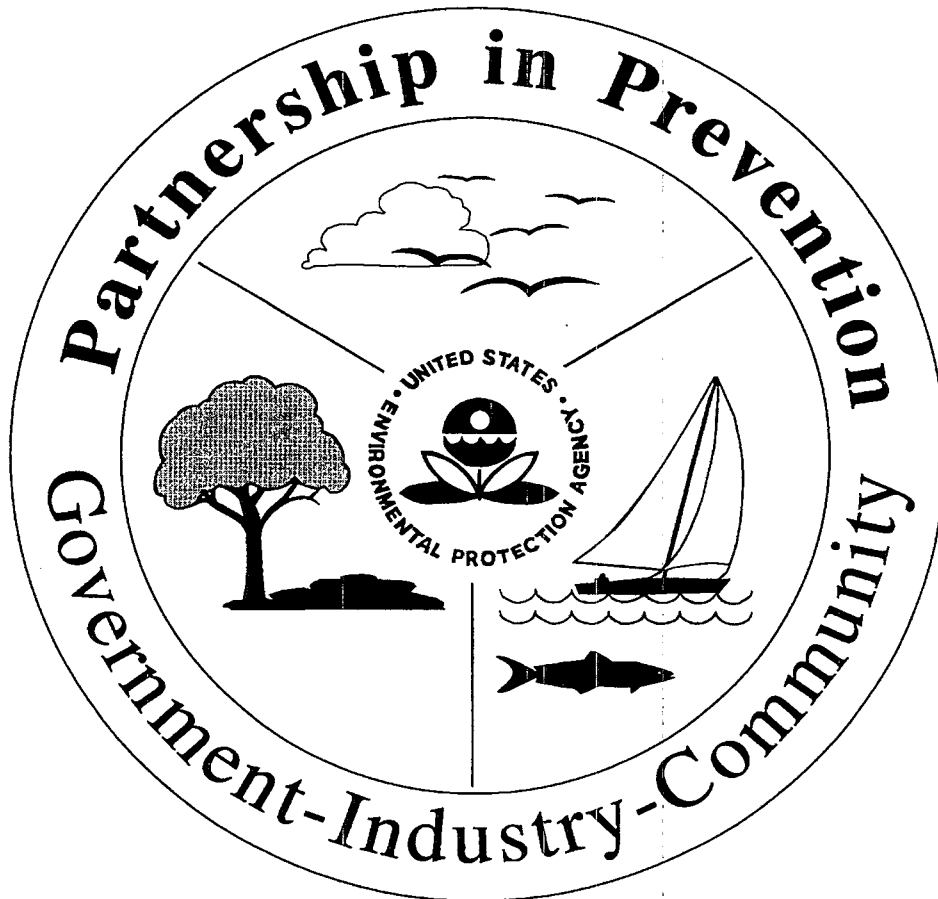




EPA's 33/50 Program Company Profile Reduction Highlights

Volume II



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REDUCTION HIGHLIGHTS, VOLUME II

This document summarizes information presented in the second set of 33/50 Program Company Profiles, which continues a series of reports being developed by EPA to highlight the accomplishments of companies participating in the 33/50 Program. The 33/50 Program is an EPA voluntary pollution reduction initiative that promotes reductions in direct environmental releases and offsite transfers of priority toxic chemicals. The program derives its name from its overall goals — an interim goal of a 33% reduction by 1992 and an ultimate goal of a 50% reduction by 1995. The program uses 1988 Toxics Release Inventory (TRI) reporting as a baseline. In February, 1991, EPA began contacting the parent companies of TRI facilities that reported using 33/50 Program chemicals since 1988 to request their participation in the 33/50 Program. As of November, 1995, nearly 1,300 companies had elected to participate in the Program, pledging to reduce emissions of the 17 target chemicals by more than 380 million pounds by 1995. Companies set their own reduction targets, which may vary from the Program's national 33% and 50% reduction goals.

17 PRIORITY CHEMICALS TARGETED
BY THE 33/50 PROGRAM

BENZENE
CADMIUM & COMPOUNDS
CARBON TETRACHLORIDE
CHLOROFORM
CHROMIUM & COMPOUNDS
CYANIDES
DICHLOROMETHANE*
LEAD & COMPOUNDS
MERCURY & COMPOUNDS
METHYL ETHYL KETONE
METHYL ISOBUTYL KETONE
NICKEL & COMPOUNDS
TETRACHLOROETHYLENE
TOLUENE
1,1,1-TRICHLOROETHANE
TRICHLOROETHYLENE
XYLENES

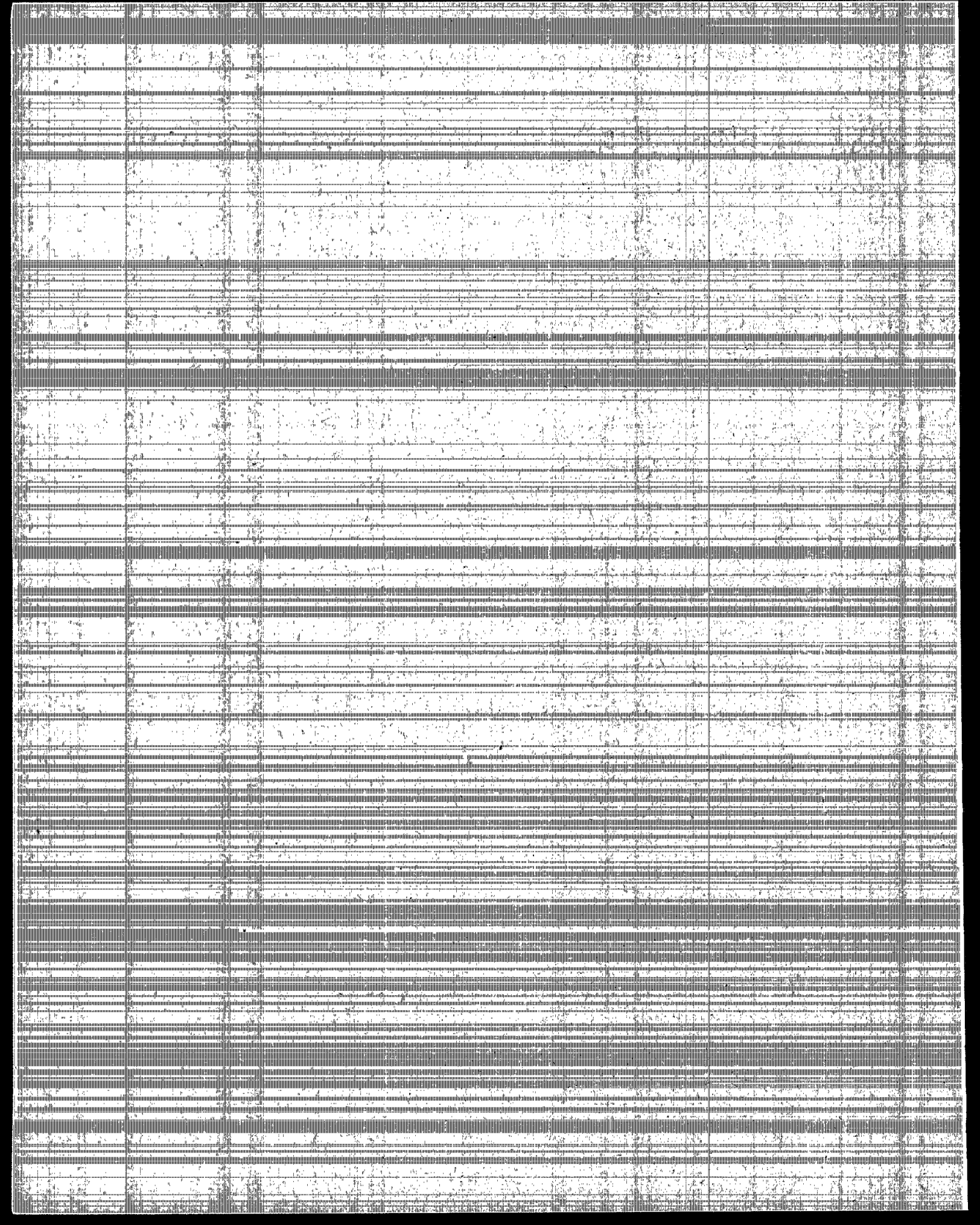
* Also referred to as methylene chloride

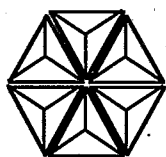
Industry exceeded the 33/50 Program's interim 33% reduction goal by more than 100 million pounds in 1992. National emissions of Program chemicals were reduced by an additional 100 million pounds in 1993, bringing total reductions since 1988 to more than 685 million pounds (46%). Facilities' TRI projections suggest that the Program's ultimate 50% reduction goal will be observed to have been achieved or exceeded in the 1994 TRI data, a full year ahead of schedule. The 1,300 companies enrolled in the 33/50 Program have accounted for most of the Program's pollution reductions. Representing just 15% of eligible companies and owning only a third of the facilities reporting Program chemicals to TRI, participants are responsible for 78% of the reductions since 1988 and 98% of the 100 million pounds reduced in 1993.

EPA is committed to recognizing companies for their participation in the 33/50 Program and for the emissions reductions they achieve. The Program issues periodic Progress Reports, in which participating companies are listed and highlighted. In addition, Company Profiles are being prepared to provide more detailed information about how companies have achieved their emissions reductions. Information presented in these profiles is drawn from a number of sources, including the company's written communications to the 33/50 Program, extensive interviews with company representatives, the annual TRI reports submitted by the company's facilities (including Pollution Prevention Act data reported to TRI in Section 8 of Form R), and, in many cases, site visits to one or more of the company's facilities. Mention of trade names, products, or services in this document does not convey, and should not be interpreted to convey, official EPA approval, endorsement, or recommendation.

Copies of the complete Profiles for each company highlighted in this document, as well as previously released Company Profiles (summarized in the first volume of this Reductions Highlights document), may be obtained by contacting the Program as specified in the box below. In addition, all written company communications to EPA regarding the 33/50 Program are available to the public upon request.

For information on the 33/50 Program, contact the TSCA Hotline at (202) 554-1404 or contact 33/50 Program staff directly by phone at (202) 260-6907 or by mail at Mail Code 7408, Office of Pollution Prevention and Toxics, U.S. EPA, 401 M Street, SW, Washington, D.C. 20460.





Bristol-Myers Squibb Company

Bristol-Myers Squibb is a manufacturer of a wide variety of well known pharmaceuticals and personal products, including Bufferin™ and Excedrin™ pain relievers, Comtrex™ cold medication, and Keri™ skin care lotion as well as medical devices and nutritional supplements. Headquartered in New York, New York, the Company operates 62 facilities in 35 countries. The Company structures its business groups along its four major product lines (pharmaceuticals, consumer and personal products, medical devices, and nutritionals), all of which report 33/50 Program chemical releases and transfers. Bristol-Myers Squibb has reduced its total releases and transfers of 33/50 Program chemicals by 54 percent from 1988 to 1993. The Company undertook the following major reduction activities:

- *Developed a proprietary process in the production of 6-aminopenicillanic acid (6-APA) and 7-aminocephalosporanic acid (7-APA) by which methyl isobutyl ketone, methanol, and dichloromethane solvent emissions were reduced. This process involves the use of a closed-loop patented process (the Titus system) to filter, dry, and bulk package 6-APA and 7-APA. This process requires less solvent because it is enclosed, and the inert nitrogen atmosphere inside the equipment minimizes solvent evaporation. The Titus system has reduced annual releases and transfers of dichloromethane by approximately 70,000 pounds, methyl isobutyl ketone by approximately 50,000 pounds, and methanol by approximately 100,000 pounds compared to 1988 levels. Although the Titus system required a significant capital investment of \$8 million, the company estimates an annual cost savings of about \$700,000.*

Cost Savings Summary

Project	Investment	Annual Savings
Titus System	\$8 million	\$700,000
Belt Filters	\$2 million	\$800,000

- *Improved the manufacturing process of penicillin to improve process efficiency and achieves a 20 percent reduction in solvent emissions. This process uses a belt filter operating in a continuous loop under negative pressure in an inert nitrogen atmosphere. The Company estimated that the belt filter project reduced releases and transfers of methyl isobutyl ketone by approximately 500,000 pounds and other TRI chemical solvents by approximately 350,000 pounds compared to 1988 levels. The Company invested \$2 million in this project, which saves approximately \$800,000 per year.*



CHRYSLER CORPORATION

Chrysler Corporation is a manufacturer of passenger cars, minivans, sport-utility vehicles, and light-duty trucks. Headquartered in Highland Park, Michigan, the Company operates approximately 50 facilities across North America, and employs about 112,000 people worldwide. Chrysler initially pledged reductions in releases and transfers of 33/50 Program chemicals of 60 percent by 1995 from 1988 levels, but later increased its commitment to an 80 percent reduction. Between 1988 and 1993, the Company reduced its total releases and transfers of 33/50 Program chemicals by 74 percent. Chrysler also achieved reductions of 49 percent in releases and transfers of non-TRI chemicals during the same time period. The Company undertook the following major reduction activities:

- *Implemented a two-step source reduction project to reformulate the base- and clear coat compositions at seven facilities worldwide. This project resulted in reductions of 33/50 Program chemicals by 65 percent in the basecoat and 20 percent in the clearcoat between 1988 and 1993. Much of the success of this project can be attributed to a focused team effort of internal and external collaborators: paint suppliers, equipment vendors, and Chrysler's Paint & Anti-Corrosion Group.*
- *Launched a program to reduce the use of basecoat paint and solvents used per vehicle by focusing on spray process parameters and manufacturing operations. Chrysler engineers optimized atomizing air flow, fluid delivery rate, and application distance. In its manufacturing operations, Chrysler instituted block painting to maximize the number of vehicles*

33/50 Program

Painted with the same color at the same time, thus minimizing the number of color changes. This project resulted in an annual reduction in releases and transfers of 33/50 Program chemicals of 500,000 pounds along with an annual savings of \$3 million per year, per plant, without any capital investment from the Company.

- Invested \$4 million in turbobell-type equipment for electrostatic spray applications of car interior and exterior paint coating. This capital investment resulted in a reduction in basecoat paint use of 50 percent on a production-normalized basis, and a reduction of 33/50 Program releases and transfers of approximately 300,000 pounds between 1988 and 1993. The payback period for this project was only 6 months.
- Achieved additional reductions of several TRI chemical releases and transfers through the following projects: reduced lead concentration by reformulating the electrodeposition primary coating solutions; eliminated lead from topcoat paints and other paint applications; substituted less hazardous trivalent chromium solutions for hexavalent chromium solutions in the rinse step of the phosphate pretreatment process; substituted a chromium and lead-free corrosion resistant coating solution used in radiator manufacturing operations; eliminated the use of toluene-based adhesive by switching to a mechanical fastener; and substituted non-chlorinated water based solutions for chlorinated solvent based solutions in the degreasing and cleaning manufacturing operations.

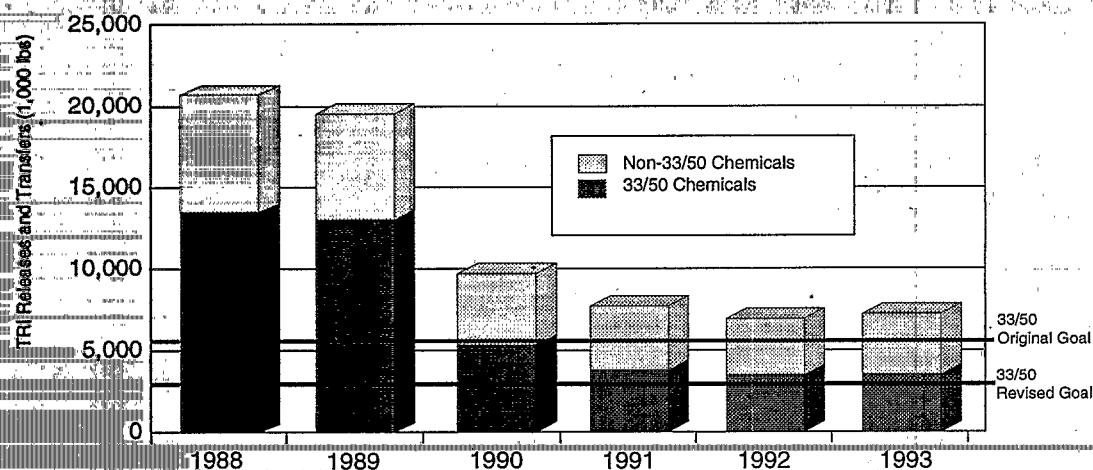
- Adopted the Life Cycle Management (LCM) approach for its Environmental and Pollution Prevention strategy to help track material from extraction to final product disposal.



Eastman Kodak, headquartered in Rochester, New York, is the world's largest manufacturer of photographic products and supplies. Eastman Kodak has 13 facilities in the United States that report the use of most chemicals in the 33/50 Program. The Company's products include imaging equipment and supplies (37 percent of sales), health and pharmaceuticals (25 percent), information systems (20 percent), and synthetic textile fibers, plastics, and chemicals (18 percent). The Company has reduced releases and transfers of 33/50 Program chemicals by 54 percent (8 million pounds) between 1988 and 1992. In addition to its 33/50 Program goals, Eastman Kodak developed the following explicit schedules for reduction in the use of ozone depleting substances: elimination of 1,1,1-trichloroethane by 1995, and 50 percent reduction in CFCs by 1993. The Company undertook the following major reduction activities:

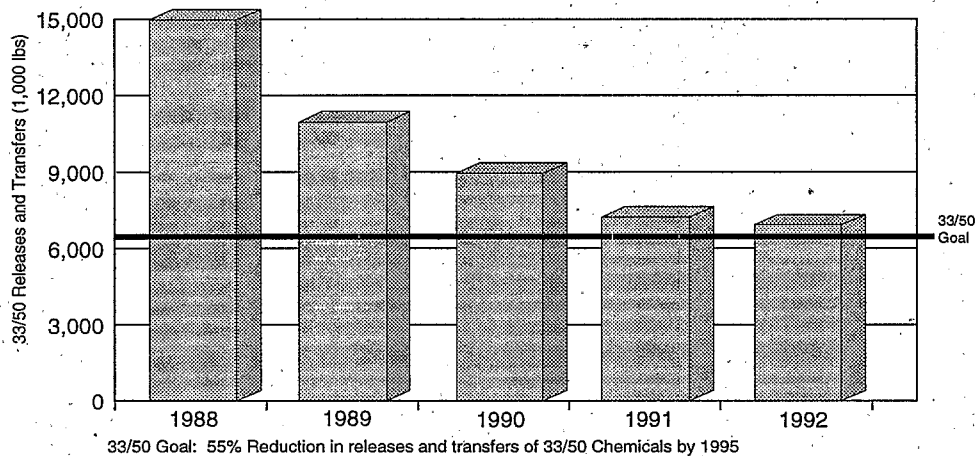
- Instituted a program to reduce air emissions of dichloromethane in the manufacturing process of triacetate-based films for modern cameras. Kodak increased the recovery of dichloromethane through two equipment and process modifications: (1) installation of a closed loop recovery system to

Chrysler's Progress Towards Meeting 33/50 Goals



Original Goal: 60% Reduction in releases and transfers of 33/50 Chemicals
Revised Goal: 80% Reduction in releases and transfers of 33/50 Chemicals

Kodak's Progress Towards Meeting 33/50 Goals



capture and reclaim solvent vapors for reuse, and (2) implementation of an aggressive monitoring and preventive maintenance program. These modifications resulted in a steady decline in releases and transfers of dichloromethane from 9.0 million pounds in 1988 to 4.4 million pounds in 1992, a decrease of more than 50 percent.

- Employed similar solvent recovery techniques at several facilities to reduce releases and transfers of methyl isobutyl ketone (MIBK) by over 1.5 million pounds between 1988 and 1993.

EAT•N

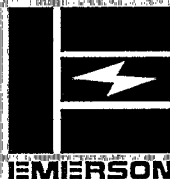
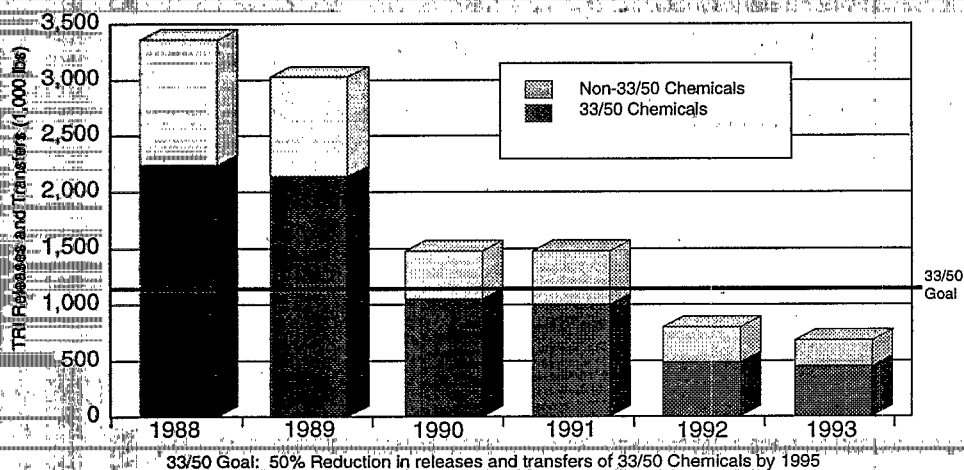
Eaton Corporation is a manufacturer of engineered products for the automotive, industrial, commercial, and military industries. Eaton is headquartered in Cleveland, Ohio and has approximately 80 manufacturing facilities across the United States, Canada, and Mexico. Of these facilities, 41 report 33/50 Program chemical releases and transfers. In addition, Eaton has four manufacturing technology centers that are involved in technical research and management consulting. The Company's total releases and transfers of 33/50 Program chemicals have been reduced by 80 percent between 1988 and 1993. The Company undertook the following major reduction activities:

- Reduced off-site transfers of metal-containing waste ("grinding swarf") generated from the grinding of intake and exhaust valves. This was accomplished by compacting the swarf into briquettes and selling them to a local smelter. The

smelter processes the swarf into low grade stainless steel "pigs" that are sold to premium stainless steel smelters for use as a raw material. This innovation has resulted in elimination of land-filling grinding swarf and a reduction in releases and transfers of approximately 450 pounds of nickel and 150 pounds of chromium per day from participating facilities. The Company's cost for managing the grinding swarf has increased by \$150,000 per year as a result of the briquetting of grinding swarf and shipment to a smelter. The Company is willing to incur these increased costs because it believes landfill costs will significantly increase in the future due to landfill closures.

- Eliminated the use of chlorinated degreasing solvents (e.g., 1,1,1-trichloroethane) used to remove lapping compound (a fine grinding compound) during the manufacture of light and heavy duty hydrostatic transmissions. This was accomplished by adding detergents containing petroleum sulfonate to the lapping compound, which allowed the Company to use an aqueous removal process for the lapping compound rather than using chlorinated degreasing solvents.
- Established a chromium waste exchange program, whereby Eaton's chromium waste is used as a production input by a nearby Monroe Shock Absorbers facility.
- Substituted solvent-based paints with powder coatings at Eaton's Lincoln, Illinois facility.
- Developed a company-wide program to use water-based paints in lieu of solvent-based paints wherever possible.
- Developed a database of material safety data sheets (MSDS) to track chemical use at its facilities.

Eaton's Progress Towards Meeting 33/50 Goals



Emerson Electric Company is a manufacturer of a wide range of industrial and consumer products including appliance components; heating, ventilation, and air conditioning components; fractional horsepower motors; industrial motors and drives; industrial components & equipment; process control equipment; and both power and hand tools. Emerson is headquartered in St. Louis, Missouri and has 255 manufacturing facilities worldwide. The Company reduced releases and transfers of 33/50 Program chemicals by approximately 61 percent between 1988 and 1993. The Company undertook the following major reduction activities:

- Replaced a centralized vapor degreaser and two small batch vapor degreasers using 1,1,1-trichloroethane (TCA) with aqueous ultrasonic cleaning systems. The new systems provide greater cleaning efficiencies and comparable throughput to the cleaning equipment previously used in the facility. Total projected cost savings for 1997 are \$281,693. The new cleaning processes reduced 33/50 Program chemicals by 56.7 percent from 1988 to 1993 and eliminated the use of TCA in cleaning systems as of 1994.
- Replaced a xylene-based varnish used on the outer stationary parts of fractional horsepower motors with water reducible varnish. Switching to a water-reducible varnish reduced VOC emissions and employee exposure, and reduced the possibility of a fire/explosion hazard. No major equipment or process changes were made as a

result of the new coating system, but supplementary automated viscosity control systems were purchased to maintain the pH and viscosity of the water-reducible varnish. Three new viscosity controllers were purchased for an investment of \$60,000, with a subsequent savings of \$17,000 in solvent-related costs, and a reduction of VOC emissions by 44,000 pounds per year.

- Replaced solvent-based paints with powder coating systems in the Appleton Electric Company facility in Columbus, Nebraska. The solvent-based paints contained toluene and xylene. The powder coating system eliminated disposal costs for the sludge generated in a traditional solvent-based painting process and eliminated the need for application of a primer prior to coating. The equipment upgrades required a total capital expenditure of \$655,200. This process change resulted in an annual reduction in operating expenses of \$368,057, and a one-time additional savings of \$117,079 in materials costs the year following implementation of the powder coating

Cost Savings Summary

Project	Investment	Annual Savings
Aqueous and Ultrasonic Cleaning	\$280,000	\$80,000-\$282,000
Power Coating System	\$655,200	\$368,057
Water Reducible Varnish	\$60,000	\$17,000

system. These modifications resulted in a reduction of 33/50 Program chemicals at this facility by approximately 90 percent between 1988 and 1993.

- Developed an internal environmental audit program to help identify environmental problems that can be evaluated and rectified. The audits focus on current compliance practices and also assist in identifying changes in management practices that will enhance waste reduction.



Inland Steel

a subsidiary of
Inland Steel Industries, Inc.

Inland Steel is the fifth largest integrated steel producer in the United States. The Company mines ore and produces iron as well as most of the raw steel used in its manufacturing operations. Its products accounted for approximately five percent of U.S. steel production in 1993. Inland Steel operates a 2,400 acre steelmaking facility known as the Indiana Harbor Works (IHW) in East Chicago, Indiana. The Company reduced releases and transfers of 33/50 Program chemicals by 86 percent between 1988 and 1993. The Company undertook the following major reduction activities:

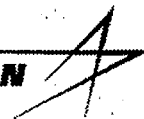
- Replaced tetrachloroethylene cleaning with aqueous cleaning using new degreasing equipment. The cleaning solution used in Inland Steel's new process is a mixture of hot water and a detergent/cleaner called Roundhouse™. There is no wastewater discharge associated with this new cleaning process. The purchase and installation of four aqueous cleaning systems cost approximately \$200,000 with a subsequent annual savings of \$37,500 associated with the purchase and disposal of tetrachloroethylene. This project eliminated the use of tetrachloroethylene.
- Recycled blast furnace and steelmaking dust and sludge comprised primarily of chromium, lead, and nickel compounds. The Company provides space for two other companies (Baker Hughes and National Recovery) to dewater the sludge and compact it into briquettes. Inland pays these companies for each ton of recycled material produced. The briquettes, which have a high iron content, are reintroduced into the blast and basic oxygen furnaces. The briquetting operation is capable of generating 600 tons of recycled material per day (219,000 tons per year). An estimated annual amount of sludge used in the briquetting operation contains approximately 7,277,000 pounds of metals

Cost Savings Summary

Project	Investment	Annual Savings
Aqueous Cleaning	\$200,000	\$37,000

including approximately 216,000 pounds of 33/50 Program chemicals — 22,000 pounds of chromium compounds, 186,000 pounds of lead compounds, and 8,000 pounds of nickel compounds. The briquetting operation is still in the pilot stage and does not yet result in a cost savings. The briquetting operation costs between \$40 and \$50 per ton of sludge processed compared to \$35 per ton of sludge to be landfilled.

LOCKHEED MARTIN



Lockheed Martin is the largest defense contractor in the world and the largest aerospace company in the United States. The Company manufactures aircraft, missiles, space launch systems, and satellite and electronic systems; refurbishes aircraft; and performs a variety of aircraft maintenance services. Headquartered in Bethesda, Maryland, Lockheed Martin operates 450 facilities around the world. Lockheed Martin was formed on March 15, 1995 with the merger of Lockheed Corporation and Martin Marietta Corporation. The Profile on this Company focuses on the former Lockheed Corporation. Lockheed reduced releases and transfers of 33/50 Program chemicals by 77 percent between 1988 and 1993. This reduction included the complete elimination of releases and transfers of cadmium compounds, lead compound, and tetrachloroethylene. Lockheed also achieved a 66 percent reduction in total non-33/50 TRI releases and transfers between 1988 and 1993. The Company undertook the following major reduction activities:

- Replaced chlorinated solvents used to clean rocket motor components with commercially available alkaline cleaners. The aqueous cleaners work as well as or better than 1,1,1-trichloroethane (TCA) to clean metal parts in large-scale manufacturing operations. Implementation required an investment in a new small-spray washing machine used primarily to clean fluid transfer tubing used in launch and missile systems. Large objects are cleaned in an existing solvent immersion tank that was converted for use with the aqueous cleaners. Advantages of this project include elimination of chlorinated chemical emissions and elimination of

the need for expensive pollution control equipment. Disadvantages include additional processing steps, operator time and expertise, and additional support equipment.

- *Eliminated solvent usage (toluene and dimethylbenzene) from printed circuit board coating operations by replacing methyl methacrylate adhesive coating with an innovative UV-cure conformal coating process. Advantages include improved product quality, lower material costs, reduced process time, and zero emissions of pollutants into the atmosphere. Limitations of the UV-cure coating process include limits on the height and size of circuit boards that can be processed and that the new process requires additional worker protection. Substituting the UV-cure process for the previously used solvent-based coating process was initially estimated to provide an annual cost savings of more than \$560,000 with a payback period of two to three months. Because of a temporary increase in production, however, the project paid for itself in a single day. At current production levels, the UV-cure system saves the Company \$60,000 per year.*
- *Eliminated dichloromethane used during paint stripping by using plastic media blasting (PMB). PMB involves impingement of aircraft surfaces with plastic beads to remove paint without damaging substrate materials. Advantages include elimination of liquid cleanup and disposal, flexibility of the system (plastic beads can be used for almost all types of paint stripping and coating removal operations), reduction of stripping time by*

50 percent compared to solvent stripping, and improvement in environmental, health, and safety conditions. Disadvantages include requirement of employee certification for operation, modification of paint stripping facilities, and requirement that employees wear protective eye wear and clothing. Lockheed estimates that conversion to PMB, based solely upon work-hour decreases and product scheduling, accounts for approximately a \$1 million annual savings.

Monsanto

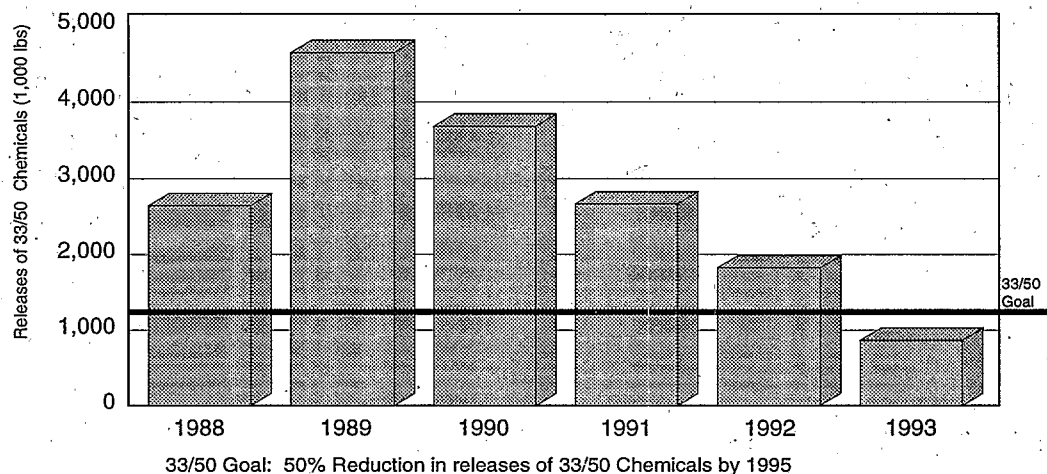
Monsanto, the fourth largest chemical company in the United States, manufactures and markets agricultural products, prescription pharmaceuticals, food ingredients, industrial chemicals, and performance chemicals used in consumer products. Headquartered in St. Louis, Missouri, Monsanto operates 33 major manufacturing facilities worldwide. The Company joined the 33/50 Program in May 1991 with a goal of reducing on-site releases of 33/50 Program chemicals from U.S. facilities by 50 percent by 1995, using 1988 as a baseline. Since then, Monsanto reduced releases of 33/50 Program chemicals by 66 percent from 2,567,783 pounds in 1988 to 865,629 pounds in 1993.

- *Reduced xylene air emissions at its W.G. Krummrich Plant by focusing on preventative maintenance. Xylene releases and transfers accounted for more than 60 percent of the facility's releases and transfers of 33/50 Program chemicals. Reduction of xylene usage occurred through several operational changes: upgrade of nitrogen system, centrifuge replacement, melt tank and screw conveyor replacement, and agitator seal replacement. These changes reduced xylene air emissions by more than 600,000 pounds with an average return on capital of 20 percent. Additional reductions of emissions were achieved by the installation of condensers, linking of tank vents to capture emissions, and installation of a thermal oxidizer to destroy xylene vapors. Overall, the Company reduced xylene emissions by over one million pounds while simultaneously increasing production and expanding its facilities.*
- *Adopted the approach of vapor balancing and stream stripping at its Nitro, West Virginia plant to*

Comparison of Coating Techniques

	Solvent Based	UV-Cure Coating
Capital cost of new equipment	--	\$16,260
Regulatory compliance		
- SCAQMD permit	Yes	Exempt
- Air scrubbing & monitoring	Yes	No
Processing/curing time	>24 hours	5-10 minutes
Percentage parts reworked	10-15	0
VOC (g/l)	660	<1
Estimated Annual Cost	\$845,400	\$281,160

Monsanto's Progress Towards Meeting 33/50 Goals



reduce toluene emissions and recycle toluene. Sodium 2-mercaptobenzothiazole (NaMBT) is a primary material in the production of sulfenamides made at the Nitro plant. The production process of NaMBT uses toluene to remove impurities from the NaMBT. The Company employed a vapor balancing technique to consolidate all tank vents to one common vent and contain the toluene vapor within the closed vent system. Any vapor not balanced in the common vent is vented through a brine cooled condenser, resulting in no significant vapor loss. The Company also implemented a steam stripping process to separate the toluene from the NaMBT and recycle the toluene for reuse. Implementation of the steam stripping process required a total capital investment of \$300,000. The annual raw material savings as a result of toluene recovery amounts to approximately \$30,000. Implementation of the vapor balancing and steam stripping processes resulted in a 90 percent reduction in toluene air emissions between 1991 and 1992.

UNISYS

Unisys produces computer hardware, software, and information management services for commercial and military customers. Headquartered in Blue Bell, Pennsylvania, Unisys operates 20 manufacturing facilities across the United States. The Company reduced releases and transfers of 33/50 Program chemicals by 98 percent between 1988 and 1993. The Company undertook the following major reduction activities:

- Replaced chromic/sulfuric acid etchant with an alkaline etchant in the production of circuit boards. Implementation of the alkaline etchant required an investment in an enclosed etching system to reduce workers' exposure to ammonia vapors. New etchant equipment also allowed copper oxide waste from the circuit boards to be captured and sold to the wood preserving industry for use as feed stock. The alkaline etchant system reduced use of chromic acid etchant from 11,015 gallons in the first half of 1993 to 2,020 in the second half of 1993. The system also resulted in a 50 percent annual reduction in the cost of circuit board etching and an 81 percent reduction in cost of waste disposal.
- Eliminated chlorinated solvents (TCA and TCE) used for cleaning the inner layers of printed circuit boards prior to assembly through a two-step process: (1) requiring workers to wear gloves and (2) using tacky rollers instead of solvents to remove loose debris. The tacky rollers produced a cleaner inner layer board than the solvent degreasing machine and reduced the labor required to clean and assemble the boards. Unisys achieved an annual savings of \$41,000, which provided a payback period of just over two years on their capital investment for the new solvent-free cleaning system.
- Replaced TCA and dichloroethane used for developing and stripping photoresist polymers with aqueous processes. Photoresist polymers, and associated cleaners, are used in three steps in the circuit board manufacturing process: inner layer etching, outer layer etching, and solder mask application. In

33/50 Program

all three steps, the TCA developer was replaced with potassium carbonate and the dichloromethane stripper with potassium hydroxide. Replacing the solvents with an aqueous process resulted in total annual savings of \$315,000, on a capital investment of \$490,00 for the inner and outer layers, and \$25,100, on a capital investment of \$87,000 for the solder mask.

Cost Savings Summary

Project	Investment	Annual Savings
Etchant replacement	\$96,000	\$4.88 per board
Tacky rollers	\$84,000	\$41,000
Aqueous developer/stripper		
Inner/final layer	\$490,000	\$87,000
Solder mask	\$315,500	\$25,100

* * * * *

The table in the following attachment provides a summary of the 33/50 Program Company Profiles completed to date. It includes information not only on those Profiles summarized in this volume, but also on those included in Volume I of the Reduction Highlights document (EPA Document #745-K-94-017, October 1994). The column on the table labeled "Highlights Volume" indicates the volume of the Reduction Highlights document in which that particular Company Profile is summarized.

The information included in the table is formatted to provide an "overview-at-a-glance" of all of the Company Profiles. For example, a manufacturer of automobile or truck parts that is searching for pollution prevention opportunities would instantly be directed to several Profiles of companies involved in the same industry, namely Chrysler Corp., Douglas & Lomason Co., and Eaton Corp. Similarly, a company searching for ways in which to reduce its use of tetrachloroethylene in cleaning applications would be directed to Inland Steel Co., Lockheed Martin, Parker Hannifin Corp., and Raytheon Co., all of whom have reduced releases and transfers of tetrachloroethylene in cleaning applications. Complete copies of any Profiles as well as Reduction Highlights Volume I can be obtained by contacting the 33/50 Program Office at:

33/50 Program
U.S. Environmental Protection Agency
Office of Pollution Prevention and Toxics
Mail Code 7408
401 M Street, SW
Washington, D.C. 20460
Tel: 202-554-1404 (TSCA Hotline)
202-260-6907 (33/50 Program Office)

Summary of 33/50 Program Company Profiles

COMPANY	INDUSTRY	Highlights Volume	No. of Facilities	Reductions of 33/50 Chemicals '88-'92	Pollution Reduction Methods Featured					
					Process/Product Changes	Solvent Substitution/Elimination	Waste Recovery/Recycling	Improved Controls	Modernization Equipment Upgrades	Worker Education
33/50 Program Chemicals	Products Manufactured/Chemical Uses									
ACME METALS INCORPORATED	STEELMAKING	1	15	89%	✓	✓	✓	✓		
Benzene	production of coke			91%	✓			✓		
Chromium Compounds	steel strapping			68%		✓				
Cyanide Compounds	production of coke			99%	✓					
Lead Compounds	steel strapping			82%			✓			
Toluene	production of coke			89%	✓			✓		
Xylene	production of coke			81%	✓			✓		
ALADDIN INDUSTRIES, INC.	METAL & PLASTIC HARDWARE	1	11	38%	✓	✓	✓	✓		
Chromium	vacuum bottles			100% (3)			✓			
Dichloromethane	hospital trays			100%	✓					
Methyl Isobutyl Ketone	cleaning silk screens			100%		✓				
Toluene	cleaning silk screens			100%		✓				
1,1,1-Trichloroethane	cleaning silk screens			26% (3)	✓					
Trichloroethylene	metal degreasing			50%		✓				
ALDAN RUBBER COMPANY	RUBBER-COATED FABRICS	1	1	85% (2)	✓	✓	✓	✓	✓	✓
Methyl Ethyl Ketone	fabric coating			84%	✓		✓	✓		
Toluene	fabric coating			85%		✓				
ANCHOR FENCE, INC.	CHAIN-LINK FENCE SYSTEMS	1	1	98% (2)		✓	✓			
Methyl Ethyl Ketone	primer coatings			93%		✓				
BRISTOL-MYERS SQUIBB COMPANY	HEALTH CARE CONSUMER PRODUCTS	2	62	54% (2)	✓		✓	✓	✓	
Dichloromethane	bulk pharmaceutical manufacturing			59%			✓	✓	✓	
Methyl Isobutyl Ketone	bulk pharmaceutical manufacturing			47%			✓	✓	✓	
CARPENTER TECHNOLOGY CORP.	STAINLESS STEEL	1	4 (1)	96%	✓	✓	✓	✓		
Chromium & Compounds	production of metals			98%			✓	✓		
Nickel & Compounds	production of metals			97%			✓	✓		
1,1,1-Trichloroethane	metal cleaning operations			90%		✓				

COMPANY	INDUSTRY	Highlights Volume	No. of Facilities	Reductions of 33/50 Chemicals '88-'92	Pollution Reduction Methods Featured					
					Process/Product Changes	Solvent Substitution/Elimination	Waste Recovery/Recycling	Improved Controls	Modernization Equipment Upgrades	Worker Education
33/50 Program Chemicals	Products Manufactured/Chemical Uses									
CHRYSLER CORPORATION	CARS, TRUCKS & FINANCIAL SERVICES	2	50	74% (2)	√	√		√	√	√
Methyl Ethyl Ketone	paints, cleaning equipment, and coatings			85%	√			√	√	√
Methyl Isobutyl Ketone	paints, cleaning equipment, and coatings			49%	√			√	√	√
Toluene	paints, and cleaning equipment			89%	√			√	√	√
Xylene	paints, and cleaning equipment			74%	√			√	√	√
DEXTER SHOE COMPANY	SHOES	1	4 (1)	49% (4)	√	√	√			
Methyl Ethyl Ketone	cleaning applications			67%		√	√			
Toluene	cleaning applications			+351%		√	√			
DOUGLAS & LOMASON COMPANY	AUTOMOBILE & TRUCK PARTS	1	4 (1)	88%	√	√				
Methyl Ethyl Ketone	painting applications			70%		√				
Toluene	painting applications			85%	√	√				
1,1,1-Trichloroethane	mold-release agent			100%		√				
Xylene	painting applications			87%	√	√				
EASTMAN KODAK COMPANY	PHOTOGRAPHIC PRODUCTS	2	13 (1)	54%	√		√	√		
Dichloromethane	film base manufacturing			51%			√	√		
EATON CORPORATION	INDUSTRIAL & COMMERCIAL PRODUCTS	2	80	80% (2)	√	√	√			
Chromium & Compounds	electroplating, truck parts, axles, valves			66%			√			
Methyl Ethyl Ketone	paint formulations			100%		√				
Nickel	electroplating, steelmaking			74%			√			
Toluene	paint formulations			88%		√				
1,1,1-Trichloroethane	degreasing			85%	√					
Xylene	paint formulations			100%		√				
EMERSON ELECTRIC COMPANY	INDUSTRIAL & CONSUMER PRODUCTS	2	255	61% (2)	√	√				
Toluene	paint formulations			74%	√	√				
1,1,1-Trichloroethane	vapor degreasing			69%	√	√				
Xylene	paint formulations			57%	√	√				

COMPANY	INDUSTRY	Highlights Volume	No. of Facilities	Reductions of 33/50 Chemicals '88-'92	Pollution Reduction Methods Featured					
					Process/Product Changes	Solvent Substitution/Elimination	Waste Recovery/Recycling	Improved Controls	Modernization Equipment Upgrades	Worker Education
33/50 Program Chemicals	Products Manufactured/Chemical Uses									
HADCO CORPORATION	PRINTED CIRCUIT BOARDS	1	2 (1)	95%		√		√		
Dichloromethane	screen cleaning			97%		√		√		
Methyl Ethyl Ketone	screen cleaning			100%		√		√		
1,1,1-Trichloroethane	dry film cleaning			82%		√		√		
INLAND STEEL COMPANY	STEEL PRODUCTS	2	1	86% (2)	√	√	√			
Chromium	steelmaking			83%			√			
Lead	steelmaking			81%	√		√			
Nickel & Compounds	steelmaking			97%	√		√			
Tetrachloroethylene	vapor degreasing			57%	√	√				
JOHNSON & JOHNSON	HEALTH CARE PRODUCTS	1	9 (1)	77%	√	√		√		
Dichloromethane	adhesives			62%	√	√		√		
Methyl Ethyl Ketone	adhesives			80%		√				
Methyl Isobutyl Ketone	adhesives			70%		√				
Toluene	adhesives			52%	√	√		√		
1,1,1-Trichloroethane	adhesives			74%		√				
Xylene	adhesives			93%		√				
LOCKHEED MARTIN	AIRCRAFT & MISSILES	2	450	76% (2)	√	√				
Dichloromethane	paint stripping			51%	√					
Tetrachloroethylene	metal cleaning			100%	√	√				
Toluene	paints and coatings			86%	√					
1,1,1-Trichloroethane	metal degreasing			73%	√	√				
Trichloroethylene	metal cleaning			76%	√	√				
Xylene	paints and coatings			85%	√					
MONSANTO COMPANY	AGRICULTURAL PRODUCTS, CHEMICALS	2	33	69% (2)			√	√	√	
Toluene	carrier solvent			63%			√	√	√	
Xylene	carrier solvent			79%			√	√	√	

COMPANY	INDUSTRY	Highlights Volume	No. of Facilities	Reductions of 33/50 Chemicals '88-'92	Pollution Reduction Methods Featured					
					Process/Product Changes	Solvent Substitution/Elimination	Waste Recovery/Recycling	Improved Controls	Modernization Equipment Upgrades	Worker Education
33/50 Program Chemicals	Products Manufactured/Chemical Uses									
OLIN CORPORATION	SPECIALTY CHEMICALS & METALS	1	23 (1)	67%	✓	✓	✓	✓		✓
Carbon Tetrachloride	carrier solvent			68%		✓	✓	✓		
Dichloromethane	degreasing operations			43%		✓				
Lead & Compounds	bullet making			94%			✓			
1,1,1-Trichloroethane	degreasing operations			61%	✓	✓		✓		✓
PARKER HANNIFIN CORPORATION	MOTION CONTROL PRODUCTS	1	52 (1)	71%	✓	✓	✓	✓	✓	
Cadmium & Compounds	metal finishing processes			46%		✓				
Chromium & Compounds	production of steel and steel alloys			96%			✓	✓		
Cyanides	metal finishing processes			+660% (5)		✓	✓			
Carbon Tetrachloride	adhesives and paints			100%		✓				
Dichloromethane	degreasing			100%		✓				
Lead & Compounds	metal finishing processes			+98%		✓				
Methyl Ethyl Ketone	rubber products			85%	✓	✓				
Methyl Isobutyl Ketone	adhesives and paints			100%		✓				
Tetrachloroethylene	degreasing			100%		✓				
Toluene	adhesives and paints			88%	✓	✓				
1,1,1-Trichloroethane	degreasing			46%		✓				
Trichloroethylene	degreasing			68%		✓				
Xylene	rubber products, adhesives, and paints			87%		✓				
PRINTED CIRCUIT CORPORATION	PRINTED CIRCUIT BOARDS	1	1 (1)	100% (2)		✓				
Dichloromethane	stripping process, cleaning			100%		✓				
1,1,1-Trichloroethane	circuit board patterns, cleaning			100%		✓				

COMPANY	INDUSTRY	Highlights	Volume	No. of Facilities	Reductions of 33/50 Chemicals '88-'92	Pollution Reduction Methods Featured					
						Process/Product Changes	Solvent Substitution/Elimination	Waste Recovery/Recycling	Improved Controls	Modernization Equipment Upgrades	Worker Education
33/50 Program Chemicals	Products Manufactured/Chemical Uses										
RAYTHEON COMPANY	AIRCRAFT, APPLIANCES, ELECTRONICS	1	25 (1)	65%	✓	✓					
Chromium	paints, soldering, surface conditioning			76%	✓	✓					
Dichloromethane	paint stripping			100%	✓	✓					
Lead	paints, soldering, surface conditioning			100%	✓	✓					
Tetrachloroethylene	electronics cleaning			100%		✓					
Toluene	paints, soldering, surface conditioning			38%	✓	✓					
1,1,1-Trichloroethane	electronics cleaning			63%		✓					
Trichloroethylene	electronics cleaning			72%		✓					
Xylene	paints, soldering, surface conditioning			43%	✓	✓					
UNISYS CORPORATION	COMPUTER HARDWARE, SOFTWARE	2	20	98% (2)	✓	✓				✓	
Chromium	etching			100%	✓	✓				✓	
Dichloromethane	stripping photoresist			100%	✓	✓					
1,1,1-Trichloroethane	cleaning, developing photoresist			94%	✓	✓					
Trichloroethylene	cleaning operations			100%	✓	✓					
U.S. STEEL GROUP	STEELMAKING	1	6 (1)	87%	✓		✓	✓			
Benzene	coke production			94%			✓	✓			
Chromium	steelmaking			80%			✓				
Cyanides	coke production			79%				✓			
Lead	steelmaking			71%			✓				
Toluene	coke production			96%			✓	✓			
Xylene	coke production			92%				✓			

Notes:

- (1) Number of facilities reporting 33/50 Chemicals
- (2) TRI data for this company reflect 1988 - 1993
- (3) Chemical first reported to TRI in 1989
- (4) Data only for 2 facilities participating in the 33/50 Program
- (5) Increase resulted from switch from on-site to off-site treatment

