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EPA Office of Compliance Sector Notebook Project

Profile of the Dry Cleaning Industry

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EPA/310-R-95-018.	Transportation Equip. Cleaning Ind.	Virginia Lathrop	564-7057

Industry Sector Notebook Contents: Dry Cleaning

EXHIBITS INDEX

LIST OF ACRONYMS

AFS - AIRS Facility Subsystem (CAA database)
AIRS - Aerometric Information Retrieval System (CAA database)
BIFs - Boilers and Industrial Furnaces (RCRA)
BOD - Biochemical Oxygen Demand
CAA - Clean Air Act
CAAA - Clean Air Act Amendments of 1990
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS - CERCLA Information System
CFCs - Chlorofluorocarbons
CO - Carbon Monoxide
COD Chemical Oxygen Demand
CSI - Common Sense Initiative
CWA - Clean Water Act
D&B - Dun and Bradstreet Marketing Index
ELP - Environmental Leadership Program
EPA - United States Environmental Protection Agency
EPCRA- Emergency Planning and Community Right-to-Know Act
FIFRA - Federal Insecticide, Fungicide, and Rodenticide Act
FINDS - Facility Indexing System
HAPs - Hazardous Air Pollutants (CAA)
HSDB - Hazardous Substances Data Bank
IDEA - Integrated Data for Enforcement Analysis
LDR - Land Disposal Restrictions (RCRA)
LEPCs - Local Emergency Planning Committees
MACT - Maximum Achievable Control Technology (CAA)
MCLGs - Maximum Contaminant Level Goals
MCLs - Maximum Contaminant Levels
MEK - Methyl Ethyl Ketone
MSDSs - Material Safety Data Sheets
NAAQS - National Ambient Air Quality Standards (CAA)
NAFTA - North American Free Trade Agreement
NCDB - National Compliance Database (for TSCA, FIFRA, EPCRA)
NCP - National Oil and Hazardous Substances Pollution Contingency Plan
NEIC - National Enforcement Investigation Center
NESHAP - National Emission Standards for Hazardous Air Pollutants
NO_2 - Nitrogen Dioxide
NOV - Notice of Violation

NO_X - Nitrogen Oxides
NPDES - National Pollution Discharge Elimination System (CWA)
NPL - National Priorities List
NRC - National Response Center
NSPS - New Source Performance Standards (CAA)
OAR - Office of Air and Radiation
OECA - Office of Enforcement and Compliance Assurance
OPA - Oil Pollution Act
OPPTS - Office of Prevention, Pesticides, and Toxic Substances
OSHA - Occupational Safety and Health Administration
OSW - Office of Solid Waste
OSWER - Office of Solid Waste and Emergency Response
OW - Office of Water
P2 - Pollution Prevention
PCS - Permit Compliance System (CWA Database)
POTW - Publicly Owned Treatments Works
RCRA - Resource Conservation and Recovery Act
RCRIS - RCRA Information System
SARA - Superfund Amendments and Reauthorization Act
SDWA - Safe Drinking Water Act
SEPs - Supplementary Environmental Projects
SERCs - State Emergency Response Commissions
SIC - Standard Industrial Classification
SO_2 - Sulfur Dioxide
SO_X - Sulfur Oxides
TOC - Total Organic Carbon
TRI - Toxic Release Inventory
TRIS - Toxic Release Inventory System
TCRIS - Toxic Chemical Release Inventory System
TSCA - Toxic Substances Control Act
TSS - Total Suspended Solids
UIC - Underground Injection Control (SDWA)
UST - Underground Storage Tanks (RCRA)
VOCs - Volatile Organic Compounds

I. INTRODUCTION TO THE SECTOR NOTEBOOK PROJECT

I.A. Summary of the Sector Notebook Project

Environmental policies based upon comprehensive analysis of air, water and land pollution are an inevitable and logical supplement to traditional single-media approaches to environmental protection. Environmental regulatory agencies are beginning to embrace comprehensive, multi-statute solutions to facility permitting, enforcement and compliance assurance, education/ outreach, research, and regulatory development issues. The central concepts driving the new policy direction are that pollutant releases to each environmental medium (air, water and land) affect each other, and that environmental strategies must actively identify and address these inter-relationships by designing policies for the "whole" facility. One way to achieve a whole facility focus is to design environmental policies for similar industrial facilities. By doing so, environmental concerns that are common to the manufacturing of similar products can be addressed in a comprehensive manner. Recognition of the need to develop the industrial "sector-based" approach within the EPA Office of Compliance led to the creation of this document.

The Sector Notebook Project was initiated by the Office of Compliance within the Office of Enforcement and Compliance Assurance (OECA) to provide its staff and managers with summary information for eighteen specific industrial sectors. As other EPA offices, states, the regulated community, environmental groups, and the public became interested in this project, the scope of the original project was expanded. The ability to design comprehensive, common sense environmental protection measures for specific industries is dependent on knowledge of several inter-related topics. For the purposes of this project, the key elements chosen for inclusion are: general industry information (economic and geographic); a description of industrial processes; pollution outputs; pollution prevention opportunities; Federal statutory and regulatory framework; compliance history; and a description of partnerships that have been formed between regulatory agencies, the regulated community and the public.

For any given industry, each topic listed above could alone be the subject of a lengthy volume. However, in order to produce a manageable document, this project focuses on providing summary information for each topic. This format provides the reader with a synopsis of each issue, and references where more in-depth information is available. Text within each profile was researched from a variety of sources, and was usually condensed from more detailed sources pertaining to specific topics. This approach allows for a wide coverage of activities that can be further explored based upon the citations and references listed at the end of this

profile. As a check on the information included, each notebook went through an external review process. The Office of Compliance appreciates the efforts of all those that participated in this process and enabled us to develop more complete, accurate and up-to-date summaries. Many of those who reviewed this notebook are listed as contacts in Section IX and may be sources of additional information. The individuals and groups on this list do not necessarily concur with all statements within this notebook.

I.B. Additional Information

Providing Comments

OECA's Office of Compliance plans to periodically review and update the notebooks and will make these updates available both in hard copy and electronically. If you have any comments on the existing notebook, or if you would like to provide additional information, please send a hard copy and computer disk to the EPA Office of Compliance, Sector Notebook Project, 401 M St., SW (2223-A), Washington, DC 20460. Comments can also be uploaded to the Enviroene Bulletin Board or the Enviroene World Wide Web for general access to all users of the system. Follow instructions in Appendix A for accessing these data systems. Once you have logged in, procedures for uploading text are available from the on-line Enviroene Help System.

Adapting Notebooks to Particular Needs

The scope of the existing notebooks reflect an approximation of the relative national occurrence of facility types that occur within each sector. In many instances, industries within specific geographic regions or states may have unique characteristics that are not fully captured in these profiles. For this reason, the Office of Compliance encourages state and local environmental agencies and other groups to supplement or re-package the information included in this notebook to include more specific industrial and regulatory information that may be available. Additionally, interested states may want to supplement the "Summary of Applicable Federal Statutes and Regulations" section with state and local requirements. Compliance or technical assistance providers may also want to develop the "Pollution Prevention" section in more detail. Please contact the appropriate specialist listed on the opening page of this notebook if your office is interested in assisting us in the further development of the information or policies addressed within this volume.

If you are interested in assisting in the development of new notebooks for sectors not covered in the original eighteen, please contact the Office of Compliance at 202-564-2395.

II. INTRODUCTION TO THE DRY CLEANING INDUSTRY

This section provides background information on the size, geographic distribution, employment, production, sales, and economic condition of the dry cleaning industry. The type of facilities described within the document are also described in terms of their Standard Industrial Classification (SIC) codes. Additionally, this section contains a list of the largest companies in terms of sales.

II.A. Introduction, Background, and Scope of the Notebook

This notebook covers the entire dry cleaning industry which includes three distinct types of operations: commercial, industrial and coin-operated. The dry cleaning industry is covered by three Standard Industrial Classification (SIC) codes, the codes the Department of Commerce uses to track the flow of goods and services. The commercial sector is included in SIC 7216 (dry cleaning plants except rug cleaning). Commercial plants typically receive small quantities of clothes from individuals and usually do not clean furs or leathers although they offer non-dry cleaning services, such as refreshing garments. The industrial dry cleaning sector is included in SIC code 7218 (industrial launderers). According to the 1987 Census of Service Industries, there are 1,379 industrial laundry facilities. Of these, the Agency estimates that 325 have dry cleaning capacity (USEPA, 1993a) while the remainder are exclusively wet laundries. Industrial dry cleaners primarily clean uniforms and may also rent uniforms and other industrial clothing such as gloves. Coin-operated dry cleaning is included in SIC 7215 (coin-operated laundries and dry cleaning). The Census of Service Industries indicates that there are 27,180 coin-operated laundries (with and without payroll) in 1987. Of these, the Agency estimated that about 3,000 offer dry cleaning services of some kind (USEPA, 1993a) although some estimate that there are fewer than 100 of such cleaners in operation. Coin-operated dry cleaners may be self-service units located in laundromats or may be run by an attendant but located in a self-service laundromat.

II.B. Characterization of the Dry Cleaning Industry

The dry cleaning industry provides garment cleaning services and in most cases will provide related services such as clothes pressing and finishing. The dry cleaning process is physically very similar to the home laundry process, except that clothes are washed in dry cleaning solvent instead of water. Fabric or garment cleaning consists of three basic functions: cleaning, drying and finishing. Garments are pre-treated for stains, and then machine washed in a solution of a solvent, soaps and detergents. The solvent is extracted by first draining, and then spinning the clothes.

Finally, the garments are dried through a combination of aeration, heat and tumbling, and then they are pressed.

These functions are the core of any fabric cleaning process, although the details vary and steps may be minimized or even omitted. All three functions are readily recognizable in the full-service dry cleaning process. Dry cleaners will also "refresh" a garment, concentrating mainly on finishing.

II.B.1. Industry size and geographic distribution

The number and size of dry cleaning firms varies within the three basic categories of dry cleaning operations. The commercial facilities are by far the most prevalent and include full service, retail operations located in shopping centers and near densely populated areas. The industrial dry cleaners operate the largest facilities which are often part of a business that rents uniforms, towels or other garments. The coin-operated sector of the market is typically associated with a laundromat that may provide either full-service retail dry cleaning similar to the commercial sector, or customer operated dry cleaning equipment. All sectors, however, provide a single basic service, clothes cleaning.

Commercial dry cleaning accounts for the majority of the firms with 30,494 facilities, as well as the majority of dry cleaning volume, 630,520 tons of clothes per year as shown in the exhibit below. The average commercial facility cleans approximately 19.7 tons of clothes per year. Industrial facilities while fewer in number, 325, have a larger average cleaning output of 578 tons of clothes per facility per year. Total dry cleaning volume of the industry sector is 187,991 tons per year. The coin-operated sector accounts for the smallest portion of the industry with 3,044 facilities processing 4,914 tons of clothes per year for an average 1.6 tons per facility.

Exhibit 1: Commercial Dry Cleaners Dominate Industry				
	Commercial	Industrial	Coin- Operated	Total
# of Facilities[a]	30,494	325	3,044[b]	33,863
Volume of Clothes Cleaned[c] (Tons/Year)	630,520	187,991	4,914	825,425
Mean Output per Facility[d] (Tons/year)	19.7	578	1.6	not applicable
Sales[e]	$4.8 billion	$385 million	$29 million	$5.2 billion

[a] USEPA, 1991b
[b] The number of coin-operated dry cleaning facilities estimated in USEPA, 1991b is high compared to a more recent estimate of <100 (Torp, 1994).
[c] Estimated values based on USEPA, 1991a and USEPA, 1991b.
[d] Volume/Number of facilities.
[e] USEPA, 1991b, some values were rounded (1993 dollars). Values indexed from 1989 dollars using the CPI for Apparel and Upkeep.

The size of dry cleaners varies by industrial sector. Most commercial dry cleaners are single facility "mom and pop" operations, although there is considerable variation in the size of these businesses. Classic family-owned-and-operated commercial cleaners typically have two or three full-time employees (including the owner) and perhaps some additional part-time employees. A typical firm might consist of a single small store front operation, with customer pickup and delivery in the front, and cleaning and finishing in the back. The store usually has one or two dry cleaning units (either a separate washer and dryer, or a combined "dry-to-dry" machine), and perhaps a water-based laundry machine for shirts and other washables.

Commercial dry cleaning is not a high profit business, and many dry cleaners are barely able to stay in business. Typical start-up costs in 1993 were $113,000, and over 60 percent of dry cleaners had annual revenues below $113,000; however, there is wide variation in the receipts. Official Census figures indicate one-quarter of the firms had annual revenues which were less than $28,000, and six percent had receipts over $564,000 in 1993 dollars (USEPA, 1991). The exhibit below shows the revenue distribution for commercial dry cleaners. The receipts must cover labor costs (by far the largest cost category), rent, capital depreciation, solvent

and other supplies. Wages are typically low; the industry average operator wage is less than $7.00 per hour. Many dry cleaners have difficulty paying competitive wages and earning any profit.

Exhibit 2: Very Small and Very Large Establishments Dominate Commercial Dry Cleaning (1993 dollars)

Annual Receipts ($/year) per Establishments	Number of Establishments	Percent	Total Annual Receipts ($1,000/year)	Percent
0-28,000	8,026	26%	160,474	53%
28,000-56,000	5,024	17%	229,611	5%
56,000-85,000	3,096	10%	233,950	5%
85,000-113,000-	3,096	10%	327,530	7%
>113,000	11,251	37%	3,857,651	80%
Total	30,494	100%	4,809,217	100%

Source: USEPA, 1993a

Coin-operated dry cleaners are gradually being phased out of the dry cleaning market. New coin-operated equipment is reported to be no longer available on the market (SRRP, 1990). The coin-operated segment of the dry cleaning industry resides in laundromats. There are two basic types of operations, including: commercial dry cleaners operating a laundromat and self-service dry cleaning operations. Commercial dry cleaners operating at a laundromat are classified as coin-operated because the dominant business at the location is the coin-operated laundromat. The dry cleaning side of the business can be fully staffed and provide the full services of a commercial dry cleaner. Alternatively, it can provide more limited service, with an operator receiving, cleaning, and returning batches of clothes to the customer, but not providing pressing, spotting or other services. The second type of coin-operated dry cleaning facility is the self-serve dry cleaning machine. These are truly coin-operated, with the customer operating the dry cleaning equipment. The exhibit below shows the total dry cleaning output and the average output per establishment as categorized by the coin-operated sector income. Comparing the total coin-operated dry cleaning sales from the first exhibit to total coin-operated sales below, shows that dry cleaning makes up only about 10 percent of the receipts in this sector, a much smaller fraction than for commercial or industrial laundries (USEPA, 1993a).

Exhibit 3: Medium-Sized Establishments Dominate Coin-operated Dry Cleaning and Laundries
(1993 dollars)[a]

Annual Receipts ($/year) per Establishment	Number of Establishments[b]	Percent	Total Annual Receipts ($1,000/yr)	Percent
0-28,000	523	17%	10,425	4%
28,000-56,000	1,451	48%	66,180	23%
56,000-85,000	475	16%	35,888	12%
85,000-113,000	169	5%	17,664	6%
>113,000	426	14%	158,468	55%
Total	3,044	100%	288,627	100%

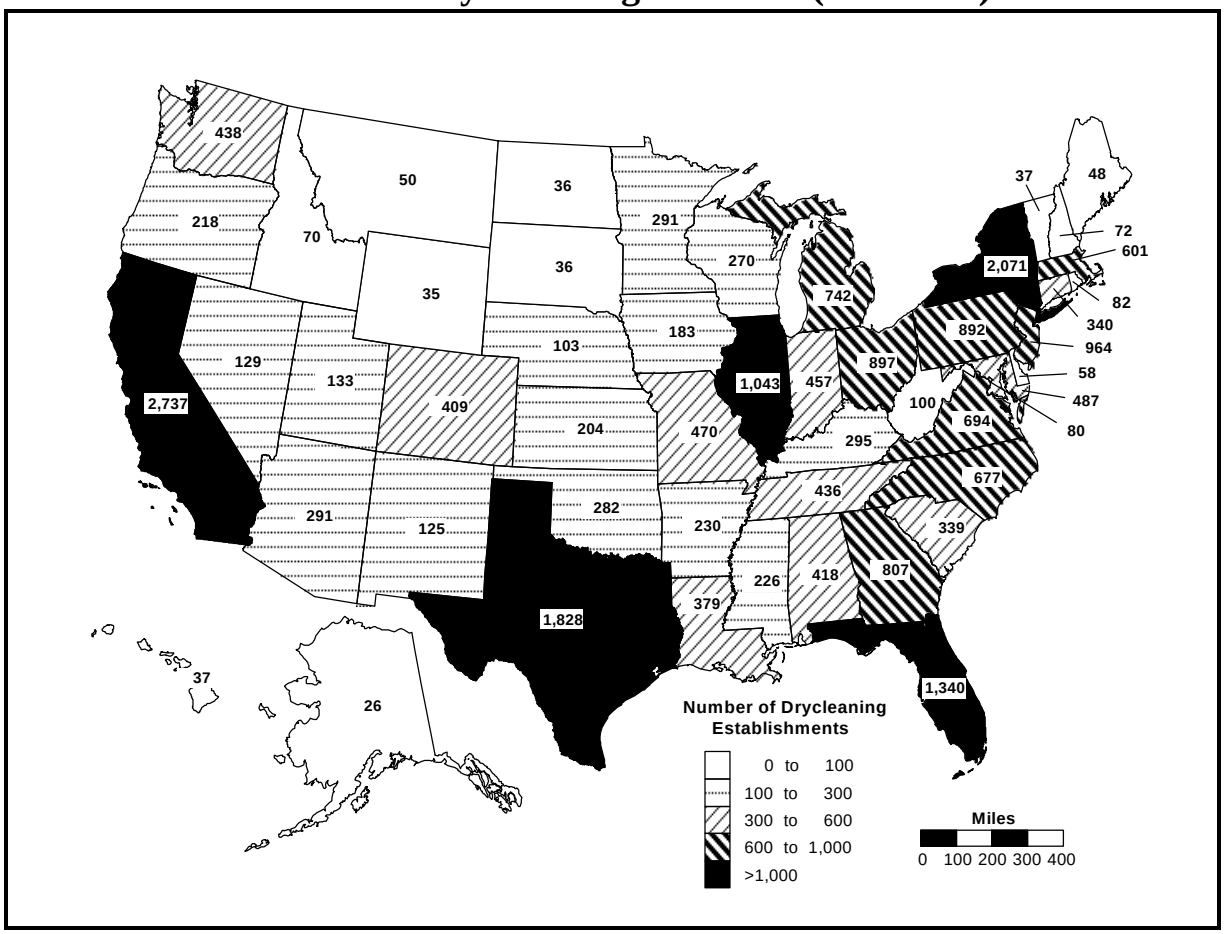
[a] Based on payroll converted to 1993 dollars using the CPI for Apparel and Upkeep.
[b] The distribution of establishments is based on the distribution of all coin-operated laundries with payroll (including those without dry cleaning capacity) reported in the 1987 Census of Service Industries.
Source: U.S. Environmental Protection Agency. 1993a. Economic Analysis of Regulatory Controls in the Dry Cleaning Industry. Final. EPA 450/3-91-021b. September.

Industrial dry cleaners tend to be larger than commercial establishments. They service institutional, professional and industrial customers by providing cleaning services for uniforms, restaurant linens, wiping towels, floor mats and work gloves. In many cases industrial dry cleaning firms offer rental as well as cleaning services. According to Census data, 1,379 industrial laundry facilities were operating in 1987 of which 325 were estimated to have dry cleaning operations. While sales for all operations at these facilities totaled $1.1 billion, only about 35 percent ($385 million) of the receipts were related to dry cleaning. The balance of receipts were from water washing or other activities (USEPA, 1993a).

Dry cleaners are spread throughout the United States although their location depends on both the type of operation and the solvent used. Commercial dry cleaners are distributed in a six to one ratio of urban to rural as a result of the greater demand for dry cleaning in urban settings. Their distribution roughly follows the population as shown in the exhibit below. Industrial laundries, however, tend to be located in medium to small cities to take advantage of the lower capital and labor costs. Industrial laundries are also less reliant upon being in their customer's immediate neighborhood. Coin-operated laundries tend to be in rural areas

where commercial dry cleaning is not available. The type of solvent used for dry cleaning also varies by geographic region. Petroleum dry cleaners are concentrated in the Gulf states, particularly Texas and Louisiana, partly due to the availability of petroleum in these locations and partly because local fire regulations prohibit petroleum cleaners in many other regions.

Exhibit 4: Dry Cleaning Facilities (SIC 7216)



Source: 1992 Census of Service Industries, Geographic Area Series

Exhibit 5: Geographic Distribution of Dry Cleaning Facilities Corresponds to Population in U.S.					
State	Percent of Facilities[a]	Receipts ($1,000)	Facilities Rank	Population Rank	1990 Pop. (1,000)[b]
California	11.8	629,747	1	1	29,760
New York	8.9	346,412	2	2	17,990
Texas	7.9	448,292	3	3	16,987
Florida	5.8	273,109	4	4	12,938
Illinois	4.5	231,475	5	6	11,431
New Jersey	4.1	186,588	6	9	7,730
Ohio	3.9	208,832	7	7	10,847
Pennsylvania	3.8	196,682	8	5	11,881
Georgia	3.5	161,054	9	11	6,478
Michigan	3.2	161,270	10	8	9,295
Virginia	3.0	165,446	11	12	6,187
North Carolina	2.9	172,653	12	10	6,628
Massachusetts	2.6	136,666	13	13	6,016
Maryland	2.1	107,265	14	19	4,781
Missouri	2.0	98,485	15	15	5,117
Indiana	2.0	102,078	16	14	5,544
Washington	1.9	79,471	17	18	4,867
Tennessee	1.9	110,116	18	17	4,877
Alabama	1.8	93,949	19	22	4,041
Colorado	1.8	77,212	20	26	3,294
Louisiana	1.6	80,484	21	21	4,345
Connecticut	1.5	90,111	22	27	3,287
South Carolina	1.5	78,297	23	25	3,487
Kentucky	1.3	61,293	24	23	3,685
Minnesota	1.3	72,772	25	20	4,375
Arizona	1.2	73,290	26	24	3,665
Oklahoma	1.2	70,665	27	28	3,146
Wisconsin	1.2	63,964	28	16	4,891
Arkansas	1.0	45,053	29	33	2,351
Mississippi	1.0	46,756	30	31	2,573
Oregon	0.9	40,728	31	29	2,842

State	Percent of Facilities[a]	Receipts ($1,000)	Facilities Rank	Population Rank	1990 Pop. (1,000)[b]
Kansas	0.9	41,941	32	32	2,478
Iowa	0.8	36,487	33	30	2,777
Utah	0.6	26,191	34	35	1,723
Nevada	0.5	34,118	35	39	1,202
New Mexico	0.5	22,225	36	37	1,515
Nebraska	0.4	22,339	37	36	1,578
West Virginia	0.4	19,301	38	34	1,793
Rhode Island	0.3	17,081	39	43	1,003
D.C.	0.3	13,898	40	48	607
New Hampshire	0.3	17,519	41	40	1,109
Idaho	0.3	12,558	42	42	1,007
Delaware	0.2	13,530	43	46	666
Montana	0.2	6,576	44	44	799
Maine	0.2	9,623	45	38	1,228
Hawaii	0.2	21,141	46	41	1,108
Vermont	0.2	7,680	47	49	563
South Dakota	0.2	4,481	48	45	696
North Dakota	0.2	8,280	49	47	639
Wyoming	0.1	4,168	50	51	454
Alaska	0.1	17,679	51	52	550
Total	100	5,069,031			248,710

[a] Number of facilities comes from the 1992 Census of Service Industries. Drycleaning plants, except rug cleaning (SIC 7216).
[b] Populations are from 1990 Census, Summary Population and Housing Characteristics, Table I: US Summary.
Total may vary due to rounding.

Ward's Business Directory of U.S. Private and Public Companies, produced by Gale Research Inc., compiles financial data on U.S. companies including those operating within the dry cleaning industry. Ward's ranks U.S. companies, whether they are a parent company, subsidiary or division, by sales volume within the 4-digit SIC codes that they have been assigned as their primary activity. Readers should note that: 1) companies are assigned a 4-digit SIC that most closely resembles their principal industry; and 2) sales figures include total company sales, including subsidiaries and operations not related to dry cleaning.

Additional sources of company specific financial information include Standard & Poor's *Stock Report Services*, Dun & Bradstreet's *Million Dollar Directory*, Moody's Manuals, and annual reports.

Exhibit 6: Top U.S. Companies with Dry Cleaning Operations

Rank[a]	Company[b]	1993 Sales (millions of dollars)
1	Initial USA, Inc. - Atlanta, GA	170
2	Concord Custom Cleaners - Richmond, KY	25
3	Dryclean USA, Inc. - Miami, FL	25
4	Pride Cleaners, Inc. - Leawood, KS	16
5	Fashion Care, Inc. - Atlanta, GA	10
6	Spic and Span, Inc. - Milwaukee, WI	10
7	Al Phillips the Cleaner, Inc. - Las Vegas, NV	8
8	Admiral, Inc. - Annapolis, MD	7
9	Walker, Inc. - Omaha, NE	3
10	WH Christian and Sons, Inc. - Brooklyn, NY	3

Note: [a] When Ward's Business Directory lists both a parent and subsidiary in the top ten, only the parent company is presented above to avoid double counting. Not all sales can be attributed to the companies dry cleaning operations.
[b] Companies shown listed SIC 7216 as primary activity.

Source: Ward's Business Directory of U.S. Private and Public Companies - 1993.

II.B.2. Product characterization

The dry cleaner's product is the service of cleaning clothes conveniently. The products may also include services such as pressing and finishing. The market is divided into two parts, those customers who shop for price and will accept adequate quality and those who are buying quality cleaning with price being less of a concern. The latter are more steady dry cleaning

customers while the former will forego dry cleaning during financial downturns.

II.B.3. Economic trends

In 1992, the total dry cleaning market generated $5.2 billion in revenues, with $4.8 billion generated by the commercial sector and $385 million and $29 million generated by the industrial and coin-operated sectors respectively. Current industry estimates indicate a zero growth rate for the commercial sector through 1996 while both the industrial and coin-operated sectors are anticipated to continue their decline during this period. More clothes are being made of launderable fabrics which reduces the demand for commercial dry cleaning. Self-service coin-operated dry cleaning machines are no longer manufactured and those currently in use are being phased out as they age. The trend toward launderable fabrics will inevitably reduce the need for industrial dry cleaning as well.

Convenience is the driving force in commercial dry cleaning. Location near the consumer and fast turnaround on their clothes as well as the cleanliness of the item are important to dry cleaning success. Consumers care little about what solvent is used to clean their clothes as long as the cleaning service is convenient, fast and effective. While the switch to launderable fabrics reduces the need for dry cleaning, the other services such as laundering, pressing and finishing may still be in demand.

III. INDUSTRIAL PROCESS DESCRIPTION

This section describes the major industrial processes within the dry cleaning industry, including the materials and equipment used, and the processes employed. The section is designed for those interested in gaining a general understanding of the industry, and for those interested in the inter-relationship between the industrial process and the topics described in subsequent sections of this profile -- pollutant outputs, pollution prevention opportunities, and Federal regulations. This section does not attempt to replicate published engineering information that is available for this industry. Refer to Section IX for a list of reference documents that are available.

This section specifically contains a description of commonly used production processes, associated raw materials, the byproducts produced or released, and the materials either recycled or transferred off-site. This discussion, coupled with schematic drawings of the identified processes, provide a concise description of where wastes may be produced in the process. This section also describes the potential fate (via air, water, and soil pathways) of these waste products.

III.A. Industrial Processes in the Dry Cleaning Industry

Dry cleaning processes garments in a way that avoids saturating fabrics with water. If thoroughly saturated with water, agitated and heated, certain fabrics (especially wool, silk and rayon) may shrink or the dye may run. Other garments that are constructed from several materials can be damaged if the various layers react differently to the cleaning process. Because dry cleaning solvents do not saturate the fibers of the fabric, the swelling and shrinking from water saturation is avoided, allowing nearly all types of fabrics and garments to be safely dry cleaned.

Four solvents dominate the dry cleaning market: perchloroethylene (PCE), petroleum solvents, chlorofluorocarbons (CFC-113) and trichloroethane (TCA). The manufacture of the latter two will be banned in 1995 under the Clean Air Act Amendments. The exhibit below shows that PCE dominates the commercial sector while petroleum solvent is used in the majority of industrial machines.

One important characteristic of the dry cleaning industry is that the machinery used with these solvents has evolved over time. The development encompasses four "generations" of machines, all of which are still in use. The first generation of equipment has separate washers and dryers, thus the operator must transfer the clothes between the two. The second generation machine design eliminates the stand-alone dryer and

combines both washing and drying into a single machine. The third generation of equipment includes added control technology to reduce the vapor emissions. The fourth generation of machine design modifies the third generation by recycling the air in the machine to further reduce emissions. Each generation is described further below.

Exhibit 7: Number of Dry Cleaning Facilities by Process and Industrial Sector[a]

Process Solvent	Industrial Sector			
	Commercial	Industrial	Coin-operated	Total
PCE	24,947	130	3,044	28,121
Petroleum	4,548[b]	195	0	4,743
CFC-113	949[b]	0	0	949
Trichloroethane	50[c]	0	0	50
Total	30,494	325	3,044	33,863

[a] USEPA, 1991b, unless otherwise indicated.
[b] Estimate based on USEPA, 1991a.
[c] Wolf, 1992.

First Generation Machines

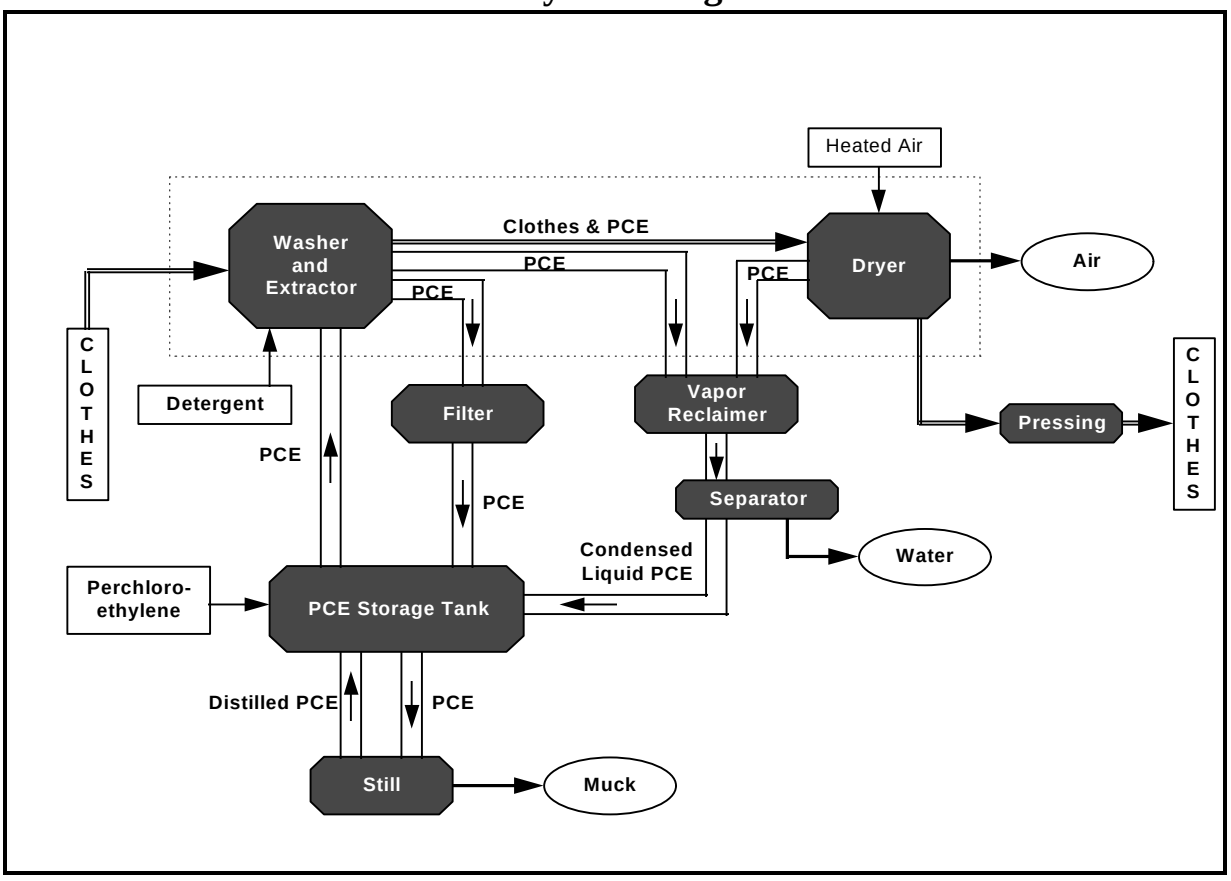
The first generation of dry cleaning machines had separate washers and dryers. These transfer machines (so-called because the wet clothes were transferred from the washer to the dryer) were the predominant type of machine used until the late-1960s, when dry-to-dry machines were developed that reduced solvent loss and improved dry cleaning economics. In a typical transfer process, the clothes are loaded into the washer, where the solvent is combined with a water and detergent charge, and the clothes and solvent are agitated by rotation of the washer's drum. After washing, the drum is rotated at high speeds to extract the residual solvent. The clothes are then manually transferred to a dryer where recirculating warm air causes most of the remaining solvent to vaporize. To reduce wrinkling, the drying cycle is followed by a brief cool-down cycle during which unheated air is circulated through the clothes (USEPA, 1991). A flow diagram for a typical PCE transfer machine is shown below. The advantages of using transfer equipment are: (a) more production since a

new load is being washed while the previous one is being dried; (b) less complicated construction with less automation and thus greater ease of repair; and (c) reduction of fabric damage since the cylinder remains cool after the prior load is removed. The disadvantages are: (a) the additional labor required to handle the heavy volume; (b) the solvent vapors that escape to the atmosphere during transfer; (c) exposure of the worker to the solvent; and (d) the garments that can fall on the floor during transfer. Currently, about 34 percent of dry cleaning machines in the U.S. are transfer units (Brown, 1993). However, the National Emissions Standards for Hazardous Air Pollutants (NESHAP) for PCE dry cleaning facilities will not allow new transfer machines that use PCE (USEPA, 1993b). Transfer machines cannot be converted to dry-to-dry machines, but they can be retrofitted with vapor control devices and with impermeable enclosures to capture fugitive emissions. Two technologies that can capture the solvent that escapes during clothing transfer are hamper enclosure and room enclosures.

Hamper enclosures consist of a hood or canopy usually made of polyethylene -- impervious plastic that encloses the clothing hamper and the open door of the washer when clothing is removed from the washer of a transfer machine and placed in the dryer. The same canopy is used when transferring the clothes from the hamper to the dryer (Environmental Reporter, 1992).

Room enclosures usually consist of a metal frame covered with clear impervious plastic that encloses both the washer and dryer of a transfer machine. During clothing transfer, a fan is turned on to draw air from outside the room enclosure through louvered door openings in the enclosure and then to a vapor emission control device.

Exhibit 8: Process Flow Diagram for Perchloroethylene Solvent Transfer Dry Cleaning Machines



Source: Adapted from USEPA, 1991b

Second Generation Machines

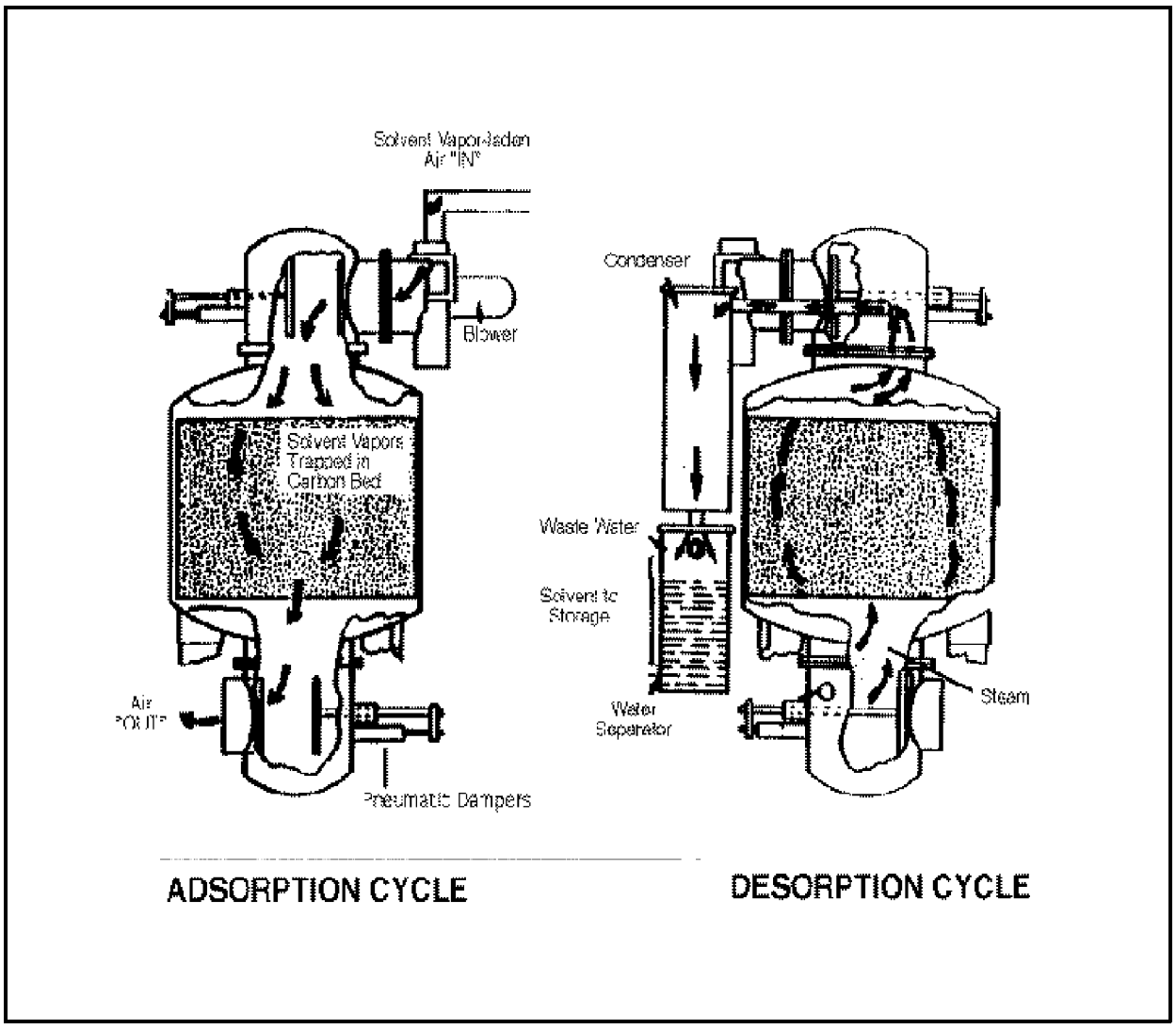
Transfer units were used exclusively until the late 1960s, when a second generation of equipment was introduced to reduce the amount of space the machines occupied and to decrease solvent consumption. Called "dry-to-dry" machines, these units integrate the washing and drying into the same unit. This saves space, requires less labor (because the operator does not have to transfer garments), reduces the amount of solvent vapor that escapes, lowers worker exposure to solvent vapor, and generates a higher solvent mileage (the quantity of solvent needed to clean a quantity of clothes). The disadvantages are lower production and less flexibility, since each machine is committed to a single load during its entire wash-dry cycle. Dry-to-dry machines currently comprise 66 percent of the units used in the U.S. (Brown, 1993). Of these, 32 percent are the vented units

(2nd generation machines) that are designed to send residual vapors to the atmosphere or an external control device (Brown, 1993). The remainder are third or fourth generation machines as described below. Second generation machines can be retrofitted with control devices such as carbon adsorbers (not allowed under current regulations) and refrigerated condensers.

Carbon adsorbers recover solvent by sending contaminated air through a bed of activated carbon that then adsorbs[a] the solvent vapors as shown below. The adsorbed solvent is recovered by passing low-pressure steam (new designs use hot air) through the carbon bed. The mixed steam and solvent vapors are then passed through a water-cooled condenser and are collected in a phase separator.[b] The carbon is dried and reused while the recovered solvent is returned to the dry cleaning system (SRRP, 1990). Carbon adsorbers can be retrofitted to both dry-to-dry and transfer machines. In tests of carbon adsorbers, the removal efficiencies were above 95 percent (USEPA, 1991). However, subsequent data from the California Air Resources Board led the Agency to believe that in actual practice the removal efficiencies are much lower. As a result, the NESHAP does not allow them as an option for primary control except in certain large facilities where carbon adsorbers were installed prior to the promulgation of the regulation, September 22, 1993.

[a] The system will hold molecules on its surface (adsorb) and then release them (desorb) when steam is passed through the bed.

[b] PCE and water are reasonably insoluble in the liquid phase. The cooled PCE/water mixture will enter the phase separator where two layers will form. The PCE will then be drawn off for recycling.



Source: USEPA 1991a

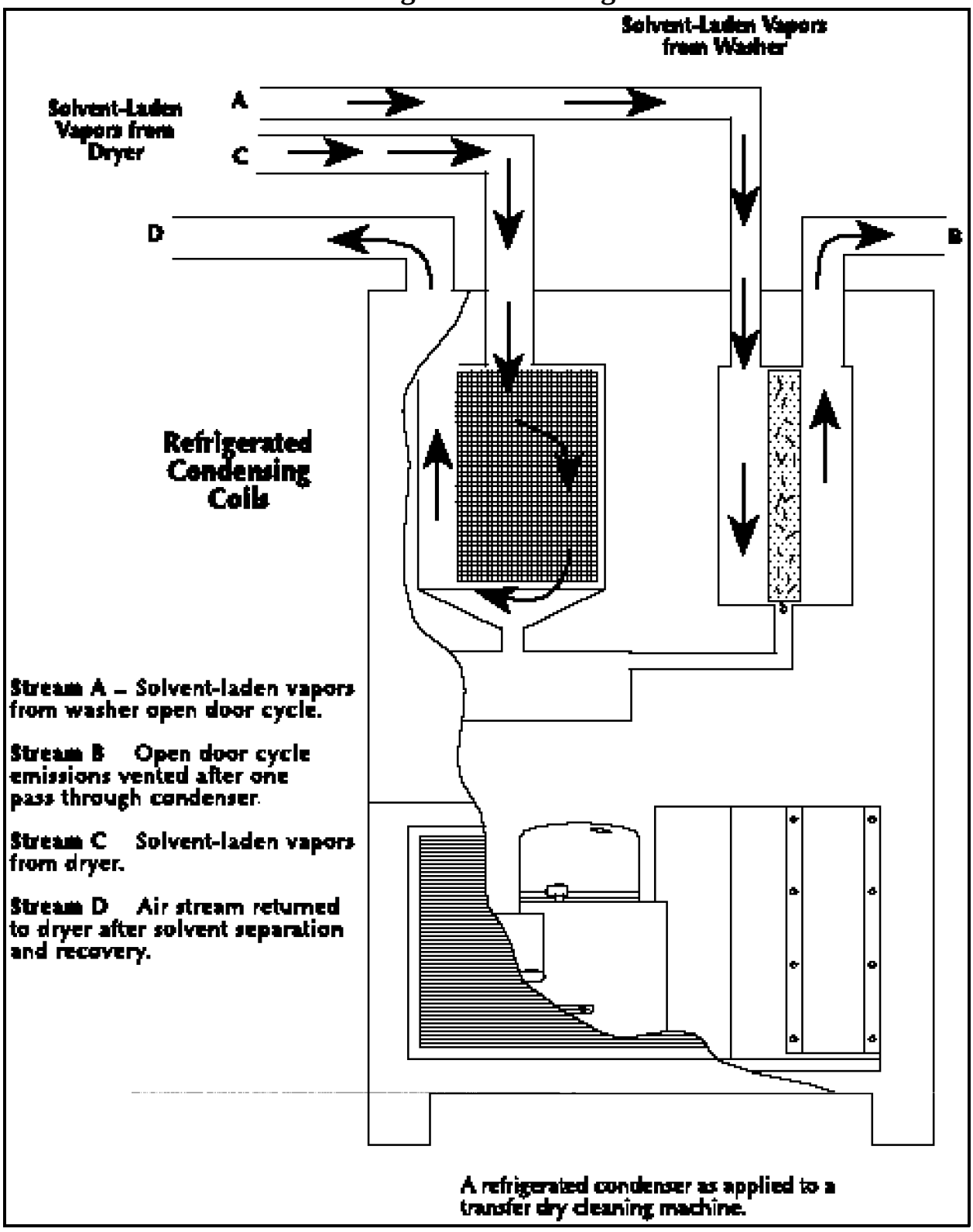
Exhibit 9: Flow Diagram of a Carbon Adsorber

Refrigerated condensers have both an advantage and a disadvantage when compared to carbon adsorbers. They require less maintenance because the refrigerant only needs to be replaced yearly while carbon adsorbers must be desorbed daily.[c] The disadvantage of refrigerated condensers compared to carbon adsorbers is that they cannot be used to control low concentration emission streams (USEPA, 1991a).

[c] The desorption of solvent is accomplished by passing steam (or hot air) through the carbon bed.

Refrigerated condensers remove vapors from the exhaust stream by cooling them to below their dew points. Most new machines have built-in refrigerated condensers, but the condensers can be retrofitted to both transfer and dry-to-dry machines (USEPA, 1991a). Refrigerated condensers achieve about 95 percent control of HAPs when compared to uncontrolled machines (Smith, 1995). The figure below shows a typical refrigerated condenser that can accommodate two HAP (hazardous air pollutant such as PCE)-laden streams. In transfer machines, a stream (Stream A) from the exhaust fan used when the washer door is opened will feed through the condenser and be vented (Stream B) and a stream from the dryer (Stream C) passes through the condenser, and after separation and recovery of the solvent returns the air stream to the dryer (Stream D). Dry-to-dry machines only have the second stream. In transfer machines, the exhaust vapors from the washer are vented (in one pass) through the condenser to the atmosphere, and thus the system can achieve only about 85 percent control of HAPs compared to an uncontrolled machine (USEPA, 1991a).

Exhibit 10: Flow Diagram of a Refrigerated Condenser



Source: USEPA 1991a

Third Generation Machines

The third generation of machines that were designed in the late 1970s and early 1980s are dry-to-dry with built-in refrigerated condensers. These are closed loop machines. A closed-loop machine does not vent air to the atmosphere but recycles it continuously throughout the dry cleaning cycle. The only air exchange with the atmosphere occurs during loading and unloading. Thirty-four percent of the machines currently in use in the U.S. are of this design (Brown, 1993). The advantage is a single unit that will release smaller amounts of vapor. The disadvantage is the greater complexity of machine design which could lead to higher maintenance costs and more frequent breakdowns. The principles of operation are the same as for the second generation machines that use refrigerated condensers.

Fourth Generation Machines

The fourth generation machine is a non-vented, closed loop process with an additional internal vapor recovery device. The control technologies used in these machines are refrigerated condensers and carbon adsorbers. In non-vented, closed loop machines, refrigerated condensers can match carbon adsorber's 95 percent control efficiency (USEPA, 1991a).

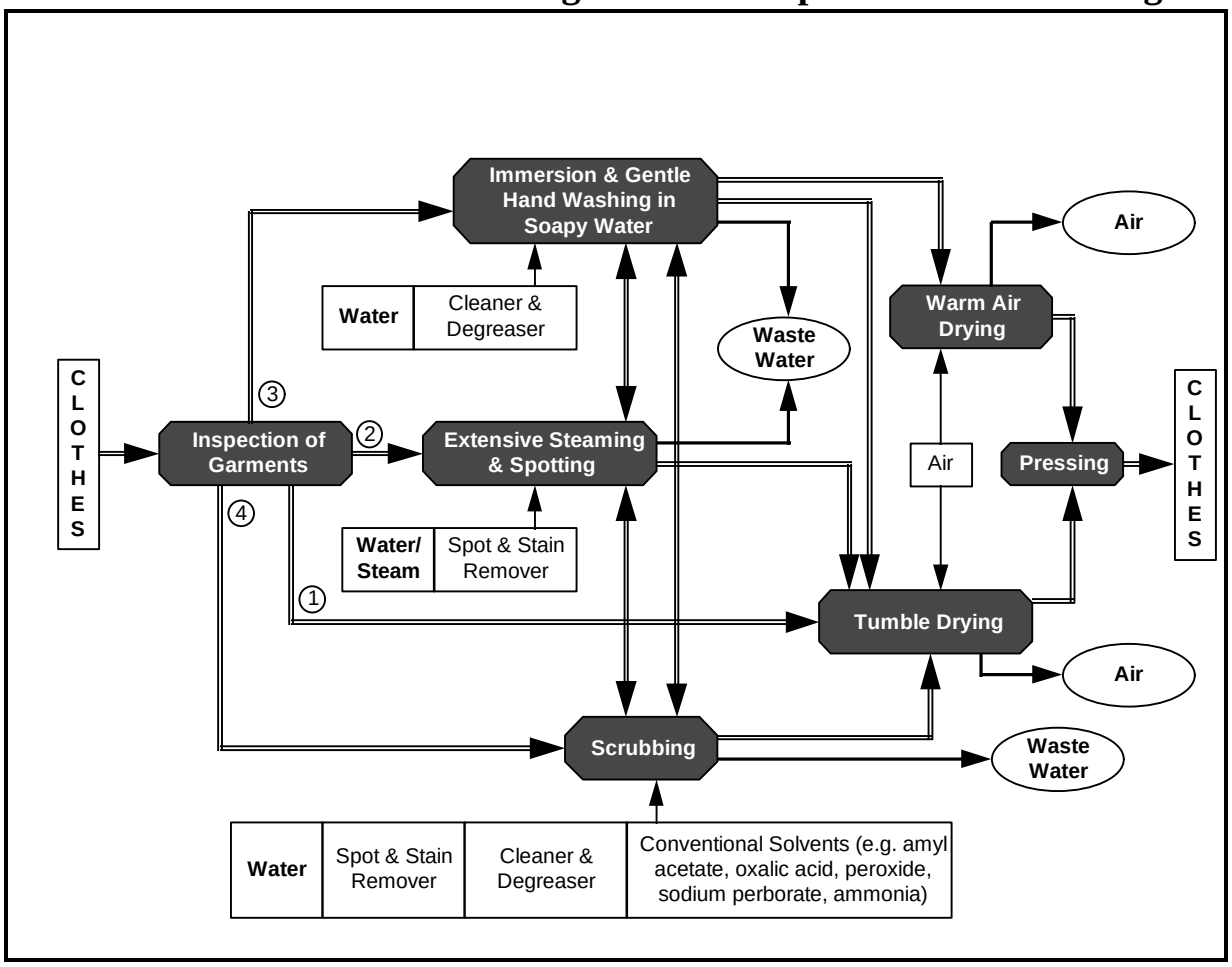
Technological Trends

The recent technological trends have been to increase mileage and to reduce emissions. The increased mileage decreases solvent costs for the facility while the reduced emissions are driven by both environmental and worker protection laws. In September, 1993 the Agency promulgated a National Emission Standard for Hazardous Air Pollutants (NESHAP) for Perchloroethylene Dry Cleaners. These regulations require both existing and new facilities that meet certain size requirements to use designated vapor control technologies and undertake leak detection and equipment repair to prevent fugitive emissions. Occupational Safety and Health Act regulations have imposed limits on worker exposure to perchloroethylene which has led to machine designs that reduce emissions from opening the door after operation. For petroleum solvents the trend has been towards development of solvents with higher flash points to reduce the explosion potential and to solvents with lower volatile organic compound content to reduce VOC emissions.

One of the most important current developments in the industry is the commercialization of aqueous alternatives for a portion of the clothes currently dry cleaned. Multi-process wet cleaning is a method of hand cleaning clothes using a controlled application of water. It is called "multi-

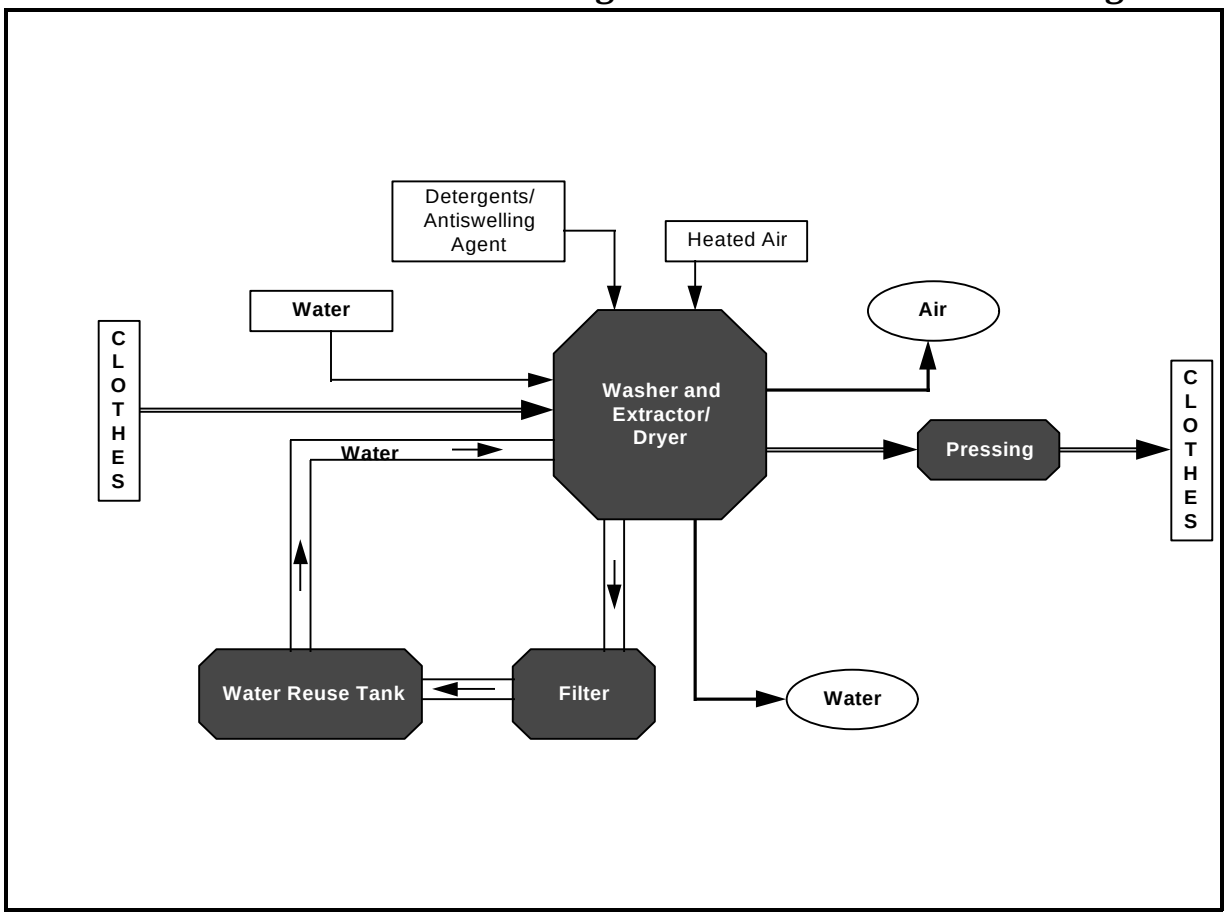
process" because a number of different steps can be included in the process depending upon the fabric type and the soil and stains on the garment. A cleaning technician inspects incoming garments for the degree of soiling and based on that and the fiber type a cleaning process is chosen. The process could be spotting, localized steaming, hand washing or machine washing. A flow diagram of multi-process wet cleaning is shown below. The second aqueous alternative is machine wet cleaning. This process uses a specially designed washing machine that reduces the agitation the clothes are subject to in a traditional laundering process and adds proprietary chemicals (that satisfy the German environmental regulations) to reduce fiber swelling. These machines have been used profitably in Europe (primarily Germany) and are now being introduced into the U.S. market by several manufacturers. The process is diagramed below. The critical test for market acceptance will be the percent of the current U.S. dry cleaning clothes stream that these processes can clean effectively without damaging the garments. Two firms in New York City currently are using a combination of the two aqueous processes and report eighty percent repeat business.

Exhibit 11: Process Flow Diagram of Multiprocess Wet Cleaning



Source: Developed for USEPA Office of Pollution Prevention and Toxics' Design for the Environment Program.

Exhibit 12: Process Flow Diagram of Machine Wet Cleaning



Source: Developed for the USEPA Office of Pollution Prevention and Toxics' Design for the Environment Program.

III.B. Raw Material Inputs and Pollution Outputs

The primary dry cleaning releases are to air (through both fugitive emissions and direct release at the end of the cycle), water (from water that was contained in the clothes and from regenerating carbon adsorbers) and solid waste (such as the muck from stills used to evaporate solvent-contaminated water, the residue remaining after contaminated solvent is filtered, and the carbon from an adsorber). There is an active recycling market for solvent recovered from dry cleaning facilities, although the overall percentage of solvent recovered is not known.

Exhibit 13: Pollution Releases from Dry Cleaning Operations	
Release Medium	Emissions
Air	Solvent spills Fugitive leaks from piping Vapor released with transferring or removing clothes from machines Vapor release from clothes dryers Residual vapor release from clothes after they are removed from the dryer
Water	Water from separator
Hazardous/Solid Waste	Residue from solvent still Filters

IV. CHEMICAL RELEASE AND TRANSFER PROFILE

This section is designed to provide background information on the pollutant releases that are reported by this industry. The best source of comparative pollutant release information is the Toxic Release Inventory System (TRI). Pursuant to the Emergency Planning and Community Right-to-Know Act, TRI includes self-reported facility release and transfer data for over 600 toxic chemicals. Facilities within SIC Codes 20-39 (manufacturing industries) that have more than 10 employees, and that are above weight-based reporting thresholds are required to report TRI on-site releases and off-site transfers. The information presented within the sector notebooks is derived from the most recently available (1993) TRI reporting year (which then included 316 chemicals), and focuses primarily on the on-site releases reported by each sector. Because TRI requires consistent reporting regardless of sector, it is an excellent tool for drawing comparisons across industries.

Although this sector notebook does not present historical information regarding TRI chemical releases over time, please note that in general, toxic chemical releases have been declining. In fact, according to the 1993 Toxic Release Inventory Data Book, reported releases dropped by 42.7 percent between 1988 and 1993. Although on-site releases have decreased, the total amount of reported toxic waste has not declined because the amount of toxic chemicals transferred off-site has increased. Transfers have increased from 3.7 billion pounds in 1991 to 4.7 billion pounds in 1993. Better management practices have led to increases in off-site transfers of toxic chemicals for recycling. More detailed information can be obtained from EPA's annual Toxics Release Inventory Public Data Release book (which is available through the EPCRA Hotline at 800-535-0202), or directly from the Toxic Release Inventory System database. (For user support call 202-260-1531)

Wherever possible, the sector notebooks present TRI data as the primary indicator of chemical release within each industrial category. TRI data provide the type, amount and media receptor of each chemical released or transferred. When other sources of pollutant release data have been obtained, these data have been included to augment the TRI information.

TRI Data Limitations

The reader should keep in mind the following limitations regarding TRI data. Within some sectors, the majority of facilities are not subject to TRI reporting because they are not considered manufacturing industries, or because they are below TRI reporting thresholds. Examples are the mining, dry cleaning, printing, and transportation equipment cleaning

sectors. For these sectors, release information from other sources has been included.

The reader should also be aware that TRI "pounds released" data presented within the notebooks is not equivalent to a "risk" ranking for each industry. Weighting each pound of release equally does not factor in the relative toxicity of each chemical that is released. The Agency is in the process of developing an approach to assign toxicological weights to each chemical released so that one can differentiate between pollutants with significant differences in toxicity. As a preliminary indicator of the environmental impact of the industry's most commonly released chemicals, the notebook briefly summarizes the toxicological properties of the top five chemicals (by weight) reported by each industry.

Definitions Associated With Section IV Data Tables

General Definitions

SIC Code -- is the Standard Industrial Classification (SIC) is a statistical classification standard used for all establishment-based Federal economic statistics. The SIC codes facilitate comparisons between facility and industry data.

TRI Facilities -- are manufacturing facilities that have 10 or more full-time employees and are above established chemical throughput thresholds. Manufacturing facilities are defined as facilities in Standard Industrial Classification primary codes 20 through 39. Facilities must submit estimates for all chemicals that are on the EPA's defined list and are above throughput thresholds.

Data Table Column Heading Definitions

The following definitions are based upon standard definitions developed by EPA's Toxic Release Inventory Program. The categories below represent the possible pollutant destinations that can be reported.

RELEASES -- are an on-site discharge of a toxic chemical to the environment. This includes emissions to the air, discharges to bodies of water, releases at the facility to land, as well as contained disposal into underground injection wells.

Releases to Air (Point and Fugitive Air Emissions) -- Include all air emissions from industry activity. Point emission occur through confined air streams as found in stacks, ducts, or pipes. Fugitive emissions include

losses from equipment leaks, or evaporative losses from impoundments, spills, or leaks.

Releases to Water (Surface Water Discharges) -- encompass any releases going directly to streams, rivers, lakes, oceans, or other bodies of water. Any estimates for storm water runoff and non-point losses must also be included.

Releases to Land -- includes disposal of toxic chemicals in waste to on-site landfills, land treated or incorporation into soil, surface impoundments, spills, leaks, or waste piles. These activities must occur within the facility's boundaries for inclusion in this category.

Underground Injection -- is a contained release of a fluid into a subsurface well for the purpose of waste disposal.

TRANSFERS -- is a transfer of toxic chemicals in wastes to a facility that is geographically or physically separate from the facility reporting under TRI. The quantities reported represent a movement of the chemical away from the reporting facility. Except for off-site transfers for disposal, these quantities do not necessarily represent entry of the chemical into the environment.

Transfers to POTWs -- are wastewaters transferred through pipes or sewers to a publicly owned treatments works (POTW). Treatment and chemical removal depend on the chemical's nature and treatment methods used. Chemicals not treated or destroyed by the POTW are generally released to surface waters or landfilled within the sludge.

Transfers to Recycling -- are sent off-site for the purposes of regenerating or recovering still valuable materials. Once these chemicals have been recycled, they may be returned to the originating facility or sold commercially.

Transfers to Energy Recovery -- are wastes combusted off-site in industrial furnaces for energy recovery. Treatment of a chemical by incineration is not considered to be energy recovery.

Transfers to Treatment -- are wastes moved off-site for either neutralization, incineration, biological destruction, or physical separation. In some cases, the chemicals are not destroyed but prepared for further waste management.

Transfers to Disposal -- are wastes taken to another facility for disposal generally as a release to land or as an injection underground.

IV.A. EPA Toxic Release Inventory for the Dry Cleaning Industry

The Toxics Release Inventory (TRI) covers only manufacturers categorized in two-digit SIC codes 20 through 39. Therefore dry cleaning facilities which are categorized as service industry establishments (SIC 72) are not required to report to TRI. However, solvent releases from dry cleaners were estimated by the Agency for two regulatory actions, the 1993 NESHAP for HAPs (excluding petroleum solvents) and the 1984 Petroleum Dry Cleaners New Source Performance Standard. The information is explained below.

The TRI database contains a detailed compilation of self-reported, facility-specific chemical releases. The top reporting facilities for this sector are listed below. Facilities that have reported only the SIC codes covered under this notebook appear on the first list. The second list contains additional facilities that have reported the SIC code covered within this report, and one or more SIC codes that are not within the scope of this notebook. Therefore, the second list includes facilities that conduct multiple operations -- some that are under the scope of this notebook, and some that are not. Currently, the facility-level data do not allow pollutant releases to be broken apart by industrial process.

IV.B. Summary of Selected Chemicals Released

The following is a synopsis of current scientific toxicity and fate information for the top chemicals (by weight) that facilities within this sector self-reported as released to the environment based upon 1993 TRI data. Because this section is based upon self-reported release data, it does not attempt to provide information on management practices employed by the sector to reduce the release of these chemicals. Information regarding pollutant release reductions over time are available from EPA's TRI and 33/50 programs, or directly from the industrial trade associations that are listed in Section IX of this document. Since these descriptions are cursory, please consult the sources referenced below for a more detailed description of both the chemicals described in this section and the chemicals that appear on the full list of TRI chemicals appearing in Section IV.A.

The brief descriptions provided below were taken from the *1993 Toxics Release Inventory Public Data Release* (EPA, 1994), and the Hazardous Substances Data Bank (HSDB), accessed via TOXNET. TOXNET is a computer system run by the National Library of Medicine. It includes a

number of toxicological databases managed by EPA, National Cancer Institute, and the National Institute for Occupational Safety and Health.[d] HSDB contains chemical-specific information on manufacturing and use, chemical and physical properties, safety and handling, toxicity and biomedical effects, pharmacology, environmental fate and exposure potential, exposure standards and regulations, monitoring and analysis methods, and additional references. The information contained below is based upon exposure assumptions that have been conducted using standard scientific procedures. The effects listed below must be taken in context of these exposure assumptions that are more fully explained within the full chemical profiles in HSDB. For more information on TOXNET, contact the TOXNET help line at 800-231-3766.

Perchloroethylene (tetrachloroethylene) (CAS: 127-18-4)

Toxicity. Chronic exposure to perchloroethylene (PCE) has been linked to damage to the central nervous system and to a lesser extent, the lungs, liver, and kidneys. Exposure to PCE is irritating to the eyes, skin, and respiratory system.

Ecologically, experimental application of PCE to a freshwater pond led to the local extinction of several phytoplankton and zooplankton species.

Carcinogenicity. PCE is a possible human carcinogen via oral exposure.

Environmental Fate. PCE released to surface water or the soil rapidly evaporates. PCE is not expected to significantly biodegrade, bioconcentrate in aquatic organisms, hydrolyze, or significantly adsorb to sediments or soil particles. PCE released to the atmosphere degrades rapidly in the presence of sunlight. It may be subject to washout in rain.

IV.C. Other Data Sources

The primary releases from the dry cleaning industry are associated with the many solvents used. As mentioned in Section III.A., four solvents dominate: perchloroethylene, petroleum solvents, chlorofluorocarbons and trichloroethane. Estimates of national releases of hazardous air pollutants (HAPs) (excludes petroleum solvents) from the baseline estimate prior to the 1993 NESHAP are 90,200 tons/year from the commercial sector, 4,800

[d] Databases included in TOXNET are: CCRIS (Chemical Carcinogenesis Research Information System), DAR T (Developmental and Reproductive Toxicity Database), DBIR (Directory of Biotechnology Information Resources), EMICBACK (Environmental Mutagen Information Center Backfile), GENE-TOX (Genetic Toxicology), HSD B (Hazardous Substances Data Bank), IRIS (Integrated Risk Information System), RTECS (Registry of Toxic Effects of Chemical Substances), and TRI (Toxic Release Inventory).

tons/year from the industrial sector and 990 tons/year from the coin-operated sector for a total of 95,900 tons/year. The total quantity of HAPs disposed of off-site is 47,500 tons per year and is primarily from filtration residue. The recent NESHAP will reduce the air emissions by prohibiting the sale of new transfer equipment, requiring control devices on existing equipment, and requiring new equipment to be fitted with controls. The most recent petroleum solvent emission data available for the dry cleaning industry are from 1982 in support of the 1984 New Source Performance Standards. Applying the release factor of 23 pounds of solvent per 100 pounds of clothes cleaned to the total petroleum-based facility throughput yields total petroleum solvent releases of 51,000 tons per year. These releases are distributed approximately equally between commercial and industrial plants (there are no coin-operated petroleum plants). Over 75 percent of the releases are from dryers with the remainder from a combination of evaporation from filters, still releases and fugitive emissions. These values may slightly overestimate current releases because vapor control technologies such as carbon adsorbers or condensers may have been added to existing machines.

The Aerometric Information Retrieval System (AIRS) contains a wide range of information related to stationary sources of air pollution, including the emissions of a number of air pollutants which may be of concern within a particular industry. Exhibit 14 summarizes annual releases of carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter of 10 microns or less (PM_{10}), sulfur dioxide (SO_2), and volatile organic compounds (VOCs).

Exhibit 14: Pollutant Releases (short tons/year)

Industry Sector	CO	NO_2	PM_{10}	PT	SO_2	VOC
Metal Mining	5,391	28,583	39,359	140,052	84,222	1,283
Nonmetal Mining	4,525	28,804	59,305	167,948	24,129	1,736
Lumber and Wood Production	123,756	42,658	14,135	63,761	9,419	41,423
Furniture and Fixtures	2,069	2,981	2,165	3,178	1,606	59,426
Pulp and Paper	624,291	394,448	35,579	113,571	541,002	96,875
Printing	8,463	4,915	399	1,031	1,728	101,537
Inorganic Chemicals	166,147	103,575	4,107	39,062	182,189	52,091
Organic Chemicals	146,947	236,826	26,493	44,860	132,459	201,888
Petroleum Refining	419,311	380,641	18,787	36,877	648,155	369,058
Rubber and Misc. Plastics	2,090	11,914	2,407	5,355	29,364	140,741
Stone, Clay and Concrete	58,043	338,482	74,623	171,853	339,216	30,262
Iron and Steel	1,518,642	138,985	42,368	83,017	238,268	82,292
Nonferrous Metals	448,758	55,658	20,074	22,490	373,007	27,375
Fabricated Metals	3,851	16,424	1,185	3,136	4,019	102,186
Computer and Office Equipment	24	0	0	0	0	0
Electronics and Other Electrical Equipment and Components	367	1,129	207	293	453	4,854
Motor Vehicles, Bodies, Parts and Accessories	35,303	23,725	2,406	12,853	25,462	101,275
Dry Cleaning	**101**	**179**	**3**	**28**	**152**	**7,310**

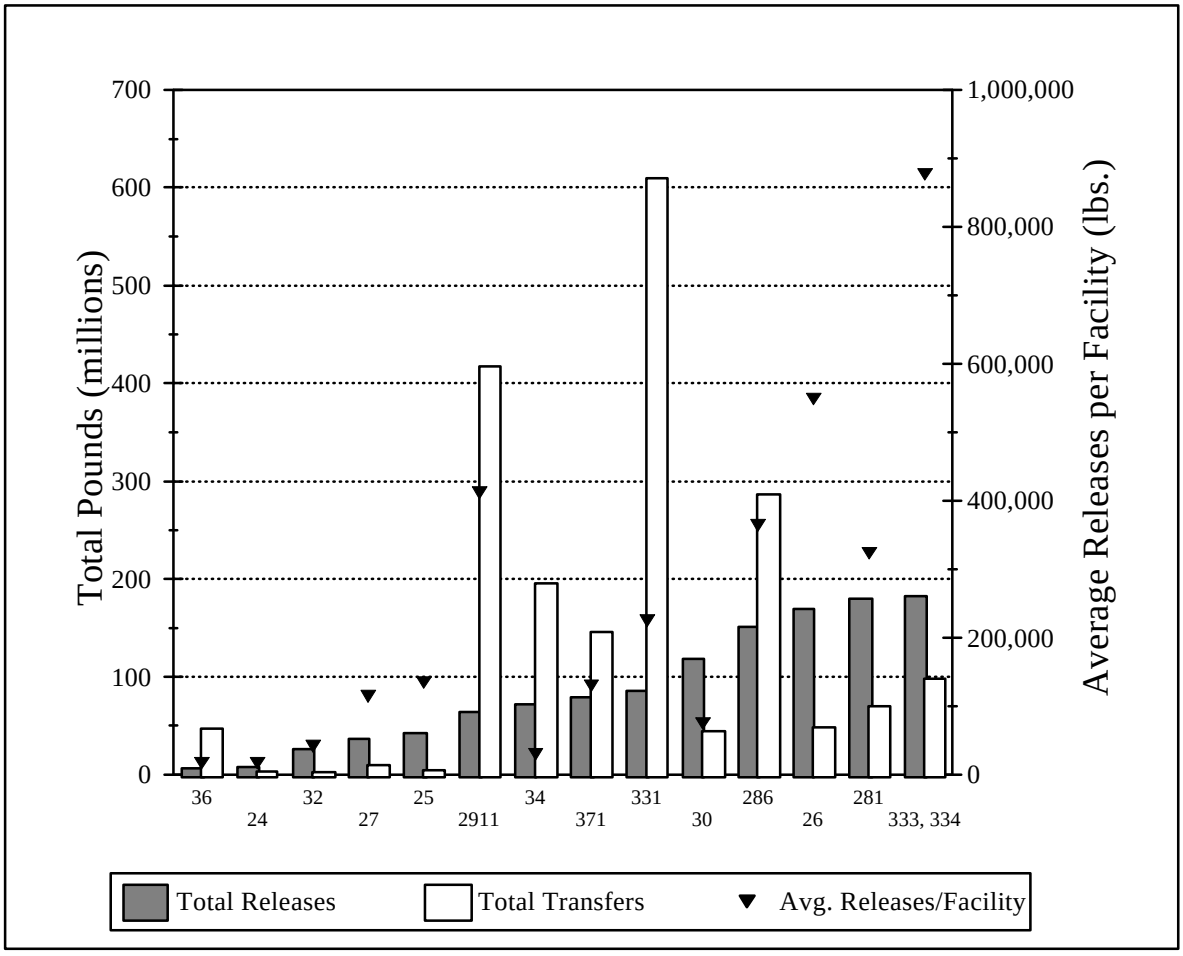
Source: U.S. EPA Office of Air and Radiation, AIRS Database, May 1995.

IV.D. Comparison of Toxic Release Inventory Between Selected Industries

The following information is presented as a comparison of pollutant release and transfer data across industrial categories. It is provided to give a general sense as to the relative scale of releases and transfers within each sector profiled under this project. Please note that the following figure and table do not contain releases and transfers for industrial categories that are not included in this project, and thus cannot be used to draw conclusions regarding the total release and transfer amounts that are reported to TRI. In addition, the dry cleaning industry sector is not subject to TRI reporting and therefore is not presented in Exhibits 14 and 15. Similar information is available within the annual TRI Public Data Release Book.

Exhibit 15 is a graphical representation of a summary of the 1993 TRI data for the dry cleaning industry and the other sectors profiled in these notebooks. The bar graph presents the total TRI releases and total transfers on the left axis and the triangle points show the average releases per facility on the right axis. Industry sectors are presented in the order of increasing total TRI releases. The graph is based on the data shown in Exhibit 16 and is meant to facilitate comparisons between the relative amounts of releases, transfers, and releases per facility both within and between these sectors. The reader should note, however, that differences in the proportion of facilities captured by TRI exist between industry sectors.

Exhibit 15: Summary of 1993 TRI Data:
Releases and Transfers by Industry



SIC Range	Industry Sector	SIC Range	Industry Sector	SIC Range	Industry Sector
36	Electronic Equipment and Components	2911	Petroleum Refining	286	Organic Chemical Mfg.
24	Lumber and Wood Products	34	Fabricated Metals	26	Pulp and Paper
32	Stone, Clay, and Concrete	371	Motor Vehicles, Bodies, Parts, and Accessories	281	Inorganic Chemical Mfg.
27	Printing	331	Iron and Steel	333,334	Nonferrous Metals
25	Wood Furniture and Fixtures	30	Rubber and Misc. Plastics		

Exhibit 16: Toxics Release Inventory Data for Selected Industries

Industry Sector	SIC Range	# TRI Facilities	1993 TRI Releases		1993 TRI Transfers		Total Releases + Transfers (million lbs.)	Average Releases + Transfers per Facility (pounds)
			Total Releases (million lbs.)	Average Releases per Facility (pounds)	Total Transfers (million lbs.)	Average Transfers per Facility (pounds)		
Stone, Clay, and Concrete	32	634	26.6	42,000	2.2	4,000	28.8	46,000
Lumber and Wood Products	24	491	8.4	17,000	3.5	7,000	11.9	24,000
Furniture and Fixtures	25	313	42.2	135,000	4.2	13,000	46.4	148,000
Printing	2711-2789	318	36.5	115,000	10.2	32,000	46.7	147,000
Electronic Equip. and Components	36	406	6.7	17,000	47.1	116,000	53.7	133,000
Rubber and Misc. Plastics	30	1,579	118.4	75,000	45	29,000	163.4	104,000
Motor Vehicles, Bodies, Parts, and Accessories	371	609	79.3	130,000	145.5	239,000	224.8	369,000
Pulp and Paper	2611-2631	309	169.7	549,000	48.4	157,000	218.1	706,000
Inorganic Chem. Mfg.	2812-2819	555	179.6	324,000	70	126,000	249.7	450,000
Petroleum Refining	2911	156	64.3	412,000	417.5	2,676,000	481.9	3,088,000
Fabricated Metals	34	2,363	72	30,000	195.7	83,000	267.7	123,000
Iron and Steel	331	381	85.8	225,000	609.5	1,600,000	695.3	1,825,000
Nonferrous Metals	333, 334	208	182.5	877,000	98.2	472,000	280.7	1,349,000
Organic Chemical Mfg.	2861-2869	417	151.6	364,000	286.7	688,000	438.4	1,052,000
Metal Mining	10	Industry sector not subject to TRI reporting.						
Nonmetal Mining	14	Industry sector not subject to TRI reporting.						
Dry Cleaning	**7216**	**Industry sector not subject to TRI reporting.**						

Source: U.S. EPA, Toxics Release Inventory Database, 1993.

V. POLLUTION PREVENTION OPPORTUNITIES

The best way to reduce pollution is to prevent it in the first place. Some companies have creatively implemented pollution prevention techniques that improve efficiency and increase profits while at the same time minimizing environmental impacts. This can be done in many ways such as reducing material inputs, re-engineering processes to reuse by-products, improving management practices, and employing substitution of toxic chemicals. Some smaller facilities are able to actually get below regulatory thresholds just by reducing pollutant releases through aggressive pollution prevention policies.

In order to encourage these approaches, this section provides both general and company-specific descriptions of some pollution prevention advances that have been implemented within the dry cleaning industry. While the list is not exhaustive, it does provide core information that can be used as the starting point for facilities interested in beginning their own pollution prevention projects. When possible, this section provides information from real activities that can, or are being implemented by this sector -- including a discussion of associated costs, time frames, and expected rates of return. This section provides summary information from activities that may be, or are being implemented by this sector. When possible, information is provided that gives the context in which the technique can be effectively used. Please note that the activities described in this section do not necessarily apply to all facilities that fall within this sector. Facility-specific conditions must be carefully considered when pollution prevention options are evaluated, and the full impacts of the change must examine how each option affects air, land and water pollutant releases.

V.A. Pollution Prevention Opportunities for the Dry Cleaning Industry

A number of major changes within the dry cleaning industry are pushing dry cleaners toward pollution prevention. Projects such as the Design for the Environment, the import of European technologies, and increased attention on the part of state and federal regulators to dry cleaning have caused trade associations, technical assistance offices, and individual establishments to investigate possible techniques for reducing the environmental releases associated with dry cleaning. Pollution prevention approaches over the short term for existing facilities and equipment include: improved operating practices or "good housekeeping" and process and equipment retrofits. Over the long-term, there are several new fabric cleaning processes under development, some of which are commercially available while others are still in the research stage. Market forces might take longer than command and control regulations to influence cleaning technologies, as new technologies will only be adopted as existing equipment is retired and replaced.

As pointed out in Section IV.C, air releases of perchloroethylene and petroleum solvents used to clean the fabric are the primary environmental release from dry cleaning. Spills, inadequate storage and drain disposal of solvents have led to groundwater contamination. In addition, (improper) disposal of solvent laden material, such as filters, as nonhazardous solid waste is of concern.

Because chemicals constitute a large cost for dry cleaners, particularly if drying exhaust is vented directly to the atmosphere, there are significant opportunities to reduce chemical use and possibly reduce operating costs. Reduced chemical use can, in turn, reduce the waste management costs associated with regulatory requirements as well as reduce potential financial liability. Some pollution prevention strategies may reduce risk but involve a higher energy consumption.

Several operating practices can reduce potential solvent exposure if they are used regularly. The practices of importance will vary based on the type of machine. For example, the major release in a transfer machine occurs when clothes are transferred. Because dry-to-dry machines wash and dry in a single container there are no such releases. Listed below are several specific practices that may reduce releases.

Improved Operating Practices- Specific to Transfer Machines

Conduct transfer of solvent saturated clothes from washer to dryer as quickly as possible.

Close dryer door immediately upon completion of transfer.

Improved Operating Practices - All Machines

Clean the filters that precede the carbon filters weekly.

Clean lint screens to avoid clogging fans and condensers.

Open button traps and lint baskets only long enough to clean.

Check baffle assembly in cleaning machine bi-weekly.

Use closed containers for collection and storage of recovered or new solvent.

Equipment Maintenance

Clean drying sensors weekly.

Replace seals regularly on dryer deodorizer and aeration valves.

Replace door gasket on button trap.

Replace gaskets around cleaning machine door or tighten enclosure.

Repair holes in air and exhaust duct.

Secure hose connection and couplings.

Clean lint buildup on cooling condenser coils weekly.

Equipment Modification

Use a hamper enclosure or a room enclosure of impermeable construction to reduce solvent release during transfer. The enclosure should be a complete vapor barrier, especially if the dry cleaner is located in a mixed use residential setting.

Use local exhaust ventilation through washer and dryer doors or exhaust hoods between washer and dryer. The exhaust velocity should be 100 feet per minute. In addition, a supplemental door fan local exhaust system should be included on third generation equipment. This should vent through a small carbon adsorber designed to control PCE emission levels between 5-20 ppmv.
Install general ventilation that changes the air every five minutes.

Place dry cleaning equipment in separate room at negative pressure and operate a separate exhaust system to control the vapors.

Place washer and dryer close together to minimize solvent losses during transfer.

Replace the cartridge filters with spin disk filters that can be cleaned without opening. This would produce fewer fugitive emissions and less hazardous waste.

Install distillation equipment where the still bottoms can be removed without opening the still. This reduces fugitive emissions.

Use carbon adsorber that is regenerated with hot air stripping rather than steam stripping. This reduces the waste stream.

Use double carbon waste water treatment devices to clean up PCE contaminated waste waters. Recycle the treated waste water to the process boiler.

Chemical Substitutions

Alternative petroleum solvents are being developed with higher flash points to reduce the fire hazard.

Alternative petroleum solvents are being developed with lower VOC content (the drawback, however, is the longer drying time).

Use wet cleaning processes.

Major Equipment Upgrades

Add a refrigerated condenser to the machine for primary control, followed perhaps by a carbon adsorber for secondary control.

Replace a transfer machine with a dry-to-dry machine.

Upgrade a dry-to-dry machine with additional control equipment such as a spill container that will catch and recycle solvent spills from the machine.

Replace current machine with a dry-to-dry closed-loop-non-vented machine that contains an integral refrigerated condenser and an integral carbon adsorber.

Technological Innovation

The majority of the hazardous solid waste is generated by the carbon adsorbers. Several technologies are being developed that use a polymer surface for adsorbing the solvent vapor. The surface can be regenerated by heating and, unlike carbon, does not need to be replaced, thus reducing the hazardous waste.

New aqueous processes that do not use organic solvents as the primary solvent were mentioned in Section III.B**.** Multiprocess wet cleaning and machine wet cleaning have both been introduced in several sites in the U.S.

New processes that use other cleaning methods are also under development. Both ultrasonic cleaning and a clothes cleaning method that uses liquid carbon dioxide are under development.

Both pollution prevention and end-of-pipe controls have the potential to substantially reduce the risk from toxic chemical release. The primary difference is the size of the initial investment. For example, to retrofit a dry-to-dry perchloroethylene machine with a refrigerated condenser costs about $7,500 while replacing the existing unit with a fourth generation machine that is closed-loop with a built-in refrigerated condenser and secondary controls is about $47,000 (35 pound machine). However, the total cost per pound of clothes cleaned over a fifteen year lifetime is nearly identical ($0.48 to $0.50) when the solvent savings are considered. The fourth generation machine also produces lower solvent releases to air and water and creates less hazardous waste. However, with 25 percent of commercial dry cleaners taking in annual receipts of less than $28,000, the initial investment required for a new machine may be prohibitive. (Information developed for OPPT's Design for the Environment Program.)

The aqueous processes have recently been introduced to the U.S. market. They reduce pollution considerably by not introducing toxic chemicals as the primary solvent. The multiprocess wet cleaning method is cost competitive with conventional dry cleaning although in preliminary short term testing it is more labor intensive. The performance of these cleaning methods has yet to be determined on a broad scale although the Agency's Design for the Environment (DfE) test site should provide this data within two years.

Liquid carbon dioxide and the ultrasonic cleaning are currently in the development stage. While neither of these technologies uses toxic chemicals, the technical and economic feasibility must be demonstrated before they are true market options.

Most commercial dry cleaners are small shops. Over twenty-five percent of dry cleaners have owners of Korean descent. Commercial dry cleaners may not be in compliance with current regulations because of lack of familiarity with the law or communication barriers. Dry cleaners get much of their technical information from their trade associations and their equipment suppliers who may only have information on their products. This could limit the dissemination of information on innovative alternatives such as machine wet cleaning which tends to be manufactured by washing machine makers rather than dry cleaning machine makers.

The Agency's Design for the Environment program has already participated in a number of outreach activities. These include attending trade shows to discuss alternatives, conducting a demonstration of multiprocess wet cleaning and arranging for a demonstration of several

alternative technologies over the next two years. A full description of the program is provided in Section VIII.A.

Showing the commercial viability of alternatives is likely to produce the largest leverage for pollution prevention since dry cleaners are skeptical that new technologies will clean as well as the current process. However, current fashion trends, the introduction of new washable fabrics and the increased use of casual (washable) clothes in the work place have created opportunities for new processes and the increased use of traditional laundry.

Pollution prevention will reduce the releases of solvents to air and water and reduce the quantity of solid waste produced. Controlling releases will reduce worker exposure, customer exposure and the exposure of residents in multi use buildings that contain dry cleaners. Some pollution prevention efforts may also be cost effective for the dry cleaner if the solvent savings are significant. Finally, the fact that a dry cleaner is environmentally sound could be used in marketing. If customers prefer such "green cleaning," the fact that a cleaner is practicing pollution prevention could increase sales.

VI. SUMMARY OF APPLICABLE FEDERAL STATUTES AND REGULATIONS

This section discusses the Federal regulations that may apply to this sector. The purpose of this section is to highlight, and briefly describe the applicable Federal requirements, and to provide citations for more detailed information. The three following sections are included.

- Section VI.A. contains a general overview of major statutes
- Section VI.B. contains a list of regulations specific to this industry
- Section VI.C. contains a list of pending and proposed regulations

The descriptions within Section VI are intended solely for general information. Depending upon the nature or scope of the activities at a particular facility, these summaries may or may not necessarily describe all applicable environmental requirements. Moreover, they do not constitute formal interpretations or clarifications of the statutes and regulations. For further information, readers should consult the Code of Federal Regulations and other state or local regulatory agencies. EPA Hotline contacts are also provided for each major statute.

VI.A. General Description of Major Statutes

Resource Conservation And Recovery Act

The Resource Conservation And Recovery Act (RCRA) of 1976 which amended the Solid Waste Disposal Act, addresses solid (Subtitle D) and hazardous (Subtitle C) waste management activities. The Hazardous and Solid Waste Amendments (HSWA) of 1984 strengthened RCRA's waste management provisions and added Subtitle I, which governs underground storage tanks (USTs).

Regulations promulgated pursuant to Subtitle C of RCRA (40 CFR Parts 260-299) establish a "cradle-to-grave" system governing hazardous waste from the point of generation to disposal. RCRA hazardous wastes include the specific materials listed in the regulations (commercial chemical products, designated with the code "P" or "U"; hazardous wastes from specific industries/sources, designated with the code "K"; or hazardous wastes from non-specific sources, designated with the code "F") or materials which exhibit a hazardous waste characteristic (ignitability, corrosivity, reactivity, or toxicity and designated with the code "D").

Regulated entities that generate hazardous waste are subject to waste accumulation, manifesting, and record keeping standards. Facilities that treat, store, or dispose of hazardous waste must obtain a permit, either from EPA or from a State agency which EPA has authorized to implement the

permitting program. Subtitle C permits contain general facility standards such as contingency plans, emergency procedures, record keeping and reporting requirements, financial assurance mechanisms, and unit-specific standards. RCRA also contains provisions (40 CFR Part 264 Subpart S and §264.10) for conducting corrective actions which govern the cleanup of releases of hazardous waste or constituents from solid waste management units at RCRA-regulated facilities.

Although RCRA is a Federal statute, many States implement the RCRA program. Currently, EPA has delegated its authority to implement various provisions of RCRA to 46 of the 50 States.

Most RCRA requirements are not industry specific but apply to any company that transports, treats, stores, or disposes of hazardous waste. Here are some important RCRA regulatory requirements:

- **Identification of Solid and Hazardous Wastes** (40 CFR Part 261) lays out the procedure every generator should follow to determine whether the material created is considered a hazardous waste, solid waste, or is exempted from regulation.

- **Standards for Generators of Hazardous Waste** (40 CFR Part 262) establishes the responsibilities of hazardous waste generators including obtaining an ID number, preparing a manifest, ensuring proper packaging and labeling, meeting standards for waste accumulation units, and record keeping and reporting requirements. Generators can accumulate hazardous waste for up to 90 days (or 180 days depending on the amount of waste generated) without obtaining a permit.

- **Land Disposal Restrictions** (LDRs) are regulations prohibiting the disposal of hazardous waste on land without prior treatment. Under the LDRs (40 CFR 268), materials must meet land disposal restriction (LDR) treatment standards prior to placement in a RCRA land disposal unit (landfill, land treatment unit, waste pile, or surface impoundment). Wastes subject to the LDRs include solvents, electroplating wastes, heavy metals, and acids. Generators of waste subject to the LDRs must provide notification of such to the designated TSD facility to ensure proper treatment prior to disposal.

- **Used Oil** storage and disposal regulations (40 CFR Part 279) do not define **Used Oil Management Standards** impose management requirements affecting the storage, transportation, burning, processing, and re-refining of the used oil. For parties that merely

generate used oil, regulations establish storage standards. For a party considered a used oil marketer (one who generates and sells off-specification used oil directly to a used oil burner), additional tracking and paperwork requirements must be satisfied.

- **Tanks and Containers** used to store hazardous waste with a high volatile organic concentration must meet emission standards under RCRA. Regulations (40 CFR Part 264-265, Subpart CC) require generators to test the waste to determine the concentration of the waste, to satisfy tank and container emissions standards, and to inspect and monitor regulated units. These regulations apply to all facilities who store such waste, including generators operating under the 90-day accumulation rule.

- **Underground Storage Tanks** (USTs) containing petroleum and hazardous substance are regulated under Subtitle I of RCRA. Subtitle I regulations (40 CFR Part 280) contain tank design and release detection requirements, as well as financial responsibility and corrective action standards for USTs. The UST program also establishes increasingly stringent standards, including upgrade requirements for existing tanks, that must be met by 1998.

- **Boilers and Industrial Furnaces** (BIFs) that use or burn fuel containing hazardous waste must comply with strict design and operating standards. BIF regulations (40 CFR Part 266, Subpart H) address unit design, provide performance standards, require emissions monitoring, and restrict the type of waste that may be burned.

EPA's RCRA/Superfund/UST Hotline, at (800) 424-9346, responds to questions and distributes guidance regarding all RCRA regulations. The RCRA Hotline operates weekdays from 8:30 a.m. to 7:30 p.m., ET, excluding Federal holidays.

Comprehensive Environmental Response, Compensation, And Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), a 1980 law commonly known as Superfund, authorizes EPA to respond to releases, or threatened releases, of hazardous substances that may endanger public health, welfare, or the environment. CERCLA also enables EPA to force parties responsible for environmental contamination to clean it up or to reimburse the Superfund for response costs incurred by EPA. The Superfund Amendments and Reauthorization Act (SARA) of 1986 revised various sections of CERCLA, extended the taxing authority for the Superfund, and created a free-standing law, SARA

Title III, also known as the Emergency Planning and Community Right-to-Know Act (EPCRA).

The CERCLA **hazardous substance release reporting regulations** (40 CFR Part 302) direct the person in charge of a facility to report to the National Response Center (NRC) any environmental release of a hazardous substance which exceeds a reportable quantity. Reportable quantities are defined and listed in 40 CFR §302.4. A release report may trigger a response by EPA, or by one or more Federal or State emergency response authorities.

EPA implements **hazardous substance responses** according to procedures outlined in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Part 300). The NCP includes provisions for permanent cleanups, known as remedial actions, and other cleanups referred to as "removals." EPA generally takes remedial actions only at sites on the National Priorities List (NPL), which currently includes approximately 1300 sites. Both EPA and states can act at other sites; however, EPA provides responsible parties the opportunity to conduct removal and remedial actions and encourages community involvement throughout the Superfund response process.

EPA's RCRA/Superfund/UST Hotline, at (800) 424-9346, answers questions and references guidance pertaining to the Superfund program. The CERCLA Hotline operates weekdays from 8:30 a.m. to 7:30 p.m., ET, excluding Federal holidays.

Emergency Planning And Community Right-To-Know Act

The Superfund Amendments and Reauthorization Act (SARA) of 1986 created the Emergency Planning and Community Right-to-Know Act (EPCRA, also known as SARA Title III), a statute designed to improve community access to information about chemical hazards and to facilitate the development of chemical emergency response plans by State and local governments. EPCRA required the establishment of State emergency response commissions (SERCs), responsible for coordinating certain emergency response activities and for appointing local emergency planning committees (LEPCs).

EPCRA and the EPCRA regulations (40 CFR Parts 350-372) establish four types of reporting obligations for facilities which store or manage specified chemicals:

- **EPCRA §302** requires facilities to notify the SERC and LEPC of the presence of any "extremely hazardous substance" (the list of

such substances is in 40 CFR Part 355, Appendices A and B) if it has such substance in excess of the substance's threshold planning quantity, and directs the facility to appoint an emergency response coordinator.

- **EPCRA §304** requires the facility to notify the SERC and the LEPC in the event of a release exceeding the reportable quantity of a CERCLA hazardous substance or an EPCRA extremely hazardous substance.

- **EPCRA §311 and §312** require a facility at which a hazardous chemical, as defined by the Occupational Safety and Health Act, is present in an amount exceeding a specified threshold to submit to the SERC, LEPC and local fire department material safety data sheets (MSDSs) or lists of MSDS's and hazardous chemical inventory forms (also known as Tier I and II forms). This information helps the local government respond in the event of a spill or release of the chemical.

- **EPCRA §313** requires manufacturing facilities included in SIC codes 20 through 39, which have ten or more employees, and which manufacture, process, or use specified chemicals in amounts greater than threshold quantities, to submit an annual toxic chemical release report. This report, commonly known as the Form R, covers releases and transfers of toxic chemicals to various facilities and environmental media, and allows EPA to compile the national Toxic Release Inventory (TRI) database.

All information submitted pursuant to EPCRA regulations is publicly accessible, unless protected by a trade secret claim.

EPA's EPCRA Hotline, at (800) 535-0202, answers questions and distributes guidance regarding the emergency planning and community right-to-know regulations. The EPCRA Hotline operates weekdays from 8:30 a.m. to 7:30 p.m., ET, excluding Federal holidays.

Clean Water Act

The primary objective of the Federal Water Pollution Control Act, commonly referred to as the Clean Water Act (CWA), is to restore and maintain the chemical, physical, and biological integrity of the nation's surface waters. Pollutants regulated under the CWA include "priority" pollutants, including various toxic pollutants; "conventional" pollutants, such as biochemical oxygen demand (BOD), total suspended solids (TSS),

fecal coliform, oil and grease, and pH; and "non-conventional" pollutants, including any pollutant not identified as either conventional or priority.

The CWA regulates both direct and indirect discharges. The **National Pollutant Discharge Elimination System (NPDES)** program (CWA §402) controls direct discharges into navigable waters. Direct discharges or "point source" discharges are from sources such as pipes and sewers. NPDES permits, issued by either EPA or an authorized State (EPA has presently authorized forty States to administer the NPDES program), contain industry-specific, technology-based and/or water quality-based limits, and establish pollutant monitoring and reporting requirements. A facility that intends to discharge into the nation's waters must obtain a permit prior to initiating its discharge. A permit applicant must provide quantitative analytical data identifying the types of pollutants present in the facility's effluent. The permit will then set forth the conditions and effluent limitations under which a facility may make a discharge.
A NPDES permit may also include discharge limits based on Federal or State water quality criteria or standards, that were designed to protect designated uses of surface waters, such as supporting aquatic life or recreation. These standards, unlike the technological standards, generally do not take into account technological feasibility or costs. Water quality criteria and standards vary from State to State, and site to site, depending on the use classification of the receiving body of water. Most States follow EPA guidelines which propose aquatic life and human health criteria for many of the 126 priority pollutants.

Storm Water Discharges

In 1987 the CWA was amended to require EPA to establish a program to address **storm water discharges**. In response, EPA promulgated the NPDES storm water permit application regulations. Storm water discharge associated with industrial activity means the discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to manufacturing, processing, or raw material storage areas at an industrial plant (40 CFR 122.26(b)(14)). These regulations require that facilities with the following storm water discharges apply for an NPDES permit: (1) a discharge associated with industrial activity; (2) a discharge from a large or medium municipal storm sewer system; or (3) a discharge which EPA or the State determines to contribute to a violation of a water quality standard or is a significant contributor of pollutants to waters of the United States.

The term "storm water discharge associated with industrial activity" means a storm water discharge from one of 11 categories of industrial activity defined at 40 CFR 122.26. Six of the categories are defined by SIC codes

while the other five are identified through narrative descriptions of the regulated industrial activity. If the primary SIC code of the facility is one of those identified in the regulations, the facility is subject to the storm water permit application requirements. If any activity at a facility is covered by one of the five narrative categories, storm water discharges from those areas where the activities occur are subject to storm water discharge permit application requirements.

Those facilities/activities that are subject to storm water discharge permit application requirements are identified below. To determine whether a particular facility falls within one of these categories, the regulation should be consulted.

Category i: Facilities subject to storm water effluent guidelines, new source performance standards, or toxic pollutant effluent standards.

Category ii: Facilities classified as SIC 24-lumber and wood products (except wood kitchen cabinets); SIC 26-paper and allied products (except paperboard containers and products); SIC 28-chemicals and allied products (except drugs and paints); SIC 291-petroleum refining; and SIC 311-leather tanning and finishing.

Category iii: Facilities classified as SIC 10-metal mining; SIC 12-coal mining; SIC 13-oil and gas extraction; and SIC 14-nonmetallic mineral mining.

Category iv: Hazardous waste treatment, storage, or disposal facilities.

Category v: Landfills, land application sites, and open dumps that receive or have received industrial wastes.

Category vi: Facilities classified as SIC 5015-used motor vehicle parts; and SIC 5093-automotive scrap and waste material recycling facilities.

Category vii: Steam electric power generating facilities.

Category viii: Facilities classified as SIC 40-railroad transportation; SIC 41-local passenger transportation; SIC 42-trucking and warehousing (except public warehousing and storage); SIC 43-U.S. Postal Service; SIC 44-water transportation; SIC 45-transportation by air; and SIC 5171-petroleum bulk storage stations and terminals.

Category ix: Sewage treatment works.

Category x: Construction activities except operations that result in the disturbance of less than five acres of total land area.

Category xi: Facilities classified as SIC 20-food and kindred products; SIC 21-tobacco products; SIC 22-textile mill products; SIC 23-apparel related products; SIC 2434-wood kitchen cabinets manufacturing; SIC 25-furniture and fixtures; SIC 265-paperboard containers and boxes; SIC 267-converted paper and paperboard products; SIC 27-printing, publishing, and allied industries; SIC 283-drugs; SIC 285-paints, varnishes, lacquer, enamels, and allied products; SIC 30-rubber and plastics; SIC 31-leather and leather products (except leather and tanning and finishing); SIC 323-glass products; SIC 34-fabricated metal products (except fabricated structural metal); SIC 35-industrial and commercial machinery and computer equipment; SIC 36-electronic and other electrical equipment and components; SIC 37-transportation equipment (except ship and boat building and repairing); SIC 38-measuring, analyzing, and controlling instruments; SIC 39-miscellaneous manufacturing industries; and SIC 4221-4225-public warehousing and storage.

Pretreatment Program

Another type of discharge that is regulated by the CWA is one that goes to a publicly-owned treatment works (POTWs). The national **pretreatment program** (CWA §307(b)) controls the indirect discharge of pollutants to POTWs by "industrial users." Facilities regulated under §307(b) must meet certain pretreatment standards. The goal of the pretreatment program is to protect municipal wastewater treatment plants from damage that may occur when hazardous, toxic, or other wastes are discharged into a sewer system and to protect the quality of sludge generated by these plants. Discharges to a POTW are regulated primarily by the POTW itself, rather than the State or EPA.

EPA has developed technology-based standards for industrial users of POTWs. Different standards apply to existing and new sources within each category. "Categorical" pretreatment standards applicable to an industry on a nationwide basis are developed by EPA. In addition, another kind of pretreatment standard, "local limits," are developed by the POTW in order to assist the POTW in achieving the effluent limitations in its NPDES permit.

Regardless of whether a State is authorized to implement either the NPDES or the pretreatment program, if it develops its own program, it may enforce requirements more stringent than Federal standards.

EPA's Office of Water, at (202) 260-5700, will direct callers with questions about the CWA to the appropriate EPA office. EPA also maintains a bibliographic database of Office of Water publications which can be accessed through the Ground Water and Drinking Water resource center, at (202) 260-7786.

Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) mandates that EPA establish regulations to protect human health from contaminants in drinking water. The law authorizes EPA to develop national drinking water standards and to create a joint Federal-State system to ensure compliance with these standards. The SDWA also directs EPA to protect underground sources of drinking water through the control of underground injection of liquid wastes.

EPA has developed primary and secondary drinking water standards under its SDWA authority. EPA and authorized States enforce the primary drinking water standards, which are, contaminant-specific concentration limits that apply to certain public drinking water supplies. Primary drinking water standards consist of maximum contaminant level goals (MCLGs), which are non-enforceable health-based goals, and maximum contaminant levels (MCLs), which are enforceable limits set as close to MCLGs as possible, considering cost and feasibility of attainment.

The SDWA **Underground Injection Control** (UIC) program (40 CFR Parts 144-148) is a permit program which protects underground sources of drinking water by regulating five classes of injection wells. UIC permits include design, operating, inspection, and monitoring requirements. Wells used to inject hazardous wastes must also comply with RCRA corrective action standards in order to be granted a RCRA permit, and must meet applicable RCRA land disposal restrictions standards. The UIC permit program is primarily State-enforced, since EPA has authorized all but a few States to administer the program.

The SDWA also provides for a Federally-implemented Sole Source Aquifer program, which prohibits Federal funds from being expended on projects that may contaminate the sole or principal source of drinking water for a given area, and for a State-implemented Wellhead Protection program, designed to protect drinking water wells and drinking water recharge areas.

EPA's Safe Drinking Water Hotline, at (800) 426-4791, answers questions and distributes guidance pertaining to SDWA standards. The Hotline

operates from 9:00 a.m. through 5:30 p.m., ET, excluding Federal holidays.

Toxic Substances Control Act

The Toxic Substances Control Act (TSCA) granted EPA authority to create a regulatory framework to collect data on chemicals in order to evaluate, assess, mitigate, and control risks which may be posed by their manufacture, processing, and use. TSCA provides a variety of control methods to prevent chemicals from posing unreasonable risk.

TSCA standards may apply at any point during a chemical's life cycle. Under TSCA §5, EPA has established an inventory of chemical substances. If a chemical is not already on the inventory, and has not been excluded by TSCA, a premanufacture notice (PMN) must be submitted to EPA prior to manufacture or import. The PMN must identify the chemical and provide available information on health and environmental effects. If available data are not sufficient to evaluate the chemical's effects, EPA can impose restrictions pending the development of information on its health and environmental effects. EPA can also restrict significant new uses of chemicals based upon factors such as the projected volume and use of the chemical.

Under TSCA §6, EPA can ban the manufacture or distribution in commerce, limit the use, require labeling, or place other restrictions on chemicals that pose unreasonable risks. Among the chemicals EPA regulates under §6 authority are asbestos, chlorofluorocarbons (CFCs), and polychlorinated biphenyls (PCBs).

EPA's TSCA Assistance Information Service, at (202) 554-1404, answers questions and distributes guidance pertaining to Toxic Substances Control Act standards. The Service operates from 8:30 a.m. through 4:30 p.m., ET, excluding Federal holidays.

Clean Air Act

The Clean Air Act (CAA) and its amendments, including the Clean Air Act Amendments (CAAA) of 1990, are designed to "protect and enhance the nation's air resources so as to promote the public health and welfare and the productive capacity of the population." The CAA consists of six sections, known as Titles, which direct EPA to establish national standards for ambient air quality and for EPA and the States to implement, maintain, and enforce these standards through a variety of mechanisms. Under the CAAA, many facilities will be required to obtain permits for the first time. State and local governments oversee, manage, and enforce many of the

requirements of the CAAA. CAA regulations appear at 40 CFR Parts 50-99.

Pursuant to Title I of the CAA, EPA has established national ambient air quality standards (NAAQSs) to limit levels of "criteria pollutants," including carbon monoxide, lead, nitrogen dioxide, particulate matter, ozone, and sulfur dioxide. Geographic areas that meet NAAQSs for a given pollutant are classified as attainment areas; those that do not meet NAAQSs are classified as non-attainment areas. Under §110 of the CAA, each State must develop a State Implementation Plan (SIP) to identify sources of air pollution and to determine what reductions are required to meet Federal air quality standards.

Title I also authorizes EPA to establish New Source Performance Standards (NSPSs), which are nationally uniform emission standards for new stationary sources falling within particular industrial categories. NSPSs are based on the pollution control technology available to that category of industrial source but allow the affected industries the flexibility to devise a cost-effective means of reducing emissions.

Under Title I, EPA establishes and enforces National Emission Standards for Hazardous Air Pollutants (NESHAPs), nationally uniform standards oriented towards controlling particular hazardous air pollutants (HAPs). Title III of the CAAA further directed EPA to develop a list of sources that emit any of 189 HAPs, and to develop regulations for these categories of sources. To date EPA has listed 174 categories and developed a schedule for the establishment of emission standards. The emission standards will be developed for both new and existing sources based on "maximum achievable control technology" (MACT). The MACT is defined as the control technology achieving the maximum degree of reduction in the emission of the HAPs, taking into account cost and other factors.

Title II of the CAA pertains to mobile sources, such as cars, trucks, buses, and planes. Reformulated gasoline, automobile pollution control devices, and vapor recovery nozzles on gas pumps are a few of the mechanisms EPA uses to regulate mobile air emission sources.

Title IV establishes a sulfur dioxide emissions program designed to reduce the formation of acid rain. Reduction of sulfur dioxide releases will be obtained by granting to certain sources limited emissions allowances, which, beginning in 1995, will be set below previous levels of sulfur dioxide releases.

Title V of the CAAA of 1990 created a permit program for all "major sources" (and certain other sources) regulated under the CAA. One

purpose of the operating permit is to include in a single document all air emissions requirements that apply to a given facility. States are developing the permit programs in accordance with guidance and regulations from EPA. Once a State program is approved by EPA, permits will be issued and monitored by that State.

Title VI is intended to protect stratospheric ozone by phasing out the manufacture of ozone-depleting chemicals and restrict their use and distribution. Production of Class I substances, including 15 kinds of chlorofluorocarbons (CFCs), will be phased out entirely by the year 2000, while certain hydrochlorofluorocarbons (HCFCs) will be phased out by 2030.

EPA's Control Technology Center, at (919) 541-0800, provides general assistance and information on CAA standards. The Stratospheric Ozone Information Hotline, at (800) 296-1996, provides general information about regulations promulgated under Title VI of the CAA, and EPA's EPCRA Hotline, at (800) 535-0202, answers questions about accidental release prevention under CAA §112(r). In addition, the Technology Transfer Network Bulletin Board System (modem access (919) 541-5742)) includes recent CAA rules, EPA guidance documents, and updates of EPA activities.

VI.B. Industry Specific Regulatory Requirements

The dry cleaning industry is becoming increasingly regulated at the Federal, State and local levels. Some of the regulations are directed specifically at dry cleaners such as the new National Emission Standard for Hazardous Air Pollutants (NESHAP) for Perchloroethylene Dry Cleaning. Other regulations are more general but are also likely to affect a significant part of the industry such as standards on underground tank storage. The major Federal laws that affect dry cleaners are identified below, as well as a few state regulations that may be indicators of national trends.

Occupational Safety and Health Act

The Occupational Safety and Health Administration proposed a 25 part per million permissible exposure level (PEL) for perchloroethylene that was to take effect on January 19, 1989. Before December 31, 1993, the PEL could be met by using personal protective equipment; however, after that date the PEL needed to be met by controls. Development of new dry cleaning machines (fourth generation) with recycling air and additional controls was underway to meet the requirement when the proposed limit was remanded in March 23, 1993, because of legal and administrative

technicalities. The PEL reverted to 100 ppm; however, some states have already included the 25 ppm level in their regulations.

Clean Air Act Amendments of 1990

A number of provisions of the Clean Air Act Amendments (CAAA) of 1990 affect the dry cleaning industry. The most recent is the September 1993 promulgation of the National Emission Standards for Hazardous Air Pollutants (NESHAP) for the Perchloroethylene Dry Cleaning Industry covering the 80 percent of the industry that uses perchloroethylene solvent. These standards prohibit the sale of new transfer machines (although existing, those machines installed prior to December 1993, transfer machines are allowed), require retrofitting of existing (defined as installed prior to December 1993) dry cleaning equipment with control devices (if they fall under the large area and major source classifications) and require new machines to be sold with such technology (40 CFR §63.320). Title VI of the Clean Air Act Amendments of 1990 calls for a ban on chlorofluorocarbons in the year 2000 and on trichloroethane in 2002 because of their ozone depleting potential. In February of 1992, President Bush announced that the ban on CFCs and TCA would be effective in the United States on December 31, 1995. The Agency also issued New Source Performance Standards (NSPS) for petroleum-based dry cleaners in 1984 (petroleum-based dry cleaners represent less than 15 percent of the market) (49 FR 37328). These are applicable in CAA non-attainment areas and may also have been adopted by individual states. They set limits on solvent loss from drying, set standards on the use of filters, and require leaks to be repaired in a timely fashion. Dry cleaners must add control devices to reduce solvent loss from the washer and dryer as well as the filters. In addition, they must monitor their machines more closely for leaks.

Comprehensive Environmental Response, Compensation and Liability Act (1980) and Superfund Amendments and Reauthorization Act (1986)

Dry cleaners or their landlords may be held joint and severally liable for perchloroethylene contamination of the site under the Comprehensive Environmental Response, Compensation and Liability Act (Superfund) (40 CFR §305). The contamination may occur by having PCE containing waste water leak through sewer pipes or by leaks of PCE during normal operation.

Resource Conservation and Recovery Act

Under the Resource Conservation and Recovery Act (RCRA) dry cleaners who generate 100 kilograms (220 pounds) or more of perchloroethylene

solid wastes (hazardous waste code D039) such as still bottoms, cartridge filters and filter muck each month are regulated under RCRA and must dispose of their wastes at a licensed hazardous waste facility (40 CFR. §260-270). Small quantity generators are defined as those who generate less than 100 kilograms and are exempt from this regulation (40 CFR §261.5). The slightly contaminated waste water generated by dry cleaners from various sources is considered hazardous waste under RCRA because it was derived from an F002 waste. The toxicity characteristic leaching procedure (TC) cutoff for perchloroethylene is 0.7 ppm. Typical separator water contains about 150 ppm and is therefore considered hazardous because it exceeds the TC level.

Underground Storage Tanks

Dry cleaning facilities that store either petroleum or perchloroethylene in an underground storage tank are subject to the Agency's underground storage tank regulations which require that the tank must be protected from corrosion, be equipped with devices that prevent spills and overfills and must have a leak detection method that provides monitoring for leaks at least every 30 days (40 CFR §265.190-196).

Clean Water Act

Discharges to a POTW - Facilities discharging wastewater to a sewer are often subject to restrictions required under the Clean Water Act (CWA). These restrictions are established by the local sewerage authority to prevent significant interference with the treatment facility or pass-through of pollutants not removed by treatment (40 CFR §125). The specific requirements include: notifying the POTW of discharges that could cause problems at the POTW, monitoring and record keeping as established by the POTW and a one-time notice of the discharge of hazardous waste, specifically if more than 33 pounds/month.

State Regulations

Several states have developed additional dry cleaning regulations. New York and California serve as examples.

New York

A negotiating committee of organizations representing dry cleaners, equipment manufacturers, consumer interests and regulatory agencies reached conceptual agreement in March 1994 on revised regulations to control emissions from dry cleaning facilities in New York State. The regulations include requirements for operator training and certification,

equipment certification, inspection and monitoring, and stringent new equipment standards which include the retrofitting of existing equipment. A finalized draft will be released before the end of the year for public comment.

The agreement calls for the phased replacement of older dry cleaning equipment with state-of-the-art closed-loop machines that use a refrigerated condenser and an integrated carbon adsorber. The regulations call for the complete phase out of older transfer machines by 1996, the addition of vapor barriers or room enclosures by late 1995 for dry cleaners using older machines, and room ventilation systems providing a complete air exchange every five minutes.

The agreement specifies that manufacturers and/or vendors of new dry cleaning equipment must have their equipment tested and certified that it meets certain standards before it can be installed. The committee is developing new standards covering the operation and maintenance of dry cleaning facilities that will go into effect in 1996. (Contacts: Lenore Kuwik 518-457-2224 and Michael Barylski 607-753-3095 at the NY State Department of Environmental Conservation)

California

The California regulations are contained in the Airborne Toxic Control Measure (CATCM) for Emissions of Perchloroethylene from Dry Cleaning Operations (17 and 25 CCR §93109). The requirements for existing and new facilities regarding dry cleaning equipment include initial notification of installation, annual reporting to the state, maintenance of good operating practices to reduce emissions, and fugitive emissions control when applying water repellent using PCE as the solvent. Existing facilities must use either a converted closed-loop machine with a primary control system or a closed-loop machine with a primary control system. New facilities are required to use a closed-loop machine with both primary and secondary control systems once their district's have approved the ATCM.

Districts within California are allowed to supersede the ATCM if district regulations are more stringent than State regulations. At this time, only the Bay Area and the South Coast Air Quality Management Districts have proposals to supersede the ATCM; other districts are assumed to be following the ATCM. (Contact: Todd Wong, California Air Resources Board, 916 322-8285)

The **Bay Area Air Quality Management District** (BAAQMD) has proposed stricter controls than the ATCM including secondary controls and vapor barrier rooms in residential facilities and ventilation systems in

non-residential facilities. They also allow evaporators to be used with certain minor criteria attached. (Contact: Scott Lutz, Bay Area Air Quality Management District, 415-749-4676)

The **South Coast Air Quality Management District** (SQAQMD) Proposal 1421 includes the control requirements in California's ATCM while keeping the NESHAP requirements for record keeping, inspection, and repair. Reporting requirements are derived from a combination of both the NESHAP and the ATCM. Specifically, Proposal 1421 requires that relocating facilities obtain a permit as if they were new facilities, waste water elimination systems be used, and facilities keep records of their solvent use for five years.

The SCAQMD is also creating the requirements for establishing a list of approved equipment. The basic structure is that the manufacturers/ distributors will demonstrate the 1421 compliance of their equipment. Once the equipment has been approved, it will be added to the list of equipment considered in compliance with the regulations. The SCAQMD hopes this will facilitate dry cleaner adherence to the regulations. (Contact: Pierre Sycip, South Coast Air Quality Management District, 909-396-3095)

VI.C. Pending and Proposed Regulatory Requirements

Petroleum solvents are currently regulated under the new source performance standards for VOCs and will be listed as a source category for toxic substances in the year 2000. (Contact: Steve Shedd, U.S. EPA, 919-541-5397)

VII. COMPLIANCE AND ENFORCEMENT HISTORY

Background

To date, EPA has focused much of its attention on measuring compliance with specific environmental statutes. This approach allows the Agency to track compliance with the Clean Air Act, the Resource Conservation and Recovery Act, the Clean Water Act, and other environmental statutes. Within the last several years, the Agency has begun to supplement single-media compliance indicators with facility-specific, multimedia indicators of compliance. In doing so, EPA is in a better position to track compliance with all statutes at the facility level, and within specific industrial sectors.

A major step in building the capacity to compile multimedia data for industrial sectors was the creation of EPA's Integrated Data for Enforcement Analysis (IDEA) system. IDEA has the capacity to "read into" the Agency's single-media databases, extract compliance records, and match the records to individual facilities. The IDEA system can match Air, Water, Waste, Toxics/Pesticides/EPCRA, TRI, and Enforcement Docket records for a given facility, and generate a list of historical permit, inspection, and enforcement activity. IDEA also has the capability to analyze data by geographic area and corporate holder. As the capacity to generate multimedia compliance data improves, EPA will make available more in-depth compliance and enforcement information. Additionally, sector-specific measures of success for compliance assistance efforts are under development.

Compliance and Enforcement Profile Description

Using inspection, violation and enforcement data from the IDEA system, this section provides information regarding the historical compliance and enforcement activity of this sector. In order to mirror the facility universe reported in the Toxic Chemical Profile, the data reported within this section consists of records only from the TRI reporting universe. With this decision, the selection criteria are consistent across sectors with certain exceptions. For the sectors that do not normally report to the TRI program, data have been provided from EPA's Facility Indexing System (FINDS) which tracks facilities in all media databases. Please note, in this section, EPA does not attempt to define the actual number of facilities that fall within each sector. Instead, the section portrays the records of a subset of facilities within the sector that are well defined within EPA databases.

As a check on the relative size of the full sector universe, most notebooks contain an estimated number of facilities within the sector according to the

Bureau of Census (See Section II). With sectors dominated by small businesses, such as metal finishers and printers, the reporting universe within the EPA databases may be small in comparison to Census data. However, the group selected for inclusion in this data analysis section should be consistent with this sector's general make-up.

Following this introduction is a list defining each data column presented within this section. These values represent a retrospective summary of inspections and enforcement actions, and solely reflect EPA, State, and local compliance assurance activities that have been entered into EPA databases. To identify any changes in trends, the EPA ran two data queries, one for the past five calendar years (August 10, 1990 to August 9, 1995) and the other for the most recent twelve-month period (August 10, 1994 to August 9, 1995). The five-year analysis gives an average level of activity for that period for comparison to the more recent activity.

Because most inspections focus on single-media requirements, the data queries presented in this section are taken from single media databases. These databases do not provide data on whether inspections are state/local or EPA-led. However, the table breaking down the universe of violations does give the reader a crude measurement of the EPA's and states' efforts within each media program. The presented data illustrate the variations across regions for certain sectors.[e] This variation may be attributable to state/local data entry variations, specific geographic concentrations, proximity to population centers, sensitive ecosystems, highly toxic chemicals used in production, or historical noncompliance. Hence, the exhibited data do not rank regional performance or necessarily reflect which regions may have the most compliance problems.

This section provides summary information about major cases that have affected this sector, and a list of Supplementary Environmental Projects (SEPs). SEPs are compliance agreements that reduce a facility's stipulated penalty in return for an environmental project that exceeds the value of the reduction. Often, these projects fund pollution prevention activities that can significantly reduce the future pollutant loadings of a facility.

The final part of this section provides highlights from interviews with several knowledgeable EPA inspectors. These interviews provide the inspector's viewpoint on where compliance problems occur, why they

[e] EPA Regions include the following states: I (CT, MA, ME, RI, NH, VT); II (NJ, NY, PR, VI); III (DC, DE, MD, PA, VA, WV); IV (AL, FL, GA, KY, MS, NC, SC, TN); V (IL, IN, MI, MN, OH, WI); VI (AR, LA, NM, OK, TX); VII (IA, KS, MO, NE); VIII (CO, MT, ND, SD, UT, WY); IX (AZ, CA, HI, NV, Pacific Trust Territories); X (AK, ID, OR, WA).

occur, and possible solutions to eliminate these problems. The reader should not reach any definitive conclusions about an industry sector's ability or willingness to comply based on these interviews. These interviews provide only anecdotal information about the interactions occurring between inspectors and the facilities they inspect.

Compliance and Enforcement Data Definitions

General Definitions

Facility Indexing System (FINDS) -- this system assigns a common facility number to EPA single-media permit records. The FINDS identification number allows EPA to compile and review all permit, compliance, enforcement and pollutant release data for any given regulated facility.

Integrated Data for Enforcement Analysis (IDEA) -- is a data integration system that can retrieve information from the major EPA program office databases. IDEA uses the FINDS identification number to "glue together" separate data records from EPA's databases. This is done to create a "master list" of data records for any given facility. Some of the data systems accessible through IDEA are: AIRS (Air Facility Indexing and Retrieval System, Office of Air and Radiation), PCS (Permit Compliance System, Office of Water), RCRIS (Resource Conservation and Recovery Information System, Office of Solid Waste), NCDB (National Compliance Data Base, Office of Prevention, Pesticides, and Toxic Substances), CERCLIS (Comprehensive Environmental and Liability Information System, Superfund), and TRIS (Inventory System). IDEA also contains information from outside sources such as Dun and Bradstreet and the Occupational Safety and Health Administration (OSHA). Most data queries displayed in notebook sections IV and VII were conducted using IDEA.

Data Table Column Heading Definitions

Facilities in Search -- are based on the universe of TRI reporters within the listed SIC code range. For industries not covered under TRI reporting requirements, the notebook uses the FINDS universe for executing data queries. The SIC code range selected for each search is defined by each notebook's selected SIC code coverage described in Section II.

Facilities Inspected -- indicates the level of EPA and state agency facility inspections for the facilities in this data search. These values show what percentage of the facility universe is inspected in a 12 or 60 month period.

This column does not count non-inspectional compliance discharge reports.

Number of Inspections -- measures the total number of inspections conducted in this sector. An inspection event is counted each time it is entered into a single media database.

Average Time Between Inspections -- provides an average length of time, expressed in months, that a compliance inspection occurs at a facility within the defined universe.

Facilities with One or More Enforcement Actions -- expresses the number of facilities that were party to at least one enforcement action within the defined time period. This category is broken down further into federal and state actions. Data are obtained for administrative, civil/judicial, and criminal enforcement actions. Administrative actions include Notices of Violation (NOVs). A facility with multiple enforcement actions is only counted once in this column (facility with three enforcement actions counts as one). All percentages that appear are referenced to the number of facilities inspected.

Total Enforcement Actions -- describes the total number of enforcement actions identified for an industrial sector across all environmental statutes. A facility with multiple enforcement actions is counted multiple times (a facility with three enforcement actions counts as three).

State Lead Actions -- shows what percentage of the total enforcement actions are taken by state and local environmental agencies. Varying levels of use by states of EPA data systems may limit the volume of actions accorded state enforcement activity. Some states extensively report enforcement activities into EPA data systems, while other states may use their own data systems.

Federal Lead Actions -- shows what percentage of the total enforcement actions are taken by the United States Environmental Protection Agency. This value includes referrals from state agencies. Many of these actions result from coordinated or joint state/federal efforts.

Enforcement to Inspection Rate -- expresses how often enforcement actions result from inspections. This value is a ratio of enforcement actions to inspections, and is presented for comparative purposes only. This measure is a rough indicator of the relationship between inspections and enforcement. This measure simply indicates historically how many enforcement actions can be attributed to inspection activity. Reported inspections and enforcement actions under the Clean Water Act (PCS), the

Clean Air Act (AFS) and the Resource Conservation and Recovery Act (RCRA) are included in this ratio. Inspections and actions from the TSCA/FIFRA/EPCRA database are not factored into this ratio because most of the actions taken under these programs are not the result of facility inspections. This ratio does not account for enforcement actions arising from non-inspection compliance monitoring activities (e.g., self-reported water discharges) that can result in enforcement action within the CAA, CWA and TSCA.

Facilities with One or More Violations Identified -- indicates the number percentage of inspected facilities having a violation identified in one of the following data categories: In Violation or Significant Violation Status (CAA); Reportable Noncompliance, Current Year Noncompliance, Significant Noncompliance (CWA); Noncompliance and Significant Noncompliance (FIFRA, TSCA, and EPCRA); Unresolved Violation and Unresolved High Priority Violation (RCRA). The values presented for this column reflect the extent of noncompliance within the measured time frame, but do not distinguish between the severity of the noncompliance. Percentages within this column may exceed 100 percent because facilities can be in violation status without being inspected. Violation status may be a precursor to an enforcement action, but does not necessarily indicate that an enforcement action will occur.

Media Breakdown of Enforcement Actions and Inspections -- four columns identify the proportion of total inspections and enforcement actions within EPA Air, Water, Waste, and TSCA/FIFRA/EPCRA databases. Each column is a percentage of either the "Total Inspections," or the "Total Actions" column.

VII.A. Dry Cleaning Industry Compliance History

Exhibit 17 provides an overview of the reported compliance and enforcement data for the dry cleaning industry over the past five years (August 1990 to August 1995). These data are also broken out by EPA Region thereby permitting geographical comparisons. A few points evident from the data are listed below.

- Within the limited universe of dry cleaning facilities retrieved from the database search, the number of dry cleaning facilities inspected was only 26 percent of those identified. In the past five years, the facilities identified were inspected on average every seven to eight years.

- A significantly larger proportion of facilities identified in the database search had been inspected than had enforcement actions brought against them.

- State lead enforcement actions accounted for almost all of the enforcement actions brought against dry cleaning facilities over the five year period.

Exhibit 17: Five-Year Enforcement and Compliance Summary for Dry Cleaning									
A	B	C	D	E	F	G	H	I	J
Region	Facilities in Search	Facilities Inspected	Number of Inspections	Average Months Between Inspections	Facilities with 1 or More Enforcement Actions	Total Enforcement Actions	Percent State Lead Actions	Percent Federal Lead Actions	Enforcement to Inspection Rate
I	146	8	14	625	0	0	--	--	--
II	12	3	4	180	0	0	--	--	--
III	22	17	36	37	1	1	100%	0%	0.03
IV	485	170	460	63	24	95	100%	0%	0.21
V	45	22	72	38	2	4	100%	0%	0.06
VI	188	9	11	1,025	1	1	100%	0%	0.09
VII	8	6	20	24	0	0	--	--	--
VIII	14	6	8	105	0	0	--	--	--
IX	2	1	5	24	1	2	44%	56%	0.45
X	11	3	3	220	0	0	--	--	--
TOTAL	933	245	633	88	29	103	99%	1%	0.16

VII.B. Comparison of Enforcement Activity Between Selected Industries

Exhibits 18 and 19 allow the compliance history of the dry cleaning industry to be compared to the other industries covered by the industry sector notebooks. Comparisons between Exhibits 18 and 19 permit the identification of trends in compliance and enforcement records of the industry by comparing data covering the last five years to that of the past year. Some points evident from the data are listed below.

- Of those sectors listed, the dry cleaning industry has been the least frequently inspected industry over the past five years. The average time between inspections for the facilities identified is 88 months.
- The industry has a relatively small percentage of facilities with violations and enforcement actions, in comparison to the other sectors.
- The rate of enforcement actions per inspection over the past five years is relatively high for the industry, but has decreased over the past year.

Exhibits 20 and 21 provide a more in-depth comparison between the dry cleaning industry and other sectors by breaking out the compliance and enforcement data by environmental statute. As in the previous Exhibits (Exhibits 18 and 19), the data cover the last five years (Exhibit 20) and the last one year (Exhibit 21) to facilitate the identification of recent trends. A few points evident from the data are listed below.

- The number of inspections carried out under each environmental statute as a percent of the total number of inspections has changed only slightly between the average of the past five years and that of the past year.
- The number of enforcement actions taken under RCRA dominate both the percentage of inspections as well as the percentage of enforcement actions.
- In the past year there has been a significant drop in the proportions of enforcement actions taken under RCRA from the average of the past five years, primarily resulting from an increase in enforcement actions taken under CWA.

Exhibit 18: Five-Year Enforcement and Compliance Summary for Selected Industries

A	B	C	D	E	F	G	H	I	J
Industry Sector	**Facilities in Search**	**Facilities Inspected**	**Number of Inspections**	**Average Months Between Inspections**	**Facilities with 1 or More Enforcement Actions**	**Total Enforcement Actions**	**Percent State Lead Actions**	**Percent Federal Lead Actions**	**Enforcement to Inspection Rate**
Pulp and Paper	306	265	3,766	5	115	502	78%	22%	0.13
Printing	4,106	1,035	4,723	52	176	514	85%	15%	0.11
Inorganic Chemicals	548	298	3,034	11	99	402	76%	24%	0.13
Organic Chemicals	412	316	3,864	6	152	726	66%	34%	0.19
Petroleum Refining	156	145	3,257	3	110	797	66%	34%	0.25
Iron and Steel	374	275	3,555	6	115	499	72%	28%	0.14
Dry Cleaning	**933**	**245**	**633**	**88**	**29**	**103**	**99%**	**1%**	**0.16**
Metal Mining	873	339	1,519	34	67	155	47%	53%	0.10
Non-Metallic Mineral Mining	1,143	631	3,422	20	84	192	76%	24%	0.06
Lumber and Wood	464	301	1,891	15	78	232	79%	21%	0.12
Furniture	293	213	1,534	11	34	91	91%	9%	0.06
Rubber and Plastic	1,665	739	3,386	30	146	391	78%	22%	0.12
Stone, Clay, and Glass	468	268	2,475	11	73	301	70%	30%	0.12
Fabricated Metal	2,346	1,340	5,509	26	280	840	80%	20%	0.15
Nonferrous Metal	844	474	3,097	16	145	470	76%	24%	0.15
Electronics	405	222	777	31	68	212	79%	21%	0.27
Automobiles	598	390	2,216	16	81	240	80%	20%	0.11

Exhibit 19: One-Year Inspection and Enforcement Summary for Selected Industries

A	B	C	D	E		F		G	H
Industry Sector	Facilities in Search	Facilities Inspected	Number of Inspections	Facilities with 1 or More Violations		Facilities with 1 or more Enforcement Actions		Total Enforcement Actions	Enforcement to Inspection Rate
				Number	Percent *	Number	Percent*		
Pulp and Paper	306	189	576	162	86%	28	15%	88	0.15
Printing	4,106	397	676	251	63%	25	6%	72	0.11
Inorganic Chemicals	548	158	427	167	106%	19	12%	49	0.12
Organic Chemicals	412	195	545	197	101%	39	20%	118	0.22
Petroleum Refining	156	109	437	109	100%	39	36%	114	0.26
Iron and Steel	374	167	488	165	99%	20	12%	46	0.09
Dry Cleaning	**933**	**80**	**111**	**21**	**26%**	**5**	**6%**	**11**	**0.10**
Metal Mining	873	114	194	82	72%	16	14%	24	0.13
Non-metallic Mineral Mining	1,143	253	425	75	30%	28	11%	54	0.13
Lumber and Wood	464	142	268	109	77%	18	13%	42	0.58
Furniture	293	160	113	66	41%	3	2%	5	0.55
Rubber and Plastic	1,665	271	435	289	107%	19	7%	59	0.14
Stone, Clay, and Glass	468	146	330	116	79%	20	14%	66	0.20
Nonferrous Metals	844	202	402	282	140%	22	11%	72	0.18
Fabricated Metal	2,346	477	746	525	110%	46	10%	114	0.15
Electronics	405	60	87	80	133%	8	13%	21	0.24
Automobiles	598	169	284	162	96%	14	8%	28	0.10

Exhibit 20: Five-Year Inspection and Enforcement Summary by Statute for Selected Industries

Industry Sector	Facilities Inspected	Total Inspections	Total Enforcement Actions	Clean Air Act		Clean Water Act		Resource Conservation and Recovery Act		FIFRA/TSCA/ EPCRA/Other	
				% of Total Inspections	% of Total Actions	% of Total Inspections	% of Total Actions	% of Total Inspections	% of Total Actions	% of Total Inspections	% of Total Actions
Pulp and Paper	265	3,766	502	51%	48%	38%	30%	9%	18%	2%	3%
Printing	1,035	4,723	514	49%	31%	6%	3%	43%	62%	2%	4%
Inorganic Chemicals	298	3,034	402	29%	26%	29%	17%	39%	53%	3%	4%
Organic Chemicals	316	3,864	726	33%	30%	16%	21%	46%	44%	5%	5%
Petroleum Refining	145	3,237	797	44%	32%	19%	12%	35%	52%	2%	5%
Iron and Steel	275	3,555	499	32%	20%	30%	18%	37%	58%	2%	5%
Dry Cleaning	**245**	**633**	**103**	**15%**	**1%**	**3%**	**4%**	**83%**	**93%**	**0%**	**1%**
Metal Mining	339	1,519	155	35%	17%	57%	60%	6%	14%	1%	9%
Non-metallic Mineral Mining	631	3,422	192	65%	46%	31%	24%	3%	27%	0%	4%
Lumber and Wood	301	1,891	232	31%	21%	8%	7%	59%	67%	2%	5%
Furniture	293	1,534	91	52%	27%	1%	1%	45%	64%	1%	8%
Rubber and Plastic	739	3,386	391	39%	15%	13%	7%	44%	68%	3%	10%
Stone, Clay, and Glass	268	2,475	301	45%	39%	15%	5%	39%	51%	2%	5%
Nonferrous Metals	474	3,097	470	36%	22%	22%	13%	38%	54%	4%	10%
Fabricated Metal	1,340	5,509	840	25%	11%	15%	6%	56%	76%	4%	7%
Electronics	222	777	212	16%	2%	14%	3%	66%	90%	3%	5%
Automobiles	390	2,216	240	35%	15%	9%	4%	54%	75%	2%	6%

Exhibit 21: One-Year Inspection and Enforcement Summary by Statute for Selected Industries

Industry Sector	Facilities Inspected	Total Inspections	Total Enforcement Actions	Clean Air Act		Clean Water Act		Resource Conservation and Recovery Act		FIFRA/TSCA/ EPCRA/Other	
				% of Total Inspections	% of Total Actions	% of Total Inspections	% of Total Actions	% of Total Inspections	% of Total Actions	% of Total Inspections	% of Total Actions
Pulp and Paper	189	576	88	56%	69%	35%	21%	10%	7%	0%	3%
Printing	397	676	72	50%	27%	5%	3%	44%	66%	0%	4%
Inorganic Chemicals	158	427	49	26%	38%	29%	21%	45%	36%	0%	6%
Organic Chemicals	195	545	118	36%	34%	13%	16%	50%	49%	1%	1%
Petroleum Refining	109	437	114	50%	31%	19%	16%	30%	47%	1%	6%
Iron and Steel	167	488	46	29%	18%	35%	26%	36%	50%	0%	6%
Dry Cleaning	**80**	**111**	**11**	**21%**	**4%**	**1%**	**22%**	**78%**	**67%**	**0%**	**7%**
Metal Mining	114	194	24	47%	42%	43%	34%	10%	6%	0%	19%
Non-metallic Mineral Mining	253	425	54	69%	58%	26%	16%	5%	16%	0%	11%
Lumber and Wood	142	268	42	29%	20%	8%	13%	63%	61%	0%	6%
Furniture	293	160	5	58%	67%	1%	10%	41%	10%	0%	13%
Rubber and Plastic	271	435	59	39%	14%	14%	4%	46%	71%	1%	11%
Stone, Clay, and Glass	146	330	66	45%	52%	18%	8%	38%	37%	0%	3%
Nonferrous Metals	202	402	72	33%	24%	21%	3%	44%	69%	1%	4%
Fabricated Metal	477	746	114	25%	14%	14%	8%	61%	77%	0%	2%
Electronics	60	87	21	17%	2%	14%	7%	69%	87%	0%	4%
Automobiles	169	284	28	34%	16%	10%	9%	56%	69%	1%	6%

VII.C. Review of Major Legal Actions

This section provides summary information about major cases that have affected this sector, and a list of Supplementary Environmental Projects (SEPs). SEPs are compliance agreements that reduce a facility's stipulated penalty in return for an environmental project that exceeds the value of the reduction. Often, these projects fund pollution prevention activities that can significantly reduce the future pollutant loadings of a facility.

VII.C.1. Review of major cases

Historically, OECA's Office of Regulatory Enforcement does not regularly compile information related to major cases and pending litigation within an industry sector. The staff are willing to pass along such information to Agency staff as requests are made. In addition, summaries of completed enforcement actions are published each fiscal year in the Enforcement Accomplishments Report. To date, these summaries are not organized by industry sector. (Contact: Office of Enforcement Capacity and Outreach, 202-260-4140)

VII.C.2. Supplementary Environmental Projects (SEPs)

Each Region's summary of Supplemental Environmental Projects (SEPs) undertaken in federal fiscal years 1993 and 1994 were reviewed. None was identified as being applied to a dry cleaning operation or establishment. Many process changes have been demonstrated which may be suitable for use as SEPs (see Pollution Prevention Opportunities - Section V.). However, because federal enforcement actions within the dry cleaning industry are few (one during the period from 1989-1994), the chances that SEPs are recommended or adopted for dry cleaners is reduced.

VIII. COMPLIANCE ASSURANCE ACTIVITIES AND INITIATIVES

This section highlights the activities undertaken by this industry sector and public agencies to voluntarily improve the sector's environmental performance. These activities include those independently initiated by industrial trade associations. In this section, the notebook also contains a listing and description of national and regional trade associations.

VIII.A. Sector-related Environmental Programs and Activities

Design for the Environment

The Environmental Protection Agency's Design for the Environment (DfE) program uses a non-regulatory, voluntary, and pro-active approach in working with industry and environmental and human health groups to reduce risk. The Design for the Environment (DfE) program was created by the Office of Pollution Prevention and Toxics of the U.S. Environmental Protection Agency in 1992 to promote the incorporation of pollution prevention principles in the design of products and processes through voluntary partnerships with industry, professional organizations, state and local governments, other federal agencies, and the public. The DfE provides businesses with the information needed to design for the environment and to help businesses use this information to make environmentally informed choices. The DfE program also works to make sure that the information reaches the people who make the choices - from buyers to industrial design engineers.

The Dry Cleaning (DfE) program has identified control technologies and alternative solvents and processes that might be used to reduce solvent releases from the industry. The Agency is evaluating the risks, costs and benefits of each alternative (including setting up an alternative process demonstration) and will publicize the results so that individual dry cleaners can understand the pros and cons of each alternative. Examples of the DfE's work in the dry cleaning industry include the following:

The DfE convened the International Roundtable of Pollution Prevention and Control in the Dry Cleaning Industry. Researchers, industry representatives, and government officials met to exchange information on issues related to the dry cleaning industry, including exposure reduction, regulation, and information dissemination.

The DfE program is producing a Cleaner Technologies Substitute Assessment (CTSA) for the dry cleaning industry to examine both existing and emerging technologies. The Agency expects to release a draft CTSA on existing technologies and another on emerging technologies sometime in 1995. The first phase of the CTSA will examine traditional, solvent-

based technologies. The new or alternative technologies, such as multiprocess wet cleaning, machine wet cleaning, liquid carbon dioxide technology, and microwave drying will be addressed in the second phase of the CTSA.

In November and December of 1992, the DfE program, in collaboration with the dry cleaning industry, conducted a short term, high volume demonstration to compare the costs and performance of an aqueous alternative process (multiprocess wet cleaning) to the traditional dry cleaning method that uses perchloroethylene.

As part of the Agency's outreach program, the DfE partnership produced a wet cleaning brochure entitled *Summary of a Report on Multiprocess Wet Cleaning*, to assist dry cleaners and consumers in learning more about how their choices and actions can affect the environment. The Agency also has distributed brochures and fact sheets on alternative cleaning processes, compiled case studies and success stories, and produced exhibits at trade shows to keep the public and the dry cleaning industry informed of the DfE project's activities.

To further test the viability of the wet cleaning process, the Agency has launched a two-year demonstration project in three demonstration sites around the United States that will establish the performance of wet cleaning methods under “real world” conditions. Two demonstration sites will test the full range of garments typically handled by professional clothes cleaners using only various wet cleaning technologies/techniques; while the one site will offer both wet and dry cleaning services. Technologies to be tested include: multiprocess wet cleaning; machine-based wet cleaning; and microwave drying to be used in combination with both cleaning methods.

The DfE project is developing a certification program centered around solvent use reduction, worker safety, and consumer awareness.

The Agency currently is working with the Federal Trade Commission on the labeling of "Dry Clean Only" garments. Public comments are being reviewed regarding proposed changes that attempt to allow for other forms of cleaning without increasing the liability of the dry cleaner. Currently, if a "Dry Clean Only" garment is damaged when cleaned using an alternative method, the dry cleaner is held liable. If the same garment is damaged during the dry cleaning process, the manufacturer is held liable. Proposed changes will make the garment label less restrictive and allow other forms of cleaning to be used without penalty. (Contact: Pollution Prevention Clearinghouse, PPIC, 202-260-1023)

VIII.B. EPA Voluntary Programs

33/50 Program

The "33/50 Program" is EPA's voluntary program to reduce toxic chemical releases of eighteen chemicals from manufacturing facilities. Participating companies pledge to reduce their toxic chemical releases by 33 percent as of 1992 and by 50 percent as of 1995. Certificates of Appreciation have been given out to participants meeting their 1992 goals. The list of chemicals includes seventeen high-use chemicals reported (including perchloroethylene) in the Toxics Release Inventory and dioxin. Because dry cleaning is a service, dry cleaners are not eligible for the 33/50 program even though perchloroethylene is covered by the program. (Contact: Mike Burns 202-260-6394 or 33/50 Program 202-260-6907)

Environmental Leadership Program

The Environmental Leadership Program (ELP) is a national initiative piloted by EPA and state agencies in which facilities have volunteered to demonstrate innovative approaches to environmental management and compliance. EPA has selected 12 pilot projects at industrial facilities and federal installations which will demonstrate the principles of the ELP program. These principles include: environmental management systems, multimedia compliance assurance, third-party verification of compliance, public measures of accountability, community involvement, and mentor programs. In return for participating, pilot participants receive public recognition and are given a period of time to correct any violations discovered during these experimental projects. At this time, no dry cleaning operations are ELP participants. (Contact: Tai-ming Chang, ELP Director, 202-564-5081 or Robert Fentress, U.S. EPA, 202-564-7023)

Project XL

Project XL was initiated in March 1995 as a part of President Clinton's *Reinventing Environmental Regulation* initiative. The projects seek to achieve cost effective environmental benefits by allowing participants to replace or modify existing regulatory requirements on the condition that they produce greater environmental benefits. EPA and program participants will negotiate and sign a Final Project Agreement, detailing specific objectives that the regulated entity shall satisfy. In exchange, EPA will allow the participant a certain degree of regulatory flexibility and may seek changes in underlying regulations or statutes. Participants are encouraged to seek stakeholder support from local governments, businesses, and environmental groups. EPA hopes to implement fifty pilot projects in four categories including facilities, sectors, communities, and government agencies regulated by EPA. Applications will be accepted on

a rolling basis and projects will move to implementation within six months of their selection. For additional information regarding XL Projects, including application procedures and criteria, see the May 23, 1995, Federal Register Notice, or contact Jon Kessler at EPA's Office of Policy Analysis 202-260-4034.

Green Lights Program

EPA's Green Lights program was initiated in 1991 and has the goal of preventing pollution by encouraging U.S. institutions to use energy-efficient lighting technologies. The program has over 1,500 participants which include major corporations; small and medium sized businesses; federal, State and local governments; non-profit groups; schools; universities; and health care facilities. Each participant is required to survey their facilities and upgrade lighting wherever it is profitable. EPA provides technical assistance to the participants through a decision support software package, workshops and manuals, and a financing registry. EPA's Office of Air and Radiation is responsible for operating the Green Lights Program. (Contact: Maria Tikoff at 202-233-9178 or the Green Light/Energy Star Hotline at 202-775-6650)

WasteWi$e Program

The WasteWi$e Program was started in 1994 by EPA's Office of Solid Waste and Emergency Response. The program is aimed at reducing municipal solid wastes by promoting waste minimization, recycling collection and the manufacturing and purchase of recycled products. As of 1994, the program had about 300 companies as members, including a number of major corporations. Members agree to identify and implement actions to reduce their solid wastes and must provide EPA with their waste reduction goals along with yearly progress reports. EPA, in turn, provides technical assistance to member companies and allows the use of the WasteWi$e logo for promotional purposes. (Contact: Lynda Wynn 202-260-0700 or the WasteWi$e Hotline at 800-372-9473)

Climate Wise Recognition Program

The Climate Change Action Plan was initiated in response to the U.S. commitment to reduce greenhouse gas emissions in accordance with the Climate Change Convention of the 1990 Earth Summit. As part of the Climate Change Action Plan, the Climate Wise Recognition Program is a partnership initiative run jointly by EPA and the Department of Energy. The program is designed to reduce greenhouse gas emissions by encouraging reductions across all sectors of the economy, encouraging participation in the full range of Climate Change Action Plan initiatives, and fostering innovation. Participants in the program are required to

identify and commit to actions that reduce greenhouse gas emissions. The program, in turn, gives organizations early recognition for their reduction commitments; provides technical assistance through consulting services, workshops, and guides; and provides access to the program's centralized information system. At EPA, the program is operated by the Air and Energy Policy Division within the Office of Policy Planning and Evaluation. (Contact: Pamela Herman 202-260-4407)

Office of Enforcement Compliance Assurance

The Office of Compliance is compiling a list of resource materials on pollution prevention and contacts in the dry cleaning industry. This is the first of several projects planned to help reduce risk from dry cleaners. (Contact: Joyce Chandler 202-564-7073)

VIII.C. Trade Association/Industry Sponsored Activity

VIII.C.1. Environmental programs

Several trade associations including the Neighborhood Cleaner's Association, the International Fabricare Institute (IFI) and the state and regional affiliates of IFI have instituted environmental programs. Theses include: introducing an environmental certificate program that provides members information on good environmental practices and then tests them on this knowledge, training sessions in alternative technologies, and information pamphlets on environmental laws and compliance. The additional trade association activities are listed below.

VIII.C.2. Summary of trade associations

Neighborhood Cleaners Association (NCA)
252 West 29th Street
New York, NY 10001-5201
Tel: (212) 967-3002 Contact: Bill Seitz

The NCA is a worldwide trade organization with over 4,000 members. NCA provides outreach to its members through monthly bulletins, through the NCA's Consumer Education Program, and educational courses on dry cleaning issues. NCA also offers representation for its members at all levels of government including the Federal Trade Commission.

Federation of Korean Drycleaners Association (FKDA)
25606 Alicia Pkwy
Lagona Hills, CA 92653
Tel: (714) 770-8613 Contact: Hank Kim

The FKDA was founded in 1986 and is an umbrella organization representing 30 regional Korean dry cleaning associations throughout the U.S. It represents approximately 12,000 members, and educates its members by providing FKDA newsletters as well as organizing educational seminars on subjects such as pollution prevention and other critical issues.

International Fabricare Institute (IFI)
12251 Tech Road
Silver Spring, Maryland 20904
Tel: (301) 622-1900 Contact: Joe Meijer

The association is a worldwide organization of dry cleaners and launderers as well as organizations and individuals concerned with professional garment cleaning, care and serviceability. There are currently over 12,000 members. The association provides publications to aid members technically and in business, represents cleaners' interest in legislative activities, as well as provides testing services for products and training for employees.

State Fabricare Institutes

Many states or regions have trade associations that are affiliated with the International Fabricare Institute. For more information call the IFI.

Textile Care Allied Trade Association, Inc. (TCATA)
200 Broadacres Drive
Bloomfield, NJ 07003
Tel: (201) 338-7700 Contact: David Cotter

TCATA has existed since 1920 and represents manufacturers and distributors of commercial laundry and dry cleaning equipment and supplies. There are currently 275 members. Its primary concern is addressing issues that affect the industry's allied trades exclusively. The association provides newsletters to its members; coordinates an annual convention; co-sponsors a biennial trade show; and provides information on machinery requirements and certain market information.

Fabricare Legislative And Regulatory Education (FLARE)
P.O. Box 5157
Naperville, IL 60567-5157
Tel: (708) 416-6221 Contact: Manfred Wentz

FLARE is a volunteer organization led by members of International Fabricare Institute, Neighborhood Cleaners Association, R.R. Streets and Co.(a dry cleaning supply company), and the Textile Care Allied Trade Association. FLARE is committed to ensuring favorable treatment by local media and providing representation at all levels of government. The majority of their attention currently is given to environmental legislation and regulation affecting the fabric care industry; however, the FLARE organization is designed to address a much broader spectrum of legislation and regulation as well as public relations issues affecting the industry.

Center for Emission Control (CEC)
2001 L Street, N.W.
Suite 506A
Washington, DC 20036
Tel: (202) 785-4374 Contact: Steve Risotto

The CEC is an independent not-for-profit organization established in October 1990 to act as a clearinghouse for information about, and to encourage the development and use of, safe and effective work practices, process modifications, control technologies, and other methods to reduce emissions of chlorinated solvent. The CEC has developed a control option document on solvent applications in the dry cleaning industry. The organizations also may undertake and support research and development projects for the creation or application of new technologies or products that will reduce emissions of chlorinated solvents.

IX. CONTACTS/ACKNOWLEDGMENTS/RESOURCE MATERIALS/BIBLIOGRAPHY

For further information on selected topics within the Dry Cleaning Industry a list of publications and contacts are provided below:

Contacts[f]

Name	Organization	Telephone	Subject
Joyce Chandler	EPA/OECA	(202)564-7073	Regulatory requirements and compliance assistance
Ohad Jehassi	EPA/OPPT	(202)260-6911	Design for the Environment
George Smith	EPA/OAQPS	(919)541-1549	Regulatory requirements (air)

OECA: Office of Enforcement and Compliance Assurance
OAQPS: Office of Air Quality Planning and Standards
OPPT: Office of Pollution Prevention and Toxics

General Profile

Brown, Richard R. 1993. TVS Emission Reduction Technology for Dry cleaning. Presented at the Air and Waste Management Association, 86th Annual Meeting and Exhibition, Denver Colorado, 1993.

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[f] Many of the contacts listed above have provided valuable background information and comments during the development of this document. EPA appreciates this support and acknowledges that the individuals listed do not necessarily endorse all statements made within this notebook.

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Drycleaners News published by Zackin Publications, Inc. Waterbury, Connecticut.

Process Descriptions and Chemical Use Profiles

Kirk-Othmer Encyclopedia of Chemical Technology. 1984. Drycleaning and Laundering.

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Department of Environmental Conservation New York State. (Undated) Draft Part 232 Dry Cleaning Inspection Report. Form listing the information required for a complete facility audit.

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[Note that several publications by OPPT's Design for the Environment Program on alternative dry cleaning technologies are expected in 1995. Contact: Ohad Jehassi, 202-260-6911, for publication dates.]

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