

# Appendix A. Pollution Abatement Form and Instructions

MA-200(I)  
(10-28-83)

U. S. DEPARTMENT OF COMMERCE  
BUREAU OF THE CENSUS

## INSTRUCTIONS AND DEFINITIONS 1983 SURVEY OF POLLUTION ABATEMENT COSTS AND EXPENDITURES

### GENERAL INSTRUCTIONS and DEFINITIONS

The purpose of the questionnaire is to collect total expenditures made by industry to abate pollutant emissions. The survey covers current operating costs and capital expenditures made to reduce pollution in its air, water, or solid forms.

**ANSWER ALL QUESTIONS.** If you cannot answer a question from your company records, please estimate the answer carefully. In particular cases, identification of abatement expenditures may require the joint efforts of your establishment's financial and engineering staff. If your establishment did not operate for a full year, please indicate the disposition by marking the appropriate box(es) in item 1A, Operating Status.

Report all value figures in thousands of dollars.

Report data on a calendar year basis for 1983. However, if your establishment uses a fiscal year that ends between 10/31/83 and 2/28/84, fiscal year data will be acceptable.

For information concerning the possible use of reporting formats other than the form provided, such as computer tape or printouts, contact Mr. Mendel D. Gayle (301) 763-1755.

**Pollution abatement** means the reduction or elimination of pollutants emitted from your property or activities. Pollution abatement includes prevention, treatment, and recycling. Treatment refers to the wide variety of techniques used to cool, detoxify, decompose, and separate-to-store or ameliorate.

Efforts to improve environmental aesthetics or employee comfort, such as landscaping or air conditioning, should **not** be included in the answers to this survey. Do **not** include expenditures for health and safety. Do **not** include purchases of motor vehicles with pollution abatement devices. The cost of such devices will be estimated by other means.

Some establishments manufacture equipment and materials, such as electrostatic precipitators or desulfurized fuels, to be sold to others for pollution abatement purposes. Current and capital expenditures for the production of such equipment and materials should **not** be reported.

**Air pollutants** are airborne substances, including particulates (dust, fly ash, smoke), sulfur oxides, nitrogen oxides, carbon monoxide, hydrocarbons, volatile organic compounds, lead, hazardous air pollutants (as identified in Sec. 112 of the Clean Air Act), and other air pollutants.

**Water pollutants** are harmful or objectionable waterborne substances causing alterations in water quality. They include:

- Conventional pollutants (total suspended solids, oil and grease, fecal coliform, ph, BOD5)
- Nonconventional pollutants (aluminum, ammonia, iron, barium, boron, chlorine, cobalt, fluoride, manganese, phosphorous, sulfur-hydrogen sulfide, titanium)
- Toxic metals/toxic inorganic compounds (antimony, arsenic, asbestos, beryllium, cadmium, chromium, copper, cyanide, lead, mercury, nickel, silver, thallium, zinc)
- Toxic organic (benzene, chloroethane, chloromethane, toluene, xylene or those designated by the Clean Water Act and EPA)

Solid waste includes garbage, trash, sewage sludge, dredged spoils, incinerator residue, wrecked or discarded equipment. Include solid waste produced as a result of air and water pollution abatement. "Hazardous solid waste are solid waste or combinations of solid waste, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in serious irreversible, or incapacitating reversible illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed." For identification and listing of hazardous waste, refer to Subtitle C-Hazardous Waste Management—Section 3001, Resource Conservation and Recovery Act 1976, Public Law 94-580, 42 US 6903.

### SPECIFIC INSTRUCTIONS

#### Item 1A — OPERATIONAL STATUS

Report the status of operations at this plant at the end of 1983.

**Idle Plants** — If this plant was temporarily idle during the entire period covered by this survey, this report should still be completed in its entirety. Actual operations for the various items should be reported as zero where appropriate.

**Sold or Leased Plant** — If this plant was sold or leased to another company to operate, indicate the month and year this action took place, report the new owner or operator in item 1B, complete item 3, and return form.

#### Item 2 — WHO SHOULD REPORT?

**No Pollution Abatement Activities** — Every concern receiving a report form which had no pollution abatement operating costs, payments to government, or capital expenditures during 1983, should complete only items 2 and 12, and return form for processing. Failure to return the form will require the issuance of followup letters.

**Pollution Abatement Activities** — Every concern receiving a report form which had some pollution abatement operating costs, payment to government, or capital expenditures during 1983, is required to submit data for items 3 through 11 as applicable.

#### Items 3 through 5 — ANNUAL COST FOR POLLUTION ABATEMENT

**Item 3** — Report the **annual operating costs and expenses** for pollution abatement incurred in 1983. Include all costs and expenses to operate and maintain plant and equipment that abate air or water pollutants and for solid waste management. Include services provided by private contractor.

This item should include the operating cost for all pollution abatement equipment and processes in operation during 1983 regardless of the year the equipment was installed or the process initiated.

#### INCLUDE THESE COSTS

- Operation and maintenance of plant and equipment
- Depreciation (or amortization) due to usage of plant and equipment
- Materials, leasing of equipment, parts, and direct labor
- Fuel and power as well as any increased cost due to increased consumption
- Services provided by private contractor

#### DO NOT INCLUDE THESE COSTS

- Expenditures for research and development
- Expenditures for health and safety
- Interest for financing pollution abatement capital expenditures
- Payment to governmental units (item 4)

**If you abate pollutants (air, water, or solid waste), be sure to complete the corresponding quantity section (items 9-11).**

**Item 4a** — Report all **payments to governmental units for sewage service**. Include payments for industrial or sanitary sewage and payments to government for overstrength effluent charges, sewer district tax assessment, etc. Include sewage service charges which are included in your local tax bill; estimate if necessary.

**Item 4b** — Report all **payments to governmental units for municipal solid waste collection and disposal services**. Included are collection cost to municipal agency (hauler) and disposal cost such as dump or burial fees at a landfill or incinerator.

**Item 5** — The estimate of **costs recovered through abatement activities** may have two parts: (1) the value of materials or energy reclaimed through abatement activities that were reused in production, and (2) revenue that was obtained from the sale of materials or energy reclaimed through abatement activities. Heat is an example of reclaimed energy. Value and revenue are net of any additional cost incurred for additional processing of materials or energy to make them reusable or salable.

For air and water, exclude the value of items if they would have been recovered, sold, or reused in production in the absence of pollution control regulations. In the case where a pollution abatement device is installed solely for the purpose of making a manufacturing process profitable; the recovery cost obtained by the usage of this device should **not** be reported in this item.

Do **not** reduce annual costs of abatement (item 3) by the estimate reported here.

## APPENDIX A

## SPECIFIC INSTRUCTIONS — Continued

**Items 6 through 8 — CAPITAL EXPENDITURES FOR NEW PLANT AND EQUIPMENT FOR POLLUTION ABATEMENT**

**Capital expenditures for new plant and equipment** include new plant and equipment acquisitions (both replacement and expansion) and expenditures for construction in progress. Capital expenditures are those chargeable to your establishment's accounts for plant and equipment that are subject to depreciation or to amortization. Total capital expenditures for abatement include expenditures for both end-of-line techniques and changes-in-production processes. Exclude expenditures for research and development.

**Item 6a — End-of-line techniques** treat air pollutants after their generation in your production processes by use of separately identifiable abatement (retrofit) facilities such as dust collectors, scrubbers, precipitators, or other treatment processes. These facilities are installed exclusively for the purpose of abating pollutant emissions from your plant or property.

**Item 6b — Changes-in-production processes** reduce or eliminate the generation of pollutants by employing material substitution, improved catalysts, reuse of waste or water, and equipment alteration. These changes may involve converting equipment to handle the use of substitute fuels that generate less pollutants. This item refers to new plant and equipment necessary for such changes in production processes. If your establishment has made expenditures for **changes-in-production processes**, estimate the expenditures as the difference between expenditures on new plant and equipment that your establishment actually made for changes-in-production processes and what your establishment would have spent for comparable plant and equipment without air pollution abatement features.

**Item 6d** — To estimate the impact of emission standards upon capital investment for pollution abatement in industry, it is necessary to match investment expenditures to major types of pollutants abated. **Note:** When a single device has the ability to abate more than one pollutant, the classification of the device is to be guided by the primary purpose for which the device was installed.

**Item 7a** — Same as item 6a, except that it refers to waste water treatment techniques such as trickling filters, settling ponds, clarifiers, oil spill dikes, and other separately identifiable treatment techniques.

**Item 7b** — Same as item 6b, except that it refers to abatement of water pollutants. The purpose of pollution abatement may be achieved by converting processes and equipment to enable recycling (closed or partially closed loop systems) or to enable additional uses of water prior to discharge. Do **not** include capital expenditures undertaken exclusively for the purpose of insuring adequate water supply for production.

**Item 8a** — Solid waste management is the collection and disposal of solid waste, materials and energy recovery, and changes-in-production processes to reduce the generation of solid waste. Collection and disposal refer to the collection, storage, transport, processing, and disposal of solid waste by incineration, sanitary or other landfill methods, and dumping in authorized areas. **Materials and energy recovery** refer to taking materials that cannot be converted into profitmaking output and recycling them for further use. Included are capital expenditures to recycle scrap metal, scrap paper, scrap wood, etc.; excluded are capital expenditures for secondary products (e.g., animal hides).

**Item 8b** — To estimate the impact of emission standards upon capital investment for pollution abatement in industry, it is necessary to match investment expenditures to major types of pollutants abated.

**Items 9 through 11 — TONNAGES OF POLLUTANTS REMOVED**

**Item 9** — Report the total tonnages of air pollutants abated during 1983. The tonnages should include all air pollutants abated during 1983 by new as well as previously existing pollution abatement equipment. If this information is not available from records, report engineering estimates where possible.

**Item 10** — Report the total tonnages of the listed water pollutants during 1983. The tonnages should include all water pollutants abated during 1983 by new as well as previously existing pollution abatement equipment. If this information is not available from records, report engineering estimates where possible.

**Item 11** — Report the total tonnages of solid waste disposed of by means acceptable to local, state, and Federal authorities. Solid wastes disposed consist of all solid wastes, including those wastes generated by air and water pollution abatement activities. **In the case** where solid waste is combined with industrial wastewater and disposed, include only the actual amount of hazardous solid waste disposed. Do not include the weight of the wastewater that was added for disposal purposes. If this information is not available from records, report engineering estimates where possible.

**IF YOU HAVE ANY QUESTIONS REGARDING THIS REPORT, PLEASE CALL (301) 763-1755.**

APPENDIX A

DUE DATE: WITHIN 60 DAYS AFTER RECEIPT

NOTICE — Response to this inquiry is required by law (title 13, U.S. Code). By section 9 of the same law your report to the Census Bureau is confidential. It may be seen only by sworn Census employees and may be used only for statistical purposes. The law also provides that copies retained in your files are immune from legal process.

FORM MA-200 7-22-83 U.S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS

**SURVEY OF POLLUTION ABATEMENT COSTS AND EXPENDITURES**

In correspondence pertaining to this report refer to this CENSUS FILE NUMBER (11 digits)

RECODE	ADDRESS	EXTRA COPY: FOLLOWUP
TAB NUMBER	INDUSTRY	
WEIGHT	TE	EI
AREA	PPH	

**CENSUS USE ONLY**

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(Please correct any error in name and address, including ZIP code)

RETURN COMPLETED FORM TO	Bureau of the Census 1201 East Tenth Street Jeffersonville, Indiana 47134	Name of person who prepared or certified the prior year's report
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This report is required only for the establishment specified in the address block of the report form. DO NOT COMBINE with other establishments in your company even though operations may jointly use the same pollution abatement facilities. When this occurs, apportion the expenditures and cost according to the rate of pollution abatement equipment utilization or the relative amounts of pollutants produced.

<b>Item 1A — OPERATIONAL STATUS</b>		<b>Item 1B — NEW OWNER OR OPERATOR</b>		
Mark (X) ONE box which best describes this establishment at the end of		121 Name		
111 <input type="checkbox"/> In operation	} Give date Mo. Yr.	122 Number and street		
112 <input type="checkbox"/> Temporarily idle		123 City	124 State	125 ZIP code
113 <input type="checkbox"/> Sold or leased to another company — Report new owner or operator in item 1B		126 Employer Identification Number		
114 <input type="checkbox"/> Permanently ceased operations				

**IMPORTANT PLEASE READ INSTRUCTIONS AND DEFINITIONS BEFORE COMPLETING FORM**

<b>Item 2 — IF THIS ESTABLISHMENT HAD NO OPERATING COSTS, PAYMENTS TO GOVERNMENT OR CAPITAL EXPENDITURES</b>	Mark (X) in box for appropriate reason, complete Item 12 and return form. Please review items 3 and 4; under normal operations those expenses, such as sewage fees and trash removal in excess of \$500, should be reported on this form.
211 <input type="checkbox"/> No pollutants generated	213 <input type="checkbox"/> All costs less than \$500
212 <input type="checkbox"/> Cost included in rent, taxes, lease agreement, or removal without charge or payment (such as scavenger services)	214 <input type="checkbox"/> Other — Specify

<b>Item 3 — ANNUAL OPERATING COSTS FOR POLLUTION ABATEMENT</b> Report the annual operating costs and expenses for pollution abatement activities.  Note: This item should include the operating costs for all pollution abatement equipment and processes in operation regardless of the year the equipment was installed or process initiated. DO NOT REDUCE your estimate by COSTS RECOVERED (Item 5).	TYPE OF POLLUTANT												
	Item (1)	Air (2)			Water (3)			Solid waste					
		Hazardous (4)			Nonhazardous (5)								
		Mil.	Thou.	Dol.	Mil.	Thou.	Dol.	Mil.	Thou.	Dol.	Mil.	Thou.	Dol.
a. Depreciation	301			311			321			331			
b. Labor	302			312			322			332			
c. Materials, supplies, fuel, and electricity	303			313			323			333			
d. Services, equipment leasing, and other costs	304			314			324			334			
e. TOTAL (Sum of lines a through d)	305			315			325			335			

<b>Item 4 — PAYMENTS TO GOVERNMENT FOR POLLUTION REMOVAL</b>	Total payments to governmental (Federal, State, county, local) units for —	Mil.	Thou.	Dol.
a. Public sewage services		401		
b. Municipal solid waste collection/disposal (if you report on this line, be sure to complete item 11.)		402		

<b>Item 5 — COSTS RECOVERED THROUGH ABATEMENT ACTIVITIES</b>		Mil.	Thou.	Dol.
a. Air		501		
b. Water		502		
c. Solid waste		503		
d. TOTAL (Sum of lines 5a through 5c)		505		

<b>Item 6 — CAPITAL EXPENDITURES FOR ABATEMENT OF AIR POLLUTANTS</b>	a. Report total expenditures for new plant and equipment designed to abate air pollutants through end-of-line techniques.	601		
	b. Report total expenditures for changes-in-production process to abate air pollutants.	602		
	c. TOTAL AIR CAPITAL (Sum of lines 6a and 6b)	605		

APPENDIX A

<p><b>Item 6 – CAPITAL EXPENDITURES FOR ABATEMENT OF AIR POLLUTANTS – Continued</b></p>	<p>d. Distribute total expenditures (on line 6c) in terms of percent by TYPE OF POLLUTANTS (Please give best estimates.)</p> <p style="text-align: center;">EXAMPLE</p> <table style="width:100%; border-collapse: collapse;"> <tr><td>(1) Particulates</td><td style="text-align: right;">40%</td></tr> <tr><td>(2) Sulfur oxides</td><td style="text-align: right;">10%</td></tr> <tr><td>(3) Nitrogen oxides, etc</td><td style="text-align: right;">35%</td></tr> <tr><td>(4) Hydrocarbons-voc</td><td style="text-align: right;">4%</td></tr> <tr><td>(5) Lead</td><td style="text-align: right;">3%</td></tr> <tr><td>(6) Hazardous air pollutants</td><td style="text-align: right;">1%</td></tr> <tr><td>(7) Other</td><td style="text-align: right;">7%</td></tr> <tr><td>(8) TOTAL</td><td style="text-align: right;">100%</td></tr> </table>	(1) Particulates	40%	(2) Sulfur oxides	10%	(3) Nitrogen oxides, etc	35%	(4) Hydrocarbons-voc	4%	(5) Lead	3%	(6) Hazardous air pollutants	1%	(7) Other	7%	(8) TOTAL	100%	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2"></th> <th colspan="2" style="text-align: center;">Percentage</th> </tr> </thead> <tbody> <tr><td>(1) Particulates</td><td style="text-align: center;">811</td><td style="text-align: center;">%</td><td></td></tr> <tr><td>(2) Sulfur oxides</td><td style="text-align: center;">812</td><td style="text-align: center;">%</td><td></td></tr> <tr><td>(3) Nitrogen oxides and carbon monoxide</td><td style="text-align: center;">813</td><td style="text-align: center;">%</td><td></td></tr> <tr><td>(4) Hydrocarbons-volatile organic compounds</td><td style="text-align: center;">814</td><td style="text-align: center;">%</td><td></td></tr> <tr><td>(5) Lead</td><td style="text-align: center;">815</td><td style="text-align: center;">%</td><td></td></tr> <tr><td>(6) Hazardous air pollutants</td><td style="text-align: center;">816</td><td style="text-align: center;">%</td><td></td></tr> <tr><td>(7) Other</td><td style="text-align: center;">817</td><td style="text-align: center;">%</td><td></td></tr> <tr><td>(8) TOTAL (Sum of lines (1) through (7))</td><td style="text-align: center;">→</td><td style="text-align: center;">100%</td><td></td></tr> </tbody> </table>			Percentage		(1) Particulates	811	%		(2) Sulfur oxides	812	%		(3) Nitrogen oxides and carbon monoxide	813	%		(4) Hydrocarbons-volatile organic compounds	814	%		(5) Lead	815	%		(6) Hazardous air pollutants	816	%		(7) Other	817	%		(8) TOTAL (Sum of lines (1) through (7))	→	100%	
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<p><b>Item 7 – CAPITAL EXPENDITURES FOR ABATEMENT OF WATER POLLUTANTS</b></p>	<p>a. Report total expenditures for new plant and equipment designed to abate water pollutants through end-of-line techniques.</p> <p>b. Report total expenditures for changes-in-production process to abate water pollutants.</p> <p>c. TOTAL WATER CAPITAL (Sum of lines 7a and 7b)</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">Mil.</th> <th style="text-align: center;">Thou.</th> <th style="text-align: center;">Dol.</th> </tr> </thead> <tbody> <tr><td>701</td><td></td><td></td><td></td></tr> <tr><td>702</td><td></td><td></td><td></td></tr> <tr><td>705</td><td></td><td></td><td></td></tr> </tbody> </table>		Mil.	Thou.	Dol.	701				702				705																																							
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<p><b>Item 8 – CAPITAL EXPENDITURES FOR SOLID WASTE MANAGEMENT</b></p>	<p>a. Report total expenditures for new plant and equipment designed for management of solid waste. (See specific instructions.)</p> <p>b. Distribute total expenditures (on line 8a) in terms of percent by TYPE OF POLLUTANTS (Please give best estimates.)</p> <p style="text-align: center;">EXAMPLE</p> <table style="width:100%; border-collapse: collapse;"> <tr><td>(1) Hazardous</td><td style="text-align: right;">25%</td></tr> <tr><td>(2) Nonhazardous</td><td style="text-align: right;">75%</td></tr> <tr><td>(3) TOTAL</td><td style="text-align: right;">100%</td></tr> </table>	(1) Hazardous	25%	(2) Nonhazardous	75%	(3) TOTAL	100%	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2"></th> <th style="text-align: center;">Percentage</th> </tr> </thead> <tbody> <tr><td>(1) Hazardous</td><td style="text-align: center;">811</td><td style="text-align: center;">%</td></tr> <tr><td>(2) Nonhazardous</td><td style="text-align: center;">812</td><td style="text-align: center;">%</td></tr> <tr><td>(3) TOTAL (Sum of lines (1) and (2))</td><td style="text-align: center;">→</td><td style="text-align: center;">100%</td></tr> </tbody> </table>			Percentage	(1) Hazardous	811	%	(2) Nonhazardous	812	%	(3) TOTAL (Sum of lines (1) and (2))	→	100%																																		
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<p><b>Item 9 – AIR POLLUTANTS ABATED BY WEIGHT</b></p> <p>Estimate total tonnage of specific air pollutants abated by new as well as previously installed pollution abatement facilities.</p>	<p>a. Particulates</p> <p>b. Sulfur oxides</p> <p>c. Nitrogen oxides and carbon monoxide</p> <p>d. Hydrocarbons-volatile organic compounds</p> <p>e. Lead</p> <p>f. Hazardous air pollutants</p> <p>g. Other</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <tbody> <tr><td>910</td><td style="text-align: center;">Tons</td></tr> <tr><td>911</td><td style="text-align: center;">Tons</td></tr> <tr><td>912</td><td style="text-align: center;">Tons</td></tr> <tr><td>913</td><td style="text-align: center;">Tons</td></tr> <tr><td>914</td><td style="text-align: center;">Tons</td></tr> <tr><td>915</td><td style="text-align: center;">Tons</td></tr> <tr><td>916</td><td style="text-align: center;">Tons</td></tr> </tbody> </table>	910	Tons	911	Tons	912	Tons	913	Tons	914	Tons	915	Tons	916	Tons																																						
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<p><b>Item 10 – WATER POLLUTANTS ABATED BY WEIGHT</b></p> <p>Estimate total tonnage of specific water pollutants abated by new as well as previously installed pollution abatement facilities.</p>	<p>a. Conventional</p> <p>b. Nonconventional</p> <p>c. Toxic metals</p> <p>d. Toxic organics</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <tbody> <tr><td>920</td><td style="text-align: center;">Tons</td></tr> <tr><td>921</td><td style="text-align: center;">Tons</td></tr> <tr><td>922</td><td style="text-align: center;">Tons</td></tr> <tr><td>923</td><td style="text-align: center;">Tons</td></tr> </tbody> </table>	920	Tons	921	Tons	922	Tons	923	Tons																																												
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<p><b>Item 11 – SOLID WASTE DISPOSAL BY WEIGHT</b></p> <p>Estimate total tonnage of solid waste disposed.</p>	<p>Include those wastes generated by air and water pollution abatement activities (e.g., dust, fly ash, sludge, and contained liquids). Exclude the weight of dissolved solids in the waste water effluent and any materials that are reclaimed.</p> <p>a. Hazardous</p> <p>b. Nonhazardous</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <tbody> <tr><td>930</td><td style="text-align: center;">Tons</td></tr> <tr><td>931</td><td style="text-align: center;">Tons</td></tr> </tbody> </table>	930	Tons	931	Tons																																																
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<p><b>Item 12 – CERTIFICATION</b> – This report is substantially accurate and has been prepared in accordance with instructions.</p>																																																						
<p>Key (Name of person to contact regarding this report – Print or type)</p>		<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Mo.</th> <th style="text-align: center;">Day</th> <th style="text-align: center;">Year</th> </tr> </thead> <tbody> <tr> <td style="width:30px;"></td> <td style="width:30px;"></td> <td style="width:30px;"></td> </tr> </tbody> </table>	Mo.	Day	Year																																																	
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Appendix B: State Abbreviations

STATE  
ABBREVIATION

STATE

AL	ALABAMA
AR	ARKANSAS
CA	CALIFORNIA
CT	CONNECTICUT
DE	DELAWARE
FL	FLORIDA
GA	GEORGIA
IA	IOWA
IL	ILLINOIS
IN	INDIANA
KS	KANSAS
KY	KENTUCKY
LA	LOUISIANA
MA	MASSACHUSETTS
MD	MARYLAND
MI	MICHIGAN
NJ	NEW JERSEY
NY	NEW YORK
OH	OHIO
OK	OKLAHOMA
PA	PENNSYLVANIA
RI	RHODE ISLAND
SC	SOUTH CAROLINA
TN	TENNESSEE
TX	TEXAS
VA	VIRGINIA
WA	WASHINGTON
WI	WISCONSIN
WV	WEST VIRGINIA

Table 1: Frequency and Percent of Plants in the Study  
Sample for N Years, N=1, 2, . . . , 11

N	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	480	25.6	480	25.6
2	241	12.8	721	38.4
3	225	12.0	946	50.4
4	177	9.4	1123	59.8
5	147	7.8	1270	67.7
6	125	6.7	1395	74.3
7	124	6.6	1519	80.9
8	120	6.4	1639	87.3
9	86	4.6	1725	91.9
10	73	3.9	1798	95.8
11	79	4.2	1877	100.0

Table 2: Frequency and Percent of Plants in the Study  
Sample that Opened Before and After 1970

	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Opened Before 1970	1199	63.9	1199	63.9
Opened After 1970	678	36.1	1877	100.0

Table 3: Frequency and Percent of Observations (Plant-Years)  
in the Study Sample in Each Year

YEAR	Frequency	Percent	Cumulative Frequency	Cumulative Percent
79	966	12.0	966	12.0
80	939	11.7	1905	23.7
81	890	11.1	2795	34.8
82	1036	12.9	383	47.7
83	402	5.0	4233	52.7
84	447	5.6	4680	58.3
85	493	6.1	5173	64.4
86	652	8.1	5825	72.5
88	617	7.7	6442	80.2
89	944	11.8	7386	92.0
90	645	8.0	803	100.0

Table 4: Frequency of Plants in the Study Sample  
by State and Year

STATE	1979	1980	1981	1982	1983	1984	1985	1986	1988	1989	1990
AL	19	19	20	22	12	10	12	9	11	18	13
AR	14	14	13	12	5	5	6	0	7	9	8
CA	64	61	59	65	22	29	32	46	48	65	43
CT	9	9	9	12	0	5	6	8	8	10	10
DE	13	13	12	8	5	5	5	7	7	12	7
FL	24	24	23	29	13	11	9	16	9	18	12
GA	28	26	27	30	14	15	15	15	19	34	17
IA	10	10	9	15	5	5	7	6	0	9	0
IL	82	78	73	75	24	29	30	43	46	70	39
IN	21	21	21	21	7	11	9	16	14	24	15
KS	9	10	9	15	8	7	10	11	6	6	5
KY	22	21	18	21	10	11	12	20	18	22	17
LA	55	56	53	48	30	36	35	46	39	49	41
MA	18	18	16	19	6	6	7	13	9	17	11
MD	20	19	18	20	6	9	9	13	13	18	10
MI	31	29	28	28	8	10	13	18	17	33	26
MN	7	6	0	0	0	0	0	0	0	5	0
MO	29	29	28	28	7	14	11	21	18	25	14
MS	11	11	10	9	0	0	9	7	7	9	8
NC	24	23	21	35	19	20	22	20	19	30	23
NE	5	5	5	6	0	0	0	0	0	0	0
NJ	106	105	100	116	38	40	51	67	63	75	53
NY	47	46	43	57	19	21	21	35	23	39	26
OH	67	65	61	73	23	21	31	41	36	72	47
OK	0	0	0	6	0	0	0	0	0	5	0
PA	46	42	45	52	23	21	19	28	29	48	32
RI	0	0	0	5	0	0	0	0	0	0	0
SC	24	23	20	21	11	13	13	19	18	25	23
TN	30	29	29	31	15	13	16	23	16	28	20
TX	87	85	85	102	48	56	57	75	81	114	88
VA	18	16	16	21	11	10	13	12	14	23	20
WA	0	0	0	5	0	0	0	0	5	6	0
WI	5	5	0	9	0	0	0	0	0	8	0
WV	21	21	19	20	13	14	13	17	17	18	17

Table 5: Frequency and Percent of Plants Reporting  
Zero Abatement Operating Cost

<u>Year</u>	<u>Frequency</u>	<u>Percent</u>
1979	32	3.3
1980	77	8.2
1981	101	11.3
1982	142	13.7
1983	0	0.0
1984	8	1.8
1985	10	2.0
1986	5	0.8
1988	4	0.6
1989	34	3.6
1990	12	1.9

Table 6a: Estimated Coefficients From Truncated Regressions<sup>1</sup>

Variable	1979	1980	1981	1982	1983	1984	1985	1986	1988	1989	1990
Constant	-6.65**	-6.49**	-6.18**	-5.45**	-3.82**	-4.00**	-5.36**	-4.88**	-4.84**	-6.05**	-4.10**
Log(tvs) <sup>2</sup>	1.12**	1.10**	1.09**	1.05**	0.92**	0.92**	1.05**	1.00**	0.97**	1.07**	0.95**
Age	0.03**	0.02*	0.02**	0.02**	0.03**	0.03**	0.04**	0.02**	0.02**	0.03**	0.02**
<u>States</u>											
AL	0.58	0.63	0.45	0.44	0.00	-0.01	-0.17	0.10	0.16	0.11	-0.27
AR	0.52	0.45	0.31	0.19	-0.18	0.31	0.16	<sup>3</sup>	0.09	0.52	-0.16
CA	-0.18	-0.06	-0.41	-0.44	-0.43	-0.35	-0.32	-0.02	-0.09	0.08	-0.44
CT	-0.01	0.45	0.03	-0.47		-0.95	-1.20	-0.52	0.06	-0.12	-0.61
DE	0.69	0.80	0.37	0.31	-0.23	-0.51	-0.52	-0.28	-0.52	0.21	-0.67
FL	0.32	0.22	0.03	0.53	-0.60	-0.85	-0.53	-0.49	0.09	-0.14	-0.80
GA	-0.19	-0.18	-0.55	-0.32	-0.47	-0.57	-0.60	-0.68	-0.38	-0.46	-0.31
IA	-0.33	-0.40	-0.56	-0.31	0.09	-0.76	-0.65	0.05		-1.14*	
IL	0.38	0.28	-0.05	0.04	-0.32	-0.33	-0.67	-0.20	-0.13	-0.38	-0.42
IN	0.63	0.63	0.27	0.43	-0.38	0.12	-0.58	0.05	0.34	-0.14	-0.17
KS	0.39	0.80	0.16	-0.63	-0.57	-0.91	-0.98	-0.48	-0.15	0.04	-0.75
KY	0.21	0.13	-0.21	0.03	-0.28	-0.33	-0.47	-0.24	0.25	0.10	-0.08
LA	0.50	0.25	0.13	0.17	-0.28	-0.24	-0.29	-0.10	-0.15	-0.15	-0.18
MA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MD	0.57	0.06	0.03	0.00	-0.28	-0.31	-0.73	-0.23	-0.01	-0.46	-0.29
MI	0.52	0.43	0.35	0.58	0.41	-0.13	0.09	0.39	0.66	0.51	-0.01
MN	-0.10	-0.23								-0.88	
MO	-0.29	-0.39	-0.33	-0.49	-0.18	-0.96	-1.22	-0.72	-0.42	-0.66	-0.18
MS	0.23	0.05	-0.26	0.44			0.22	-0.06	-0.31	-0.05	-0.16
NC	0.22	0.39	0.02	-0.05	-0.44	-0.55	-0.62	-0.90*	-0.37	-0.40	-0.54
NE	-0.73	-0.18	0.33	-0.45							
NJ	0.21	0.29	0.02	-0.11	0.05	-0.23	-0.26	0.01	-0.17	-0.03	-0.23
NY	0.47	0.52	0.42	0.21	-0.22	-0.12	-0.49	-0.11	0.10	0.30	0.07
OH	-0.23	-0.07	-0.36	-0.22	-0.46	-0.76	-0.78	-0.33	0.06	-0.29	-0.44
OK				0.16						-0.48	
PA	0.11	0.03	-0.05	-0.06	-0.06	-0.62	-0.90	0.02	0.20	0.19	-0.13
RI				0.58							
SC	-0.28	0.17	-0.40	-0.21	-0.41	-0.56	-0.66	-0.68	-0.32	-0.32	-0.65
TN	0.48	0.49	0.13	-0.01	0.09	-0.10	-0.38	-0.36	0.13	0.01	-0.56
TX	-0.09	-0.05	-0.34	-0.36	-0.61	-0.51	-0.70	-0.23	-0.30	-0.37	-0.35
VA	-0.27	-0.20	-0.57	-0.22	-0.35	-0.31	-1.05	-0.60	-0.19	-0.50	-0.76*
WA				-0.73					-0.50	-0.55	
WI	0.76	1.15		-0.43						-0.02	
WV	0.56	0.37	0.00	0.12	-0.28	-0.27	-0.21	0.24	0.19	0.03	0.19

<sup>1</sup> Truncated regressions are of log(abatement operating cost) regressed on state (dummies), 4-digit SIC code industry (dummies), the age of the plant, and log(total value of shipments) (log(tvs)). Heteroskedasticity was modeled by making the variance of the error term a function of log(tvs). The coefficient of log(tvs) in the error variance is always negative and always significant at the 99% level of confidence.

<sup>2</sup> The hypothesis that the coefficient of log(tvs) is 1.0 is tested using a Wald test statistic in each separate-year analysis. The null hypothesis cannot be rejected (i.e., the coefficient is not significantly different from 1.0) in all years except 1979.

<sup>3</sup> ' ' signifies that the state is not included in the analysis because of insufficient observations.

\*Significantly different from zero at the 95% level of confidence.

\*\*Significantly different from zero at the 99% level of confidence.

Table 6b: Estimated Coefficients From Truncated Regressions<sup>1</sup>

Variable	1979	1980	1981	1982	1983	1984	1985	1986	1988	1989	1990
<u>Industry</u>											
<u>SIC Code</u>											
2812	0.90	1.30	1.22	1.07	0.93*	0.84	0.91	0.62	0.62	0.80	0.96*
2813	-1.42**	-D <sup>2</sup>	-1.99**	-0.66	.	.	-2.92**	-2.31**	-0.97	-1.25**	-1.65
2816	0.90**	1.20**	0.83**	0.91**	1.35**	1.73**	0.86	1.12**	1.13*	1.07**	0.79*
2819	0.14	0.53**	0.48*	0.66**	0.68*	0.97**	0.60*	0.83**	0.88**	0.79**	0.82**
2821	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2822	-0.17	0.10	-0.05	0.07	0.33	0.47	0.10	-0.03	0.48*	0.24	0.29
2823	-0.02	0.12	0.46	0.47	0.39	D	D	0.45	.	.	D
2824	-0.63*	-0.64*	-0.63*	-0.77**	-0.47	-0.60	-0.73*	-0.32	-0.41	-0.53*	-0.42
2831	-1.87**	-1.79**	-2.22**	.	-3.02**	-2.21**	-2.38**	-2.17**	.	.	.
2833	0.43	0.52	0.56	0.49	0.58	0.79*	0.44	0.69	0.60*	-0.15	0.60*
2834	-2.21**	-2.04**	-2.12**	-2.25**	-1.96**	-1.61**	-1.93**	-1.86**	-1.08**	-1.94**	-1.56**
2835	.	.	.	.	.	.	.	.	-0.57	-2.32**	-1.71**
2836	.	.	.	-2.73**	.	.	.	.	-D	-0.85	-1.00
2841	-1.81**	-1.65**	-1.83**	-2.01**	-1.95**	-1.49**	-1.52**	-1.60**	-1.48**	-1.59**	-1.94**
2842	-2.41**	-2.68**	-2.46**	-2.45**	-2.39**	-1.39**	-2.26**	-1.90**	-1.64**	-2.14*	.
2843	-0.28	-0.33	-0.15	-0.31	0.63	0.31	0.14	0.45	0.57	-0.21	0.67
2844	-2.67**	-2.47**	-2.48**	-2.65**	-2.77**	-2.89**	-2.39**	-2.21**	-1.84**	-1.74**	-1.73**
2851	-1.25**	-1.13**	-0.90**	-1.24**	-1.55**	-1.26**	-1.21**	-1.15**	-0.81**	-0.62**	-0.61**
2861	0.35	-0.19	-0.44	-D	-0.10	0.17	-0.52	0.51	.	0.01	D
2865	0.75*	0.88**	0.94**	0.46*	0.60*	0.76*	0.56*	0.80**	1.06**	0.89**	0.56**
2869	0.33*	0.61**	0.55**	0.54**	0.74**	0.87**	0.63**	0.69**	0.94**	0.71**	0.74**
2873	0.64*	0.52	0.41	0.24	0.45	0.68	0.47	0.27	0.63	0.22	0.27
2874	0.74*	0.63	0.84	-0.01	0.97*	1.04**	0.93	0.85*	1.20**	0.76	.
2875	-2.26**	.	-D	.	.	.	.	-1.47**	.	-D	.
2879	-0.21	-0.38	-0.04	-0.18	0.82**	0.71**	0.42	0.62*	0.95**	0.57**	0.72**
2891	-1.97**	-1.09*	-1.44*	-1.34**	-0.41	-0.20	-0.91*	-0.85	-0.78*	-0.42	-0.43
2892	-0.04	0.29	0.47	-0.59	0.49	0.79	1.03	0.50	0.78	.	.
2893	-D	-D*	-D	-1.02	.	-D	-1.44	-1.37*	-0.78	-D	.
2895	0.54	0.63	0.07	-1.33**	-D	-1.73**	.	-2.02	.	-D	.
2899	-0.42	-0.55*	-0.66**	-0.53*	-0.26	0.03	0.07	-0.14	0.04	-0.37*	-0.09

<sup>1</sup> Truncated regressions are of log(abatement operating cost) regressed on state (dummies), 4-digit SIC code industry (dummies), the age of the plant, and log(total value of shipments) (log(tvs)). Heteroskedasticity was modeled by making the variance of the error term a function of log(tvs). The coefficient of log(tvs) in the error variance is always negative and always significant at the 99% level of confidence.

<sup>2</sup> 'D' signifies that the number is withheld to avoid disclosing operations of individual companies.

<sup>3</sup> '.' signifies that the industry is not included in the analysis because there is not more than one observation in the industry in that year.

\* Significantly different from zero at the 95% level of confidence.

\*\* Significantly different from zero at the 99% level of confidence.