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EPA's 33/50 Program Company Profile

Carpenter Technology Corporation

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THE 33/50 PROGRAM

This Company Profile is part of 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 17 high-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 April, 1994, a total of 1,216 companies had elected to participate in the Program, pledging to reduce emissions of the 17 target chemicals by more than 355 million pounds by 1995. Companies are encouraged to set their own reduction targets, which may vary from the Program's national 33% and 50% reduction goals. Company commitments and reduction pledges continue to be received by EPA on a daily basis.

The 1992 TRI data revealed that releases and transfers of 33/50 Program chemicals declined by 40% between 1988 and 1992, surpassing the Program's 1992 interim reduction goal by more than 100 million pounds. This accomplishment, together with evidence from analysis of facilities' projected releases and transfers of the 17 priority chemicals, reported to TRI under the Pollution Prevention Act, offers strong encouragement that the 33/50 Program's ultimate goal of a 50% reduction by 1995 will be achieved.

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

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, such as this one, are being prepared to provide more detailed information about companies that have written to EPA describing significant emissions reduction initiatives. Information presented in these profiles is drawn primarily from the company's written 33/50 Program communications and the annual TRI reports submitted by their facilities (including Pollution Prevention Act data reported to TRI in Section 8 of Form R). All company communications to EPA regarding the 33/50 Program are available to the public upon request.

EPA does not endorse the performance, worker safety, or environmental acceptability of any of the technical options discussed in this Profile. Mention of any product or procedure in this document is for informational purposes only, and does not constitute a recommendation of any such product or procedure, either express or implied, by EPA.

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.

Carpenter Technology Corporation

Carpenter Technology Corporation reduced total releases and transfers of 33/50 Program chemicals by 96% (2,710,230 pounds) from 1988 to 1992, surpassing its goal of an 86% reduction. In 1993, the company received an award from the Governor of Pennsylvania recognizing its achievements in reducing emissions of toxic substances.

I. Corporate Background

Carpenter Technology Corporation manufactures stainless steel and other specialty metals for a variety of industries including aerospace, nuclear, and electronics. The company is headquartered in Reading, Pennsylvania and has four facilities that report emissions of 33/50 Program chemicals.

Its two largest facilities are in Reading, Pennsylvania and Orangeburg, South Carolina. The former produces a variety of bar wire and strip metal products while the latter produces fine wire. In addition, a small plant in Fryeburg, Maine and a plant in El Cajon, California also make metal products. (A fifth facility in Bridgeport, Connecticut reported significant releases of several 33/50 Program chemicals in 1988 but ceased all manufacturing operations shortly thereafter and no longer reports to TRI.)

Carpenter's facilities use six 33/50 Program chemicals: chromium (and compounds), cyanides, nickel (and compounds), tetrachloroethylene, 1,1,1-trichloroethane, and trichloroethylene. Chromium and nickel are used as raw materials in the production of metals while the chlorinated solvents are used primarily for cleaning finished metal products.

Carpenter Technology reduced releases and transfers of 33/50 Program chemicals by 96% from 1988 to 1992.

Carpenter reported a total of 2,808,918 pounds of releases and transfers of 33/50 Program chemicals in 1988 (see Table I at the end of this profile). Of this amount, chromium, primarily in sludge and dissolved in waste acids, accounted for two-thirds of the total. In addition, the company reported 3,486,414 pounds of releases and transfers of other TRI chemicals in the same base year. The vast majority of these other TRI chemicals were hydrochloric and nitric acids used to remove metal oxide scale from hot metal pieces after they leave the furnace.

Releases and Transfers of TRI Chemicals Reported by Carpenter Technology Corporation
(1000 lbs.)

	1988	1992
33/50 Chemicals		
Chromium & compounds	1,855	38
Cyanide	<1	<1
Nickel & compounds	469	16
Tetrachloroethylene	40	8
1,1,1-Trichloroethane	182	18
Trichloroethylene	263	18
33/50 Subtotal	2,809	98
Other TRI Chemicals	3,486	104
Total*	6,295	202

* Columns do not sum to total due to rounding.

II. Corporate Environmental Strategy

Carpenter asserts that it will conduct all operations with concern for employees, the public, and the environment. Carpenter aims to maintain or exceed compliance with all applicable environmental regulations. The company also strives to minimize discharges in order to eliminate or reduce the hazards of all by-products and waste materials.

The company's environmental strategy identifies a series of methods by which the company can make continuous improvements to meet its environmental objectives. These methods are:

- identify and control environmental hazards stemming from operations;
- conduct pollution control and monitoring programs to protect employees, the public, the environment, the corporation's assets, and the continuity of operations;

- scrutinize products purchased, processes, and waste management methods for waste minimization opportunities (including the recycling of wastes which must be generated and avoid the landfilling of wastes);

- communicate applicable information on regulations, procedures, and compliance status to all employees; and

- work constructively with trade associations, government agencies and others to develop equitable and realistic laws, regulations, and standards to protect the environment.

Closely related to Carpenter's environmental strategy is another set of principles that emphasizes on health and safety issues. In its statement on health and safety, the company encourages all workers to devote the necessary time and resources to perform their tasks safely.

III. 33/50 Program Goals and Pollution Reduction Activities

In May 1991, Carpenter committed to reduce its total releases and transfers of 33/50 Program chemicals by 86% (2,415,670 pounds) from 1988 to 1995. Its commitment was based on a review of its 1989 data on releases and transfers and a projection for its 1991 data to be reported later that year. The company noted that most of these reductions would be accomplished at its three largest facilities - Reading, Bridgeport, and Orangeburg - through source reduction (e.g., consolidation of production facilities and changes in operating practices) and recycling.

In 1988, as a first step in identifying source reduction opportunities, Carpenter set up a team dedicated to continuous environmental improvements. This team consisted of key staff from engineering, production, and research and development. The team identified several types of projects including solvent substitution, reduction in solvent emissions through process modifications, increased recycling of metal-bearing waste streams, and changes in operator procedures to reduce the amount of acid used for metal descaling.

Specific changes implemented by Carpenter to reduce solvent emissions include:

- Substituting mineral spirits (petroleum-based solvents) for trichloroethane for cleaning certain types of metal parts.

- Eliminating non-cleaning uses of 1,1,1-trichloroethane (e.g., as a lubricant).

- Improving vapor degreaser process control to minimize the amount of solvent needed to clean metal components, and reducing by 50% the number of vapor degreasers used.

- Improving process control to minimize the amount of waste acid generated and eliminate the need for sending acid bath wastes off-site for treatment.

As a first step in identifying source reduction opportunities, Carpenter set up a team dedicated to continuous improvements

Two additional changes resulted in the elimination of all releases of metals (1,608,250 pounds of chromium and nickel) to land and a significant reduction in the amount of metals transferred off-site for treatment:

- Improving sludge drying operations and recycling rolling mill sludges, resulting in a 400% increase in the amount of metal oxides that can be recycled. These wastes were previously transferred off-site for treatment.

- Adding chemical inhibitors to acid bath solutions to reduce the amount of dissolved metals being transferred to the acid waste streams.

In addition, for economic reasons, the company consolidated its operations in 1989 by closing the Bridgeport plant while maintaining similar company-wide production levels through operation of four other plants. Through this action, Carpenter was able to achieve a 35% reduction in releases and transfers of 33/50 Program chemicals.

Carpenter has also achieved a 97% reduction in non-33/50 chemicals, primarily acids. The company used to replace acid baths on a routine, time-based schedule. Acids are now tested and stabilized, a process that extends the life of the

baths. Acids are now treated on-site only when rendered unusable.

IV. Progress Towards 33/50 Reduction Goals

As a result of these initiatives, Carpenter has already far exceeded its 33/50 Program goals. Corporate-wide releases and transfers of 33/50 Program chemicals have been reduced by 96% from 1988 levels. In addition, as part of Carpenter's overall environmental goals, the company has reduced its releases and transfers of non-33/50 TRI chemicals by 97%. In total, Carpenter has eliminated over 6 million pounds of total releases and transfers of all TRI chemicals since 1988 while maintaining the same overall level of production.

Carpenter projects additional reductions in overall releases and transfers of 33/50 Program chemicals in 1994 (see Table II), primarily through elimination of its use of 1,1,1-trichloroethane.

V. Summary of Carpenter's Experience

By seeking continuous improvements, Carpenter has achieved significant reductions in releases and transfers of 33/50 Program chemicals. The company's 96% reduction to date has far surpassed its ambitious goal of an 86% reduction in 33/50 Program chemicals by 1995. In addition, it has managed to reduce releases and transfers of TRI chemicals by 97% from 1988. The company other expects to achieve additional reductions through further adoption of source reduction and recycling initiatives.

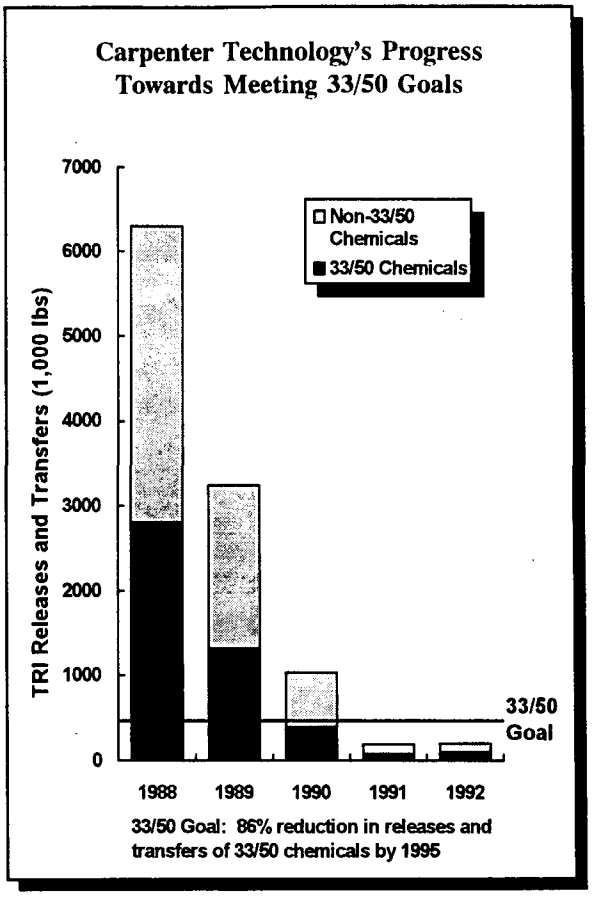

Table I
Carpenter Technology Corporation
Releases and Transfers of TRI Chemicals, 1988-1992
(all data from TRI unless otherwise noted)

Chemical	Year	Total Air Emissions (pounds)	Surface Water Discharges (pounds)	Releases to Land (pounds)	Transfers to POTW (pounds)	Transfers Off-site for Treatment/ Disposal/Other (pounds)	Total Releases and Transfers (1) (pounds)	Percent Change 1988-1992 Total Releases and Transfers
Chromium	1988	12,290	220	1,384,700	214	457,430	1,854,854	
	1989	7,872	207	270,105	9	223,907	502,100	
	1990	8,416	141	103,029	301	40,289	152,176	
	1991	9,592	189	0	263	25,099	35,143	
	1992	7,429	277	0	430	30,167	38,303	-98%
Cyanide compounds	1988	100	100	0	0	100	300	
	1989	58	83	0	0	33	174	
	1990	58	41	0	0	3	102	
	1991	58	70	0	0	85	213	
	1992	58	46	0	0	285	389	30%
Nickel	1988	6,510	770	223,550	702	237,253	468,785	
	1989	3,671	938	73,842	377	150,283	229,111	
	1990	3,661	1,017	28,166	267	36,193	69,304	
	1991	3,817	777	0	280	13,474	18,348	
	1992	3,128	235	0	360	12,372	16,095	-97%
Tetrachloroethylene	1988	36,700	0	0	0	3,400	40,100	
	1989	56,606	0	0	0	19,319	75,925	
	1990	23,408	0	0	0	6,552	29,960	
	1991	2,648	0	0	0	0	2,648	
	1992	7,826	0	0	0	0	7,826	-80%
1,1,1-Trichloroethane	1988	169,113	0	0	0	12,654	181,767	
	1989	163,032	0	0	0	49,089	212,121	
	1990	99,364	0	0	0	15,456	114,820	
	1991	5,752	0	0	0	0	5,752	
	1992	18,275	0	0	0	0	18,275	-90%
Trichloroethylene	1988	263,046	0	0	0	66	263,112	
	1989	299,544	0	0	0	75	299,619	
	1990	22,907	0	0	0	2,303	25,210	
	1991	13,100	0	0	0	0	13,100	
	1992	17,800	0	0	0	0	17,800	-93%
33/50 Program Chemicals	1988	487,759	1,090	1,608,250	916	710,903	2,808,918	
	1989	530,783	1,228	343,947	386	442,706	1,319,050	
	1990	157,814	1,199	131,195	568	100,796	391,572	
	1991	34,967	1,036	0	543	38,658	75,204	
	1992	54,516	558	0	790	42,824	98,688	-96%

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Releases and Transfers of TRI Chemicals, 1988-1992
(all data from TRI unless otherwise noted)

Chemical	Year	Total Air Emissions (pounds)	Surface Water Discharges (pounds)	Releases to Land (pounds)	Transfers to POTW (pounds)	Transfers Off-site for Treatment/ Disposal/Other (pounds)	Total Releases and Transfers (1) (pounds)	Percent Change 1988-1992 Total Releases and Transfers
Non 33/50 Program Chemicals	1988	92,658	977	841,100	201	2,551,478	3,486,414	
	1989	76,025	876	145,400	59	1,702,296	1,924,656	
	1990	101,834	945	56,355	59	481,000	640,193	
	1991	111,402	945	2,123	250	4,379	119,099	
	1992	95,787	896	1,594	250	5,044	103,571	-97%
All TRI Chemicals	1988	580,417	2,067	2,449,350	1,117	3,262,381	6,295,332	
	1989	606,808	2,104	489,347	445	2,145,002	3,243,706	
	1990	259,648	2,144	187,550	627	581,796	1,031,765	
	1991	146,369	1,981	2,123	793	43,037	194,303	
	1992	150,303	1,454	1,594	1,040	47,868	202,259	-97%
Percent Change, 1988-1992								
33/50 Program Chemicals		-89%	-49%	-100%	-14%	-94%	-96%	
Non 33/50 Program chemicals		3%	-8%	-100%	24%	-100%	-97%	
All TRI Chemicals		-74%	-30%	-100%	-7%	-99%	-97%	

Notes: (1) Total Releases and Transfers for 1991 and 1992 do not include on- or off-site recycling or energy recovery.

Table II
Carpenter Technology Corporation
Pollution Prevention Act Reporting (1)

Chemical	Year	Recycled On-Site (pounds)	Recycled Off-Site (pounds)	Energy Recovery Off-Site (pounds)	Treated On-Site (pounds)	Treated Off-Site (pounds)	Quantity Released (pounds)	Percent Change 1991-1994 Quantity Released	Total Production Related Wastes (pounds)	Percent Change 1991-1994 Production Related Wastes
Chromium	1991	1,588,233	1,767,732	0	0	18	34,589		3,390,572	
	1992	1,513,012	1,954,812	0	0	15	37,646		3,505,485	
	1994	1,500,000	2,000,000	0	0	10	9,525	-72%	3,509,535	4%
Cyanide compounds	1991	0	0	0	12,614	85	128		12,827	
	1992	0	0	0	13,614	285	104		14,003	
	1994	0	0	0	14,295	200	109	-15%	14,604	14%
Nickel	1991	1,113,573	1,156,418	0	0	150	17,845		2,287,986	
	1992	966,433	1,546,292	0	0	92	15,510		2,528,327	
	1994	1,000,000	1,500,000	0	0	85	3,721	-79%	2,503,806	9%
Tetrachloroethylene	1991	0	24,993	7,669	0	0	2,648		35,310	
	1992	0	14,122	1,021	7	0	10,611		25,761	
	1994	0	10,000	500	0	0	4,000	51%	14,500	-59%
1,1,1-Trichloroethane	1991	0	21,668	14,116	0	0	12,452		48,236	
	1992	0	10,226	1,069	42	0	18,630		29,967	
	1994	0	1,000	0	0	0	500	-96%	1,500	-97%
Trichloroethylene	1991	27,000	4,900	0	0	0	12,800		44,700	
	1992	26,700	1,350	0	0	0	15,400		43,450	
	1994	25,200	700	0	0	0	13,600	6%	39,500	-12%

Table II
Carpenter Technology Corporation
Pollution Prevention Act Reporting (1)

Chemical	Year	Recycled On-Site (pounds)	Recycled Off-Site (pounds)	Energy Recovery Off-Site (pounds)	Treated On-Site (pounds)	Treated Off-Site (pounds)	Quantity Released (pounds)	Percent Change 1991-1994 Quantity Released	Total Production Related Wastes (pounds)	Percent Change 1991-1994 Production Related Wastes
33/50 Program Chemicals	1991	2,728,806	2,975,711	21,785	12,614	253	80,462		5,819,631	
	1992	2,506,145	3,526,802	2,090	13,663	392	97,901		6,146,993	
	1994	2,525,200	3,511,700	500	14,295	295	31,455	-61%	6,083,445	5%
Non 33/50 Program Chemicals	1991	1,279,493	521,801	0	3,818,629	3	117,393		5,737,319	
	1992	1,974,705	1,269,888	0	4,816,093	7	103,614		8,164,307	
	1994	2,037,175	1,289,000	0	4,515,000	5	94,188	-20%	7,935,368	38%
All TRI Chemicals	1991	4,008,299	3,497,512	21,785	3,831,243	256	197,855		11,556,950	
	1992	4,480,850	4,796,690	2,090	4,829,756	399	201,515		14,311,300	
	1994	4,562,375	4,800,700	500	4,529,295	300	125,643	-36%	14,018,813	21%
Percent Changes, 1991-1994										
33/50 Program chemicals		-7%	18%	-98%	13%	17%	-61%		5%	
Non 33/50 Program chemicals		59%	147%	--	18%	67%	-20%		38%	
All TRI Chemicals		14%	37%	-98%	18%	17%	-36%		21%	

Notes: (1) Actual data for 1991 and 1992, projections for 1994.