



# STATE OF NEW YORK DEPARTMENT OF HEALTH

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18 November, 1993

Mr. Bruce Jordan  
Director  
Emission Standards Division (MD-13)  
U.S. Environmental Protection Agency  
Research Triangle Park, NC 27711

RE: NESHAP for Dry Cleaners

Dear Mr. Jordan:

The New York State Department of Health (DOH) appreciates the opportunity to provide additional information on indoor air and groundwater contamination associated with dry cleaning facilities. We remain concerned that indoor air quality be protected since in New York State the greatest public health risks from exposure to high perchloroethylene (PCE) levels have been found to be to people in residential settings. Although the final rule may help reduce air pollution, data are not available to show that indoor exposures will be reduced to acceptable levels.

In February 1992, DOH submitted information to EPA on PCE levels in residences co-located in buildings with dry cleaning establishments. These data estimated that in New York State about 150,000 people would be exposed to PCE levels up to 200 milligrams per cubic meter of air in their apartments or where they work and that the health risks to these people were significant. Since that time, additional data that we have collected continue to show that a significant number of people are being exposed to high levels of PCE and that the final rule as proposed will not reduce these exposures very substantially.

In early 1992, we surveyed more than 3,000 dry cleaners in New York State (Attachment A). About 18 percent of the dry cleaners in New York State are in buildings with residences. Nearly one-third of the facilities in New York City have apartments above them. Almost half of all the dry cleaners in the state are in buildings which contain other businesses where workers can be exposed for long periods of time.

Our survey provided a basis for updating the estimated number of people who may be exposed to elevated levels from dry cleaners (Attachment B, Tables 5 and 6, pp. 32-22). An estimated 170,000 people would be exposed, 43 percent living in apartments, 10 percent working in dry cleaning establishments and 47 percent working in other businesses in the same structure as a dry cleaner.

We and the local health departments in New York State have taken indoor air samples in residences near 40 dry cleaners (see Attachment C). Transfer and vented dry-to-dry machines generally have larger impacts on indoor air than non-vented dry-to-dry machines. Indoor air concentrations ranged from 15 to 197,000 micrograms per cubic meter of air ( $\mu\text{g}/\text{m}^3$ ) in apartments where dry cleaners operate transfer machines ( $n=10$ ). Indoor air concentrations ranged from 160 to 55,000  $\mu\text{g}/\text{m}^3$  for vented dry-to-dry cleaners ( $n=9$ ) and 6 to 1,910  $\mu\text{g}/\text{m}^3$  for non-vented dry-to-dry cleaners ( $n=12$ ). Apartments above 15 of the 19 transfer facilities and vented dry-to-dry facilities had air concentrations exceeding 1,000  $\mu\text{g}/\text{m}^3$ . Only one of the twelve non-vented dry-to-dry machines had an apartment above it where PCE concentrations exceeded 1,000  $\mu\text{g}/\text{m}^3$ . Almost all indoor air levels exceeded 100  $\mu\text{g}/\text{m}^3$ .

We also found elevated PCE concentrations in indoor air of dwellings in buildings near dry cleaners (n=5). The highest apartment level (3,100  $\mu\text{g}/\text{m}^3$ ) was in an adjoining building to the dry cleaner. The second highest level in an apartment was in a building 30 feet from a dry cleaner (1,450  $\mu\text{g}/\text{m}^3$ ).

Stores in strip malls are impacted by dry cleaners. Businesses near a dry cleaner operating in a strip mall had levels of PCE as high as 50,400  $\mu\text{g}/\text{m}^3$ , and in another case in businesses such as a pizza parlor, a deli and a fish market, PCE levels were as high as 34,500  $\mu\text{g}/\text{m}^3$ .

To our knowledge, no published data are available to determine the effectiveness of the NESHAPS requirements on reducing these exposures. As part of a New York State negotiated rulemaking for dry cleaners, we recently evaluated two dry cleaning facilities where elevated indoor air PCE levels (up to 12,700  $\mu\text{g}/\text{m}^3$ ) were found in indoor air of apartments. These two facilities had installed room enclosures and vapor barriers as well as provided increased ventilation. These evaluations suggest that even these measures (MACT under the NESHAP) are inadequate to control air quality impacts of dry cleaning operations. The reports on these investigations are being finalized and will be sent to EPA as soon as the residents have been informed of the results.

Even small area source facilities can have a very large local impact on residential indoor air quality (up to 49,000  $\mu\text{g}/\text{m}^3$ ). These facilities may not be adequately controlled by implementation of the NESHAP, which requires them to have leak detection and repair, and storage of all PCE solvent and waste in sealed containers. Annual solvent usage is available for 26 of the dry cleaners that have been evaluated (Attachment C). Indoor air PCE concentrations were elevated in nearly all apartments above these 26 dry cleaning facilities. Of these 26 facilities, 5 of 9 transfer facilities (55 percent), and 9 of 17 (53 percent) dry-to-dry facilities would be considered small area sources for which no emission controls would be required.

In New York State, the most stringent controls under the NESHAP would be required for only 27 of 1,717 (about 2 percent) of the dry cleaners who provided solvent usage to the survey (see Attachment D). About 11 percent of the cleaners using transfer machines (52 of 486) are considered small facilities and would be exempt from process vent emission control requirements under the NESHAP. Statewide, about 47 percent of facilities using dry-to-dry machines (579 of 1,231) would be considered small area sources and would be exempt from process vent emission control requirements under the NESHAP. The remaining large area source dry cleaners operating dry-to-dry machines in New York State (647 of 1,231) would have to comply with the NESHAP.

The indoor air exposure levels in residences and businesses near dry cleaners identified by New York State studies and investigations are high-risk environmental health problems. Both cancer risks and non-cancer risks associated with these levels of exposure are highly elevated, and may affect a very large, non-occupational population which includes sensitive groups such as infants and children, the elderly or infirm and pregnant women and nursing mothers (see Attachment B).

The most obvious method of reducing PCE contamination of indoor air is to separate the source of contamination, the dry cleaner, from the apartments. If this is not feasible, EPA should consider a two-tiered regulation which would require dry cleaning facilities in residential areas (either within the same building as a cleaning facility or within some specified distance to residences) to have more stringent controls on their emissions than other cleaners. These measures could include room enclosures, vapor barriers, effective ventilation, and requirements that only the best-controlled machines (non-vented dry-to-dry machines with suitable room emission controls) be allowed to operate in dry cleaning facilities in proximity to residences.

Phasing-out transfer machine and vented dry-to-dry systems would also clearly help reduce emissions of PCE from dry cleaning facilities. Transfer machines should be phased-out of

mixed-use buildings within a specific timetable, and should only be allowed to operate in the interim under stringent performance criteria with suitable regulatory enforcement provisions.

Other strategies to reduce indoor air concentrations of PCE include the use of alternative, non-chemical cleaning techniques such as the wet-clean process recently evaluated by the EPA (USEPA, 1993). We encourage the EPA to support research to improve the efficacy of such cleaning processes and encourage use of methods which would reduce the amount of volatile solvents used by the dry cleaning industry.

The DOH strongly believes that EPA should conduct a residual risk analysis for area source cleaners because the population exposures may not be adequately reduced after the NESHAP is enacted even if all the regulated cleaners comply with the regulation. The risks may not be reduced substantially for two reasons: 1) many of the dry cleaners who pose the risks will be excluded from regulatory requirements because they are small solvent consumers, and 2) the regulatory requirements for those dry cleaners who are included in the NESHAP may not result in adequate reductions in population exposures to PCE.

Exposure to PCE in drinking water is also a public health concern, particularly where there are private wells. PCE from dry cleaners has contaminated groundwater in at least 30 sites in New York State (see Attachment E). Groundwater concentrations as high as 28,000 micrograms of PCE per liter have been attributed to dry cleaners. These sites were identified because PCE was detected in routine sampling or because of taste and odor complaints. We have not systematically sampled private drinking water supplies near dry cleaners. All public water supplies have been tested for PCE. Two of these sites (Katonah Municipal Well, CERCLIS NO. NYD980780795, and Brewster Wellfield CERCLIS NO. NYD980625575) are listed on the National Priority List of hazardous waste sites. All 30 of these sites are listed on the Inactive Hazardous Waste Disposal Sites in New York State. Six public water supply wells and eighty-five private wells have been contaminated.

The cost of treating well water is estimated to be \$3,500 to \$4,500 per filter per system per year. This cost includes the filter and its installation and maintenance, costs associated with monitoring the filter system and periodic regeneration or replacement of the carbon.

At one dry cleaner establishment in a suburban area of Rensselaer County, groundwater remediation has been on-going since 1990. Eighteen private well water supplies are contaminated with PCE. To date, the remediation costs are: \$556,000 for the Remedial Investigation/Feasibility Study and \$200,000 to \$300,000 for vacuum extraction of the contaminants from on-site soils. Currently, filters on the private water supplies cost \$40,000 per year. The proposed final remediation plan for this site calls for removal and treatment of contaminated groundwater (2.6 million gallons) and for extension of a public water supply to serve the affected area. Over a 30-year period, the proposed plan would cost about \$4.1 million.

We hope these data are useful to you.

Very truly yours,



William Stasiuk, P.E., Ph.D.  
Director  
Center for Environmental Health

**Attachment A. Survey of Dry Cleaners in New York State**

# New York State Dry Cleaner Survey

New York State Department of Health  
Bureau of Toxic Substance Assessment  
November 1993

## Introduction

In 1991, the New York State Department of Health (NYS DOH) found that apartments above dry cleaners had substantially elevated solvent (tetrachloroethene) air concentrations (Schreiber *et al*, 1993). In 1992, NYS DOH surveyed dry cleaners in New York State to identify facilities which were operating in buildings with residences and other businesses and therefore had a strong potential for non-occupational exposures to tetrachloroethene.

## Methodology

In January 1992, a simple questionnaire (Appendix A) was prepared requesting information about solvent usage, machine type, and proximity to residences or other businesses. The Neighborhood Cleaners Association (NCA) mailed the questionnaires to approximately 3,500 dry cleaners. By May 1992, responses were received from 1,782 facilities.

NYS DOH also found that the New York State Department of Economic Development (NYS DED) maintains a database which included dry cleaners. The NYS DED listing contained 2,003 dry cleaners from whom no response had been received in the first mailing. A second round survey was sent to these additional dry cleaners in an attempt to gather data from as many facilities as possible.

Thus, NYS DOH was able to identify 3,785 dry cleaner facilities in New York State from responses to the first mailing and the NYS DED listing. From the two mailings, 2,561 responses were ultimately received, a 68% response rate.

## Survey Results

Assuming that the respondents to the questionnaire are a representative cross section of the dry cleaning industry, almost half of all dry cleaners in New York State (1,214/2,561 or 47%) are located in the five boroughs of New York City (Table 1). Another 31% (799/2,561) can be found on Long Island or in the three upstate counties bordering New York City. Thus, only 21% (548/2,561) of dry cleaners are located in parts of the state outside the metropolitan New York City area and Long Island.

The potential for residential exposures to dry cleaner solvent emissions are much greater in New York City than elsewhere in the state. Approximately 18% of all dry cleaners in the state indicated that they are located in building with residences (Table 1). However, the vast majority (83%) of these co-located facilities are in New York City. In New York City, almost one-third (32%) of the dry cleaners are located in residential buildings, while elsewhere in the state only 6% of facilities are so situated.

A larger number and proportion of dry cleaners are located in buildings with other businesses than are located in residential buildings. Almost half (45%) of all dry cleaners in the state are located in buildings with other businesses (Table 1). Most (88%) of these facilities co-located with other businesses are in New York City and the surrounding metropolitan area.

The New York State Dry Cleaner Study (Schreiber *et al*, 1993) found that solvent (tetrachloroethene) emissions were more severe from transfer machines than from dry-to-dry equipment. Thus, facilities using these older machines pose a greater potential risk to residents.

Statewide, slightly more than one-third (34%) of dry cleaners located in residential buildings use transfer machines, and this pattern is relatively uniform throughout the state (Table 2). Transfer machines are less frequently found in dry cleaners co-located with other businesses, comprising only 24% of such facilities (Table 3). The most advanced equipment for solvent emission control (non-vented, dry-to-dry machines) can be found in about half of all dry cleaners co-located with residences or businesses.

Only 1,717 of the 2,041 dry cleaners who reported dry cleaning on the premises provided an estimate of annual solvent usage (Table 4). These facilities reported an annual total of almost 550,000 gallons of tetrachloroethene, and approximately 40% of this usage (220,000 gallons) was in New York City facilities. Actual solvent usage by all dry cleaners in New York State can be estimated by correcting for non-responses to this question (about 15%) and non-responses to the entire questionnaire (about 32%). Such a correction indicates that all New York State dry cleaners use 964,000 gallons or 13.2 million pounds of tetrachloroethene annually, and New York City dry cleaners use 386,000 gallons or 5.28 million pounds.

Statewide, slightly more than half of this solvent usage is by facilities using transfer machines even though these machines represent only one third of the machines in use in the state, reflecting the greater solvent usage in transfer machines (median = 350 gallons; mean = 568 gallons) compared to dry-to-dry machines (median = 150 gallons; mean = 219 gallons). Few (20) facilities with transfer machines use 100 gallons or less per year, and a similar number use more than 1,800 gallons (Figure 1). For facilities with dry-to-dry equipment, more than 200 use 70 gallons or less, and fewer than 20 facilities use more than 1,800 gallons (Figure 2).

## *Discussion*

All responses to the questionnaire were provided by the owners or operators of the facilities and have not been verified in any systematic way. There is no reason to suspect a systematic bias in the responses that were provided or to believe that the data are inaccurate. However, the findings of the New York State Dry Cleaners Study of tetrachloroethene concentrations in residences located in buildings with dry cleaners had been reported in trade publications and other press immediately prior to mailing the survey. Non-respondents may not have the same characteristics as respondents. For example, marginally profitable dry cleaners may have been less represented in the respondents than in non-respondents, and facilities against whom complaints had been lodged may not have responded as frequently as others. If these factors influenced respondents, the survey may have underestimated the proportion of transfer machines in the industry and the proportion of facilities located in buildings with residential or other business uses.

The vast majority of tetrachloroethene used by dry cleaners each year are emitted into the air (US EPA, 1991, p. 64387). Thus, dry cleaners in New York State are emitting about 13 million pounds of tetrachloroethene annually, 5 million pounds of which are emitted in New York City. Since 1989, US EPA has estimated annual environmental releases of a variety of toxics through the Toxics Release Inventory (TRI) program from reporting industrial sources. The most recently summarized data are for 1991 (US EPA, 1993) and total annual emissions of tetrachloroethene from all TRI facilities in the nation were 16 million pounds.

## *Conclusions*

1. Less than one-fifth of dry cleaners in New York State are located in buildings with residences. However, most (83%) of these facilities are in New York City where close to one-third of all facilities have apartments above them. About 6% of dry cleaners elsewhere in the state have residences in the same building.
2. Almost half of all dry-cleaners in New York State are located in buildings with other businesses.



3. About one-third of dry cleaners located in residential buildings use transfer machines, equipment with the greatest potential solvent emissions. One-fourth of dry cleaners that share a building with other businesses use transfer machines.
4. About half of all dry cleaners located in buildings with residents or businesses use the most advanced equipment for solvent emission control (non-vented, dry-to-dry machines).
5. Dry cleaners in New York State release as much tetrachloroethene as all industrial sources of tetrachloroethene in the nation.

### **References**

- Schreiber, J., S House, E Prohonic, G Smead, C Hudson, M Styk and J Lauber. 1993. An Investigation of Indoor Air Contamination in Residences Above Dry Cleaners. *Risk Analysis* 13(3):335-344.
- United States Environmental Protection Agency (US EPA). May 1993. 1991 Toxics Release Inventory: Public Data Release. EPA 745-R-93-003. Office of Pollution Prevention and Toxics (TS-799), Washington, DC. 364 pp.
- United States Environmental Protection Agency (US EPA). December 9, 1991. National Emissions Standards for Hazardous Air Pollutants for Source Categories: Perchloroethylene Emissions from Dry Cleaners, Proposed rule and notice of public hearing. *Federal Register* 56(236):64382-64402.

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10 November 1993

Table 1. Summary of response to the dry cleaners survey.

Location	Total # of Responses	Total # of Residential	Total # of Business	Other or No Use	Dropstore only, Out of Business or Didn't Specify
New York City <sup>1</sup>	1214	392 (32%)	507 (42%)	111 (9%)	204 (17%)
Metro New York <sup>2</sup>	799	33 (4%)	493 (62%)	141 (18%)	132 (17%)
Upstate <sup>3</sup>	548	46 (8%)	138 (25%)	180 (33%)	184 (34%)
Total	2561	471 (18%)	1138 (45%)	432 (17%)	520 (20%)

Table 2. Types of dry cleaners in residential buildings.

Location	Total # of Dry Cleaners in Residential Buildings	MACHINE TYPE		
		Transfer	Dry-to-Dry Vented	Dry-to-Dry Non-vented
New York City <sup>1</sup>	392	134 (34%)	69 (18%)	187 (48%)
Metro New York <sup>2</sup>	33	11 (33%)	6 (18%)	16 (48%)
Upstate <sup>3</sup>	46	17 (37%)	12 (26%)	17 (36%)
Total	471	162 (34%)	87 (18%)	220 (47%)

% = dry cleaners in specific category of the total number of responses for that location.

<sup>1</sup> New York City includes the boroughs of Manhattan, Queens, Kings, Staten Island and the Bronx.

<sup>2</sup> Metropolitan New York includes Nassau, Orange, Rockland, Suffolk and Westchester Counties.

<sup>3</sup> Upstate includes all counties except New York City and Westchester Counties.



Table 3. Types of dry cleaners in buildings with other businesses.

Location	Total # of Dry Cleaners in Buildings with Businesses	Machine Type		
		Transfer	Dry-to-Dry Vented	Dry-to-Dry Non-vented
New York City <sup>1</sup>	507	147 (29%)	118 (23%)	241 (48%)
Metro New York <sup>2</sup>	493	99 (20%)	121 (25%)	273 (55%)
Upstate <sup>3</sup>	138	30 (22%)	38 (28%)	70 (51%)
Total	1138	276 (24%)	277 (24%)	584 (51%)

% = Dry cleaners in specific category of the total number of responses for that location.

Table 4. Reported solvent (tetrachloroethene) usage in gallons.

Location	Transfer	Dry-Dry	Other	Total
New York City <sup>1</sup>	120,310 (260)	96,705 (563)	2,850 (3)	219,865 (826)
Metro New York <sup>2</sup>	71,603 (132)	94,262 (436)	0 (0)	165,865 (568)
Upstate <sup>3</sup>	84,874 (95)	77,958 (288)	0 (0)	162,832 (323)
Total	276,787 (487)	268,925 (1,227)	2,850 (3)	548,562 (1,717)

(n) = Number of respondent dry cleaners.

<sup>1</sup> New York City includes the boroughs of Manhattan, Queens, Kings, Staten Island and the Bronx.

<sup>2</sup> Metropolitan New York includes Nassau, Orange, Rockland, Suffolk and Westchester Counties.

<sup>3</sup> Upstate includes all counties except New York City and Westchester Counties.

Figure 1. Distribution of Solvent Usage for Transfer Machines

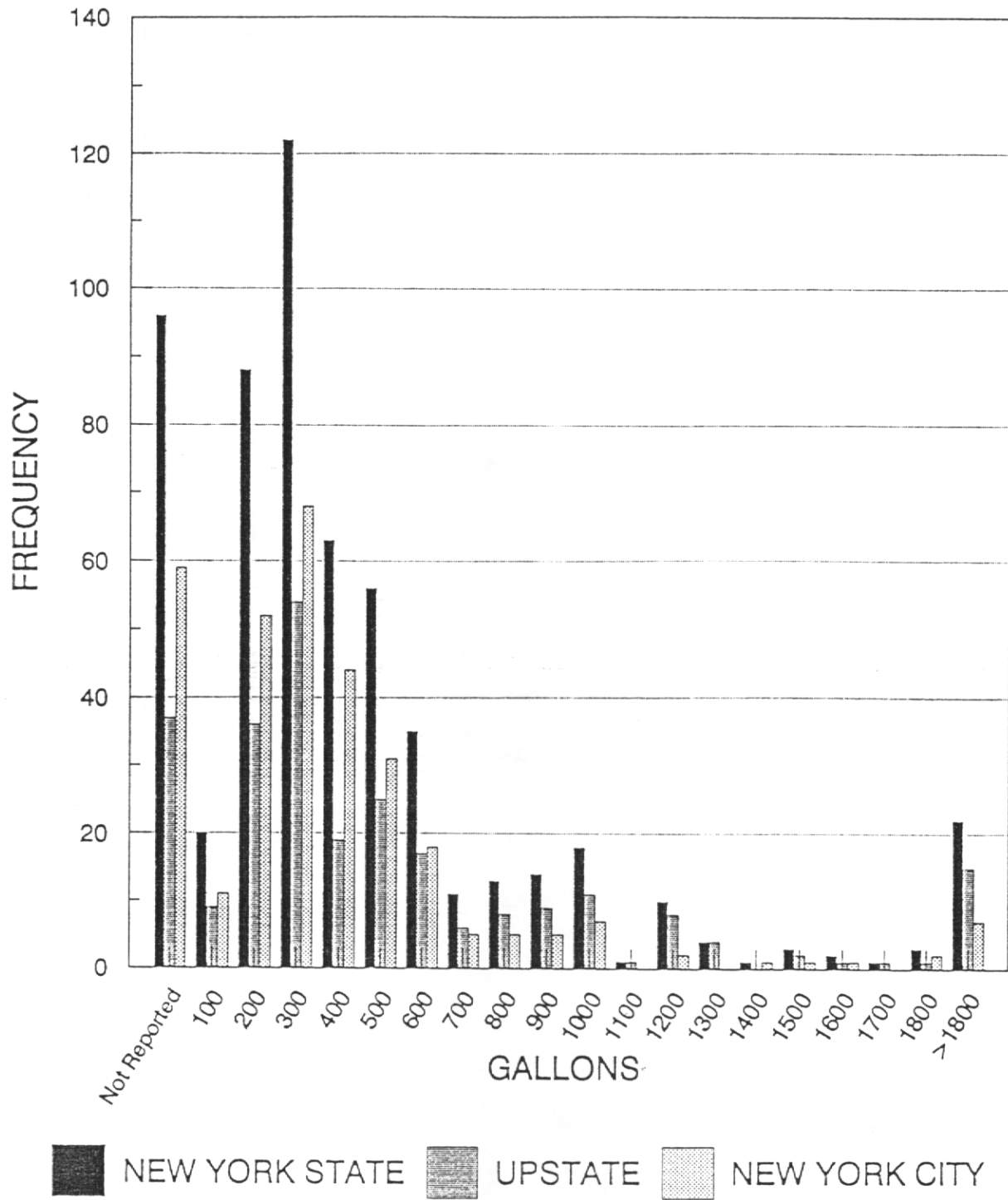
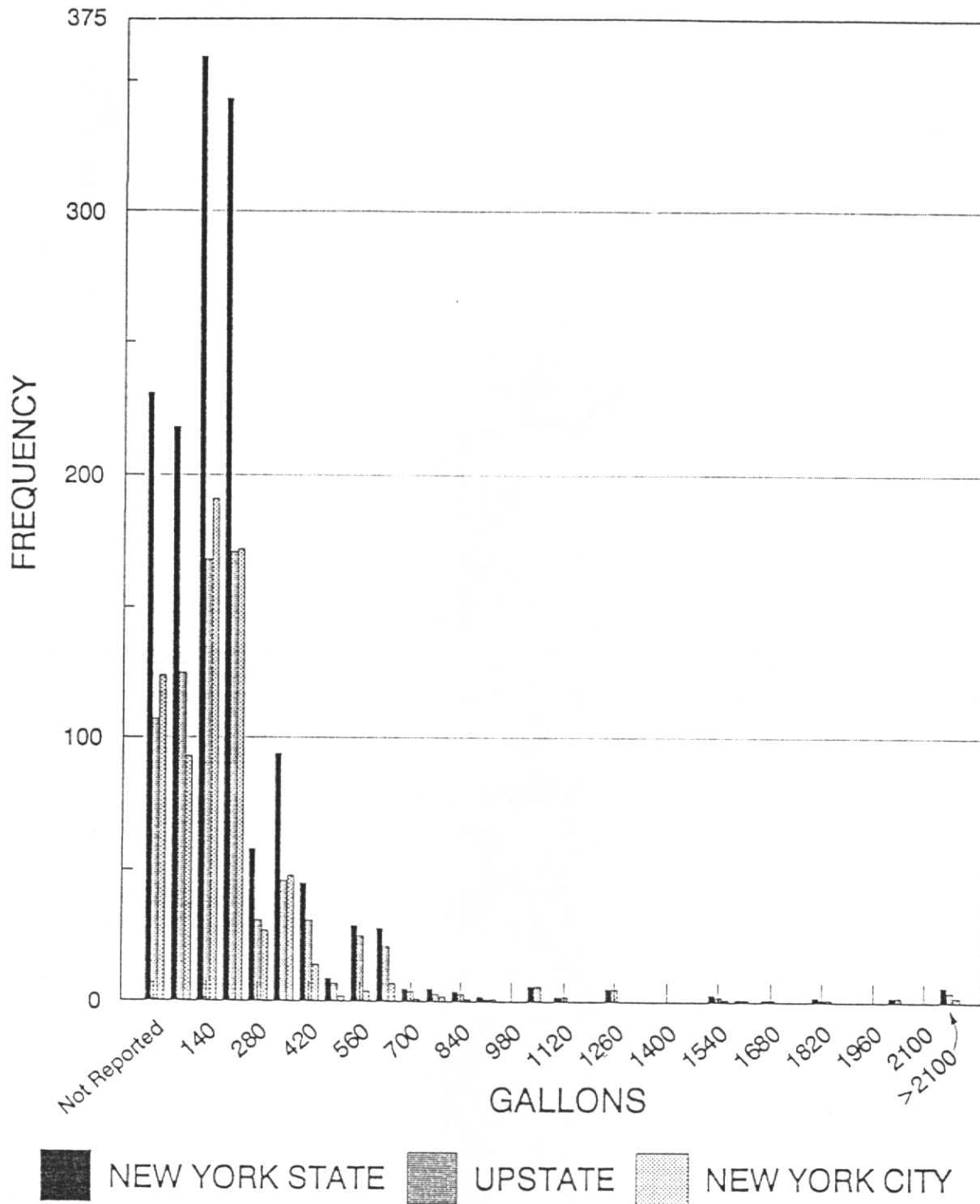


Figure 2. Distribution of Solvent Usage for Dry-Dry Machines



## Appendix A. Questionnaire Used in the Dry Cleaner Survey

Name of Establishment: \_\_\_\_\_

Address of Establishment: \_\_\_\_\_  
\_\_\_\_\_

Telephone Number: \_\_\_\_\_ (County)  
(\_\_\_\_\_) \_\_\_\_\_

Name of Proprietor: \_\_\_\_\_

PLEASE CHECK THE APPROPRIATE BOX REGARDING YOUR OPERATION.

1. Solvent Used:
- |                                  |                                    |                          |                          |
|----------------------------------|------------------------------------|--------------------------|--------------------------|
| PERC<br>(perchloro-<br>ethylene) | Petroleum<br>(Stoddard)<br>Solvent | Fluoro-<br>carbon        | Other                    |
| <input type="checkbox"/>         | <input type="checkbox"/>           | <input type="checkbox"/> | <input type="checkbox"/> |

Approximate number of gallons used annually: \_\_\_\_\_

2. Machine Type:
- |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|
| Transfer                 | Dry-to-Dry<br>(vented)   | Dry-to-Dry<br>(no vent)  | Other                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. Pounds of Garment  
Dry Cleaned each  
Week (maximum):
- |                           |                          |                              |
|---------------------------|--------------------------|------------------------------|
| Less than<br>1,000 pounds | 1,000 to<br>2,000 pounds | Greater than<br>2,000 pounds |
| <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/>     |

4. Other Uses of  
Building besides  
Dry Cleaner:
- |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|
| Residential              | Other<br>Business        | Other                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

5. Distance to Nearest  
Building:
- |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|
| Less than<br>50 Feet     | 50 to 100<br>Feet        | Greater than<br>100 Feet |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

6. Source of Water  
Supply for Dry Cleaner
- |                          |                          |
|--------------------------|--------------------------|
| Public                   | Private                  |
| <input type="checkbox"/> | <input type="checkbox"/> |

7. Sewage System for  
Dry Cleaner
- |                          |                          |
|--------------------------|--------------------------|
| Public                   | Private                  |
| <input type="checkbox"/> | <input type="checkbox"/> |

Signature of Preparer: \_\_\_\_\_

Name of Preparer: \_\_\_\_\_

Date: \_\_\_\_\_

**Attachment B. Economic and Public Health Impact Analysis  
of Regulating Perchloroethylene Emissions  
from Dry Cleaning Machines**