FIFTH PROGRESS REPORT

FROM THE TASK FORCE

OF THE

METAL FINISHING INDUSTRY POLLUTION PREVENTION PROJECT

SEPTEMBER 1998


Environment Canada Environnement Canada

Ontario

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METAL FINISHING INDUSTRY POLLUTION PREVENTION PROJECT
FIFTH TASK FORCE PROGRESS REPORT
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1. INTRODUCTION

The Metal Finishing Pollution Prevention Task Force is pleased to present its fifth progress report on the pollution prevention activities of the participating metal finishing companies.

The Metal Finishing Pollution Prevention Project (the Project) is a voluntary cooperative effort between the Canadian Association of Metal Finishers (CAMF), the American Electroplaters and Surface Finishers Society (AESF), the Metal Finishing Suppliers' Association (MFSA), the Ontario Ministry of the Environment (MOE), and the federal Department of the Environment (DOE). It is a component of the Ontario Ministry of Environment's Pollution Prevention Strategy and the Canadian Department of Environment's Great Lakes Pollution Prevention Initiative.

A joint industry/government task force was established to oversee the Project. It is comprised of technical representatives from CAMF, AESF, MFSA, Environment Canada and the Ontario Ministry of Environment.

The Project goals are to develop a methodology and supporting tools for formulating pollution prevention plans for the reduction of toxic substances used, generated and/or released in the metal finishing industry, to promote the development and implementation of site-specific pollution prevention plans by the member companies of CAMF and AESF and to publish progress of substance use reduction under the plans.

The intent of this report is to provide information on the project and inform the reader of results by highlighting case studies which illustrate pollution prevention plans at work within plant facilities. The projects vary in complexity, cost and approach within the environmental management hierarchy. The metal finishing companies have identified pollution prevention initiatives as having clear environmental and economic benefits. The companies have successfully executed many of the initiatives and the pollution prevention process is ongoing in most plants.

Highlights of the Fifth Project Report

- 20 metal finishing companies are participating in the Project;
- 5 new case studies are included, for a project total of 29 case studies;
- Over 234 tonnes of additional waste reduced/eliminated are reported, for a project total of almost 2,186 tonnes;
- 843,750 litres of water use have been reduced;
- $111,000 of additional savings are reported, for a project total of $557,700; and
- 80 employees from 31 organizations have completed training in pollution prevention planning.

2. ACCOMPLISHMENTS:

2.1 Twenty Companies Join Project

Twenty metal finishing companies have become signatories to the Project. This is one more company since our last report.

In the Metal Finishing Sector, 13 facilities have applied for recognition of their achievements in 23 projects by the Ontario MOEE Pollution Prevention Pledge Program (P^4). The companies and results reported to the Ontario P^4 program are listed in Appendix 5.

Company Signatories

A.G. Simpson Ltd. (Oshawa)
Aerospace Metal Finishing (Schomberg)
Anti-Friction Enterprises (1985) Ltd. (Rexdale)
Chromeshield Company (formerly Rustshield Plating) (Windsor)
Circoflex Corp. (Scarborough)
Continuous Colour Coat Ltd. (Rexdale)
Coretec Inc. (formerly known as Prototype Circuits Inc.) (Scarborough)
Delphax Systems (Mississauga)
Dovercourt Electro-Plating Co. Ltd. (Toronto)
Dura Automotive Systems (Canada) Ltd. (Windsor)
Dura-Chrome Ltd. (Wallaceburg)
Elite Metal Finishing Inc. (Cambridge)
Kuntz Electroplating Inc. (Kitchener)
Menasco Aerospace (Oakville)
Rauscher Plating Ltd. (Cambridge)
Reliable Plating Ltd. (Gloucester)
Specialty Technical Services Ltd. (Hamilton)
Strataflex Canada Corp. (Toronto)
Tenneco Automotive (formerly known as Monroe Auto Equipment Co. of Canada) (Owen Sound)
Torcad Ltd. (Toronto)

2.2 Development and Implementation of Pollution Prevention Plans

To develop and implement pollution prevention plans within their facilities, the metal finishing companies used the 8-Step Pollution Prevention Planning Process (Appendix 1) developed by the Task Force.

The companies also use a reporting format developed by the Task Force for reporting on their site-specific pollution prevention projects. The site-specific project reports were used by the Task Force to prepare the project profile tables which appear as Tables 1 and 2. Table 3 summarizes the reductions and cost savings achieved from the case studies. The case study summaries provide information on plant projects, target chemicals, objectives, project description, expected or achieved reductions, and advantages including cost savings (See Appendices 2 & 3).

The site-specific pollution prevention project achievements in this report are examples of the pollution prevention activities by the companies.

TABLE 1: SUMMARY OF NEW/UPDATED POLLUTION PREVENTION CASE STUDIES

Plant Pollution Prevention Project	Target Substance	Results/Advantages	Method Employed	Media Addressed
Chromic Acid (Recovery and Reuse) (page 20)	Chromic acid	• $13,000/y savings • Reduced chromic acid purchase by 3,700 kg per year	• Installed ion transfer equipment (porous pots) on etch bath	• Off-site disposal, discharge to sewer
Chromic Acid (Recovery and Reuse) (page 21)	Chromic acid	• $19,000/y savings • Reduced chromic acid purchase by 5,400 kg per year	• Installed atmospheric evaporators on plating bath and dragout	• Off-site disposal, discharge to sewer
Phosphoric Acid Co-Product (Use Reduction and Recovery) (page 22)	Phosphoric acid	• $67,000/y savings • 82.5% recovery of phosphoric acid co-product used in bright dip • Reduced phosphoric acid by 139,00 kg/y and 50% caustic soda solution by 173,000 kg/y	• Installed recovery system and four tank rinse system	• Discharge to sewer, off--site disposal
Water (Cooling) Usage Reduction (page 23)	Water	• $12,000/y savings • Payback in one month • Lowered waste treatment cost and increased retention time in Wastewater Treatment Plant	• Using low pressure air recirculation of rinses and use of hoist controlled spray system	• Discharge to sewer
Water (Groundwater) Usage Reduction (page 24)	Groundwater	• Positive effect on all plating, air compression and Co-generation systems	• Installing two cooling towers	• Use of natural resource

TABLE 2: SUMMARY OF PREVIOUSLY REPORTED POLLUTION PREVENTION CASE STUDIES

Plant Pollution Prevention Project	Target Substance	Results/Advantages	Method Employed	Media Addressed
Acid Recovery for Reuse (page 26)	Sulphuric acid, Ferric chloride	• 4,000 kg/y and $1,473/y savings for sulphuric acid • 9,048 kg/y and $8,324/y savings for ferric chloride	• Install acid purification unit for sulphuric acid • Internal recycling of spent ferric chloride	• Discharge to sewer
Acids (Spent) Regeneration (page 27)	Hydrochloric acid	• A filtering system made more efficient use of the acid and gave more consistent pickling	• Trial runs on acid recovery prototype system on its phosphating bath failed to provide a reliable system	• Discharge to sewer, off-site disposal
Chlorine Usage Reduction in Waste Treatment Through Better Monitoring and Chlorine Control (page 28)	Chlorine	• Reduced residual chlorine from 50 mg/L to <10 mg/L • Reduced chlorine use as a percent of sales by 20%	• Increased monitoring frequency	• Discharge to sewer
Chromate Usage Reduction in Zinc Chromate Process (page 29)	Spent chromate solution	• $6,000/y savings • 1,080 kg/y of concentrated chromate solution	• Installed a screen tray for the chromate tank	• Discharge to sewer, on-site disposal
Chrome Plating Solution Reduction (page 30)	Chromic acid	• Expected annual savings of $1,000,000, with expected capital investment of $650,000 • 80% waste disposal reduction, 70% chromic acid purchase • Reduced loading on air scrubber	• Installed a pulse spray system with atmospheric evaporation	• Discharge to sewer, offsite disposal

TABLE 2: SUMMARY OF PREVIOUSLY REPORTED POLLUTION PREVENTION CASE STUDIES (continued)

Plant Pollution Prevention Project	Target Substance	Results/Advantages	Method Employed	Media Addressed
Chromic Acid Losses Reduction (page 31)	Chromic acid	• $102,000/y savings • 25,000 kg/y of chromium hydroxide sludge disposal eliminated	• Installed a pulse spray system with atmospheric evaporation	• Discharge to sewer, offsite disposal
ChromiumReduction from Losses Due to Spills and Ventilation Systems (page 32)	Chromic acid	• To be determined	• Installation of appropriate control equipment to reduce chrome losses	• Off-site disposal
Cleaners (Alkaline) Life Extension by Oil Removal (page 33)	Alkaline cleaning solution	• 40% use reduction • 80% reduction in cleaner dump	• Installation of a unit to remove oil & suspended matter from their alkaline cleaning solutions	• Discharge to sewer, on-site disposal
Cleaners (Spent) Reuse by Oil Removal (page34)	Cleaning Solutions	• $30,000/ y savings • 15,000 L/y reduced	• Installed 4 oil removers	• Discharge to sewer
Cleaners (Wasted) Elimination by Substituting Powder Cleaners with Liquid Cleaners (page 35)	Powder cleaners	• No longer have wasted cleaner that didn't dissolve, and saved labour in adding the cleaners	• Switched all cleaners on the stainless steel line to liquid form.	• Discharge to sewer
Cyanide Elimination in the Zinc Plating Process (page 36)	Cyanide	• 5700 L/y reduction in cyanide solution, equivalent to 43 kg/y of cyanide • Productivity increased by 30%	• Substituted to an acid zinc process	• Hazardous Waste

TABLE 2: SUMMARY OF PREVIOUSLY REPORTED POLLUTION PREVENTION CASE STUDIES (continued)

Plant Pollution Prevention Project	Target Substance	Results/Advantages	Method Employed	Media Addressed
Cyanide Hydrolysis (page 37)	Sodium hypochlorite, Caustic, Hydrochloric acid and Chlorine.	• $214,000/y savings in chemical and labour costs • Eliminated use of a total of 61,400 kg/y of treatment chemicals	• Changed traditional cyanide destruction process to a hydrolysis system using high temperature and pressure	• Hazardous Waste
Lead Masking Tape Disposal Elimination (page 38)	Lead masking tape	• 385 kg/y from landfill to recycle	• Employee awareness and providing a collection container	• Off-site disposal
Nickel Sludge Recycling (page 39)	Nickel sludge	• Recycling 1600 tonnes/y of dried nickel sludge, reducing landfill costs and recovering 240 tonnes /y nickel	• Off-site recycling of dried nickel sludge to Inco smelter	• Landfill
Spills Elimination from Black Oxide Process (page 40)	Sodium Hydroxide	• 454 kg/y use reduction	• Employee awareness and charting for process control	• Discharge to sewer
Wastes (Acid and Alkaline) Elimination from Disposal (page 41)	Acid and alkaline wastes	• $72,000/y savings on disposal cost • 229,000 kg/y acid waste & 2,660 kg/y alkaline waste containing heavy metals • 370 kg/y waste oils and lubricants	• Installed an electrowinning system and used an existing ion exchange system for persulfate and sulphuric acid wastes	• Offsite disposal

TABLE 2: SUMMARY OF PREVIOUSLY REPORTED POLLUTION PREVENTION CASE STUDIES (continued)

Plant Pollution Prevention Project	Target Substance	Results/Advantages	Method Employed	Media Addressed
Water (Cooling) - Magnetic Field Treatment System (page 42)	Water Treatment chemicals	• 2,740 kg/y reduction in cooling tower chemicals • Chemical savings of $4,370 per year • Wastewater treatment cost savings of $7,050 • Water savings of $1,010 per year and a reduction of 3,255 m^3 in water consumption • Sewer-use cost savings of $500 • 1.7 y payback	• Installed a magnetic field treatment system to replace chemical treatment for prevention of pipe scale build-up in the cooling water system for plating baths and heat treatment.	• Discharge to Sewer
Water (Cooling) Usage Reduction (page 43)	Non-contact cooling water	• $50,000/y savings • 50% of process cooling water	• Install a cooling water recycling system	• Discharge to sewer
Water (Reuse) from the Air Scrubber Washdown Unit to Replace Plating Tank Evaporation Losses (page 44)	Water	• $1,200/y savings in labour • Payback of one year • Eliminated discharge to sewer and costs associated with wastewater treatment	• A level control on the plating tank activates addition of replacement water from the scrubber wash down unit	• Discharge to sewer
Water (Rinse) Recycling (p. 45)	Water	• 50% of rinsewater recycled • $60,000/y savings on water	• Reduced chlorine level in process rinsewater by reducing and diverting waste acid dumps and acid pickling rinsewaters	• Discharge to sewer

TABLE 2: SUMMARY OF PREVIOUSLY REPORTED POLLUTION PREVENTION CASE STUDIES (continued)

Plant Pollution Prevention Project	Target Substance	Results/Advantages	Method Employed	Media Addressed
Water (Rinse) Usage Reduction Through the Use of Conductivity Controllers (page 46)	Water	• Savings from improved product quality and a reduced number of rejects • Unexpectedly, amount of water use increased	• Automated rinsewater flow control with installation of 12 conductivity controllers	• Discharge to sewer
Water Usage Reduction (page 47)	Water	• A 20% reduction in water usage is anticipated which in turn represents an annual savings of $9,000 in water purchases	• Reviewing options to reduce water demand: reactive rinsing, counter current rinsing, spray rinsing, and more effective water recycle after treatment	• Discharge to Sewer
Water Usage Reduction (page 48)	Water	• Savings of $26,000/y in water by eliminating cooling with fresh water	• Use of air cooled compressors and use of clean treated water from waste treatment system for cooling brazing stations	• Wastewater Discharge
Water - Zero Discharge Implementation (page 49)	Water	• Reduced water bill and waste treatment chemical purchases	• Segregated process waste water; evaporative distillation for reuse of water and to concentrate sludges	• Discharge to Sewer
Water - Zero Discharge Implementation (page 50)	Water	• Expect $5,000/y savings on water • Quality improvement resulting in less reworks	• Installing nanofiltration, carbon, and sand filter system to purify process water for reuse	• Wastewater Discharge

TABLE 3: REDUCTIONS ACHIEVED IN NEW AND PREVIOUS CASE STUDIES

Substance	Reduction/Elimination Reported in 3 New Case Studies Involving Substances (kg/year)	Reduction/Elimination Reported in 12 Previous Case Studies Involving Substances (kg/year)	Total (kg/year)	Financial Savings Reported in 3 New Case Studies ($/year)	Financial Savings Reported in 12 Previous Case Studies ($/year)	Total ($/year)
alkaline cleaner*	---	15,000	15,000	---	$30,000	$30,000
chlorine	---	27,250	27,250	---	$214,000	$214,000
chromate solution (conc.)	---	1,080	1,080	---	$6,000	$6,000
chromic acid	9,100	---	9,100	$32,000	---	$32,000
chromium hydroxide sludge	---	25,000	25,000	---	$102,000	$102,000
cooling tower chemicals	---	2,740	2,740	---	$12,900	$12,900
cyanide	---	43	43	---	---	---
dried nickel sludge	---	1,600,000	1,600,000	---	---	---
ferric chloride	---	9,048	9,048	---	$8,324	$8,324
hydrochloric acid	---	6,530	6,530	---	---	---
lead masking tape	---	385	385	---	---	---
phosphoric acid	139,000	---	139,000	$67,000	---	$67,000
sodium hydroxide	86,500	26,854	113,354	see phos. acid	---	---
sodium hypochlorite	---	1,200	1,200	---	---	---
sulphuric acid	---	4,000	4,000	---	$1,473	$1,473
acid waste (containing heavy metals)	---	229,000	229,000	---	$72,000	$72,000
alkaline waste (containing heavy metals)	---	2,660	2,660	---		
waste oils and lubricants	---	370	370	---		
Total	234,600	1,951,160	2,185,760	$99,000	$446,697	$545,697

* Assumed a specific gravity of 1 kg/L in converting from litre to kilogram.

Note: Water Reduction cost savings and volumes are not included in this table.
Cost savings of $12,000 from water reduction were reported in a new case study. Cost savings of $40,000 from water reduction were reported in previous case studies.

2.3 Memorandum of Understanding

The Project is guided by the principles set out in the Memorandum of Understanding (MOU). The original MOU was signed in July 1993 by the President of CAMF, Dave Edwards, the President of AESF, Frank Hayes, the President of APMA, Neil DeKoker, the Chairman of MFSA, Serge Archambault, the Ontario Minister of Environment and Energy, Bud Wildman, and the Minister of the Environment, Jean Charest. The MOU was renewed in June 1995 by the Chairman of CAMF, Andrew McDonald, the National Director of AESF, Ken Lemke, the Chairman of MFSA, Warren Smith, the Ontario Minister of Environment and Energy, Brenda Elliot, and the Deputy Prime Minister and Minister of the Environment, Sheila Copps. Both the MOU and the 1995 addendum can be found in Appendix 6. The new 1998 MOU addendum will be placed on Environment Canada's Green Lane Internet site and the Ontario Ministry of the Environment Environmental Bill of Rights Internet site for public comment prior to renewal. The Task Force members have, for the past 19 months, been operating in the spirit of the MOU.

Some targets for the new MOU include:

- growth of the number of participating companies, with a target of 25 companies by February 1999, and 30 by February 2000;
- continued reporting of projects from metal finishers' pollution prevention plans;
- a minimum of six Task Force meetings a year with reviews of the status of the Action Plan implementation;
- an expansion of the list of substances to be addressed in pollution prevention activities; and
- consideration of specific sub-sectors for further effort including: surface coatings (paints), printed wiring boards, anodizing, galvanizing, and dip coatings.

The Task Force Action Plan will include as a minimum:

- company participation promotion;
- provision of training for all signatory companies;
- reporting schedule for P2 plans & achievements;
- sharing of cost saving & waste reductions data by/to company participants;
- provision of technical assistance to member companies;
- workshops, information sharing and public reporting opportunities; and
- recognition opportunity development (award program development).

2.4 Assistance for Companies from the Task Force

2.4.1 Metal Finishing Pollution Prevention Guide

The Metal Finishing Pollution Prevention Guide, finalized in September 1995, was developed by the Task Force to provide tools and industry specific examples to guide a metal finishing facility through the planning process. The guide is based on the eight-step pollution prevention planning strategy (Appendix 1), agreed to by the Task Force.

The Guide has been widely distributed across the metal finishing sector. It was also used as the basis for the first four modules of the 1997 AESF course on pollution prevention, being presented across North America.

2.4.2 Project Co-ordinator - Promoting Pollution Prevention to the Industry

To date, John Nagata (Metal Finishing Project Co-ordinator) has distributed more than 200 Metal Finishing Pollution Prevention Guides to metal finishing companies throughout Ontario, and has met to promote and assist companies to initiate pollution prevention activities. He taught a session on metal finishing and pollution prevention to Ministry of Environment enforcement officers in a Ministry course on Industrial Unit Operations. He attends all Task Force meetings, assists in Task Force activities, and reports on his activities to the Task Force. Last year, he initiated a P2 Newsletter to raise the awareness of the Project within the metal finishing sector.

J. Nagata has also been forming links with other community organizations to promote pollution prevention to metal finishers. He met with the coordinators of the Automotive Parts Manufacturers' Association (APMA) and the Ontario Printing and Imaging Association (OPIA), which also operate pollution prevention Memoranda of Understanding, to explore the development of a partnership in a specific geographic area, in order to enhance outreach in each industry sector. The London Chamber of Commerce Environmental Management Resource Centre for Business, Inc. (EMRCB) recently signed on to the Metal Finishing P2 Project. The EMRCB is a not-for-profit initiative whose mandate is to provide area businesses with cost-effective assistance for their environmental compliance and control programs and their resource conservation programs, while actively promoting green industries within the context of sustainable development.

2.4.3 Training

A training course, based on the Metal Finishing Pollution Prevention Guide, was developed by Water Technology International (WTI) and Sheridan College. The training provides an introduction to the eight-step pollution prevention planning process documented in the Guide. Through examples and case studies, the course demonstrated the benefits that can be achieved from the planning process. Sheridan College, with funding from Environment Canada, also prepared an updated video series on pollution prevention for metal finishers which is now commercially available. Over the past year, the course was presented on October 3-4, 1997, at Kuntz Electroplating Inc. in Kitchener, Ontario, to twelve metal finishers. This was followed by another training course in February 1998 to thirteen metal finishers in Scarborough and a subsequent course in May 1998 to seven metal finishers in Toronto. To further encourage participation by metal finishers, the course fees are partially subsidized by the Ontario Ministry of Environment.

Over 80 employees from the following 31 organizations have completed the Task Force sponsored pollution prevention training to date : ABM Plating Inc., Acadian Barrel, Advanced Processing, Anti-Friction Enterprises, Caspe Systems, CEEL, Com Dev, Delta Faucet, Department of National Defense, Dovercourt Electro-Plating Co. Ltd., Dura-Chrome Ltd., Dura Automotive Systems, Globe Stamping, H&E Plating, Hughes Elcan Optical, Hybrid Integrated Services, Knape & Vogt Canada Inc., Kuntz Electroplating Inc., Long Manufacturing, Menasco Aerospace, Metal Koting (Continuous Colour Coat), Metro Toronto Works, Multichair Inc., Ontario Ministry of the Environment, Plateway, Quali-Tech, Rauscher Plating Ltd., Rustshield Plating (now known as Chromeshield Company), A.G. Simpson, SNC-Lavalin, and Torcad Ltd.

2.4.4 Pollution Prevention Resource Centre

A Pollution Prevention Resource Centre was established in Burlington, Ontario at the Canadian Clean Technology Centre (operated by Water Technology International (WTI)) to coordinate the technology and information resources available from signatory suppliers to the MOU project (Canadian Centre for Pollution Prevention (C2P2), WTI, the Ontario Waste Exchange, Canadian Finishing Systems Ltd. and the Metal Finishing Suppliers Association). With over 100 references from metal finishing publications and technical documents, Internet access to 200 International databases and information sources, and comprehensive facilities for the demonstration of clean technologies, the Resource Centre meets the technological needs of metal finishers. Services offered include:

Information research that includes retrieval, interpretation and technical assistance to solve problems on site or through the WTI facilities for development, evaluation and demonstration of alternative / clean technologies. Enquiries have exceeded 160 annually from metal finishers, consultants and agencies.

Information clearing from industry databases such as the Metal Finishing Information Clearinghouse operated by the National Centre for Manufacturing Sciences, in-house publications and reports. Reports issued include the Nickel Sludge Report for the task force, and metal finishing project articles for the International Labour Organization and the Indian Chamber of Commerce.

Industry expertise qualified to do customized industrial waste assessments, training workshops based on the Metal Finishing Pollution Prevention Guide, and to undertake technology evaluation, development and demonstration. Filtration technologies have been evaluated for application in metal finishing processes.

Details of the services offered by Resource Centre participants are presented in Appendix 7.

2.4.5 Industrial Waste Audit Program (IWAP)

Over the past year, two companies: Court Valve in St. Catharines and Menasco Aviation in Burlington, and one signatory company: Dura-Chrome in Wallaceburg, have taken advantage of the

Industrial Waste Audit Program (IWAP) to help them with their pollution prevention planning. The total number of metal finishing companies having used this service is now seven. The program provides assistance to companies initiating pollution prevention planning activities. Through this service, companies are given assistance in developing a comprehensive list of wastes that could be addressed in a pollution prevention program. Furthermore, for some of the higher priority wastes, potential solutions for the reduction or elimination of the wastes are provided.

The Metal Finishing Pollution Prevention Project is providing, through the WTI and funding from Environment Canada, this subsidized on-site technical assistance for the metal finishers signed onto the MOU.

2.4.6 Demonstration Projects/Studies

Monroe Auto Equipment Co. of Canada (now known as Tenneco Automotive) completed its demonstration project on the replacement of one of its cooling water tower systems with a magnetic field treatment system. The project has resulted in chemical, water and waste reductions. Details of this project are presented in Appendix 2.

Kuntz Electroplating Inc. in Kitchener, Ontario, had proposed a demonstration project on nickel recycling by a group of metal finishing companies in the Kitchener/Waterloo area. A feasibility study for the project was completed in December 1996. The company is currently unable to pursue this project, but will re-evaluate its potential at a later time.

The Task Force will continue to support the technology development and assessment needs of industry by promoting, encouraging and supporting demonstration projects and studies by companies and research facilities.

2.5 Ongoing Communications

2.5.1 Annual Progress Workshops

On September 24, 1997, the Metal Finishing Pollution Prevention Task Force hosted the Fourth Progress Review and Workshop Meeting in Toronto. Approximately 50 people attended the meeting with 56% of them from metal finishing companies, 24% from metal finishing suppliers, 6% from metal finishing associations, and 14% from governments (see Appendix 4).

The meeting provided an opportunity for participating metal finishing companies to address their peers, to outline the programs that they are committed to and to summarize some of the results that they have achieved to date. Five metal finishing companies: Dura Automotive (Windsor), Specialty Technical Services (Hamilton), Monroe Auto Equipment Company (now known as Tenneco Automotive) (Owen Sound), Torcad Limited (Toronto), and Spectra Anodizing (Woodbridge) presented their experiences and successes with the pollution prevention planning process. Dura Automotive discussed their experience setting up a pollution prevention plan at their facility according to the Metal Finishing

Pollution Prevention Guide. Specialty Technical Services detailed their closed loop hard chromium plating line. Torcad Limited discussed their success with the Industrial Waste Audit Program. Spectra Anodizing discussed the reuse and recovery of their phosphate rinses on their anodizing lines. Monroe Automotive (now known as Tenneco Automotive) finished the case studies section by detailing their reduction in cooling water chemicals using a new magnetic field technology on their cooling water return lines.

At the same time, the Task Force sought input from industry on issues which have arisen since the last workshop and future directions. During a breakout session, the needs and expectations of metal finishers were surveyed to formulate an action plan for 1998.

On September 23, 1998, the Metal Finishing Pollution Prevention Task Force will host the Fifth Progress Review and Workshop Meeting in Toronto.

2.5.2 Progress Reports

For the past five years, the annual Task Force progress reports have been the key source of public information on the project. Task Force progress reports have been made accessible through the Internet at the following sites:

4th Report:
http://www.cciw.ca/glimr/data/fourth-metal-finish/intro.html

3rd Report:
http://strategis.ic.gc.ca/SSG/mm01109e.html
http://www.cciw.ca/glimr/data/third-metal-finish/intro.html

2nd Report:
http://www.cciw.ca/glimr/data/poll-prev-metal2/intro.html

1st Report
http://www.cciw.ca/glimr/data/poll-prev-metal1/intro.html

2.5.3 P2 Newsletter

The *Metal Finishing Pollution Prevention P2 Newsletter*, produced by the metal finishing project coordinator, is distributed quarterly to government officials, sales and service providers, and over 400 metal finishing facilities. It describes the project, upcoming training events and as well as important environmental news for metal finishers.

2.5.4 Pollution Prevention Award

In late 1996, the Task Force initiated a Pollution Prevention Award to provide a vehicle for public

recognition of metal finishers' advances in pollution prevention. In 1997, the Task Force Pollution Prevention Award was presented to Kuntz Electroplating Inc. for its pollution prevention activities and its leadership in developing nickel recycling alternatives for waste nickel sludges from the industry. The award was presented at the AESF Springfest on behalf of the Task Force by Andrew Telegdi, MP for Waterloo, and also at the Kuntz facility on July 9, 1997, by John Mills (Regional Director General for Environment Canada - Ontario Regional Office). The July 9th presentation was covered by CKCO television news.

In 1998, the Task Force Pollution Prevention Award was presented to Spectra Anodizing for its chemical and cost savings associated with the reuse and recovery of phosphoric acid co-product in their anodizing line. The award was presented at the 1998 AESF Springfest in Kitchener, and also at Spectra's facility after a Task Force Meeting held at the facility on June 24, 1998. Fred Granek (Manager, Pollution Prevention, Ontario Ministry of the Environment) and Tom Tseng (Manager, Toxics Prevention Division, Environmental Protection Branch - Ontario Region, Environment Canada) presented the award at the June 24th presentation.

2.5.5 Booth at Annual Spring Industry Exhibition

For the past four years, the Task Force has hosted a booth at the annual AESF Springfest in Kitchener. On April 16, 1998, the project co-ordinator and government representatives staffed the booth to promote the Project and to answer inquiries.

2.5.6 Public Consultation

In 1994, a multi-stakeholder workshop was held for all MOU projects including Metal Finishing. Its purpose was to provide an opportunity for industry to demonstrate to all stakeholders that environmental protection in Ontario can be strengthened through voluntary pollution prevention. Such workshops also provide an opportunity to establish effective dialogue and build relationships with environmental groups to support voluntary pollution prevention initiatives. In December 1996, a multi-stakeholder group was invited to plan another series of workshops with the aim of improving the feedback from stakeholders. This program was cancelled due to lack of interest from environmental groups.

2.5.7 Sharing the Project's Experience Internationally

The experience of metal finishers in Ontario is now being used as an example for starting pollution prevention programs internationally. In 1997, Environment Canada, through the Canadian International Development Agency (CIDA), has been assisting Brazil in setting up a pollution prevention program for their metal finishing industry. The Ontario Metal Finishing Industry Pollution Prevention Project was presented in detail at a course given in Brazil in August, 1997. A representative from the Ontario metal finishing industry, Brian Calver, assisted in the delivery of the course and presented Ontario metal finishers' experiences with pollution prevention.

3. ONGOING ACTIVITIES AND FUTURE DIRECTIONS:

The Task Force will continue to promote and assist companies in developing and implementing pollution prevention programs for reduction of pollutants into the environment. Some of the issues to be addressed by the Task Force are:

- Increase company participation in the Metal Finishing Project. The new MOU sets a goal of 25 companies by February 1999;
- Ensure all practices and tools, including technical assistance and training are available to all metal finishers;
- Assist metal finishers in documenting past Volatile Organic Compound (VOC) and toxics reduction efforts in cleaning, degreasing and surface coating operations and identify alternatives;
- Renew the Memorandum of Understanding;
- Publish more case studies from metal finishers;
- Provide support to metal finishing companies initiating demonstration projects; and
- Work with suppliers to facilitate technology workshops with metal finishing sub-sectors (nickel plating, printed wiring boards, anodizers).

4. REQUESTS FOR ADDITIONAL INFORMATION

For additional information, please contact

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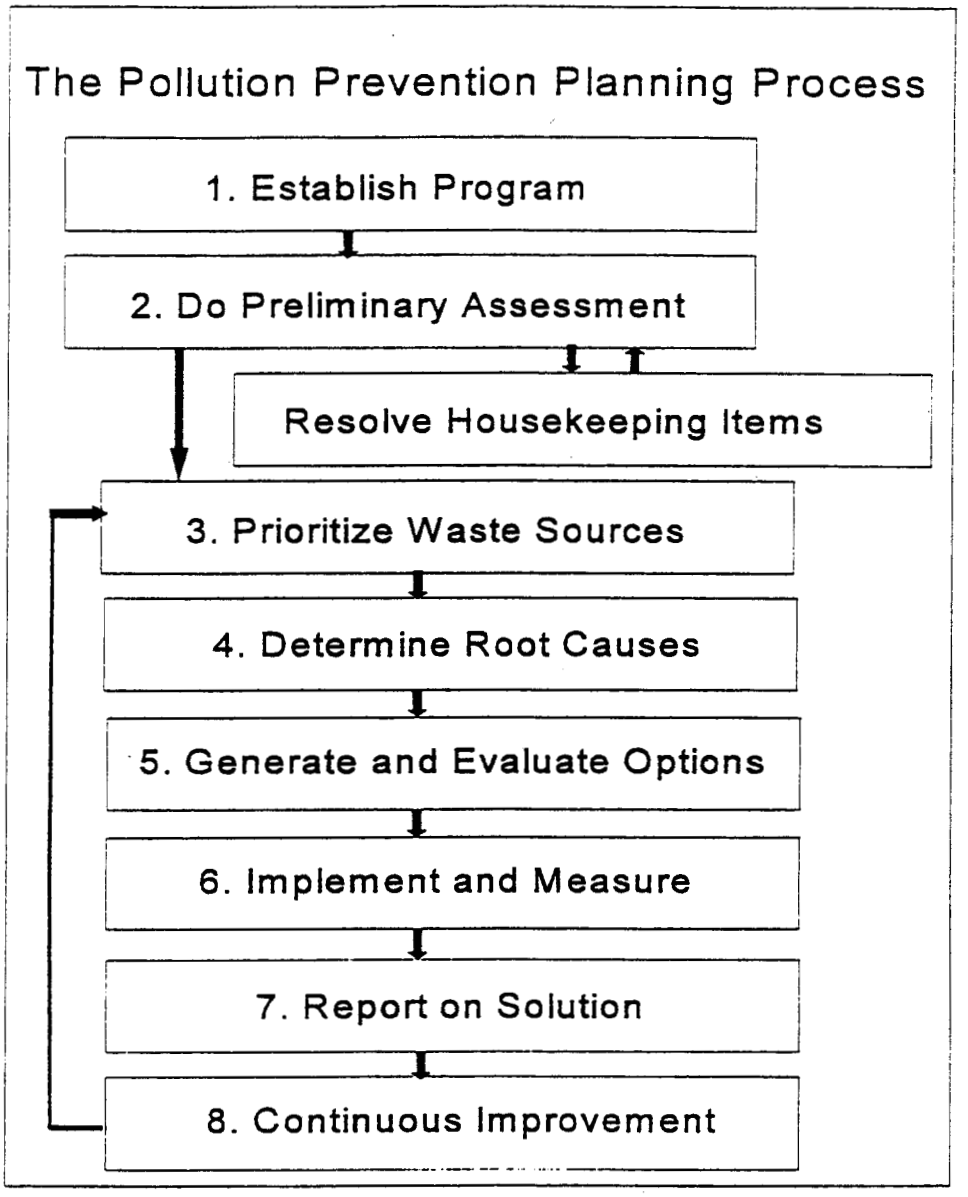
Environmental Partnerships
Ontario Ministry of Environment

(416) 314-3900

APPENDIX 1

POLLUTION PREVENTION PLANNING PROCESS


The Pollution Prevention Planning Process
1. Establish Program
2. Do Preliminary Assessment
Resolve Housekeeping Items
3. Prioritize Waste Sources
4. Determine Root Causes
5. Generate and Evaluate Options
6. Implement and Measure
7. Report on Solution
8. Continuous Improvement

APPENDIX 2

COMPANY POLLUTION PREVENTION CASE STUDY SUMMARIES

(NEW SUMMARIES)

CHROMIC ACID (RECOVERY AND REUSE)

LEADER PLATING ON PLASTIC LIMITED (DOWNSVIEW)

Leader Plating on Plastic Limited is one of a limited number of companies that currently offers electroplating on ABS plastic. The company electroplates copper, nickel, and chromium for the hardware, plumbing, appliance, furniture, electronic and automotive industries. The company's plating process has been approved by the automotive industry and the majority of their production is for the automotive industry .

Substance(s) being targeted: Chromic acid (pre-plate line)

Target reduction(s): 50% reduction in chromic acid purchases

Objective: To recover and reuse chromic acid from the hexavalent chromium etch bath on the ABS plastic pre-plate line.

Project Description: Installation of ion transfer technology (porous pots) on etch bath

Advantages: The recovery and reuse of chromic acid reduces purchases of new chromic acid and reduces the amount of chromium directed to the waste treatment system. Purification of the etch bath eliminates the need for bath dumping due to contamination. The reduced chromium content in the heavy metal sludge from the waste treatment system makes this sludge a recyclable commodity that is returned to Falconbridge nickel smelters.

Current Results: Reductions in chromic acid purchase of 3,700 kg per year
Savings: $13,000 per year
Payback period: 1 year

Environmental Hierarchy: Pollution Prevention - reduction, reuse

Pollution Prevention Approach: Equipment change, use reduction

Environmental Media Addressed: Off-site disposal, discharge to sewer

CHROMIC ACID (RECOVERY AND REUSE)

LEADER PLATING ON PLASTIC LIMITED (DOWNSVIEW)

Leader Plating on Plastic Limited is one of a limited number of companies that currently offers electroplating on ABS plastic. The company electroplates copper, nickel, and chromium for the hardware, plumbing, appliance, furniture, electronic and automotive industries. The company's plating process has been approved by the automotive industry and the majority of their production is for the automotive industry.

Substance(s) being targeted: Chromic acid

Objective: To recover and reuse chromic acid from the hexavalent chromium plating bath and rinses.

Project Description: Installation atmospheric evaporators on plating bath and dragout

Target reduction(s): 80% reduction in chromic acid purchases

Advantages: The recovery and reuse of chromic acid reduces purchases of new chromic acid, reduces the amount of chromium directed to the waste treatment system, and the reduced chromium content in the heavy metal sludge from the waste treatment system makes this sludge a recyclable commodity that is returned to Falconbridge nickel smelters.

Current Results: Reductions in chromic acid purchase of 5,400 kg per year
Savings: $19,000 per year

Environmental Hierarchy: Pollution Prevention - reduction, reuse

Pollution Prevention Approach: Equipment change, use reduction

Environmental Media Addressed: Off-site disposal, discharge to sewer

1998 METAL FINISHING POLLUTION PREVENTION PROJECT P2 AWARD WINNER

PHOSPHORIC ACID CO-PRODUCT (USE REDUCTION AND RECOVERY)

SPECTRA ANODIZING LIMITED (WOODBRIDGE)

Spectra Anodizing provides organic dyeing, and etch and brightened batch anodizing on aluminum extrusions. The opening of Spectra Aluminum Products Inc. state-of-the-art extrusion facility adds extrusion capabilities to Spectra's current processing capabilities. Spectra Anodizing currently provides finishing services for sporting goods, appliances, office and commercial furnishings, recreational vehicles, interior trims, lighting, and the automotive market. Spectra Anodizing strives to be environmentally progressive by improving manufacturing processes and adapting to change. In their efforts to protect the environment, their goal is not only to exceed municipal regulations but also to reduce and reuse process chemicals at the source.

Substance(s) being targeted: Phosphoric acid co-product from bright dip

Target reduction(s): 80% recovery of phosphoric acid co-product used in bright dip

Objective: To reduce dragout and recover phosphoric acid co-product.

Project Description: Installation of recovery system and four tank rinse system

Advantages: Reduction of associated chemical costs (reduced water consumption, reduced raw material purchases from reduced dragout, reduced waste treatment chemicals) recovery versus 100% neutralization, lower sludge volume, recovered co-product is sellable

Current Results: 82.5% recovery of phosphoric acid co-product (139 tonnes phosphoric acid and 173 tonnes of 50% caustic soda)
Savings: $67,000 per year

Environmental Hierarchy: Pollution Prevention - reduction, reuse, recycling

Pollution Prevention Approach: Equipment change, use reduction, recycling, reuse

Environmental Media Addressed: Liquid effluent, discharge to sewer, off-site disposal

WATER (COOLING) USAGE REDUCTION

DURA-CHROME LIMITED (WALLACEBURG)

Dura-Chrome is a job shop which specializes in chromium plating of zinc strip, stainless steel, and aluminum parts for the automotive industry. Stainless steel parts make up approximately 50% of the base parts, with zinc and aluminum parts making up the remainder at 30% and 20% respectively. About 96% of production is focused on the automotive sector, with plating of plumbing fixtures making up the balance.

Dura-Chrome is certified for QS 9000 Quality Management System and is currently investigating ISO 14001 Environmental Management System registration.

Substance(s) being targeted: Water

Target reduction(s): 30% reduction in water use

Project Description: To minimize water use from the plating operations using low pressure air recirculation of rinses and use of hoist controlled spray system

Advantages: Reduced water consumption provides water cost savings and a lower volume of water to be treated by the Wastewater Treatment Plant thus resulting in lower waste treatment cost and increased retention time.

Current Results: 20% reduction in water use (843,750 litres)
Savings: $12,000 per year
Capital costs: $1,000
Payback period: 1 month

Environmental Hierarchy: Pollution Prevention - reduction, reuse

Pollution Prevention Approach: Equipment change, use reduction

Environmental Media Addressed: Discharge to sewer

WATER (GROUNDWATER) USAGE REDUCTION STRATEGY

KUNTZ ELECTROPLATING INC. (KITCHENER)

Kuntz Electroplating Inc. (KEI) is a world class metal finisher providing copper/nickel/chrome plating to the automotive industry. As the industry's largest and most diverse open shop, KEI is committed to ongoing research and development, innovative solutions and overall excellence.

KEI is registered to QS9000 (ISO 9002) Quality Management System and is currently pursuing registration to ISO 14001 Environmental Management System.

Substance(s) being targeted: Non-contact cooling water

Target reduction(s): 80% reduction in groundwater use

Project Description: To minimize groundwater use for cooling requirements, KEI has installed two cooling towers. These provide a reservoir of cool water (85°F) which will be circulated through heat exchangers. The purpose of this is to dissipate excess heat produced in plating baths. It will also cool the air compressors and the engines used in the Co-gen department. Groundwater was previously pumped once-through the heat exchanges and then discharged into a system.

Advantages: Reduced discharge of warm water to the environment and eliminated need to get approval to increase groundwater intake.

Expected Results: Groundwater use for cooling should decrease by approximately 80%. Total cooling water use should drop from 198,939,600 L/y.

Environmental Hierarchy: Pollution Prevention - recycling

Pollution Prevention Approach: Equipment installation

Environmental Media Addressed: Liquid effluent, Discharge to sewer, Natural resource

APPENDIX 3

COMPILATION OF COMPANY POLLUTION PREVENTION CASE STUDY SUMMARIES

FROM PREVIOUS PROGRESS REPORTS

ACID RECOVERY FOR REUSE

DELPHAX SYSTEMS (MISSISSAUGA)

Delphax Systems is a captive plant which manufactures high-tech, high speed electronic printers. The company is interested in utilizing pollution prevention concepts to strengthen its operations and cost savings programs. The management and staff of Delphax Systems are committed to protecting the environment by eliminating, minimizing and recycling all waste materials as well as improving the health and safety of the employees and product quality.

Delphax has reduced its packaging waste and is recycling what remains. For example, it switched from glass bottles to 45 gallon drums, eliminating cardboard, styrofoam and glass packaging; it recycles cardboard, office and production papers.

Other current projects include:

- Recycling rejected (defective) components through special processes as per individual components;
- Delivering chemicals in a mini bulk system to supply production and wastewater systems;
- Minimizing rinsewater consumption in all plant processes. Treated wastewater is recycled to supply scrubber water requirements.

Substance(s) being targeted: sulphuric acid, ferric chloride

Target Reduction(s): 95% recovery of sulphuric acid for reuse
60% recovery of ferric chloride for reuse

Objective: To recover raw material for reuse within the process.

Project Description: Installation of an acid purification unit to recover sulphuric acid.

Results and Advantages: Through recycling the sulphuric acid through an acid purification unit, Delphax expects to save 4,000 kg/y or $1,473 per year.

Through recycling internally the spent ferric chloride (which is currently recycled offsite). Delphax expects to save 9,048 kg/y or $8,324 per year.

Environmental Hierarchy: Pollution Prevention, Reuse

Pollution Prevention Approach: Process modification

Environmental Media Addressed: Liquid effluent

ACIDS (SPENT) REGENERATION

TORCAD LTD. (TORONTO)

Torcad Ltd. is a job shop whose production focuses on zinc plating, and phosphating of automotive parts, electrical components, and fasteners. The facility processes approximately 150 tons of products per day and is located in Toronto, Ontario. In 1994, the company eliminated cadmium from its processes in order to generate sludge which could be disposed of at a non-hazardous landfill site.

Large quantities of acids are purchased annually and used for pickling operations on the process lines. Muriatic acid (HCl) accounts for approximately 90% of acid purchases. Spent acid is currently hauled off-site for recovery. The cost of disposal of waste acid and unused acid in a spent acid bath totals approximately $28,000 per year. Two options were identified for recovering the acid: (1) recover the unused acid and return to the process or (2) segregate the waste acid streams and precipitate. The company reviewed the two options and concluded that the former option provided additional benefits, such as the possibility of recovery of zinc and iron, aside from acid recovery.

Substance(s) being targeted: Hydrochloric acid

Target Reduction(s): 80% of lost acids

Objective: To regenerate process acid wastes on-site.

Project Description: Installation of an on-site acid recovery system for regeneration of spent acids.

Results and Advantages:

The acid regeneration program was halted because, although technically feasible, it failed to provide a reliable system. A side benefit was the installation of a filtering system made more efficient use of acid and gave more consistent pickling.

The company tested a prototype of the acid recovery system on its phosphating bath. Some of the predicted advantages were acid savings through recovery of acid, reduced consumption through removal of acid consuming contaminants, chemical savings related to reduced demand for acid neutralization, and reduced waste and solids disposal costs. In addition, zinc and iron from used acid pickle solution could have been separated into separate streams from which they can be recovered.

Environmental Hierarchy: Pollution Prevention, Recycle/Reuse

Pollution Prevention Approach: Equipment change

Environmental Media Addressed: Liquid effluent, discharge to sewer, offsite disposal

CHLORINE USAGE REDUCTION IN WASTE TREATMENT THROUGH BETTER MONITORING AND CHLORINE CONTROL

DURACHROME LTD. (WALLACEBURG)

Durachrome is a job shop which specializes in chrome plating of zinc strip, stainless steel, and aluminum parts for the automotive industry. Stainless steel parts make up approximately 50% of the base parts, with zinc and aluminum parts making up the remainder at 30% and 20% respectively. About 96% of production is focused on the automotive sector, with plating of plumbing fixtures making up the balance.

The segregated waste streams go to a wastewater treatment system that separately oxidizes the cyanide effluent and reduces the hexavalent chromium bearing effluent. The treated effluents are combined with other waste streams containing nickel and copper and the metals are precipitated. The thickened sludge is dewatered and sent to Falconbridge for metal (nickel) recovery.

This project is an operational change that improved control of chlorine use in the cyanide oxidation treatment process. As new technologies become available, it is anticipated that cyanide process baths will be eliminated with the subsequent elimination of the use of chlorine. Increased monitoring of cyanide loadings will allow improved control of chlorine addition resulting in reduced chlorine usage.

Substance(s) being targeted: Chlorine

Target Reduction(s): 20% reduction in chlorine use

Objective: To reduce the use of chlorine, and the cost associated with the consumption of chlorine. To reduce the potential for re-oxidizing trivalent chromium to hexavalent chromium.

Project Description: The monitoring frequency for chlorine concentration was increased from weekly to daily at two locations rather than one.

Results and Advantages: By increasing the monitoring frequency from weekly at one location to daily at two locations, residual chlorine was reduced from 50 mg/L to <10 mg/L. Since an additional plating line was installed, cyanide use at the facility has increased, therefore chlorine consumption also increased. However, chlorine use as a percentage of sales was reduced by 20%.

Environmental Hierarchy: Pollution Prevention

Pollution Prevention Approach: Use reduction, operational change

Environmental Media Addressed: Discharge to sewer

CHROMATE REDUCTION IN ZINC CHROMATE PROCESS

KNAPE & VOGT CANADA, INC. (ETOBICOKE)

Knape & Vogt Canada Inc. is a manufacturer of decorative shelving and builders hardware. Its plating department specializes in zinc, copper and brass plating of steel parts for both hardware and automotive industries.

During rack plating operation, few parts may fall in the chromate tank. Iron from the steel parts will be dissolved and will contaminate the chromate solution. When the iron concentration builds up to a certain level, the chromate solution will be considered as spent and will be dumped to the waste treatment system.

The company would like to install a screen tray for the chromate tank. The operators check and take out fallen parts on the screen at the end of each shift.

Substance(s) being targeted: Spent chromate solution

Target Reduction(s): 50% of bath dumps

Objective: To reduce or eliminate spent chromate solution being dumped to the Waste Water Plant.

Project Description: Installation of a screen tray for the chromate tanks.

Results and Advantages:

After manipulating the equipment, the chromate service life extended more than double than before.

Payback time for the cost of the equipment is less than one month. The company is currently reducing its consumption of more than 1,080 kg of concentrated chromate solution per year and yielding an annual saving of more than $6,000.

The advantages are significant cost savings associated with loss of raw material as well as waste treatment operation plus better quality finished parts and better control for the process.

Environmental Hierarchy: Pollution Prevention, Reduce

Pollution Prevention Approach: Equipment change, use reduction

Environmental Media Addressed: Liquid effluent, discharge to sewer, on-site disposal

CHROME PLATING SOLUTION REDUCTION

A.G. SIMPSON CO. LTD., OSHAWA PLANT 4 (OSHAWA)

A.G. Simpson Co. Ltd. (Oshawa) chrome plates bumpers for the automotive industry.

In order to reduce off-site transfers and treatment of liquid hazardous waste, disposal of sludges and to reduce the load on the air scrubber systems, A.G. Simpson developed a system to make common three plating line solutions, thus reducing chromic acid plating solution requirements.

Substance(s) being targeted: Chromic Acid

Target Reduction(s): 80% waste disposal reduction
70% chromic acid purchase

Objective: To improve employee health and safety by lessening contact with chromate, save costs, reduce reject rate, reduce fastener failures, and make common three plating line solutions.

Project Description: The company systematically determined the costs of their current practices, evaluated recovery systems, and worked with a supplier to install equipment and evaluate. Ion exchange units, evaporators and spray rinsing equipment were installed. Expected capital investment is $650,000.

Results and Advantages: After one month operation, no new chrome addition was required. Cost savings are predicted at $1,000,000 per year.

Environmental Hierarchy: Pollution Prevention, Recycle/Reuse

Pollution Prevention Approach: Equipment change, Use reduction

Environmental Media Addressed: Hazardous waste, Air Emissions

CHROMIC ACID LOSSES REDUCTION

MONROE AUTO EQUIPMENT CO. (NOW KNOWN AS TENNECO AUTOMOTIVE) (OWEN SOUND)

Monroe Auto Equipment Co. of Canada is a captive shop which does hard chrome plating and painting (solid-dip-baked) on automotive struts and components. The facility processes several million strut rods annually. In May 1990, an environmental committee, M.O.R.E. (Monroe's Organization Regarding The Environment), was formed at the plant. Since its establishment, the committee has conducted many pollution prevention activities, such as recycling and reuse of materials.

Although Monroe is quite advanced in its efforts in pollution prevention, the M.O.R.E. Committee is continuously seeking for opportunities in pollution prevention. Through the use of the draft Metal Finishing P2 Guide and the Ontario Waste Management Corporation (OWMC) waste reduction audit, Monroe's P2 Team was able to identify chromic acid losses as their primary waste concern. Using the Monroe PEP (People Eliminating Problems) process, the Team then focused its attention on point source reduction of chrome around the plating process and rinsing stages through better contaminant control in the chrome baths and improved rinsing procedures respectively. Three options for reduction of chromic acid waste were finally selected and presented to management for review.

Substance(s) being targeted: Chromic acid

Target Reduction(s): 85% of chemical losses from the rinse tanks

Objective: To install appropriate equipment to prevent chromic acid from being lost as waste.

Project Description: Install recovery equipment and improve rinsewater quality for reuse.

Results and Advantages:

The company installed a pulse spray system with atmospheric evaporation for a total cost of $205,700 and an expected payback period of 2.4 years. The advantages are cost savings of $45,000 per year associated with loss of raw material and reduction in hazardous waste disposal cost and a water treatment cost saving of $57,000. In addition, the company has eliminated disposal of 25,000 kg/yr of chromium hydroxide sludge to a hazardous landfill.

Environmental Hierarchy: Pollution Prevention

Pollution Prevention Approach: Use reduction, equipment change

Environmental Media Addressed: Liquid effluent, off-site disposal

CHROMIUM REDUCTION FROM LOSSES DUE TO SPILLS AND VENTILATION SYSTEMS

MENASCO AEROSPACE (OAKVILLE)

Menasco Aerospace is a captive shop specializing in manufacturing aircraft landing gear assemblies and flight control equipment. Operations include chromium, titanium-cadmium, cadmium and nickel plating, chromating, painting, and assembly.

Based on the information collected during the detailed assessment, the total annual chrome losses represent more than two-thirds of the annual chromium purchases. The Dump Storage Tank was identified as the most significant source of chrome loss (50%). Sources contributing to this waste location included: (1) an accumulation of chrome bath spills in the Dry Pit, and (2) the chrome bath vent system which carries chrome mist and spilled solution to the Chrome Vent Concentrate Tank. Losses through the Waste Treatment Plant (includes the Chrome Rinsewater and Scrubber Waster Tank effluent), as chromium bearing hydroxide sludge represented about 19% of the annual chrome purchases.

It was decided that activity would focus initially in identifying possible pollution prevention options to eliminate or minimize losses to the Dump Storage Tank since the losses are not inherent to the plating process, and could be addressed by improved operating practices.

Substance(s) being targeted: Chromic acid

Target Reduction(s): 50%

Objective: Installation of appropriate control equipment to reduce chrome lost to spills and the ventilation system.

Project Description: Identified pollution prevention options to eliminate or minimize losses to the Dump Storage Tank.

Results and Advantages: Ongoing

Environmental Hierarchy: Pollution Prevention

Pollution Prevention Approach: Operational Change, Equipment Change

Environmental Media Addressed: Off-site Disposal

CLEANERS (ALKALINE) LIFE EXTENSION BY OIL REMOVAL

ABM PLATING INC. (SCARBOROUGH)

ABM Plating is a new job shop which currently offers barrel zinc plating with chromate coatings. The company is looking at expansion and the company Vice President is looking at implementing pollution prevention strategies in the plant for waste and cost reduction. One of their projects has been the installation of a unit to remove oils and suspended matter from their alkaline cleaning solutions.

Substance(s) being targeted: Alkaline cleaning solutions

Target Reduction(s): 40% of raw material usage
80% reduction in cleaner dumps

Objective: To extend cleaner life and reduce the dumping of spent cleaners to the wastewater treatment system

Project Description: Installation of an alkaline cleaner oil removal unit.

Results and Advantages:

The use of these oil removal units provides a great extension of cleaner life thereby realizing cost savings through lower raw material usage and lower waste treatment costs as the frequency of cleaner dumping is greatly reduced.

As the company has just started up, the actual savings are hard to document. The plating lines have been in operation for six months since March 1996 and they are dumping the two cleaners for the first time since the start-up of production.

Environmental Hierarchy: Pollution Prevention, Reduce, Recycling

Pollution Prevention Approach: Equipment change, use reduction

Environmental Media Addressed: Liquid effluent, discharge to sewer, on-site disposal

CLEANERS (SPENT) REUSE BY OIL REMOVAL

TORCAD LTD. (TORONTO)

Torcad Ltd. is a job shop whose production focuses on zinc plating, and phosphating of automotive parts, electrical components, and hardware. The facility processes approximately 150 tons of products per day and is located in Toronto, Ontario.

Alkaline cleaning solutions are used extensively on the process lines. It was estimated that cleaner costs are over $200,000 per year and an estimated 100,000 L of spent cleaner is dumped annually to the Wastewater Treatment Plant.

The company would like to install a unit to remove oils and suspended matter from the spent cleaning solution and recycle it to the cleaning baths on the plating lines. A 3-year payback on the cleaner recycling system is acceptable.

Substance(s) being targeted: Spent cleaning solution

Target Reduction(s): 80% of bath dumps

Objective: To reduce or eliminate spent cleaning solution being dumped to the Wastewater Treatment Plant.

Project Description: Installation of a de-centralized alkaline cleaner recycling system.

Results and Advantages: The company has installed four oil removers for a total cost of $40,000. A 1.5 year payback period is expected, thus resulting in annual cost savings of $30,000 per year, and savings of 15,000 L alkaline cleaner per year.

The advantages are significant cost savings associated with loss of raw materials and improvement in wastewater treatment plant operation.

Environmental Hierarchy: Pollution Prevention, Recycle/Reuse

Pollution Prevention Approach: Equipment change, use reduction

Environmental Media Addressed: Liquid effluent, discharge to sewer, on-site disposal

CLEANERS (WASTED) ELIMINATION BY SUBSTITUTING POWDER CLEANERS WITH LIQUID CLEANERS

DURACHROME LTD. (WALLACEBURG)

Durachrome is a job shop which specializes in chrome plating of zinc strip, stainless steel, and aluminum parts for the automotive industry. Stainless steel parts make up approximately 50% of the base parts, with zinc and aluminum parts making up the remainder at 30% and 20% respectively. About 96% of production is focused on the automotive sector, with plating of plumbing fixtures making up the balance.

With assistance from chemical suppliers, powder cleaners were replaced with liquid cleaners resulting in better control of the cleaning process. It was determined that around 20% of the powdered cleaner was being wasted because it did not fully dissolve in the aqueous cleaner bath.

Substance(s) being targeted: Powder cleaners

Target Reduction(s): 100%

Objective: By replacing the powdered cleaners with liquid cleaners, they expected to reduce wasted powder cleaners and decrease the time that was spent adding the powdered cleaners.

Project Description: With assistance from chemical suppliers, powder cleaners were replaced with liquid cleaners.

Results and Advantages: By switching from powder cleaners, which have to be dissolved in water, to liquid cleaners on the Stainless Steel line, they eliminated the 20% wasted powdered cleaners which previously sat undissolved in the cleaner tanks. They also achieved a 10-15% savings in labour cost.

Environmental Hierarchy: Pollution Prevention

Pollution Prevention Approach: Operational Change, Use reduction

Environmental Media Addressed: Discharge to sewer

CYANIDE ELIMINATION IN THE ZINC PLATING PROCESS

RAUSCHER PLATING LTD. (CAMBRIDGE)

Rauscher Plating Ltd. is an electroplating job shop which provides zinc and nickel chrome finishes to the Automotive, Electronic and Commercial markets in North America.

Rauscher has been a dedicated funding supporter of research in this area through the AESF Research Foundation for over a decade.

This project is a product substitution and process change from plating with a zinc cyanide to an acid zinc process. The change eliminates the use of cyanide in the zinc plating process and the associated chemicals used for waste treatment of cyanide.

Substance(s) being targeted: Cyanide

Target Reduction(s): 100% of cyanide used in the plant's operation

Objective: To find an alternative to cyanide zinc plating, yet maintain the advantages of a cyanide system.

Project Description: Reduction of cyanide use by replacing cyanide zinc plating with an acid zinc plating process.

Results and Advantages:

By eliminating the need for cyanide in its zinc plating process, Rauscher has eliminated 1500 gallons/year of cyanide use. At a concentration of 1 oz /U.S gallon, this is equivalent to 43 kg/y of cyanide in 5700 L/y solution. It has also reduced its costs for chemicals used in cyanide treatment, (e.g. elimination of sodium hypochlorite purchases), as well as reducing the overall wastewater treatment costs, since there is less volume for the wastewater treatment system to handle. Also, as a result of the effort on this project, productivity on the plating lines has been increased by 30%.

Environmental Hierarchy: Pollution Prevention

Pollution Prevention Approach: Process Change, Product Substitution, Waste Reduction

Environmental Media Addressed: Discharge to sewer

CYANIDE HYDROLYSIS

KUNTZ ELECTROPLATING INC. (KITCHENER)

Kuntz Electroplating Inc. (KEI) is a world class metal finisher providing copper/nickel/chrome plating to the automotive industry. As the industry's largest and most diverse open shop, KEI is committed to ongoing research and development, innovative solutions and overall excellence. KEI is registered to QS9000 (ISO 9002) Quality Management System and is currently pursuing registration to ISO 14001 Environmental Management System.

KEI developed, with an equipment supplier, a unique cyanide destruction system using high temperature and pressure to replace the traditional treatment process that required use of treatment chemicals.

Substance(s) being targeted: Chemicals used to treat waste cyanide: sodium hypochlorite, caustic, sulphuric acid, chlorine

Target Reduction(s): All treatment chemicals used for cyanide destruction

Objective: To eliminate use of treatment chemicals in the destruction of cyanide

Project Description:

KEI developed, with an equipment supplier, a unique cyanide destruction system to compete with the traditional chlorination and SO_2 air cyanide destruction. The Cyanide Hydrolysis System (CHS) process is designed to destroy cyanide compounds of low and high concentration contained in water and aqueous slurries. It is a system based on hydrolysis that utilizes high temperature and pressure to decompose cyanide to elemental compounds.

Results and Advantages:

The cyanide destruction process eliminated the annual consumption of 61,400 kg/y of treatment chemicals included in the following solutions: 12000 L sodium hypochlorite (10%), 52,800 L of caustic (50% NaOH), and 19,800 L of hydrochloric acid (33%). Also eliminated was the use of 25 drums of chlorine per batch, equivalent to 27,250 kg/y. Annual cost savings from reduced chemical use and labor were $214,000.

Environmental Hierarchy: Pollution Prevention

Pollution Prevention Approach: Process Change

Environmental Media Addressed: Hazardous Waste

LEAD MASKING TAPE DISPOSAL ELIMINATION

MENASCO AEROSPACE (OAKVILLE)

Menasco Aerospace is a captive shop specializing in manufacturing aircraft landing gear assemblies and flight control equipment. Operations include chromium, titanium-cadmium, cadmium and nickel plating, chromating, painting, and assembly.

During their facility pollution prevention assessment, the team members identified a number of housekeeping items that could be addressed quickly and relatively easily.

They identified that a lead masking tape was being disposed to the landfill. Although it was an acceptable practice previously, they identified that they could have it recycled off site.

Substance(s) being targeted: Lead masking tape

Objective: Eliminate the disposal of all lead masking tape to landfill.

Project Description: Using the information from their pollution prevention planning process, they eliminated the disposal of lead tape to the landfill by providing a collection container and by using their employee awareness program.

Target Reduction: 100%

Results and Advantages: 385 kg/y lead masking tape recycled. The company no longer has to pay for landfilling this material.

Environmental Hierarchy: Recycle/reuse

Pollution Prevention Approach: Operational Change

Environmental Media Addressed: Off-site Disposal

NICKEL SLUDGE RECYCLING

KUNTZ ELECTROPLATING INC. (KITCHENER)

Kuntz Electroplating Inc. (KEI) is a world class metal finisher providing copper/nickel/chrome plating to the automotive industry. As the industry's largest and most diverse open shop, KEI is committed to ongoing research and development, innovative solutions and overall excellence. KEI is registered to QS9000 (ISO 9002) Quality Management System and is currently pursuing registration to ISO 14001 Environmental Management System.

The Nickel Recovery Project was conceived to find an alternative for landfill disposal of nickel sludge. Kuntz was able to produce a dry sludge that was acceptable for addition to the INCO smelter, thus recovering the waste nickel content.

Substance(s) being targeted: Nickel-bearing wastes

Target Reduction(s): 100% of nickel bearing sludge

Objective: To eliminate the landfill disposal of dried nickel bearing sludge.

Project Description:

In early 1990, KEI approached both INCO and Falconbridge with the concept of sending its nickel bearing hazardous solid waste to their facilities to use as a feed stock additive within their smelting operation. Based on the nickel value of their wastes (content of nickel, minimized content of metallic impurities, and minimum moisture content), KEI and INCO developed a contract for acceptance of this material. KEI is still maintaining this relationship with INCO.

KEI is also researching a project to provide the metal finishing industry with alternatives to disposal of nickel sludge/solutions in secure/hazardous landfills.

Results and Advantages: This project provided significant cost savings in landfill disposal, as well as recovering approximately 240 tonnes/y of valuable nickel (1600 tonnes/y x 15% nickel) which otherwise would have been disposed to a landfill. Kuntz is shipping on average 32 tonnes per week (1600 tonnes/y) of dried nickel bearing sludge to INCO's smelting operations.

Environmental Hierarchy: Off-Site Recycle

Pollution Prevention Approach: Process Change

Environmental Media Addressed: Solid Waste Landfill, Hazardous Waste

SPILLS ELIMINATION FROM BLACK OXIDE PROCESS

MENASCO AEROSPACE (OAKVILLE)

Menasco Aerospace is a captive shop specializing in manufacturing aircraft landing gear assemblies and flight control equipment. Operations include chromium, titanium-cadmium, cadmium and nickel plating, chromating, painting, and assembly.

During operation of the Black Oxide process, the bath is heated to a specified temperature (280-300°F). The exact boiling temperature of the bath is maintained by chemicals addition.

The spills not only represent a loss of raw materials, but also a significant health and safety concern. Primary causes of Black Oxide spills were identified as follows:

- Procedure / Operator Training / Record of Tank History
- Inadequate agitation
- Too much sludge in tank
- Wrong type of heaters

Alternatives to the bath, or to the operating procedures used by Menasco staff were required.

Substance(s) being targeted: Activated Black Magic (sodium hydroxide)

Target Reduction: 67% of current use

Objective: To develop appropriate measures to better control the Black Oxide process and minimize the potential for a spill, thus protecting the environment by reducing hazardous waste while addressing a health and safety concern.

Project Description: Using their own internal quality methods, they established an employee awareness program, and developed a process chart to control and maintain process solution.

Results and Advantages: By working with their operators to develop the solution, there is now no longer the incidence of spills, and the health and safety issue is under control. They have reduced the amount of material that they needed to add to the process by 454 kg/y.

Environmental Hierarchy: Pollution Prevention

Pollution Prevention Approach: Operational Change, Equipment Change

Environmental Media Addressed: Off-site Disposal

WASTES (ACID AND ALKALINE) ELIMINATION FROM DISPOSAL

STRATAFLEX CANADA CORP. (TORONTO)

Strataflex Canada Corp. is a manufacturer of flexible circuit boards used in the computer, aerospace, telecommunications, and defence industries. Operations include plating of multilayered flex circuits, with copper and other specialty conductor alloys.

Strataflex has committed itself to a policy of eliminating waste haulage to landfill.

Substance(s) being targeted: Acid and alkaline wastes containing metals, waste oils and lubricants.

Target Reduction(s): Reductions are continuing.

Objective: To eliminate waste haulage to landfill.

Project Description:

Installation of an electrowinning system and use of existing ion exchange system to process sodium persulfate and sulphuric acid wastes. Metallic copper residue is removed and sold for reprocessing.

Precipitation of cupric chloride etchant, film stripper and developer solution to remove copper and photo resist polymer, processing of effluent through ion exchange unit.

Results and Advantages:

By making process modifications over 1994, Strataflex eliminated the following chemical waste from disposal: 229,000 kg/y acid waste containing heavy metals, 2,660 kg/y alkaline waste containing heavy metals, and recovered 370 kg/y waste oils and lubricants for reuse. Eliminating the disposal of waste chemicals saved $72,000 per year in direct disposal costs.

Environmental Hierarchy: Pollution Prevention

Pollution Prevention Approach: Process modification

Environmental Media Addressed: Off-site Disposal

WATER (COOLING) - MAGNETIC FIELD TREATMENT SYSTEM

MONROE AUTO EQUIPMENT CO. (NOW KNOWN AS TENNECO AUTOMOTIVE) (OWEN SOUND)

Monroe Auto Equipment Co. of Canada is a captive shop which does hard chrome plating and painting (solid-dip-baked) on automotive struts and components. The facility processes several million strut rods annually. In May 1990, an environmental committee, M.O.R.E. (Monroe's Organization Regarding The Environment), was formed at the plant. Since its establishment, the committee has conducted many pollution prevention activities, such as recycling and reuse of materials.

The plant operates a cooling water system to remove process heat generated, among others, in the Chrome Plating Baths and Heat Treatment Furnaces. The system consists of three separate loops each with its own cooling tower. To prevent building up of pipe scale in the system, the cooling water is treated with an assortment of chemical inhibitors. Four alternatives to the chemical treatment of cooling water were considered and it was concluded that the magnetic field technology offered the lowest capital cost and shortest payback on investment. The company undertook the initiative as a demonstration project with partial funding from Environment Canada.

Substance(s) being targeted: Cooling water treatment chemicals, make-up water

Target Reduction(s): 75% of cooling water treatment chemicals, 43% of make-up water

Objective: To reduce the consumption of water and treatment chemicals.

Project Description: Installed magnetic field technology to prevent the build up of pipe scale in the cooling water system.

Results and Advantages:

The total cost of the magnetic field technology was $15,590. The company expects a payback period of 1.7 years. The advantages are: chemical savings of $4,370 per year and reduction of 2,740 kg/y of cooling tower chemicals, wastewater treatment cost savings of $7,050, water savings of $1,010 per year and a reduction of 3,255 cubic metres in water consumption, and sewer-use cost savings of $500. The annual total savings achieved by the company is $12,930.

Environmental Hierarchy: Pollution Prevention

Pollution Prevention Approach: Use reduction, Equipment change

Environmental Media Addressed: Liquid effluent, discharge to sewer

WATER (COOLING) USAGE REDUCTION

STRATAFLEX CANADA CORP. (TORONTO)

Strataflex Canada Corp. is a manufacturer of flexible circuit boards used in the computer, aerospace, telecommunications, and defence industries. Operations include plating of multilayered flex circuits, with copper and other specialty conductor alloys.

Strataflex has committed itself to a policy of eliminating waste haulage to landfill.

Substance(s) being targeted: Non-contact cooling water

Target Reduction(s): 50% of process cooling water

Objective: To minimize water usage by close looping cooling water cycles.

Project Description: Installation of a cooling water recycling system to reduce water use.

Results and Advantages: Through the implementation of this plan, Strataflex aims to reduce water usage. Once implemented, it should result in savings of up to $50,000 per year.

Environmental Hierarchy: Pollution Prevention, Reuse

Pollution Prevention Approach: Process modification

Environmental Media Addressed: Discharge to sewer

WATER (REUSE) FROM THE AIR SCRUBBER WASH DOWN UNIT TO REPLACE PLATING TANK EVAPORATION LOSSES

SPECIALTY TECHNICAL SERVICES LTD. (HAMILTON)

Specialty Technical Services (STS) is a young chrome plating company that is specifically designed for the surface treatment of aircraft repair and overhaul parts. It is a low volume plater specializing in complete processing of 'one of ' parts.

This project is a process change from manual to automatic control of the plating tank level using water from the scrubber wash down unit. Savings are from labour and water use reductions, eliminating the need for water discharge to sewer. There is now no need for a wastewater treatment system or an attendant for off shifts.

Substance(s) being targeted: water

Target Reduction(s): any amount

Objective: To identify and reduce the consumption of water use in the plating process.

Project Description:

The major water consumers in the plant were identified as (a) the extraction hood air scrubber, (b) the rinse tank and (c) evaporative losses from plating tanks. In order to reduce the water losses, the following process changes were made:

1) The air scrubber wash down unit was modified from a manually operated switch to one controlled by the plating tank.

2) Parts are rinsed over the plating tank, reducing water to the rinse tank. The rinse tank is pumped directly back into the chrome plating solution.

3) The solution level of the plating tank is controlled to within 4 cm. A level controller monitors the evaporation in the tank and calls for water. Instead of fresh water being added, the scrubber wash down unit is activated and the discharge goes to the tank for make up solution.

Results and Advantages: Since discharge to sewer was eliminated, there is now no need for a wastewater treatment system or an attendant for off shifts. In addition to cost savings for water and chemicals, were $1,200 per year from eliminating labour required for topping up the plating tanks. Payback was one year or less with equipment cost $1,500 and installation cost $1,000.

Environmental Hierarchy: Pollution Prevention

Pollution Prevention Approach: Process Change

Environmental Media Addressed: Air emissions, discharge to sewer

WATER (RINSE) RECYCLING

TORCAD LTD. (TORONTO)

Torcad Ltd. is a job shop whose production focuses on zinc plating, and phosphating of automotive parts, electrical components, and fasteners. The facility processes approximately 150 tons of products per day and is located in Toronto, Ontario.

Torcad presently processes about 600 L/min of wastewater which represents a potential for large savings. It was suggested that savings as high as $100,000 per year in water costs could be realized. To accomplish this, closed looping of the water use must be accomplished. This can be achieved if the problem of high chloride ion concentration in the treated water can be resolved.

To accomplish this waste acid dumps and acid pickling rinsewaters must be reduced or diverted from the final treatment plant. Alternatively, chloride ion removal from the final treated water could be practised, however, this technology is costly and does not represent an economically viable alternative. A payback period of 5 years is acceptable to Torcad for any cost of equipment, maintenance and operation incurred on the close looping of water.

Substance(s) being targeted: Process Rinsewater

Target Reduction(s): 80% of process water

Objective: To minimize water use by approaching close looping of process rinsewaters.

Project Description: To develop a method to reduce the level of chlorine ion in the final effluent, thereby making water reuse more feasible.

Results and Advantages: The company is currently recycling 50% of the process rinsewater and yielding an annual saving of $60,000.

The advantages are water cost savings of up to $100,000 per year and a lower volume of water to be treated by the Wastewater Treatment Plant thus resulting in lower wastewater treatment cost.

Environmental Hierarchy: Pollution Prevention

Pollution Prevention Approach: Equipment change, use reduction, operational change

Environmental Media Addressed: Discharge to sewer

WATER (RINSE) USAGE REDUCTION THROUGH THE USE OF CONDUCTIVITY CONTROLLERS

DURACHROME LTD. (WALLACEBURG)

Durachrome is a job shop which specializes in chrome plating of zinc strip, stainless steel, and aluminum parts for the automotive industry. Stainless steel parts make up approximately 50% of the base parts, with zinc and aluminum parts making up the remainder at 30% and 20% respectively. About 96% of production is focused on the automotive sector, with plating of plumbing fixtures making up the balance.

This project is an operational change from manual to automatic conductivity control of the acid copper, chrome, and nickel rinse waters to achieve a reduction in rinse water volumes. After installation of the 14 controllers, water usage was actually found to have increased slightly. The tighter control of rinsewater quality did however result in fewer parts being rejected for quality defects, thus allowing the company to realize a savings.

Substance being targeted: Water

Target Reduction: Any amount

Objective: To reduce the volume of rinse water resulting in cost savings associated with the reduction of process water consumption, as well as improved control of plating process, and improved operation of the Waste Treatment Plant.

Project Description: Installation of conductivity controllers

Results and Advantages: After the installation of conductivity controllers, the amount of water used increased, but savings were realized on reducing the number of rejected parts.

Environmental Hierarchy: Pollution Prevention

Pollution Prevention Approach: Use Reduction

Environmental Media Addressed: Discharge to sewer

WATER USAGE REDUCTION

ANTI-FRICTION ENTERPRISES (REXDALE)

Anti-Friction Enterprises (1985) Ltd. is a metal coatings company whose production focuses on applying corrosion protective coatings, mainly on automotive parts. The pretreatment for the process usually involves alkaline cleaning or zinc phosphating, where water is used for rinsing after treatment in various chemical baths.

In early 1997, the company participated in the Industrial Waste Audit Program (IWAP) offered by WTI which resulted in their development of a summary pollution prevention plan. The plan identified several activities related to improved pollution prevention actions, potential resource recovery opportunities, and ISO 9000 and 14000 future requirements which the company should address.

One of the activities identified was the review of water recovery options and reduction of overall water usage at the facility. Rinsewater demand at Anti-Friction represents about 33% of potable water intake and aspirator water on the vacuum filter represents about 35%. The company is reviewing a number of options that will result in reduced water demand.

Substance(s) being targeted: Water

Target Reduction(s): 20% reduction in water usage

Objective: To reduce water usage.

Project Description: Review of options available to reduce the facility's water demand.

Results and Advantages:

The company is reviewing such options as, reactive rinsing, counter current rinsing, spray rinsing, and more effective water recycle after treatment to reduce its water demand. A 20% reduction in water usage is anticipated which in turn represents an annual savings of $9,000 in water purchases. Additional savings would also be realized from reduced waste treatment.

Environmental Hierarchy: Pollution Prevention, Recycle/Reuse

Pollution Prevention Approach: Equipment change, Use reduction

Environmental Media Addressed: Liquid effluent, discharge to sewer

WATER USAGE REDUCTION

DELTA FAUCET CANADA (LONDON)

Delta Faucet Canada manufactures plumbing fixtures for residential, institutional and commercial markets. The London factory assembles and electroplates many of these products. Copper, nickel, and chromium electroplating is performed at this plant.

Substance being targeted: Water Use On Assembly Brazing Lines

Objective: To reduce or eliminate fresh water use to cool assembly brazing lines

Project Description: Large amounts of fresh water were used to cool air compressor units and five brazing stations. A study was done to reduce or eliminate the amount of fresh water being used. It identified the purchase of air cooled compressors and the use of clean treated water from the waste treatment system for cooling.

Target reductions: 100% of fresh water use

Advantages: No fresh water is used for cooling. Contaminated water from the brazing process is treated in the waste treatment system and reused.

Results: Delta Faucet is expecting savings of $26,000 per year

Environmental Hierarchy: Pollution Prevention - reduction, recycling

Pollution Prevention Approach: Equipment change, use reduction, recycling

Environmental Media Addressed: Liquid effluent, discharge to sewer, raw material

WATER - ZERO DISCHARGE IMPLEMENTATION

AEROSPACE METAL FINISHING (SCHOMBERG)

Aerospace Metal Finishing is a job shop which offers cadmium, copper, electroless nickel, passivating, chemical conversion coating, chromic, sulphuric and hard anodizing of precision machined components to the military and defense industry. It also offers silver plating, has expanded its focus to include space hardware, medical equipment, satellite and telecommunication components, precision components for injection molding machines, and the painting and priming of aircraft landing gear and other structural components. The plant currently services more than 150 precision machining houses across Canada.

Substance(s) being targeted: Process Water

Target reduction(s): 100% of plant process water (no process water leaves the plant)

Objective: Zero Discharge of Process Water

Project Description:

Aerospace Metal Finishing has no drains for metal finishing process water to leave the plant. Process water is diverted to collection sumps where they are segregated into acid, alkali, and mixed wastes. After cyanide treatment and neutralization, the system wastes are fed into evaporative distillation systems which recovers water from the waste stream to be reused in the plant and concentrates the wastes into heavy metal salt sludges which can be filtered through a filter press to produce a solid filter cake with 80-90% solids. Process water usage from the evaporation units range from 0.07 to 0.14 m^3/h (15 to 30 gallons per hour).

Advantages: Besides not having a water bill for metal finishing processes, Aerospace has limited chemical purchases for waste water treatment (for cyanide destruction) and the peace of mind that they have no process water being discharged from the plant.

Results: Aerospace Metal Finishing does not discharge liquid effluent to the municipal sewer system.

Environmental Hierarchy: Pollution Prevention - reduction, recycling, re-use

Pollution Prevention Approach: Equipment change, use reduction

Environmental Media Addressed: Liquid effluent, discharge to sewer

WATER - ZERO DISCHARGE IMPLEMENTATION

RELIABLE PLATING LIMITED (GLOUCESTER)

Reliable Plating Limited is a job shop which offers copper, brass, tin, and zinc plating and specializes in anodizing. Reliable Plating would like to alleviate any concerns with the discharge of treated effluent water by attaining the goal of zero discharge of plant effluent water.

Substance(s) being targeted: Process Water

Target reduction(s): 100% of process water (no process water to leave the plant)

Objective: Zero Discharge of Process Water

Project Description: Installation of nanofiltration, carbon, and sand filter system to purify treated process waste water for re-use in the plant's metal finishing operations.

Advantages: Targeted water use savings of $5,000 per year. The company will also have no process water leaving the plant, thereby eliminating the risk of a discharge of effluent above by-law limits.

Current Results: Equipment purchase and installation is in progress at this time.

Environmental Hierarchy: Pollution Prevention - reduction, recycling, re-use

Pollution Prevention Approach: Equipment change, use reduction

Environmental Media Addressed: Liquid effluent, discharge to sewer

APPENDIX 4

METAL FINISHING INDUSTRY PARTICIPANTS AT THE SEPTEMBER 1997 TASK FORCE WORKSHOP

METAL FINISHING PARTICIPANTS AT THE SEPTEMBER 1997 TASK FORCE WORKSHOP

Metal Finishers

Acadian Barrel Finishing Ltd.

Advanced Processing

Canadian Buttons Ltd.

Cooper Plating Inc.

deHaviland Inc.

Delphax Systems

Dura Automotive Systems

Dura-Chrome Ltd.

EDAC Inc.

Holody Electroplating Ltd.

Industrial Processing

Knape & Vogt Canada Inc.

Kuntz Electroplating Inc.

Long Manufacturing

M. Stanton Electroplating

Menasco Aerospace Ltd.

Meridian Operations Inc. (Richmond Div.)

Monroe Auto Equipment Ltd. (now known as Tenneco (Automotive)

Ontario Chrome

Prism Printed Circuits

Prototype Circuits Inc. (now known as Coretec Inc.)

Rauscher Plating Ltd.

Reliable Plating Ltd.

Rustshield Plating (now known as Chromeshield Company)

Metal Finishers (continued)

S&C Ekectric

Specialty Technical Services

Spectra Anodizing

Torcad Ltd.

Metal Finishing Associations and Governments

American Electroplaters and Surface Finishers Society

Canadian Association of Metal Finishers

Environment Canada

Metal Finishing Suppliers' Association

Ontario Ministry of Environment

Chemical & Equipment Suppliers, Consulting & Analytical Services

Canadian Finishing Systems Ltd

Canadian Centre for Pollution Prevention

Chem Solv

Controlchem Canada Ltd.

Eco-Tec Inc.

Greenware Environmental Systems Inc.

Kontec Ecology Systems

Service Filtration of Canada

Water Technology International Corporation

APPENDIX 5

SUMMARY OF RESULTS ACHIEVED BY METAL FINISHING COMPANIES AND VOLUNTARILY REPORTED TO THE ONTARIO P^4 PROGRAM

SUMMARY OF RESULTS ACHIEVED BY METAL FINISHING COMPANIES AND VOLUNTARILY REPORTED TO THE ONTARIO P4 PROGRAM

Facility	Target Substance	Results	Method Employed	Year Achieved
A&A Metal Cleaning, (Chatham)	muriatic acid	70% reduction in disposal 3186 kg/y	Reuse as pH control in waste treatment	1993
Acadian Barrel Finishing Ltd. (Toronto)	zinc metal zinc chloride plating salts	13% reduction 4,741 kg/y 89% reduction 4,381 kg/y 45% reduction 28,539 kg/y	process change to recycle zinc rinses	1991
	cleaners	54% reduction 18,181 kg/y	oil skimmer on cleaner bath to extend life	1991
Acadian Platers Co. Ltd. (Toronto)	zinc metal plating salts	29% reduction 10,816 kg/y 41% reduction 7,211 kg/y	process change to recycle zinc rinses	1991
Colonial Designs Manuf. (Scarborough)	copper, nickel, brass, zinc, cyanide	100% reduction 6600 kg/y	electrolytic recovery, electrodialysis	1993
COMDEV (Cambridge)	metal sludges, cyanide	99% reduction in disposal 7,000 kg/y	electrolytic recovery of metals for recovery	1994
Embury Co. (Orillia)	aluminum	83% reduction in disposal 30,000 kg/y	recovery/processing of waste alum for sale as product	1994
Fineline Circuits (Scarborough)	copper	90% recovery of copper 40-60 drums/y of sludge waste reduced	electrolytic recovery of copper for sale as product	1994
Kuntz Electroplating Inc. (Kitchener)	nickel sludge	100% reduction in disposal 1600 tonnes/y to recycle	off-site recycle to smelter for recovery of nickel	1991 +
	sodium hypochlorite caustic hydrochloric acid	100% use reduction 12,000 L/y 52,800 L/y 19,800 L/y	process change to an innovative cyanide hydrolisis system	1996 +
Menasco Aerospace Ltd. (Oakville)	sodium hydroxide	67% reduction in use 454 kg/y	reduction in use by process control, training	1994 +
	lead masking tape	100% reduction in disposal 385 kg/y	off-site recycle	1994 +
Monroe Auto Equipment Co.** (now known as Tenneco Automotive)** (Owen Sound)	oil/synthetic based coolants	95% reduction in disposal 14,000 L/y	reuse	1991
	aluminum sulphate	95% reduction in use 31,000 gal/y	substitution to a less hazardous alternative	1991
	water reducible paints	100% reduction in disposal 450 gal/y	collection and reuse of drips	1993
	metal hydroxide sludge and grinder swarf	100% reduction in disposal	off-site recycle	1992
	rinse water	50% reduction 1.73 million gals/y	reduction in use by installation of flow meters	1991
	chromium hydroxide sludge	55% reduction 25,000 kg/y	installation of pulse spray with atmospheric evaporator to prevent chromic acid losses	1996 +
Prototype Circuits Inc. (now known as Coretec Inc.) (Scarborough)	acid waste - heavy metals	100% reduction 2,500 kg/y	process modification - new technology/equipment	1996
	copper	95% reduction 1,630 kg/y	capture copper from wastewater for reuse	1993
Strataflex Canada Corp. ** (Toronto)	acid waste (heavy metals)	100% reduction in disposal 236,930 kg/y	recovery of copper for reprocessing	1994 +
	alkaline waste (metals)	100% reduction in disposal 5,740 kg/y	recovery of copper for reprocessing	1994 +
	waste oils and lubricants	100% reduction in disposal 370 kg/y	recovery for reuse	1994 +
Sun Polishing & Plating (Toronto)	metal hydroxide sludges	55% reduction in disposal 3,100 kg/y	recovery and reuse of copper, brass and chromic acid	1990

** Awarded the 1994 MOEE P4 medium-size business achievement award

**** Awarded the 1997 MOE P4 large-size business achievement award

\+ Included as a case study in this Progress Report

APPENDIX 6

MEMORANDUM OF UNDERSTANDING (MOU)
AND
ADDENDUM TO MOU (1995)

CANADA'S GREEN PLAN
LE PLAN VERT DU CANADA

MEMORANDUM OF UNDERSTANDING ON THE METAL FINISHING POLLUTION PREVENTION PROJECT

between

THE ONTARIO MINISTRY OF ENVIRONMENT AND ENERGY AND THE FEDERAL DEPARTMENT OF ENVIRONMENT

and

THE CANADIAN ASSOCIATION OF METAL FINISHERS THE AMERICAN ELECTROPLATERS AND SURFACE FINISHERS SOCIETY, THE AUTOMOTIVE PARTS MANUFACTURERS' ASSOCIATION AND THE METAL FINISHING SUPPLIERS ASSOCIATION

It is understood that the Canadian Association of Metal Finishers (CAMF), the American Electroplaters and Surface Finishers Society (AESF), the Automotive Parts Manufacturers' Association (APMA) and the Metal Finishing Suppliers Association (MFSA), in cooperation with the Ontario Ministry of Environment and Energy and the federal Department of Environment, will voluntarily promote the development and implementation of pollution prevention plans for the member companies of CAMF, AESF, APMA and MFSA in Ontario as part of Ontario's Pollution Prevention Strategy and the Great Lakes Pollution Prevention Initiative under Canada's Green Plan.

It is understood that a Task Force comprised of representatives from the federal and provincial governments and CAMF, AESF, APMA, and MFSA will be in effect for a two-year renewable time period with the purpose, responsibilities, goals, milestones, and accomplishments as outlined in the document entitled "Terms of Reference for the Joint Industry and Canadian and Ontario Governments Metal Finishing Pollution Prevention Task Force". The Task Force will meet on a regular basis and will report periodically to the federal and provincial governments, the members of CAMF, AESF, APMA and MFSA and the public, as provided in the terms of reference.

Jean J. Charest

Jean Charest
Minister, Environment Canada
Ministre de l'Environnement du Canada

Date MAY 3 1 1993

Frank Hayes

Frank Hayes
President, American Electroplaters and Surface Finishers Society
Président, Société américaine de l'industrie de la galvanoplastie et du traitement des métaux de surface

Date July 22, 1993

Bud Wildman

Bud Wildman
Minister, Ontario Ministry of Environment and Energy
Ministre de l'Environnement et de l'Énergie de l'Ontario

Date July 6, 1993

Serge Archambault

Serge Archambault
Chairman, Metal Finishing Suppliers Association
Président, Association des fournisseurs de l'industrie du traitement des métaux de surface

Date July 16, 1993.

Dave Edwards

Dave A. Edwards
President, Canadian Association of Metal Finishers
Président, Association canadienne de l'industrie du traitement des métaux de surface

Date July 21, 1993

Neil De Koker

Neil De Koker
President, Automotive Parts Manufacturers' Association
Président, Association des fabricants de pièces d'automobile du Canada

Date July 21, 1993

PROTOCOLE D'ENTENTE SUR LE PROJET DE PRÉVENTION DE LA POLLUTION CAUSÉE PAR LE TRAITEMENT DES MÉTAUX DE SURFACE

conclu entre

LE MINISTÈRE DE L'ENVIRONNEMENT ET DE L'ÉNERGIE DE L'ONTARIO ET LE MINISTÈRE DE L'ENVIRONNEMENT DU CANADA

et

L'ASSOCIATION CANADIENNE DE L'INDUSTRIE DU TRAITEMENT DES MÉTAUX DE SURFACE, LA SOCIÉTÉ AMÉRICAINE DE L'INDUSTRIE DE LA GALVANOPLASTIE ET DU TRAITEMENT DES MÉTAUX DE SURFACE, L'ASSOCIATION DES FABRICANTS DE PIÈCES D'AUTOMOBILE DU CANADA ET L'ASSOCIATION DES FOURNISSEURS DE L'INDUSTRIE DU TRAITEMENT DES MÉTAUX DE SURFACE

L'Association canadienne de l'industrie du traitement des métaux de surface (ACIM), la Société américaine de l'industrie de la galvanoplastie et du traitement des métaux de surface (SAGM), l'Association des fabricants de pièces d'automobile du Canada (AFPA) et l'Association des fournisseurs de l'industrie du traitement des métaux de surface (AFIM), en collaboration avec le ministère de l'Environnement et de l'Énergie de l'Ontario et le ministère de l'Environnement du Canada, ont convenu de promouvoir de plein gré l'élaboration et la mise en oeuvre de programmes de prévention de la pollution pour les sociétés membres en Ontario de l'ACIM, de la SAGM, de l'AFPA et de l'AFIM, dans le cadre de la Stratégie ontarienne de prévention de la pollution ainsi que de l'Initiative de prévention de la pollution dans les Grands Lacs du Plan vert du Canada.

Un groupe de travail composé de représentants des gouvernements fédéral et provincial, et de l'ACIM, de la SAGM, de l'AFPA et de l'AFIM sera mandaté pour une période de deux ans renouvelable. Son but, ses responsabilités, ses objectifs, ses activités et ses réalisations sont présentés dans le document intitulé «Mandat du Groupe de travail, formé de représentants de l'industrie ainsi que des gouvernements fédéral et provincial, sur la prévention de la pollution causée par le traitement des métaux de surface». Conformément à son mandat, le Groupe de travail se réunira régulièrement et fera rapport périodiquement aux gouvernements fédéral et provincial, aux membres de l'ACIM, de la SAGM, de l'AFPA et de l'AFIM, ainsi qu'au public.

Environment Canada | Environnement Canada | APMA | CAMF | Ontario

METAL FINISHING POLLUTION PREVENTION PROJECT

CANADA'S GREEN PLAN
LE PLAN VERT DU CANADA

TERMS OF REFERENCE FOR THE JOINT INDUSTRY AND CANADIAN AND ONTARIO GOVERNMENTS TASK FORCE

The Metal Finishing Pollution Prevention Project is a cooperative effort by governments and industry to promote the development and implementation of pollution prevention programs in the metal finishing industry. Participation in this project is being undertaken by the Canadian Association of Metal Finishers (CAMF), the Ontario Branches of the American Electroplaters and Surface Finishers Society (AESF), the Automotive Parts Manufacturers' Association (APMA), the Canadian Chapter of the Metal Finishing Suppliers Association (MFSA) and Federal and Ontario Governments.

The participating association members acknowledge the importance of protecting and preventing further degradation of the Great Lakes Basin ecosystem resulting from the discharge of toxic substances. The project is voluntary in nature, is consistent with existing regulatory initiatives and is intended to be supportive of participating member company management plans, and federal and provincial strategies, for long term competitiveness in an overall North American economic environment.

This agreement in no way diminishes or varies a participant's responsibilities under federal, provincial or municipal laws, either existing or coming into effect after this agreement is entered into.

An explanation of the terminology used within these terms of reference is provided in Appendix A, for the purpose of clarification only.

PURPOSE/GOAL:

The purpose of the Metal Finishing Pollution Prevention Project (the Metal Finishing Project) is to actively contribute towards multi-media pollution prevention consistent with the Canada/United States programs and the Ontario Ministry of the Environment's Pollution Prevention Strategy. The goal of the Metal Finishing Project is to develop a methodology and supporting tools for formulating pollution prevention plans for the reduction of toxic substances used, generated or released in the metal finishing industry, and to promote the development and implementation of site-specific pollution prevention plans by the members and member companies of CAMF, AESF, APMA and MFSA.

The Project will be co-ordinated by a Task Force whose responsibilities will include developing and promoting a strategy with the supporting tools for:

- identifying;
- planning;

- implementing;
- monitoring;
- reporting; and
- verification;

of toxic substance use reduction/pollution prevention plans which may be developed and implemented by members and member companies of the CAMF, AESF, APMA and MFSA.

The success of this voluntary pollution prevention project will depend upon the cooperation, trust and open communication between the Task Force members. This project is a voluntary effort by the industry and is not intended to supplant any existing or future regulatory measures.

MEMBERSHIP:

The Metal Finishing Pollution Prevention Task Force will be comprised of representatives from the federal Department of Environment, the Ontario Ministry of Environment and Energy, the Canadian Association of Metal Finishers (CAMF), the Ontario Branches of the American Electroplaters and Surface Finishers Society (AESF), the Automotive Parts Manufacturers' (APMA) and the Canadian Chapter of the Metal Finishing Suppliers Association (MFSA).

The initial members on the Task Force will be:

The Federal Department of Environment
A/Chief, Great Lakes Pollution Prevention - Ray Rivers
A/Head Water Pollution Control, Pollution Abatement Division, Ontario Region - Pauline Macura Brown

The Ontario Ministry of Environment and Energy
Supervisor Sewer Use, Water Resources Branch - Brian LeClair
Specialist, Sewer Use Issues, Water Resources Branch - Steve Neville

Canadian Association of Metal Finishers (CAMF)
Executive Director - Jack Dupuis
Secretary / Treasurer - Brian Calver

The American Electroplaters and Surface Finishers Society (AESF)
Treasurer - Walter Wikaruk
Secretary - Peter Zoras

The Metal Finishing Suppliers Association (MFSA)
Co-chair, Environmental Committee - Michael Dejak
Co-chair, Environmental Committee - Ted Halahel

The Automotive Parts Manufacturers' Association (APMA)
Environmental Engineer - Mark Cotter

The Task Force may from time to time invite other interested parties to participate as observers or presenters in the meetings.

RESPONSIBILITIES/GOALS:

The Task Force has the following responsibilities:

A. To prepare and oversee the execution of the Memorandum of Understanding concerning the Metal Finishing Project between CAMF, AESF, APMA, MFSA and the federal and provincial governments.

B. To oversee the development and promotion of a strategy with supporting tools (guidance manuals etc) for developing and implementing site-specific toxic substance use reduction/pollution prevention plans involving a multi-media approach (air, water, and land) for the metal finishing sector. These pollution prevention plans would include measures such as process change/optimization, substitution of substances (using lower risk alternatives), introduction of new technologies, improving operating procedures (best management practices), controls at final release point, education of consumers, waste minimization, energy conservation and others as are deemed appropriate.

C. To promote the development and implementation of toxic substance use, generation and release reduction plans by the facilities in the sector.

D. To develop and review the communications strategy for reporting on the effectiveness and progress of the Metal Finishing Project to other members of the metal finishing sector, other industrial sectors, and the public. The Task Force will work cooperatively on public announcements and press releases as deemed appropriate under an overall consolidated communications plan.

E. To review materials to be prepared by consultants and industry association representatives for the Metal Finishing Project.

F. To provide detailed periodic reports in support of the communications strategy to senior industry and government management on the reduction of toxic substance use, generation or release which may result from the implementation of the pollution prevention initiative.

G. To monitor the implementation and progress of any multi-media toxic substance use reduction/pollution prevention plans voluntarily developed by members and member companies for the Metal Finishing Project as determined by plant-established targets and timetables.

The detailed items to be included as part of the development of the strategy and supporting tools as outlined in (B) are as follows:-

1. To categorize and identify the metal finishing industry and any sub-sectors of the metal finishing industry.

2. To develop a glossary of terms in order to provide the participants with an understanding of the concepts related to the terms. The glossary will be reviewed on a regular basis.

3. To establish a list of toxic substances (including persistent toxic substances) and criteria to be used by companies to prioritize the substances for reduction and elimination.

4. To develop a comprehensive pollution prevention assessment tool which consists of a comprehensive review of all manufacturing and production processes in a facility including a determination and analysis of current toxic substance use, generation, and release information (including the production units, product(s) and process(es), rate of production and the effects of any anticipated activities that could change the rate of material used).

5. To evaluate the assessment tool at five (5) association member companies facilities.

6. To develop a strategy for the identification, evaluation and prioritization of pollution prevention opportunities and technology alternatives for the metal finishing sector.

7. To develop a toxic substance use, generation and release reduction/pollution prevention planning strategy for the metal finishing sector.

8. To develop pollution prevention plans for five (5) association member company facilities and to promote the implementation of the pollution prevention opportunities identified.

9. To determine the reporting frequency and the content of the internal progress reports summarising progress in implementing the pollution prevention plan.

10. To determine the reporting frequency and the content of external progress reports summarising progress in implementing pollution prevention plans, and determine to whom the reports should be submitted.

11. To develop a protocol for dealing with proprietary (confidential) information.

12. To identify and recommend solutions to regulatory barriers to pollution prevention.

13. To identify sector-wide (or sub-sector-wide) priority pollution prevention opportunities that need technology development programs or demonstration.

14. To organize technical conferences and workshops for the metal finishing industry, customers, supplier community, and related industries.

15. To develop curricula and training programs for employees on toxic substance use, generation and release reduction plans.

The industry associations will provide the following:

a. Information recounting historical success stories regarding efforts to reduce use and generation through process change, technology, or product substitution.

b. Participation in technology transfer to promote pollution prevention techniques internally, and between participating companies and related suppliers. The appropriate confidentiality will be afforded to technology which is proprietary in nature.

c. Advancement of pollution prevention programs within their respective organizations, with suppliers, and with related trade associations. The advancement efforts may include technical assistance, supplier quality programs, or others as deemed appropriate.

d. Each association may provide advice and offer recommendations to the supplier community as deemed appropriate.

The specific milestones and accomplishments required to meet the goals and responsibilities stated above are presented in Appendix B.

TIMING:

The Task Force will meet on a regular basis to discuss and exchange information on the progress of the metal finishing pollution prevention plans. The Task Force will be in effect for an initial two year period and may continue to operate after September 30, 1994 by mutual consent of all the parties.

APPENDIX A
EXPLANATION OF TERMS

For the purposes of clarifying the terminology used within the foregoing terms of reference, the following terms have the broad meaning described below:

"Pollution Prevention Plans" means multi-media plans for reduction in the use, generation and release of "toxic substances". The term "Pollution Prevention Plans" has the same broad meaning as the terms "Toxic substance use/reduction plans", "Toxic reduction plans"

"Toxic substances" includes persistent toxic substances, non-persistent toxic substances and other environmental contaminants of concern.

"Pollution prevention assessment tool" means a methodology or protocol which is used to collect comprehensive data and information at a facility with respect to the use, generation and release of toxic substances.

Great Lakes Pollution Prevention Initiative

AGREEMENT TO EXTEND THE MEMORANDUM OF UNDERSTANDING ON THE METAL FINISHING INDUSTRY POLLUTION PREVENTION PROJECT

between

THE FEDERAL DEPARTMENT OF ENVIRONMENT
AND THE ONTARIO MINISTRY OF ENVIRONMENT AND ENERGY

and

THE CANADIAN ASSOCIATION OF METAL FINISHERS,
THE AMERICAN ELECTROPLATERS AND SURFACE FINISHERS,
THE CANADIAN CHAPTER OF THE METAL FINISHING SUPPLIERS ASSOCIATION

AND THE PARTICIPATING MEMBER COMPANIES

It is understood that the Memorandum of Understanding covering the period of June, 1993 to June 1995 has been extended to February 28, 1997 by mutual consent of all parties and that the participating member companies of CAMF, AESF and MFSA, in cooperation with the Federal Department of Environment and the Ontario Ministry of Environment and Energy will voluntarily develop and implement pollution prevention plans and that CAMF, AESF and MFSA will continue to promote the development and implementation of pollution prevention plans for their member companies as part of the federal Great Lakes Pollution Prevention Initiative and Ontario's Pollution Prevention Strategy.

It is understood that the Task Force will continue to meet on a regular basis and will report periodically to the federal and provincial governments, the members of CAMF, AESF and MFSA and the public as provided in the Terms of Reference. It is understood that the purpose, responsibilities, goals, milestones and accomplishments remain as outlined in the documents entitled "Metal Finishing Pollution Prevention Project Terms of Reference for the Joint Industry and Canadian and Ontario Governments Task Force" with the additions and modifications outlined in the "MOU Addendum".

SHEILA COPPS
Deputy Prime Minister of Canada and Minister of the Environment
Vice-première ministre du Canada et ministre de l'Environnement

ANDREW MacDONALD
Chairman, Canadian Association of Metal Finishers
Président, Association canadienne de l'industrie du traitement des métaux de surface

KEN LEMKE
National Director, American Electroplaters and Surface Finishers
Directeur national, Société américaine de l'industrie de la galvanoplastie et du traitement des métaux de surface de surface

BRENDA ELLIOTT
Minister, Ontario Ministry of Environment and Energy
Ministre, ministère de l'Environnement et de l'Énergie de l'Ontario

WARREN SMITH
Chairman, Canadian Chapter of the Metal Finishing Suppliers Association
Président, Association des fournisseurs de l'industrie du traitement des métaux

ACCORD VISANT À PROROGER LA DURÉE DU PROTOCOLE D'ENTENTE RELATIF AU PROJET DE PRÉVENTION DE LA POLLUTION DE L'INDUSTRIE DU TRAITEMENT DES MÉTAUX

conclu entre

LE MINISTÈRE FÉDÉRAL DE L'ENVIRONNEMENT,
LE MINISTÈRE DE L'ENVIRONNEMENT ET DE L'ÉNERGIE DE L'ONTARIO

et

L'ASSOCIATION CANADIENNE DE L'INDUSTRIE DU TRAITEMENT DES MÉTAUX DE SURFACE,
LA SOCIÉTÉ AMÉRICAINE DE L'INDUSTRIE DE LA GALVANOPLASTIE ET DU TRAITEMENT DES MÉTAUX DE SURFACE,
ET L'ASSOCIATION DES FOURNISSEURS DE L'INDUSTRIE DU TRAITEMENT DES MÉTAUX DE SURFACE

AINSI QUE LES ENTREPRISES MEMBRES PARTICIPANTES

Il est entendu, par consentement mutuel des parties et des entreprises membres des associations susmentionnées, que le Protocole d'entente couvrant la période de juin 1993 à juin 1995 restera en vigueur jusqu'au 28 février 1997. Les associations susmentionnées s'engagent librement à élaborer et à mettre à exécution des plans de prévention de la pollution avec la collaboration du ministère fédéral de l'Environnement et du ministère de l'Environnement et de l'Énergie de l'Ontario. Elles s'engagent en outre à continuer à motiver leurs entreprises membres à prévenir la pollution dans le cadre de l'Initiative de prévention de la pollution des Grands Lacs et de la Stratégie de prévention de la pollution de l'Ontario.

Il est entendu que le Groupe de travail continuera de se réunir régulièrement et qu'il rendra compte de ses travaux aux gouvernements fédéral et ontarien, ainsi qu'au grand public et aux entreprises membres des associations susmentionnées, tel qu'il est stipulé dans son mandat. Il est également entendu que le but du Protocole d'entente, les responsabilités qui incombent aux parties signataires et les réalisations et étapes déterminantes du projet demeurent tels qu'ils sont stipulés dans le document intitulé *Metal Finishing Pollution Prevention Project Terms of Reference for the Joint Industry and Canadian and Ontario Government Task Force*, avec les ajouts et les modifications figurant dans l'addendum du Protocole d'entente.

Environment Canada Environnement Canada

AESF CAMF mfsa Ontario

APPENDIX B

MILESTONES AND ACCOMPLISHMENTS OF THE TASK FORCE

The commitment by industry associations and the governments to this Project will only be demonstrated by achieving specific milestones and accomplishments as set out by the Task Force.

MILESTONES

1. Develop Task Force Terms of Reference - September 1992.
2. Signing of the Memorandum of Understanding between the governments and industry associations - June 1993.
3. Publish success stories which have reduced the use, generation or release of toxic substances - June 1993 and ongoing.
4. Develop a glossary of terms - November 1992 and ongoing.
5. Develop a list of target substances - December 1992.
6. Develop a draft comprehensive pollution prevention assessment tool which establishes the current state of a facility - December 1992.
7. Evaluate assessment tool at five (5) member company facilities - June 1993.
8. Develop a strategy for the identification, evaluation and prioritization of pollution prevention opportunities and technology alternatives - July 1993.
9. Develop a toxics use, generation and emission reduction planning strategy - September 1993.
10. Develop and promote implementation of toxics reduction plans for 5 member company facilities - October 1993.
11. Monitor progress and produce six month status reports - June 1993 and ongoing.
12. Organize and conduct workshops between the metal finishing sector and other sectors and industries to discuss the success of pollution prevention measures - November 1992, September 1993, and September 1994.
13. Promote technology-transfer among industries - September 1993 & September 1994.
14. Cooperate in the publication of a sector handbook on pollution prevention - September 1994.

MEMORANDUM OF UNDERSTANDING ADDENDUM

The Metal Finishing Industry Pollution Prevention Task Force comprised of representatives from the Federal Department of Environment, the Ontario Ministry of Environment and Energy, the Canadian Association of Metal Finishers (CAMF), the American Electroplaters and Surface Finishers (AESF), the Canadian Chapter of the Metal Finishing Suppliers Association (MFSA), and their participating member companies will continue to operate until February 28, 1997.

The purpose, responsibilities, goals, milestones and accomplishments remain as outlined in the documents entitled "Metal Finishing Pollution Prevention Project Terms of Reference for the Joint Industry and Canadian and Ontario Governments Task Force" with the following modifications. The intent of these modifications is to elaborate on the key activities of the Task Force for this extension period.

1. The Task Force will continue to report on the progress and implementation of pollution prevention plans.

2. The Task Force will enhance the procedures for reporting and verifying progress of facility pollution prevention plans.

3. Through its existing communications plan, the Task Force will continue to report on progress to the public and interested stakeholders. Meetings and site visits with respect to pollution prevention projects with interested parties will provide additional opportunities for discussion and communication.

4. The Task Force will continue to promote pollution prevention activities that reduce and/or eliminate the use, generation and release of the agreed list of targeted substances provided in the May 1993 Progress Report. Substances identified in the following initiatives, present in metal finishing facilities, and not already on the list will be added to the list as part of this agreement:

   - National Pollutant Release Inventory
   - Substances listed in its Appendix 2 of the Canada-Ontario Agreement as at July 6, 1994
   - CCME NOx/VOCs initiatives in cleaning/degreasing, industrial boilers, and surface coating

5. Metal finishing firms who have agreed, with the signature of their senior executive officer, as appropriate, to participate in the Project, and have committed to develop and implement pollution prevention plans to reduce and/or eliminate the use, generation and release of the list of targeted substances, are listed in Appendix A. Such companies gain representation on the Task Force. Other companies will have the opportunity to participate on the Project by signing Appendix A over the term of this agreement.

6. Suppliers of equipment, chemicals or services who have agreed to participate in the Project are listed in Appendix B. Such companies gain representation on the Task Force. Other suppliers or equipment manufacturers will have the opportunity to participate on the Project by signing Appendix B over the term of this agreement.

7. The Task Force will encourage industry members to participate in the Accelerated Reduction and Elimination of Toxics Program (ARET) and the Ontario Pollution Prevention Pledge Program (P4). The Task Force will contribute to the Accelerated Reduction and Elimination of Toxics Program (ARET) and the Ontario Pollution Prevention Pledge Program (P4) by submitting project progress reports so that pollution prevention projects under the MOU can be incorporated into the activities and reports of these programs.

8. The Task Force will enhance and support the clean technology, training and on-site technical assistance activities included in the Project.

9. The Task Force will develop and implement a pollution prevention promotional strategy. The strategy may include such items as a pollution prevention coordinator, newsletters, electronic bulletin board service and contribution and representation to development of programs such as 'regulatory equivalence for voluntary action' and market based incentives. Success of the promotional activity will be monitored on the basis of the number of individual company agreements signed with the Task Force, as outlined in Appendix A, and/or the number of Association members which participate in the P4 and ARET programs.

10. Task Force membership may from time to time change to allow for the departure of existing or participation by new or alternate members.

11. The members of the Task Force will take turns as titular head of the Task Force on a rolling basis to be established by the Task Force.

The members of the task force are as follows and show their agreement and support for the MOU extension by their signatures.

Canadian Association of Metal Finishers

Jack Dupuis,
April 19/95
Date

Brian Calver,
April 19/95
Date

Toronto Branch of the American Electroplaters and Surface Finishers

Walter Wikaruk,
April 19/95
Date

Canadian Chapter of the Metal Finishing Suppliers Association

Michael Dejak,
April 19/95
Date

Federal Department of Environment, Pollution Prevention and Abatement Division

Pauline Brown,
April 19/95
Date

Anita Li,
April 19/95
Date

Ontario Ministry of Environment and Energy, Pollution Prevention Office

Brian LeClair,
May 30/95
Date

Bruce Gillies,
Apr. 19/95
Date

APPENDIX A

AGREEMENT BETWEEN _____ AND THE TASK FORCE

The Metal Finishing Facility agrees to:

- Develop a site specific pollution prevention plan, using the method of identifying pollutants and prioritizing reduction and/or elimination as outlined in the "Metal Finishing Pollution Prevention Guide".
- Implement the site specific pollution prevention plan.
- Prepare and submit project summaries and semi-annual progress reports of the site specific pollution prevention plans to the Task Force.

The Metal Finishing Facility understands that, as a participant in the Task Force, they will be encouraged to:

- Contribute to the Task Force by participating in one or more of the following: reviewing position papers, identifying training needs, identifying clean technology needs planning training seminars or technology workshops, participating in workshops, promoting the project at member association meetings, identifying barriers, providing suggestions regarding means to promote pollution prevention within the sector, revision of the Metal Finishing Pollution Prevention Guide.

The Task Force agrees to:

- Facilitate and support pollution prevention planning at the Facility.
- Facilitate and support the facility in obtaining partial funding for an initial assessment to assist the Facility in identifying their waste sources, and capital equipment required to implement the plan.
- Assist the Facility in gaining access to government programs and funding sources.
- Assist the Facility in addressing barriers to pollution prevention.

_____ _____

Company Task Force

_____ _____

Date Date

APPENDIX B

AGREEMENT BETWEEN _____ AND THE TASK FORCE

The Supplier of Equipment, Chemicals or Services agrees to:

- Participate actively on the clean technology committee in the following activities:
  - Identify pollutants and the processes and practices which generate them, especially persistent toxic substances.
  - Investigate and recommend clean technology alternatives.
  - Show benefits of new technology, alternative processes, waste management techniques and health-safety aspects.
- Educate, promote and support the pollution prevention initiative through our sales and marketing efforts.

The Task Force agrees to:

- Provide the opportunity for Suppliers of Equipment, Chemicals or Services to be part of clean technology needs identification.
- Provide opportunities for basic training in pollution prevention planning.
- Provide opportunities for meeting and discussing pollution prevention needs with the metal finishing industry.

_____	_____
Company	Task Force
_____	_____
Date	Date

APPENDIX 7

SUPPLIERS SIGNATORY TO THE METAL FINISHING PROJECT

&

POLLUTION PREVENTION RESOURCE CENTRE FOR THE METAL FINISHING INDUSTRY

Canadian Centre for Pollution Prevention

Centre canadien pour la prévention de la pollution

Canadian Centre for Pollution Prevention

Information, Training, Advisory and Conference Services

The Canadian Centre for Pollution Prevention (C2P2) provides '*at source*' environmental solutions through the following services:

Information

Operating Canada's foremost P2 resource the C2P2 offers easy access to regional, national and international pollution prevention (P2) information through:

- information search service, hard copy distribution and links to primary pollution prevention centres
- extensive reference library and current publications listing
- Canada's easy-to-use pollution prevention Internet site
- on-line forum, *P2 Dialogue*, dedicated to the sharing of pollution prevention information
- *at the source* newsletter and monthly *What's New in P2* bulletin

Training

Industrial and Institutional Pollution Prevention Workshops

The C2P2 offers one-day workshops for the printing and graphics, auto parts, metal finishing, and health care sectors, based on guidebooks for implementing pollution prevention. Participants learn how to assess their operations for pollution prevention opportunities and use practical examples to demonstrate the environmental and financial advantages from changing operating practices and using emerging technologies.

Environmental Code of Practice Training

This workshop and administration service can train businesses to meet environmental, health and safety operating standards (based on the Environmental Training and Certification Program for Dry Cleaners in Ontario). The successful model combines 'Training Industry Trainers' and administration practices needed for certification or licensing requirements.

Make the C2P2 your pollution prevention resource.

265 North Front St.
Suite 112
Sarnia, Ontario
N7T 7X1
Tel: (519) 337-3423
Fax: (519) 337-3486
c2p2@sarnia.com
http://c2p2.sarnia.com

1-800-667-9790

http://c2p2.sarnia.com ***E-mail: c2p2@sarnia.com***

Municipal Pollution Prevention Planning Workshops

This two-day workshop can be customized to an individual municipality and features the innovative approaches of the Hamilton-Wentworth Comprehensive Municipal Pollution Prevention Project. The workshop will highlight:

- Communication Skills (for implementing a pollution prevention program)
- Departmental Environmental Training (i.e. for sewer users and municipal staff)
- Environmental Management Systems (for small and medium sized enterprises and industrial parks).

Pollution Prevention for Federal and Provincial Facilities

This two-day customized workshop offers managers of federal and provincial facilities the practical methods for establishing departmental pollution prevention strategies, featuring environmental management systems (EMS), 'Greening of Government' and departmental action plans

Advisory

Pollution prevention advisory services provide decision support tools for improving environmental performance and maximizing financial benefits. These are offered in cooperation with organizations with specialized skills and knowledge for the metal finishing, printing and graphics, dry cleaning, and other industrial sectors.

Conferences

The C2P2 organizes and facilitates pollution prevention conferences to increase pollution prevention awareness and promote information exchange between participants involved in pollution prevention activities. In cooperation with Partners for Prevention the C2P2 hosts an annual pollution prevention roundtable.

The operation of Canada's foremost pollution prevention resource is possible through the generous support of our sponsors.

Environment Canada
National Office of Pollution Prevention, Ontario Region, Atlantic Region

WATER TECHNOLOGY INTERNATIONAL CORPORATION

Water Technology International Corporation (WTI) is an employee-owned company which provides technology and services to solve environmental problems. The company currently generates most of its revenues through the provision of specialized technical services to private sector and institutional clients. Over the past year, WTI has positioned itself to earn a greater percentage of its revenues from technology commercialization activities. The company also has a number of international joint ventures and strategic alliances through which services and technologies are provided.

The North American services component of WTI involves operations in Burlington, Ontario; Vancouver and Victoria, British Columbia; Lockport, New York and Monterrey, Mexico. The services provided by WTI and its subsidiaries include:

- audits and assessments
- waste characterization and treatability studies
- technology evaluation and selection
- design services
- laboratory analysis
- environmental management systems and training
- facility operations.

Services offered to private sector clients are provided at competitive rates to meet objectives and project parameters defined by these clients. In most cases, these private sector clients are seeking advice to solve operational problems. In other situations, WTI is engaged to help companies further develop and enhance their environmental products.

Services offered to institutional clients typically involve decision support to assist agencies in fulfilling their mandates. While the method of delivery may vary from client to client, the approach is built on proven integrity and technical know-how accumulated over many years of experience. A significant percentage of WTI revenues are presently derived from institutional clients. Most of this institutional revenue is earned through a multi-year contract secured by WTI in 1996 to operate Environment Canada's Wastewater Technology Centre and Canadian Clean Technology Centre in Burlington, Ontario.

The technology commercialization interests of WTI are centred on a wholly-owned subsidiary of WTI, ECO-TEAM Technologies Inc. ECO-TEAM was established by WTI to provide an effective marketing and sales vehicle for WTI-developed technologies. Presently, ECO-TEAM is selling proprietary technologies into the food and beverage, marine transportation and sludge dewatering markets. WTI also has a number of equity-based joint ventures and licensing arrangements in other key markets. It is expected that the technology commercialization business of the company will grow significantly.

Water Technology International Corporation

Expertise in Metal Finishing

Industrial Waste Audit Program (IWAP)

This unique computerized time saving tool provides:

⇒ Collection and organization of environmental data
⇒ Accurate waste accouting
⇒ Identification of waste minimization opportunities
⇒ Cost evaluation for waste materials
⇒ Assessment of environmental management

The IWAP addresses:

- Best Management Practices (BMPs)
- Environmental Policy
- Material Management
- Health and Safety
- Hazardous Wastes
- Solid, Water and Gaseous Wastes
- Pollution Prevention Opportunities

Pollution Prevention Training in Metal Finishing

A "Hands ON" interactive workshop is the answer to the training needs of the industry.

Pollution Prevention planning introduces a philosophy of total company involvement in better management of resources in the manufacturing processes that results in reduced losses of contaminants from metal finishing processes and provides the company with ***improved profits, enhanced product quality and more satisfied customers***. The course includes a 150 page reference textbook with numerous illustrations in each chapter, over 15 example templates for effective pollution prevention planning, and over 100 additional 100 pages of supplemental information in over 12 appendices.

Technology Development

WTI staff have conducted R&D work in almost all areas of pollution charcterization and prevention in the Metal Fabrication and Finishing Sector. Some highlights are:

⇒ Ontario Industry Survey
⇒ Mexican Industry Assessment
⇒ Zinc Recovery with Ion Exchange
⇒ Electrochemical Cadmium Recovery
⇒ Metalworking Fluids Recovery
⇒ Membrane Process Use in the Industry
⇒ Cleaning Bath Maintenance and Reuse
⇒ Chromium Palting Bath Maintenance
⇒ Acid Recovery from Pickling Operations
⇒ Steel Industry Waste Characterization

"An established environmental products and services company providing cost-effective solutions and management."

CANADIAN FINISHING SYSTEMS LTD.

3455 Harvester Road, Unit 22
Burlington, Ont. L7N 3P2
Phone: (905) 634-5168
Fax: (905) 634-5699

Canadian Finishing Systems Ltd

Who are we?? .... Our name says it all!

We are an **all-Canadian** metal finishing supply company, with a complete range of finishing equipment, chemicals and service, from Anode bags to Zinc Plating processes.

Canadian Finishing Systems provides customer-proven technologies, backed by our up-to-date Development Laboratories and Technical Service personnel.

Our reputation is based on reliable, quality processes as well as our exceptional technical background and expertise.

We are continually introducing new products which help metal finishers to comply with environmental, safety and pollution prevention concerns, for example:

* Non chelated, and phosphate free cleaners.
* Non emulsifying cleaners for extended cleaner life.
* Canning non cyanide alkaline zinc processes.
* Canning cyanide free Bondal
* Water soluble chloride zinc brighteners which eliminate a number of plating problems.
* Zinc alloy processes.
* Full range of water treatment products.

Your questions and inquiries are welcomed and encouraged since we believe our information, support and service leads to informed, knowledgeable, satisfied and successful customers. In addition, your questions serve to guide our Development programme.

Talk to us! We listen - and help!

E-mail address: cfs@worldchat.com
Web Site: http://www.finishing.com/cfs

Metal Finishing Suppliers' Association

MFSA Introduction

What It Is and What It Does

MFSA is an international organization of the major suppliers of processes, supplies, and equipment for electroplating and other metal finishing.

As a professional group, MFSA seeks to foster the best modern practices among its constituent companies with optimum use of new technology and marketing developments - both for the individual growth of member firms and for the broad advancement of the metal finishing industry.

The Association offers its members a growing and continuously updated library of information as new industry aids are suggested and adopted by the trustees - a group carefully chosen to represent all sections of the industry.

Mission Statement

The Metal Finishing Suppliers' Association represents the commercial, legislative and regulatory interests of suppliers to all facets of the metal finishing industry.

Members develop, manufacture, market and distribute equipment, chemicals and services to finishers, supplying products that are vital to all sectors of society world-wide.

MFSA fosters inter-society cooperation, and camaraderie among its members.

MFSA members are committed to total quality: in their products and services; in the safety of their own and customers' work forces; and in the protection of the public and the environment.

History

The Metal Finishing Suppliers' Association has a long and proud history of service to the metal finishing industry dating back to 1924 when a group of suppliers, called the "International Fellowship Club", began meeting informally for social and business purposes.

From this humble beginning 72 years ago, MFSA has grown into a North American trade association with over 170 member companies. Our members are in all aspects of the metal finishing industry and include manufacturers and distributors of metals, chemicals, and equipment for electroplating and other metal surface treatment and enhancement; for the minimization, removal, clean up, and disposal of spent chemicals and other industrial waste; and for pollution control and abatement. Additionally, consultants and other service companies to the metal finishing industry have also joined the Association.

Our members range from large, multi-national companies to those with just a few employees. They are located throughout the United States and Canada and offer a broad spectrum of goods and services for the metal finishing industry.

MFSA is headquartered in the Chicago area and is run on a day to day basis by an experienced Executive Director who previously spent over 40 years in the metal finishing industry. A group of 20 senior level executives from all segments of the industry comprise the Officers and Trustees who manage the affairs and activities of the Association.

POLLUTION PREVENTION

RESOURCE CENTRE

for the

Metal Finishing Industry

This joint initiative offers easy access to technical and information resources for the metal finishing industry. Linkages with international information resources provide a comprehensive range of expertise to companies seeking pollution prevention solutions.

LOCATION

Canadian Clean Technology Centre
of the
Water Technology International Corporation.

867 Lakeshore Road
Burlington, Ontario
L7R 4L7

PARTNERS

Water Technology International, operator of the Canadian Clean Technology Centre and the Wastewater Technology Centre (WTC), offers the development of cost-effective technologies and processes for reducing waste and optimizing resource use.

The **Canadian Centre for Pollution Prevention** is Canada's foremost pollution prevention resource providing access to information and research services across Canada and internationally.

The **Metal Finishing Pollution Prevention Project** is a joint government and industry initiative to reduce or eliminate the use, generation or release of a targeted list of substances, including persistent toxic substances through the development and implementation of pollution prevention plans.

RESOURCE CENTRE

for the

Metal Finishing Industry

POLLUTION PREVENTION SERVICES

- **Information Research**
- **Information Clearing**
- **Industry Expertise**

1-800-667-9790

SERVICES

INFORMATION RESEARCH

Expertise for information retrieval, interpretation and technical assistance services based on:

- Electronic and document searching from more than 100 technical assistance providers.
- Network of linkages with key North American information and technology centres.
- Internet access to key sites serving the metal finishing industry.

INFORMATION CLEARING

A library of reference materials for the metal finishing industry:

- Pollution prevention / clean technology publications and reports.
- North American case studies and success stories.
- Databases on vendors and technologies for the metal finishing industry.
- Videotapes.

INDUSTRY EXPERTISE

Established links to industry experts include:

- Customized on-site industrial waste assessments.
- Technical interpretation by industrial and technological experts in Ontario and across Canada.
- Training workshops based on Metal Finishing Pollution Prevention Guidebook.
- Facilities for cost effective technology evaluation, development and demonstration.

BENEFITS

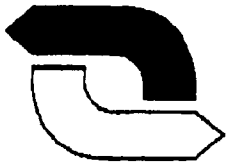
- practical pollution prevention tools
- new competitive technologies
- save time in your information search
- get answers from the experts

1-800-667-9790
E-mail: c2p2@sarnia.com

FEATURES

- research
- publications
- assessments and training
- technology demonstrations

Ontario Waste Exchange



2395 Speakman Drive
Mississauga, Ontario L5K 1B3
(905) 822-4111 Fax (905) 822-7630

The Ontario Waste Exchange (OWE) is a technical assistance programme designed to help Ontario's industrial, commercial and institutional waste generators find practical alternatives to waste disposal and potentially minimize the costs associated with waste management. This programme is co-sponsored by the Environment and Plastics Industry Council (EPIC), ORTECH Corporation, other associations and frequent OWE users.

We may be able to help your company by providing:

1. Technical assistance on waste related problems to **ELIMINATE, SUBSTITUTE, REDUCE, REUSE** and **RECYCLE** your waste

2. Waste Exchange contacts for potential reuse or raw material substitute opportunities

3. Recycling industry contacts

The OWE can disseminate any of this information quickly to you from our databases.

Also at your service is the Canadian Waste Materials Exchange (CWME) programme which publishes a bi-monthly bulletin listing waste AVAILABLE and wastes WANTED. Your company could list any waste stream in the CWME bulletin at no cost. If you would like to subscribe, please complete the invoice card on the back of the bulletin and return it to us, along with the 1997 subscription fee of **$70.00 including GST.** You will be added to the CWME mailing list for one year.

The Waste Exchange programmes are committed to helping industries minimize their wastes and to find uses and users for the wastes that are produced. We hope that we can be of assistance to your company.

Please feel free to call the OWE at any time, at (905) 822-4111 plus extension, or fax us at (905) 822-7630.

Stephen Mocniak (Ext. 354)

Mary Jane Hanley (Ext. 358)

ORTECH
ISO 9002 Registered

EPIC
ENVIRONMENT AND PLASTICS INSTITUTE OF CANADA

Canadian Association of Metal Finishers

Founded in 1986, The Canadian Association of Metal Finishers (CAMF) is a voluntary group whose members are metal finishers, suppliers, and interested government parties. CAMF fosters co-operation among its members regardless of size or location, to make industry effective in dealing with current issues that are, or might affect members operations.

CAMF is well recognized at all levels of government and is now consulted upon when legislative changes or additions are being considered. Some current issues are the Ontario Smog Plan (an initiative of the Ontario government to set standards for NO_x/VOC emissions), Strategic Options Process (which would have put stricter limits on handling nickel salts, chromium, and cadmium), and the Metal Finishing Pollution Prevention Project (MFPPP).

American Electroplaters and Surface Finishers Society

The American Electroplaters and Surface Finishers Society, Inc. (AESF) is an international, individual-membership, non-profit professional society, dedicated to *your* advancement in the profession of surface finishing.

AESF fosters this advancement through comprehensive educational programs that benefit everyone involved in this widely diversified industry, along with broad research efforts that seek new processes or ways to improve on existing technology.

Founded in 1909, AESF now has 85 Branches and more than 7,000 members, wolrdwide. The Society is regarded and respected as the foremost organization of its kind, throughout the world.

Mission

The primary mission of AESF is to advance the science of surface finishing, to benefit industry and society through education, information and involvement; and to help you, personally, advance in your surface finishing career.

This mission has the strong support and representation of the industry in both government and private sectors. Membership is open to all surface finishing professionals; and to those who provide services, supplies, equipment and support to the industry.