to identify themselves to the State as VSQGs to use the center. Some may have feared future regulation as VSQGs. Second, local environmental and civic organizations did not provide as much support for the project as originally planned. Several organizations had initially agreed to help with the project, but provided only limited help due to the short time deadlines of the project and their own pre-existing priorities and projects. Third, the center received less publicity than originally planned due to staff time limitations.

Industry Toxic Effluent Reduction

Preliminary analysis of the data indicates that when the textile plant switched to a more degradable product it may have caused a new loading problem for the POTW as biological units at the POTW could only partially digest the product's carbon chains. The project team believes that the problem might be easily remedied if the POTW adds additional biological reactors during periods of peak production at the textile plant. This type of loading problem may be resolved by simply establishing and

maintaining a line of communication between the POTW and the company.

RESULTS AND PRODUCTS

Industry Toxic Effluent Reduction

Toxicity at the POTW appears to have been reduced while production levels at the textile company have increased steadily since the beginning of the project. Tools to aid in continued cooperation at the conclusion of this project are being developed.

Continued success in toxicity reduction will depend on maintaining the data elements established and by expanding them when new products are introduced at the textile company. These activities will allow both parties to observe trends, noting toxicity changes as they occur. The project team will develop a computerized system to electronically link the databases held at each facility in order to routinely track the data and review the trends.

The textile company should be commended for its efforts. Both management and employees have been extremely helpful throughout the project. Moreover, the textile company has actively pursued pollution prevention beyond those measures addressed through this project.

Finally, OTA is developing a model to expand the Warren project. The model is being designed to help small POTWs meet the increasing challenges of new NPDES permit restrictions when they are imposed. OTA's module will allow POTWs to use the microtox unit on a lend-lease basis to conduct toxicity trials at their plants. POTWs could use the toxicity information to establish working relationships aimed at problem solving with their industrial users. Pollution prevention approaches and OTA technical resources would be the first step in this process. Program elements and the logistics of the proposed model are in the early stages of development.

Household/Small Business Hazardous Waste Reduction

A complete information packet on initiating a consumer-targeted educational program about POTWs and pollution prevention will be available to all POTWs as a result of this study. Some packets will be distributed throughout the Blackstone Watershed while others will be available upon request. The packet will consist of (1) a video; (2) a permit application template for POTWs to use in establishing waste collection centers; (3) a consumer guide about POTWs, toxics and pollution prevention recipes; (4) the children's curriculum; and (5) a publicity poster. These materials will help POTWs establish broad based consumer programs without having to allocate scarce resources (time and money) to this effort. Already, OTA has received numerous requests for these materials.

AVAILABLE MATERIALS

- Educational video
- Sample curriculum materials
- "H₂Ome Improvements" consumer manual and brochure
- Recycling Center Permit Application

FOR MORE INFORMATION CONTACT

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INTRODUCTION

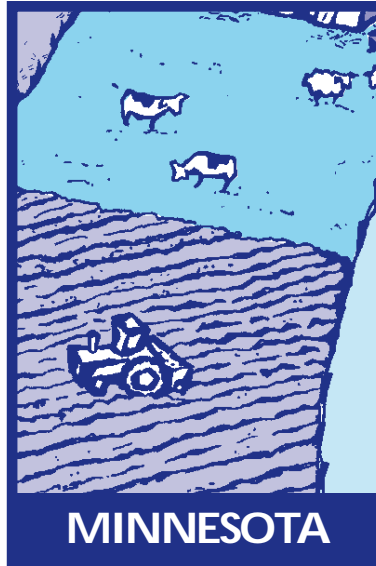
The Minnesota Office of Waste Management (OWM) oversees State programs designed to conserve resources and prevent pollution. Its programs encourage waste reduction, recycling of reusable materials, recovery of resources from waste, and treatment of waste to reduce risks. In 1984, the State established the Minnesota Technical Assistance Program (MnTAP) to provide non-regulatory assistance to Minnesota industry in pollution prevention and waste management. MnTAP services include on-site and telephone consultation, educational and technical resources, and a student intern program.

Since 1969, the Metropolitan Waste Control Commission (MWCC) has managed the wastewater of the Twin Cities metropolitan area. MWCC owns and operates nine wastewater treatment plants and over 300 miles of interceptor sewers and treats 275 million gallons of wastewater per day. MWCC's Metro Plant is the largest treatment plant in the State of Minnesota and treats approximately 220 million gallons of wastewater per day.

GOALS

Minnesota hoped to accomplish the following three goals with the EPA grant:

- 1) To establish programs and activities that promote source pollution prevention at the State's largest POTW;
- 2) To reduce the level of pollutants and wastewaters discharged to the wastewater treatment system; and
- 3) To seek ways to benefit from multi-media pollution prevention activities.



STRATEGY

Minnesota adopted a six-pronged approach to reach the above goals:

- 1) **Training.** The State planned to train MWCC pretreatment program staff, MWCC staff committee members, other Minnesota POTW staff, Minnesota Pollution Control Agency (MPCA) industrial wastewater staff, representatives from metro county hazardous waste programs, and interested industrial users of sewage treatment plant systems on multi-media pollution prevention techniques. The proposed training would be in the form of the following three workshops:

Workshop I: Presentation of background information and introduction to pollution prevention concepts.

Workshop II: Discussion of how to integrate pollution prevention techniques into inspections, identification of opportunities to prevent pollution, and use of case studies to reinforce the program's objectives.

Workshop III: A forum for industrial users and POTW staff to share ideas and experiences on pollution prevention.

To supplement the workshops, the State planned to provide tours of successful industry pollution prevention programs.

- 2) **Technical Assistance.** After attending the above workshops, MWCC staff planned to provide on-site technical assistance to industry in Minneapolis/St. Paul. MWCC staff members would promote pollution prevention to industry and identify opportunities to prevent

pollution during routine inspections. In addition, MWCC staff would refer industry to MnTAP or other contacts, where appropriate.

- 3) **Regulatory Integration.** The State and MWCC proposed to organize a staff committee to help integrate pollution prevention into MWCC programs. The staff committee would provide guidance for MWCC in achieving program objectives and would generally oversee the grant project.
- 4) **Measuring Success.** The State and MWCC planned to develop methods of quantifying changes in the level of pollution resulting from the pollution prevention efforts.
- 5) **Coordination.** MWCC planned to coordinate its efforts with other programs in Minnesota by: (1) meeting quarterly with other pollution prevention programs in the state; (2) continuing to participate on OWM's Pollution Prevention Task Force; (3) participating at OWM's annual Pollution Prevention Conference; and (4) developing fact sheets and other materials for use by other POTWs.
- 6) **Advisory Group.** The State and MWCC proposed to solicit industry and public input both by forming an advisory group which would serve in an advisory capacity for the grant project and MWCC's pollution prevention efforts.

PROGRAM ACCOMPLISHMENTS

Pollution Prevention Workshop #1

On April 29, 1992, the first of three workshops was held by OWM and MWCC. Speakers described pollution prevention and its importance as an alternative to end-of-pipe treatment. They also introduced waste minimization techniques for various industries.

Pollution Prevention Workshop #2

On October 13, 1992, OWM and MWCC sponsored a second workshop. The purpose of this work-

shop was to: (1) provide information on how to integrate pollution prevention into inspections; (2) identify pollution prevention opportunities; (3) promote the pollution prevention approach; and (4) discuss case studies. Concurrent sessions were held for a variety of industrial processes so that pollution prevention could be discussed specific to each individual industry.

Pollution Prevention Workshop #3

The State decided to integrate the third workshop with the Minnesota statewide Pollution Prevention Conference because the combination of the two events was more efficient and provided an opportunity to reach a larger audience. The Conference/Workshop was held on June 17, 1993 and was sponsored by OWM, MWCC, MnTAP, and the Minnesota Chamber of Commerce. The purpose of the conference was to promote pollution prevention to all industrial users. There were eight different topic areas with six sessions for each topic area. The eight topic areas were: (1) Pollution Prevention Basics; (2) Industry/Process Specific I; (3) Industry/Process Specific II; (4) Wastewater Pollution Prevention; (5) Solid Waste Source Reduction; (6) Pollution Prevention Community Partnerships; (7) Pollution Prevention Case Studies; and (8) Pollution Prevention Initiatives.

Pollution Prevention Survey

To obtain information regarding industrial pollution prevention activities, success stories, and input on ways to provide further assistance to industries, MWCC conducted a pollution prevention survey among permitted industrial users. MWCC mailed the survey to over 650 permitted industrial users and received a 65 percent response rate. The results of the survey have been compiled and will serve to guide MWCC's future pollution prevention efforts and initiatives.

Pollution Prevention Advisory Committee

In August, 1992 MWCC established the Pollution Prevention Advisory Committee (PPAC). The com-

mittee, comprised of sixteen representatives of MWCC, OWM, and various industries, citizen groups and communities, serves in an advisory capacity for the grant project and MWCC's pollution prevention efforts. PPAC meetings were held once every two months during the term of the grant program. The topics discussed included MWCC's pollution prevention program, the pollution prevention survey, integration of pollution prevention into MWCC's pretreatment program, and the grant program in general.

Staff Training

MWCC Staff have attended several local workshops and conferences on pollution prevention as part of staff training. Some of the topics discussed included pollution prevention in electroplating/metal finishing operations and vehicle maintenance. The Waste Reduction Institute for Training Applications and Research conducted a one-day training session for MWCC's pretreatment staff on pollution prevention opportunities in electroplating and metal finishing operations on April 20, 1993.

Industrial Pollution Prevention Participation Program (I4P)

Initiated in November of 1992, this program is intended to promote, in a voluntary and non-regulatory manner, pollution prevention among the permitted industrial users. The program encourages industries to reduce pollution of wastewater without transferring pollutants from one medium to another (i.e., from water to air).

AVAILABLE MATERIALS

Minnesota has made the following materials available:

- A brochure describing the Minnesota Technical Assistance Program;
- A brochure summarizing the topics of discussion at the 3rd annual Minnesota Conference on Pollution Prevention;

- A booklet summarizing a model pollution prevention plan including examples of preventative activities;
- A fact sheet describing the MWCC;
- A fact sheet describing the Industrial Waste Division of the Quality Control Department of MWCC. The fact sheet outlines how the division controls and monitors discharges to the sewer system to insure compliance with local and federal regulations;
- A fact sheet defining pollution prevention and outlining its use as an environmental protection tool;
- A fact sheet explaining the Minnesota Toxic Pollution Prevention Act;
- "Managing and Reducing Dental Waste", a brochure on preventing pollution at dental clinics; and
- A brochure on household pollution prevention.

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INTRODUCTION

The New Mexico Environment Department (NMED) initiated a number of pollution prevention efforts in conjunction with EPA Region 6 prior to the award of the EPA grant. These efforts focused on a pilot program — Improving Municipal Performance by Addressing Capacity (IMPAC). IMPAC, developed during 1989-90, is a compliance maintenance program that helps POTWs meet federal Clean Water Act provisions. IMPAC is intended to assist municipalities in their efforts to identify and address performance-limiting factors that have been found to adversely impact the ability of POTWs to effectively treat municipal wastewater and produce a compliant effluent.

NMED transferred \$70,000 of the \$100,000 awarded by EPA to the City of Albuquerque. Albuquerque is a large city (approximately 500,000 residents) that has a growing economic base. The State chose Albuquerque, in part, because Albuquerque had already established a program to pretreat potentially hazardous pollutants prior to introduction to the POTW. Because industrial pretreatment programs often result in transfer of pollutants to other media rather than elimination, Albuquerque used the grant to emphasize pollution prevention. The POTW strongly encouraged pollution prevention as it feared more stringent discharge requirements on both its effluent and sludge and was interested in composting and distributing wastewater sludge for beneficial use.

GOALS

New Mexico and the City of Albuquerque hoped to accomplish the following objectives in this project:

- 1) Educational Outreach. Provide information on hazardous waste management to industry;



- 2) Technical assistance. Help companies identify and evaluate site-specific opportunities for hazardous waste minimization;
- 3) Identification and Targeting of Specific Discharges for Waste Reduction. Reduce wastes with greatest detrimental impact on the POTW's ability to comply with NPDES permit requirements and produce safe sludge; and
- 4) Evaluation of Regulatory Alternatives. Establish indirect inducements or direct requirements to promote waste minimization (i.e., mass balance discharge limits or more stringent local limits).

STRATEGY

NMED chose to implement its waste minimization program through the established Albuquerque Industrial Pretreatment Program. Through this program, New Mexico focused on meeting waste minimization and source reduction goals at the local level, since 29 of the state's 50 largest industries are either located in Albuquerque or utilize the city's sewer system for disposal of their effluent.

Some of the services that the Albuquerque Industrial Pretreatment Program planned to perform include:

- Monitoring of industries suspected of discharging toxins or hazardous constituents to the City's POTW;
- Levying of surcharges and enforcement actions to violators to induce industries to reduce the amounts of toxic or hazardous wastes they discharge into the POTW;

- Technical assistance to industry on matters relating to the pretreatment, minimization, or elimination of toxic waste discharges;
- Identification and elimination of toxins in the wastewater received by the Albuquerque POTW; and
- Laboratory analyses performed to identify or quantify the concentrations of toxic or hazardous constituents in industrial wastewater discharges.

PROGRAM ACCOMPLISHMENTS

New Mexico has accomplished numerous objectives in educational outreach, technical assistance, and identification and targeting programs.

Educational Outreach

Albuquerque is currently developing a Self-Assessment Manual to help general industry assess a facility's waste generation and its potential waste reduction opportunities. While the manual itself is not industry-specific, there are industry-specific worksheets being developed to supplement the manual. The City is developing worksheets for photoprocessors, jewelry manufacturers, and electroplaters/metals finishers.

During 1993, the City of Albuquerque sponsored five workshops:

- 1) Photo and Jewelry Industry Workshop. The New Mexico Silver Users Association/City of Albuquerque sponsored two nights of workshops on techniques for reducing the level of silver in wastewater. The sponsors advertised the workshop in a newsletter that reaches nearly 1,000 people in the photo and jewelry industries — both large users of silver. At the workshop the City introduced the City's 5 PPM Program. Under this voluntary compliance program, the City provides certificates to facilities

that reduce the content of silver in their wastewater to 5 parts per million (ppm). The City also asked participants to share information on successful silver reduction/recycling techniques. At the conference, one area jeweler spoke on what his facility has done to achieve virtually closed-loop recycling of most process metals and recharge/reuse of its pickling solutions. Approximately 50 people attended at least one of the workshops.

- 2) Electroplating/Metals Finishing Industry Workshop. Approximately 40 participants, including close to 30 industry representatives, attended this workshop sponsored by the City of Albuquerque on May 28, 1993. This workshop covered methods of waste reduction and ion exchange and similar processes.
- 3) Photographic Processing Silver Reduction Workshop. Close to 30 percent of the facilities contacted attended this workshop held on July 14, 1993. The information discussed at the workshop included techniques for reducing photographic wastes and the 5 PPM Program. Three area silver recovery and equipment suppliers made presentations. Waste Minimization staff discussed water conservation and the level of fixer solution required to make on-site recovery of silver economically viable at photoprocessing facilities. A representative of the Albuquerque Hazardous Waste Program covered current RCRA and DOT regulations that affect photographic wastes.
- 4) Radiator Repair Industry Workshop. This workshop/seminar, sponsored by the Albuquerque Environmental Health Department, advised participants of waste reduction opportunities in the radiator repair industry.
- 5) Waste Reduction Workshop for the Printing Industry. On November 30, 1993, a waste reduction workshop for printers was held. The workshop, sponsored by the Albuquerque Waste Minimization Program, the Albuquerque Club

of Printing House Craftsmen, and the T-VI Commercial Printing Program, provided participants with information on printing industry regulations and pollution prevention techniques (i.e., silver recovery). Workshop presenters also discussed the handling of hazardous waste and various air quality and stormwater quality concerns.

Technical Assistance

The City launched the Industry Waste Reduction Opportunities (Industry WROs) project by visiting 28 industrial sites. The objective of the program was to identify and evaluate opportunities for pollution prevention through reduced volume and toxicity of industrial wastes. The majority of the visits were to photo processing labs (7), jewelry manufacturers (6), and electroplaters and metals finishers (5). At certain sites, the City took samples from the waste streams to assess metal loadings in effluent discharges. These site visits helped the City to identify the present level of pollution prevention at facilities around the city as well as explore areas for potential waste reduction. The City found businesses with successful product recovery systems willing to transfer information on pollution prevention techniques to similar area businesses.

Identification and Targeting

In January 1993, the City initiated an industrial mapping project. Using the Albuquerque Geographic Information System, the City located nearly 80 percent of the City's metal finishing and photofinishing industries. The map shows clusters of the priority industries in relation to sewer lines. The City used the map to select specific manholes for domestic and domestic/commercial sampling. The City is also better able to manage field time by selecting those industries of concern and visiting those industries within close proximity of each other.

Sampling and process data collected during the

site visits (described above) has helped the City better target resources.

PROBLEMS AND RESOLUTION

Implementation of the project was delayed from the proposed October 1, 1991 start date because of prolonged contract negotiations between NMED and two of the contractors (City of Albuquerque and University of New Mexico) working on the project. In addition, a State-issued temporary freeze on any new expenditures of funds for professional service agreements delayed the commencement of the project. To enable the project to meet its objectives, EPA extended the project and budget periods for one year to September 30, 1994.

AVAILABLE MATERIALS

- Announcement flyer and agenda for electroplaters workshop
- Monthly progress reports
- Summary reports of inspections, waste assessment, meetings, and analyses
- Synopsis of the Printer's Waste Reduction Workshop

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INTRODUCTION

North Carolina's pretreatment and pollution prevention programs have worked together for a number of years to train industrial dischargers and POTW pretreatment coordinators on approaches that dischargers can use to reduce effluent pollutant loadings. The EPA grant allowed North Carolina to fully integrate pollution prevention into the State Pretreatment Program.

GOALS

North Carolina hoped to accomplish the following four goals with the EPA grant:

- 1) Develop a framework at the state level to oversee local pollution prevention programs;
- 2) Establish pollution prevention programs at POTWs;
- 3) Address specific pollution problems through the use of pollution prevention techniques; and
- 4) Transfer information to other states and local pretreatment programs.

STRATEGY

North Carolina initiated a number of activities to achieve the above goals. To accomplish the first goal, North Carolina endeavored to integrate its well-established pollution prevention program with the existing State Pretreatment Program. One means of integrating the two programs is the provision of training in pollution prevention techniques.

To realize the second goal — establishing local pollution prevention programs at POTWs — North Carolina decided to pilot programs at two represen-



tative POTWs located in Winston-Salem and Troy. Pretreatment programs in North Carolina generally fall into one of two categories: programs in large municipalities or programs in small towns. The needs of POTWs in larger municipalities such as Winston-Salem differ somewhat from the needs of POTWs in smaller towns such as Troy. For example, POTWs in large municipalities usually serve a large number of significant industrial users (SIUs) and generally have sufficient staff and laboratory support to implement pollution prevention programs with minimal support from the State. Small towns, however, usually serve fewer SIUs. Because of their small size, the towns generally face greater resource constraints and may depend more heavily on staff support provided by the State. Small town POTWs typically serve a

wide variety of uncontrolled discharges including light industrial facilities and commercial operations. Thus, North Carolina determined that it would establish one project at a large municipality and one at a POTW serving a small town. To transfer lessons learned from the pilot project, North Carolina has awarded three challenge grants to qualified POTWs in other areas of the state.

To further the State's third goal — addressing specific pollution problems through the use of pollution prevention techniques — North Carolina used an additional criterion when evaluating potential pilot program locations. The State selected pilot locations that possessed an existing pollution problem that could not be addressed through treatment.

To accomplish the fourth goal — enabling other states, local pretreatment programs, and industries to benefit from this project — the State resolved to develop comprehensive guidance materials on developing POTW pollution prevention programs at the state and local levels. In addition, the State planned to develop guidance for industries based upon the specific pollution addressed in the pilot projects.

PROGRAM ACCOMPLISHMENTS

State Accomplishments

- Set up a pilot project with the City of Winston-Salem to establish a pollution prevention program within the City's POTW Pretreatment Program (\$35,000). Winston-Salem is a relatively large city that has a population of approximately 150,000. The city maintains a well-established pretreatment program and would like to reduce metal loads to maintain compliance with NPDES permit and regain capacity for future use.
- Set up a pilot project with Town of Troy to establish a pollution prevention program at the Town's POTW (\$15,000). Troy is a small town and has a population of approximately 3,400. It has three SIUs and nine industries. Its POTW encountered periodic compliance problems with NPDES effluent limits for cadmium, lead, cyanide, and whole-effluent toxicity.
- The Office of Waste Reduction conducted a training seminar for the DEM Pretreatment Program. Training included a half-day of classroom instruction on pollution prevention case studies and a half-day field training on waste reduction audits.
- The State trained Winston-Salem staff to conduct on-site industrial audits.
- The State trained Troy POTW staff on sampling procedures and pollution prevention audits.
- The State offered challenge grants for POTWs with pretreatment programs to develop pollution prevention programs (3 at \$17,000 each).
- The State included several items involving pollution prevention in the recent revision of the State's pretreatment regulations.

City of Winston-Salem Accomplishments

- Received training from Pollution Prevention Program Staff.

- Publicized the pollution prevention program through newspapers and radio.
- Surveyed 620 industrial and commercial users in 17 industrial categories on waste streams.
- Completed an updated headworks analysis
- Used the waste stream survey and headworks analysis to target specific industries or categories of users for outreach and pollution prevention audit. Sent 385 information packages to targeted businesses.
- Performed 44 industrial audits.
- Established a pollution prevention library.
- Modified pretreatment permit applications and the inspection checklist to include questions pertaining to waste reduction activities.
- Established an awards program for industrial users of POTWs.
- Staff attended sessions on water conservation and water transfers and participated in wastewater schools.
- Incorporated pollution prevention into ongoing City efforts, "Keep Winston-Salem Beautiful" and "Recycle Today!"
- Sponsored two seminars:
 - "Business and the Environment"
 - "Pollution Prevention Makes Sense"

Town of Troy Accomplishments

- Received training from Pollution Prevention Program Staff.
- Completed a long-term headworks monitoring program for the Town that provides site-specific pollutant concentrations, loads, and treatment plant pollutant removal efficiencies.
- Conducted a Pollution Prevention Program kick-off presentation for industrial users.

- Conducted pollution prevention audits/assessments for nine industrial users.
- Initiated a baseline performance monitoring program and investigated sewer line monitoring to further identify potential sources of toxicity.
- Inventoried Material Safety Data Sheets (MSDS) from 6 industrial users into a computer database.
- Incorporated pollution prevention into ongoing municipal efforts such as the Town Utilities Department's Street Crew and the local Parks and Recreation Department.
- Publicized the pollution prevention program through newspapers and television.
- Reduced oil/grease discharges through personal communication with oil/grease dischargers.
- Mailed out 129 questionnaires to businesses to assess their pollution prevention potential.
- Sent 14 pollution prevention packages as a result of the returned questionnaires.
- Performed a specific conductivity scan and additional toxicity monitoring to locate sources of aquatic toxicity.
- Lowered the hydraulic loading to the POTW through an infiltration/inflow investigation.
- Distributed solid waste recycling and composting information as requested by the general public.

PROBLEMS AND RESOLUTION

Winston-Salem found that small businesses had difficulty locating recyclers interested in collecting small amounts of reusable materials they generated. Winston-Salem identified the following possible

solutions to this problem:

- Identification of small business interested in “piggy backing” on larger facilities’ existing collections points;
- Assistance to small businesses in neighborhood networking; and
- Establishment of local collection points throughout the City.

AVAILABLE MATERIALS

The following materials are available from the Division of Environmental Management:

- Waste stream questionnaires used in the survey are available to interested parties. Winston-Salem developed one general questionnaire and 17 industry-specific questionnaires including automotive, battery, car washers, and laboratories.
- Agenda for workshops.
- A final report that documents the results of the two pilot programs, describes integration of pollution prevention into state water programs, describes how North Carolina established pollution prevention programs at other POTWs, and identifies additional resources for POTWs.
- The City of Winston-Salem's Pollution Prevention Plan.

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INTRODUCTION

Utah does not have legislation or regulations that require industry to develop waste minimization plans. Thus, the Utah project focused on how to incorporate waste minimization into existing POTW pretreatment programs. In particular, the State focused on one POTW pretreatment program in Salt Lake City. Salt Lake City is a moderately sized metropolitan city located in a semi-arid and rapid-growth region, typical of the southwest. The typical industrial users are metal finishers.

GOALS

Project goals included reducing pollution throughout Utah as well as in Salt Lake City. Specific goals include:

- Expand the scope of the State's POTW self-audit program to include multi-media source reduction, water conservation, and technical assistance as a means for extending the useful life of POTWs;
- Strengthen both Utah and Salt Lake City's pollution prevention capacity;
- Encourage industrial, commercial, and residential users of Salt Lake City's POTW to prevent pollution and minimize waste;
- Address high-risk areas (based on health, ecological, and POTW compliance factors);
- Use the results of this pilot to transfer knowledge gained to similar states and municipalities; and
- Support goals of the Pollution Prevention Act of 1990.



STRATEGY

The City resolved to conduct the following activities to encourage industrial, commercial, and residential users of Salt Lake City's POTW to prevent pollution and minimize waste:

- Conduct assessments of waste water being discharged into City sewers;
- Promote water conservation;
- Conduct waste minimization assessments at select industrial sites;
- Establish stringent local limits based on mass and technology;
- Provide information, education, and technical assistance;
- Target key industries that discharge to Salt Lake City's POTW; and
- Recognize industrial users that implement aggressive pollution prevention programs.

As part of this strategy, the State and City sponsored pollution prevention workshops for the City's commercial and industrial users. As the majority of industrial users in Utah are in the metal finishing industry, the State planned to focus at least one workshop on this industry.

To reduce solvents released to the City's POTW, Salt Lake City planned to develop a solvent reduction and reuse program at city-owned operations. To further the same goal, the City sought to establish a chemical clearinghouse.

Utah presented the results of this project at meetings with industrial organizations and government officials throughout the State and EPA Region VIII.

PROGRAM ACCOMPLISHMENTS

As part of its “Pollution Prevention Education Initiative”, Utah held workshops for the following four groups:

- (1) Pretreatment Coordinators. Representatives from 14 of the 15 approved pretreatment programs, and several coordinators from non-approved programs attended this three-day, City/State-sponsored workshop. During the first two days, the staff introduced pollution prevention and discussed how coordinators can incorporate pollution prevention into their POTW pretreatment programs. Pretreatment coordinators also learned how to conduct pollution prevention assessments. On the third day of the workshop, the group visited two Salt Lake City industrial sites — a metal finisher and the City’s fleet maintenance service. The participants toured the facilities and discussed source reduction opportunities for each facility’s waste stream. Participants also received hands-on training on how to access pollution prevention information on data bases and clearinghouses.
- (2) Metal Finishers. This workshop focused on metal finishing companies in Salt Lake City. Metal finishers represent 17 of the 18 industrial users that discharge to the POTW. The staff presented pollution prevention case studies and discussed applications of pollution prevention techniques. The staff illustrated that pollution prevention is a practical and cost-effective tool for the metal finishing industry.
- (3) General Industry. This workshop highlighted the uses of pollution prevention techniques in a wide range of industries. The presentations highlighted six industries including: metal finishing, food processing, aircraft production, laundries, hospitals, and auto maintenance. The workshop included information on waste disposal and water conservation.
- (4) Pretreatment Update Seminar. Utah held a follow-up seminar to the first workshop for

pretreatment coordinators. The staff presented success stories to the pretreatment coordinators and distributed a survey to help the State assess the benefits of the grant program.

Salt Lake City developed an awards program to recognize and encourage implementation of innovative pollution prevention programs. To keep the awards program meaningful, the City determined that the same company could not routinely win. The City developed the following criteria to select the award-winning programs:

- The program is designed to decrease the production of pollution;
- Pollution prevention techniques do not result in a media transfer of pollutants;
- The company developed innovative changes in processes that will decrease pollution and may be transferred to other industries;
- The company substitutes chlorinated solvents with cleaner alternatives, where applicable; and
- The company complies with State/City regulations.

Through this grant project, Salt Lake City also changed procurement policies at city-owned facilities to eliminate chlorinated solvents. Salt Lake City now gives priority to bids that utilize alternative, non-chlorinated solvents.

Finally, Utah presented a summary of the project results at two conferences held in the spring of 1993:

- (1) Utah Water Pollution Control Association. Given that many POTW managers attended the annual meeting in April 1993, Utah/Salt Lake City staff emphasized the importance of management support for pollution prevention programs, as well as the benefits to POTWs. These benefits include extending the useful life of the plant by reducing loadings from commercial, industrial, and domestic users and increasing regulatory compliance.

- (2) EPA Region VIII. Utah also presented the results of their project at the annual EPA Region VIII pretreatment coordinators meeting in Jackson, Wyoming in May 1993. Many of those attending the conference were unfamiliar with pollution prevention techniques prior to the conference. Some pretreatment coordinators mentioned, however, that they were beginning to incorporate pollution prevention into their pretreatment programs.

PROBLEMS AND RESOLUTION

Utah encountered several problems during the implementation of its grant project including:

- Ensuring attendance at workshops;
- Making workshops specific enough to inform industry;
- Encouraging solvent recovery at city-owned facilities; and
- Establishing a chemical clearinghouse.

Utah had difficulty attracting a large audience to some of its workshops. For example, Utah sent out over 200 invitations for the general industry workshop and only 26 individuals representing 13 companies attended. In contrast, 40 metal finishers representing 15 companies attended the first industry workshop which was specific to the metal plating industry. Since the metals industry is regulated by the State, the staff attributed the high attendance to the regulatory threat posed by the State and City.

Post-conference survey results indicate that participants, especially those of the general industry workshop, desired more industry-specific information (i.e., case studies of how pollution prevention had benefited a company similar to their own and details of how the pollution prevention practice was implemented).

Salt Lake City did not develop a solvent recovery system for city-owned facilities as it had planned initially. Upon further reflection, the City determined that eliminating solvents altogether would be a preferable waste management alternative. To eliminate solvents, Salt Lake City now gives preference to alternative, non-chlorinated solvents in the bidding process.

The City encountered liability problems as it tried to establish a chemical clearinghouse. Rather than operating a chemical clearinghouse, the City chose to facilitate the exchange of chemicals and materials and match users and producers.

SUCCESS

Salt Lake City staff distributed a questionnaire/skill evaluation to help staff gauge the success of each workshop. Overall, the results show that the workshops were successful.

Overall, pretreatment coordinators found their workshop beneficial — rating the workshop as a 4.4 on a 5.0 point scale. The pretreatment coordinators also indicated that they wanted further training and information on pollution prevention. The survey results demonstrate that Utah/Salt Lake City successfully communicated the message about the benefits of pollution prevention:

- Only 3 percent of respondents felt that increased regulation was needed to help promote pollution prevention.
- 100 percent of the pretreatment coordinators indicated that pollution prevention provides economic payback and is cost effective.
- 48 percent of the coordinators indicated that reduced liability was another benefit of pollution prevention.

At the metal finishers workshop, the average rating on the usefulness of the program was 3.7 on a 5.0 point scale. The overall quality of the presentation was rated as 4.5 and most participants stated that they would attend a follow-up workshop. Some of the participants also requested vendor lists, more references, examples of practical applications, and specific information for their individual companies. The participants seemed to be most interested in hearing about innovative technologies that have the potential to be implemented as pollution prevention strategies.

The survey of pretreatment coordinators attending the update seminar indicated that 80 percent of the POTWs were incorporating pollution prevention into their pretreatment programs and 45 percent had at least one industrial user reporting success with pollution prevention activities. Two POTWs responded that they had noticeable reductions in pollutants at their plant. Although five POTWs had awards programs in place, only the one in Salt Lake City included pollution prevention.

One-hundred percent of the attendees at the Pretreatment Update Seminar responded that they had benefitted from the training and would be interested in further programs. Particularly, the participants were interested in learning more about the printing, dry cleaning, laboratory, photo finishing, food service, silk screening, and waste oil industries. When asked what information had been the most valuable, 38 percent of the pretreatment coordinators indicated that specific case studies and examples were the most useful information and 21 percent felt that the session on how to communicate effectively with industrial users was the most valuable.

AVAILABLE MATERIALS

- Workshop announcement flyers
- Workshop agenda and detailed outline of Pollution Prevention Workshop for Pretreatment Inspectors held June 2-4, 1992

- Pollution Prevention Skill Evaluation administered at the beginning and the conclusion of all workshops to help evaluate the success of the workshops
- Final report

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