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## Chapter 9



# ***Toxics Release Inventory Data for Electrical Equipment (SIC Code 36)***

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## **A Look at Electronic and Other Electrical Equipment and Components, Except Computer Equipment (SIC Code 36)**

The electrical equipment sector, Standard Industrial Classification (SIC) code 36, manufactures several major types of electrical equipment and components. Major industry groups in this sector produce equipment for transmission and distribution of electricity, electrical motors and related products for industry, household appliances, and electric lighting and wiring equipment. Other major industry groups in this sector manufacture communications equipment (including telephone and telegraph equipment, as well as radio and television broadcasting equipment) and electronic components (including circuit boards and semiconductors). Because early computers were large machines with many moving parts, computers are not classified as electrical equipment (SIC code 36), but as industrial machinery (SIC code 35).

Components of computer manufacturing, however—circuit boards and semiconductors—are important products in SIC code 36. Box 9-1 lists Standard Industrial Classification (SIC) codes and their designations for this sector. In TRI, SIC codes are given as reported by the facilities; these may differ from information in data collections that focus more on economic activity.

In 1996, production of electronic and electrical equipment and components resulted in shipments valued at \$320.61 billion, up from \$301.45 billion in 1995 (in current dollars). Employment in the sector was 1.6 million in 1996. Electrical equipment manufacture has grown much more rapidly than U.S. manufacturing as a whole. From 1989 to 1996, production in the electrical equipment sector rose 90.3%, compared to 17.6% for all manufacturing (see Chapter 4, Table 4-10.) The diversity of product categories in this sector lends a certain confusion to any overview of its performance. Analysis of this sector in *U.S. Industry & Trade Outlook '98* (DRI/McGraw-Hill, Standard & Poor's, and U.S. Department of Commerce, International Trade Administration, 1998), is spread among at least seven chapters that address industries on the basis of common economic activity rather than classification in the SIC system. Factors that influence the production of equipment for generating and transmitting



**Box 9-1. SIC Code 36, Electronic and Other Electrical Equipment and Components, Except Computer Equipment: Codes and Classifications**

| SIC Code  | Industry Description   |
|---|--|
| <b>361 Electric Transmission and Distribution Equipment</b>               |  |
| 3612 Power, Distribution, and Specialty Transformers.                     | Manufacture of power, distribution, instrument, and specialty transformers.  |
| 3613 Switchgear and Switchboard Apparatus                                 | Manufacture of switchgear and switchboard apparatus, including power switches, circuit breakers, power switching equipment, and similar switchgear for general industrial applications; switchboards and cubicles, control and metering panels, fuses and fuse mountings, and similar switchboard apparatus and supplies.                        |
| <b>362 Electrical Industrial Apparatus</b>                                |  |
| 3621 Motors and Generators  | Manufacture of electric motors and power generators, motor generator sets, railway motors and control equipment, and motors, generators, and control equipment for gasoline, electric, and oil-electric buses and trucks.  |
| 3624 Carbon and Graphite Products   | Manufacture of carbon, graphite, and metal-graphite brushes and brush stock; carbon or graphite electrodes for thermal and electrolytic uses; carbon and graphite fibers; and other carbon, graphite, and metal-graphite products.   |
| 3625 Relays and Industrial Controls                                       | Manufacture of relays; motor starters and controllers; and other industrial controls and accessories.  |
| 3629 Electrical Industrial Apparatus, nec*                                | Manufacture of miscellaneous industrial and commercial electric apparatus and equipment, such as variable capacitors and rectifiers for industrial applications.   |
| <b>363 Household Appliances</b>   |  |
| 3631 Household Cooking Equipment  | Manufacture of household electric and nonelectric cooking equipment, such as stoves, ranges, and ovens, except portable electric appliances. Includes microwave and convention ovens (including portable).   |
| 3632 Household Refrigerators and Home and Farm Freezers                   | Manufacture of household refrigerators and home and farm freezers.   |
| 3633 Household Laundry Equipment  | Manufacture of laundry equipment, such as washing machines, dryers, and ironers, for household use, including coin-operated.   |
| 3634 Electric Housewares and Fans   | Manufacture of electric housewares for heating, cooking, and other purposes. Manufacture of electric household fans, except attic fans. Includes household-type ventilation and exhaust fans, portable household cooking appliances (except convection and microwave ovens), electric space heaters, and portable humidifiers and dehumidifiers. |
| 3635 Household Vacuum Cleaners  | Manufacture of vacuum cleaners for household use.  |
| 3639 Household Appliances, nec*   | Manufacture of miscellaneous household appliances, such as water heaters, dishwashers, food waste disposal units, and household sewing machines.   |
| <b>364 Electric Lighting and Wiring Equipment</b>                         |  |
| 3641 Electric Lamp Bulbs and Tubes  | Manufacture of electric bulbs, tubes, and related light sources. Includes incandescent filament lamps, vapor and fluorescent lamps, photoflash and photoflood lamps, and electrotherapeutic lamp units for ultraviolet and infrared radiation.   |
| 3643 Current-Carrying Wiring Devices                                      | Manufacture of current-carrying wiring devices.  |
| 3644 Noncurrent-carrying Wiring Devices                                   | Manufacture of noncurrent-carrying wiring devices. Includes conduits and fittings; electrical insulators (except porcelain, other ceramic, and glass insulators); outlet, switch, and fuse boxes, pole line hardware.  |
| 3645 Residential Electric Lighting Fixtures                               | Manufacture of residential electric lighting fixtures and equipment, fixed or portable.  |
| 3646 Commercial, Industrial, and Institutional Electric Lighting Fixtures | Manufacture of commercial, industrial, and institutional electric lighting fixtures.   |
| 3647 Vehicular Lighting Equipment   | Manufacture of vehicular lighting equipment.   |
| 3648 Lighting Equipment, nec*   | Manufacture of miscellaneous lighting fixtures and equipment, electric and nonelectric, including flashlights, searchlights, ultraviolet lamp fixtures, and infrared lamp fixtures.  |

\*nec: not elsewhere classified.


**Box 9-1. SIC Code 36, Electronic and Other Electrical Equipment and Components, Except Computer Equipment: Codes and Classifications, Continued**

| SIC Code   | Industry Description   |
|--|--|
| <b>365 Household Audio and Video Equipment, and Audio Recordings</b>   |  |
| 3651 Household Audio and Video Equipment                               | Manufacture of electronic audio and video equipment for home entertainment (including automotive), such as television sets, radio broadcast receivers, tape players, phonographs, and video records and players. Manufacture of public address systems and music distribution apparatus.   |
| 3652 Phonograph Records and Prerecorded Audio Tapes and Disks          | Manufacture of phonograph records and prerecorded audio tapes and disks.   |
| <b>366 Communications Equipment</b>                                    |  |
| 3661 Telephone and Telegraph Apparatus                                 | Manufacture of wire telephone and telegraph equipment. Includes modems and other telephone and telegraph communications interface equipment.   |
| 3663 Radio and Television Broadcasting and Communications Equipment    | Manufacture of radio and television broadcasting and communications equipment. Includes closed-circuit and cable television equipment; studio equipment; light communications equipment; transmitters, transceivers, and receivers (except household and automotive); cellular radio telephones; communication antennas; receivers; RF power amplifiers; and fixed and mobile radio systems. |
| 3669 Communications Equipment, nec*                                    | Manufacture of miscellaneous communications and related equipment. Includes intercommunication equipment, traffic signaling equipment, and fire and burglar alarm apparatus.   |
| <b>367 Electronic Components and Accessories</b>                       |  |
| 3671 Electron Tubes  | Manufacture of electron tubes and tube parts.  |
| 3672 Printed Circuit Boards  | Manufacture of printed circuit boards.   |
| 3674 Semiconductors and Related Devices                                | Manufacture of semiconductors and related solid-state devices. Includes semiconductor diodes and stacks, including rectifiers, integrated microcircuits (semiconductor networks), transistors, solar cells, and light sensing and emitting semiconductor (solid state devices).  |
| 3675 Electronic Capacitors   | Manufacture of electronic capacitors.  |
| 3676 Electronic Resistors  | Manufacture of electronic resistors.   |
| 3677 Electronic Coils, Transformers, and Other Inductors               | Manufacture of electronic coils, transformers, and inductors.  |
| 3678 Electronic Connectors   | Manufacture of electronic connectors.  |
| 3679 Electronic Components, nec*                                       | Manufacture of miscellaneous electronic components, such as receiving antennas, switches, and waveguides.  |
| <b>369 Miscellaneous Electrical Machinery, Equipment, and Supplies</b> |  |
| 3691 Storage Batteries   | Manufacture of storage batteries.  |
| 3692 Primary Batteries, Dry and Wet                                    | Manufacture of primary batteries, dry or wet.  |
| 3694 Electrical Equipment for Internal Combustion Engines              | Manufacture of electrical equipment for internal combustion engines. Includes armatures, starting motors, alternators, and generators for automobiles and aircraft. Includes ignition apparatus for internal combustion engines, including spark plugs, magnetos, coils, and distributors.   |
| 3695 Magnetic and Optical Recording Media                              | Manufacture of blank tape, disk, or cassette magnetic or optical recording media for use in recording audio, video, and other signals.   |
| 3699 Electrical Machinery, Equipment, and Supplies, nec*               | Manufacture of miscellaneous electrical machinery, equipment, and supplies, including high energy particle acceleration systems and equipment, electronic simulators, appliance and extension cords, bells and chimes, and insect traps.   |

**Source:** Executive Office of the President, Office of Management and Budget, *Standard Industrial Classification Manual*, 1987: Standard Industrial Classification (SIC) codes and industry descriptions.

\*nec: not elsewhere classified.



Table 9-1. Summary of TRI Information by 4-digit SIC Code, 1996: Electrical Equipment, SIC Code 36

| Total On- and Off-site Releases Rank | Total Production-related Waste Rank | SIC Code | Industry                              | Total Facilities Number | Total Forms Number | Form As Number | Total On-site Releases Pounds | Total Off-site Releases Pounds | Total On- and Off-site Releases Pounds |
|--------------------------------------|-------------------------------------|----------|---------------------------------------|-------------------------|--------------------|----------------|-------------------------------|--------------------------------|--|
| 13                                   | 13                                  | 3612     | Transformers, Except Electronic       | 38                      | 90                 | 2              | 1,041,920                     | 246,650                        | 1,288,570                              |
| 26                                   | 12                                  | 3613     | Switchgear & Switchboard Apparatus    | 42                      | 84                 | 3              | 123,558                       | 41,590                         | 165,148                                |
| 6                                    | 9                                   | 3621     | Motors & Generators                   | 79                      | 191                | 8              | 2,487,700                     | 99,028                         | 2,586,728                              |
| 19                                   | 10                                  | 3624     | Carbon & Graphite Products            | 26                      | 40                 | 0              | 347,258                       | 53,653                         | 400,911                                |
| 34                                   | 27                                  | 3625     | Relays & Industrial Controls          | 14                      | 26                 | 1              | 81,551                        | 4,588                          | 86,139                                 |
| 28                                   | 25                                  | 3629     | Electrical Industrial Apparatus, nec* | 16                      | 25                 | 1              | 93,917                        | 62,649                         | 156,566                                |
| 29                                   | 34                                  | 3631     | Household Cooking Equipment           | 9                       | 26                 | 0              | 81,098                        | 69,869                         | 150,967                                |
| 4                                    | 18                                  | 3632     | Household Refrigerators & Freezers    | 13                      | 64                 | 1              | 2,751,418                     | 47,550                         | 2,798,968                              |
| 8                                    | 20                                  | 3633     | Household Laundry Equipment           | 10                      | 60                 | 0              | 1,745,257                     | 161,947                        | 1,907,204                              |
| 16                                   | 28                                  | 3634     | Electric Housewares & Fans            | 16                      | 28                 | 2              | 556,491                       | 1,250                          | 557,741                                |
| 37                                   | 39                                  | 3635     | Household Vacuum Cleaners             | 2                       | 3                  | 0              | 17,255                        | 500                            | 17,755                                 |
| 14                                   | 24                                  | 3639     | Household Appliances, nec*            | 12                      | 45                 | 1              | 932,151                       | 208,891                        | 1,141,042                              |
| 2                                    | 15                                  | 3641     | Electric Lamps                        | 26                      | 65                 | 0              | 2,373,160                     | 728,039                        | 3,101,199                              |
| 18                                   | 16                                  | 3643     | Current-carrying Wiring Devices       | 47                      | 80                 | 6              | 170,107                       | 237,174                        | 407,281                                |
| 21                                   | 17                                  | 3644     | Noncurrent-carrying Wiring Devices    | 18                      | 42                 | 2              | 299,293                       | 7,734                          | 307,027                                |
| 27                                   | 26                                  | 3645     | Residential Lighting Fixtures         | 10                      | 15                 | 5              | 153,711                       | 5,900                          | 159,611                                |
| 22                                   | 32                                  | 3646     | Commercial Lighting Fixtures          | 12                      | 19                 | 1              | 227,393                       | 250                            | 227,643                                |
| 33                                   | 35                                  | 3647     | Vehicular Lighting Equipment          | 6                       | 16                 | 0              | 70,206                        | 16,754                         | 86,960                                 |
| 32                                   | 19                                  | 3648     | Lighting Equipment, nec*              | 8                       | 18                 | 1              | 33,888                        | 59,300                         | 93,188                                 |
| 17                                   | 29                                  | 3651     | Household Audio & Video Equipment     | 13                      | 21                 | 0              | 443,864                       | 2,604                          | 446,468                                |
| 39                                   | 37                                  | 3652     | Prerecorded Records & Tapes           | 4                       | 5                  | 0              | 5,489                         | 5,081                          | 10,570                                 |
| 31                                   | 31                                  | 3661     | Telephone & Telegraph Apparatus       | 12                      | 15                 | 3              | 122,377                       | 4,006                          | 126,383                                |
| 38                                   | 36                                  | 3663     | Radio & TV Communications Equipment   | 8                       | 27                 | 0              | 10,835                        | 5                              | 10,840                                 |
| 36                                   | 23                                  | 3669     | Communications Equipment, nec*        | 11                      | 13                 | 0              | 40,346                        | 7,248                          | 47,594                                 |
| 15                                   | 7                                   | 3671     | Electron Tubes                        | 14                      | 70                 | 0              | 632,671                       | 339,378                        | 972,049                                |
| 1                                    | 2                                   | 3672     | Printed Circuit Boards                | 214                     | 582                | 11             | 1,197,800                     | 7,347,373                      | 8,545,173                              |
| 3                                    | 3                                   | 3674     | Semiconductors & Related Devices      | 131                     | 499                | 6              | 2,227,646                     | 741,476                        | 2,969,122                              |
| 11                                   | 11                                  | 3675     | Electronic Capacitors                 | 27                      | 63                 | 0              | 917,038                       | 641,297                        | 1,558,335                              |
| 25                                   | 30                                  | 3676     | Electronic Resistors                  | 7                       | 12                 | 0              | 100,371                       | 78,797                         | 179,168                                |
| 30                                   | 33                                  | 3677     | Electronic Coils & Transformers       | 16                      | 23                 | 0              | 133,084                       | 1,750                          | 134,834                                |
| 24                                   | 14                                  | 3678     | Electronic Connectors                 | 24                      | 60                 | 1              | 166,456                       | 26,446                         | 192,902                                |
| 9                                    | 6                                   | 3679     | Electronic Components, nec*           | 106                     | 194                | 21             | 1,536,616                     | 332,553                        | 1,869,169                              |
| 10                                   | 1                                   | 3691     | Storage Batteries                     | 77                      | 181                | 1              | 242,993                       | 1,480,262                      | 1,723,255                              |
| 7                                    | 8                                   | 3692     | Primary Batteries, Dry & Wet          | 22                      | 55                 | 0              | 367,994                       | 2,210,035                      | 2,578,029                              |
| 20                                   | 22                                  | 3694     | Engine Electrical Equipment           | 20                      | 42                 | 0              | 244,322                       | 105,717                        | 350,039                                |
| 12                                   | 5                                   | 3695     | Magnetic & Optical Recording Media    | 17                      | 39                 | 0              | 1,264,005                     | 139,443                        | 1,403,448                              |
| 23                                   | 21                                  | 3699     | Electrical Equipment & Supplies, nec* | 23                      | 61                 | 10             | 141,107                       | 51,952                         | 193,059                                |
| 5                                    | 4                                   |          | Multiple within SIC 36                | 75                      | 212                | 2              | 2,220,202                     | 543,769                        | 2,763,971                              |
| 35                                   | 38                                  |          | Invalid SIC Code within SIC 36        | 8                       | 10                 | 1              | 49,571                        | 750                            | 50,321                                 |
| Total for SIC Code 36                |                                     |          |                                       | 1,233                   | 3,121              | 90             | 25,652,119                    | 16,113,258                     | 41,765,377                             |

**Note:** On-site Releases from Section 5 of Form R. On-site Waste Management from Section 8 of Form R. Off-site Releases from Section 6 (transfers off-site to disposal) of Form R. Total Transfers Off-site for Further Waste Management from Section 6 (excluding transfers off-site to disposal) of Form R. Total Production-related Waste sums Section 8 (Current Year, Column B) of Form R, except: Non-production-related Waste (remedial/catastrophic incidents). Facilities/forms with more than one 4-digit SIC code within SIC code 20 are assigned to the "multiple" category.

\*nec: not elsewhere classified.

electricity may differ markedly from those that drive the manufacture of washing machines, printed circuit boards, or lead-acid batteries.

Manufacture of electronic components (SIC code 367, which includes circuit boards and semiconductors) represents the largest economic activity within SIC code 36. The value of this

industry's shipments in 1996 was \$128 billion and employment was 587,900, about two-fifths of the sector's total in both measures. The second largest industry group was production of communications equipment (SIC code 366), which had \$66.23 billion in shipments and employed 258,400, roughly one-fifth of the sector's totals.



Table 9-1. Summary of TRI Information by 4-digit SIC Code, 1996: Electrical Equipment, SIC Code 36, Continued

| SIC Code              | Industry                              | Total Other On-site Waste Management<br>Pounds | Total Transfers Off-site for Further Waste Management<br>Pounds | Total Production-related Waste<br>Pounds | Non-Production-related Waste<br>Pounds |
|-----------------------|---------------------------------------|--|---|--|--|
| 3612                  | Transformers, Except Electronic       | 360,608  | 5,832,457   | 8,272,263                                | 108                                    |
| 3613                  | Switchgear & Switchboard Apparatus    | 587,653  | 8,382,165   | 9,279,624                                | 17,370                                 |
| 3621                  | Motors & Generators                   | 636,199  | 9,549,206   | 12,380,217                               | 1,408                                  |
| 3624                  | Carbon & Graphite Products            | 9,560,688                                      | 233,848   | 10,232,251                               | 130                                    |
| 3625                  | Relays & Industrial Controls          | 24,624   | 1,237,141   | 1,349,794                                | 0                                      |
| 3629                  | Electrical Industrial Apparatus, nec* | 2,482  | 1,363,697   | 1,602,541                                | 1,156                                  |
| 3631                  | Household Cooking Equipment           | 4,042  | 252,446   | 411,317                                  | 0                                      |
| 3632                  | Household Refrigerators & Freezers    | 138,190  | 1,489,300   | 4,476,760                                | 5,200                                  |
| 3633                  | Household Laundry Equipment           | 855,473  | 971,627   | 3,671,164                                | 0                                      |
| 3634                  | Electric Housewares & Fans            | 71,400   | 491,937   | 1,123,011                                | 0                                      |
| 3635                  | Household Vacuum Cleaners             | 206  | 48,355  | 66,044                                   | 0                                      |
| 3639                  | Household Appliances, nec*            | 279,422  | 502,213   | 1,942,083                                | 0                                      |
| 3641                  | Electric Lamps                        | 1,566,403                                      | 1,638,112   | 6,450,360                                | 60                                     |
| 3643                  | Current-carrying Wiring Devices       | 2,817,437                                      | 2,973,124   | 6,254,196                                | 0                                      |
| 3644                  | Noncurrent-carrying Wiring Devices    | 4,120,598                                      | 1,160,346   | 5,577,483                                | 0                                      |
| 3645                  | Residential Lighting Fixtures         | 1,472,725                                      | 12,978  | 1,593,530                                | 0                                      |
| 3646                  | Commercial Lighting Fixtures          | 168,917  | 33,472  | 425,192                                  | 0                                      |
| 3647                  | Vehicular Lighting Equipment          | 79,000   | 89,712  | 267,603                                  | 0                                      |
| 3648                  | Lighting Equipment, nec*              | 76,000   | 4,186,539   | 4,342,672                                | 0                                      |
| 3651                  | Household Audio & Video Equipment     | 63,458   | 479,132   | 991,893                                  | 0                                      |
| 3652                  | Prerecorded Records & Tapes           | 527  | 93,103  | 103,423                                  | 0                                      |
| 3661                  | Telephone & Telegraph Apparatus       | 970  | 300,740   | 428,086                                  | 0                                      |
| 3663                  | Radio & TV Communications Equipment   | 116,171  | 17,963  | 140,024                                  | 0                                      |
| 3669                  | Communications Equipment, nec*        | 31,598   | 2,711,065   | 2,802,973                                | 0                                      |
| 3671                  | Electron Tubes                        | 9,141,793                                      | 7,314,087   | 17,659,163                               | 0                                      |
| 3672                  | Printed Circuit Boards                | 14,524,539                                     | 34,473,455  | 58,951,340                               | 103                                    |
| 3674                  | Semiconductors & Related Devices      | 34,547,619                                     | 12,254,762  | 49,332,568                               | 17,220                                 |
| 3675                  | Electronic Capacitors                 | 4,289,484                                      | 3,876,009   | 9,829,376                                | 2                                      |
| 3676                  | Electronic Resistors                  | 183,297  | 186,223   | 498,284                                  | 0                                      |
| 3677                  | Electronic Coils & Transformers       | 8,624  | 264,659   | 423,469                                  | 0                                      |
| 3678                  | Electronic Connectors                 | 1,594,310                                      | 4,877,714   | 6,869,077                                | 0                                      |
| 3679                  | Electronic Components, nec*           | 10,150,879                                     | 6,356,214   | 18,349,206                               | 3,075                                  |
| 3691                  | Storage Batteries                     | 104,469,548                                    | 229,399,495   | 358,730,306                              | 3,536                                  |
| 3692                  | Primary Batteries, Dry & Wet          | 10,029,861                                     | 2,075,512   | 14,742,152                               | 0                                      |
| 3694                  | Engine Electrical Equipment           | 466,862  | 1,404,347   | 3,004,650                                | 0                                      |
| 3695                  | Magnetic & Optical Recording Media    | 21,578,346                                     | 1,730,414   | 24,834,037                               | 1,601                                  |
| 3699                  | Electrical Equipment & Supplies, nec* | 781,870  | 2,385,434   | 3,501,883                                | 0                                      |
|                       | Multiple within SIC 36                | 3,227,519                                      | 22,014,716  | 28,404,703                               | 304                                    |
|                       | Invalid SIC Code within SIC 36        | 7,735  | 29,131  | 87,521                                   | 99                                     |
| Total for SIC Code 36 |                                       | 238,037,077                                    | 372,692,850   | 679,402,239                              | 51,372                                 |

**Note:** On-site Releases from Section 5 of Form R. On-site Waste Management from Section 8 of Form R. Off-site Releases from Section 6 (transfers off-site to disposal) of Form R. Total Transfers Off-site for Further Waste Management from Section 6 (excluding transfers off-site to disposal) of Form R. Total Production-related Waste sums Section 8 (Current Year, Column B) of Form R, except: Non-production-related Waste (remedial/catastrophic incidents). Facilities/forms with more than one 4-digit SIC code within SIC code 20 are assigned to the "multiple" category.

\*nec: not elsewhere classified.

Two segments of the electronic component industry have been associated with high levels of wastes managed by industries in SIC code 36, as is evident in the analyses presented in this chapter: semiconductors and related devices (SIC code 3674) and printed circuit boards (SIC code 3672). Although computers are the primary end use of semiconductors (half of the market in 1995), all

electronic products depend on semiconductors, including consumer electronics (televisions, radios, VCRs, etc.), telecommunications, industrial machinery, and equipment for both transportation and military uses.

The process of building a semiconductor from silicon ingots to computer chips bearing hundreds



of integrated circuits involves repeated coating, etching, and cleaning processes, using solvents and acids. Some parts of the processes that build printed circuit boards are somewhat similar, although laminating, drilling, coating, and soldering operations generate additional forms of waste, including particulates.

The Semiconductor Industry Association uses TRI data “to document individual company and industry-wide pollution-prevention and waste-management practices.” The association cites a decrease in hazardous air pollutants (HAPs) by 1994 to less than one fourth their 1987 level. Semiconductor manufacture previously generated air emissions of two ozone-depleting chemicals—1,1,1-trichloroethane (methyl chloroform) and Freon 113—that have been practically eliminated in industry processes since 1993, as noted by the Semiconductor Industry Association. Use of trichloroethylene has also been reduced.

Lead-acid batteries are classified among miscellaneous electrical equipment and supplies (SIC code 369). Eighty-three percent of the lead-acid battery market consists of starting, lighting, and ignition batteries, with common applications in vehicles from motorcycles and passenger cars to marine aircraft and military vehicles. The remaining 17% of this market is in industrial uses. Once a major concern in landfills, lead-acid batteries were recycled at an average rate of 94.9% per year from 1990 to 1995, according to the Battery Council International. Manufacture of these storage batteries, however, continues to generate large quantities of TRI chemicals in waste. Battery production is also the driving factor in the U.S. and global lead industry.

## 1996 TRI Data for Electrical Equipment

Table 9-1 summarizes TRI reporting by the electrical equipment sector for 1996. More than 3,100 TRI reporting forms were submitted for 1996. Just 2.9% were Form A certification statements, certifying that a chemical’s annual reportable amount was less than 500 pounds for the year and that the facility did not manufacture, process, or otherwise use more than 1 million pounds. This is considerably lower than the 10.1% national average for all sectors. (The Form A certification statement is explained in Chapter 1.) Of the 3,121 total forms submitted, 582 (18.6%) reported in printed circuit board manufacture (SIC code 3672) and 499 (16.0%) in production of semiconductors and related devices (SIC code 3674).

As shown in Table 9-1, printed circuit board manufacture accounted for the largest on- and off-site releases, 8.5 million pounds or one fifth (20.5%) of the sector’s total releases. This consisted primarily of off-site releases (transfers off-site to disposal), which were 7.3 million pounds for this industry or 45.6% of the sector’s total off-site releases. The largest on-site releases were reported in the manufacture of household refrigerators and freezers (SIC code 3632), which was 2.8 million pounds or 10.7% of the on-site releases in this sector. The storage battery industry (SIC code 3691) reported by far the largest portion of other on-site waste management (104.5 million pounds or 43.9% of that total), transfers off-site for further waste management (229.4 million pounds, or 61.6%), and total production-related waste (358.7 million pounds, or 52.8%).

Some facilities in this sector manufacture products in similar but distinct categories, as designated in the Standard Industrial Classification (SIC) scheme. For example, facilities may manufacture both electrical transformers (SIC code 3612) and electric motors (SIC code 3621). Others may produce more than one kind of household equipment: cooking



Table 9-2. Multiple SIC Codes, 1996: Electrical Equipment, SIC Code 36

| SIC Codes                     | Total        |                | Total On-site Releases Pounds | Total Off-site Releases Pounds | Total On- and Off-site Releases Pounds | Total Other On-site Waste Management Pounds | Total Transfers Off-site for Further Waste Management Pounds | Total Production-related Waste Pounds | Non-Production-related Waste Pounds |
|-------------------------------|--------------|----------------|-------------------------------|--------------------------------|--|---|--|---------------------------------------|-------------------------------------|
|                               | Forms Number | Form As Number |                               |                                |  |   |  |                                       |                                     |
| 3612 3621 3699                | 39           | 0              | 3,412                         | 38,364                         | 41,776                                 | 9,284                                       | 7,444,526  | 7,813,645                             | 0                                   |
| 3613 3629                     | 2            | 0              | 216,790                       | 0                              | 216,790                                | 0   | 4,279  | 220,719                               | 0                                   |
| 3621 3624                     | 1            | 0              | 255                           | 0                              | 255                                    | 0   | 500  | 425                                   | 0                                   |
| 3621 3694                     | 2            | 0              | 50                            | 3,187                          | 3,237                                  | 0   | 465  | 3,422                                 | 0                                   |
| 3625 3643                     | 8            | 0              | 91,515                        | 2,600                          | 94,115                                 | 58,714                                      | 56,694   | 209,192                               | 150                                 |
| 3625 3651 3661 3663 3669 3699 | 5            | 1              | 28                            | 0                              | 28                                     | 0   | 86,439   | 86,578                                | 0                                   |
| 3625 3676                     | 4            | 0              | 181,282                       | 0                              | 181,282                                | 26,818                                      | 306,053  | 515,553                               | 0                                   |
| 3631 3632                     | 8            | 0              | 21,732                        | 30,114                         | 51,846                                 | 74,674                                      | 6,495  | 132,702                               | 0                                   |
| 3631 3632 3633 3639           | 8            | 0              | 150,130                       | 0                              | 150,130                                | 0   | 419,400  | 569,265                               | 0                                   |
| 3632 3639                     | 20           | 1              | 1,095,109                     | 15,766                         | 1,110,875                              | 494,929                                     | 201,832  | 1,808,144                             | 154                                 |
| 3643 3644                     | 2            | 0              | 1                             | 10,485                         | 10,486                                 | 1,700                                       | 19,018   | 31,152                                | 0                                   |
| 3643 3644 3646                | 5            | 0              | 602                           | 0                              | 602                                    | 0   | 114,999  | 113,239                               | 0                                   |
| 3645 3646                     | 1            | 0              | 4,964                         | 0                              | 4,964                                  | 0   | 17,372   | 22,336                                | 0                                   |
| 3651 3671 3672 3679 3694      | 4            | 0              | 2,857                         | 0                              | 2,857                                  | 34,030                                      | 85,530   | 121,417                               | 0                                   |
| 3651 3672                     | 2            | 0              | 260                           | 0                              | 260                                    | 47,769                                      | 250  | 47,814                                | 0                                   |
| 3662 3679                     | 10           | 0              | 626                           | 12,470                         | 13,096                                 | 34,372                                      | 1,305,786  | 1,083,483                             | 0                                   |
| 3663 3671                     | 1            | 0              | 0                             | 0                              | 0                                      | 0   | 38,192   | 38,192                                | 0                                   |
| 3663 3671 3679                | 21           | 0              | 15,720                        | 223,965                        | 239,685                                | 242,458                                     | 1,528,530  | 2,011,877                             | 0                                   |
| 3663 3678 3679                | 2            | 0              | 150                           | 4,257                          | 4,407                                  | 39,109                                      | 70   | 43,657                                | 0                                   |
| 3672 3674                     | 4            | 0              | 14,686                        | 0                              | 14,686                                 | 0   | 77,111   | 90,677                                | 0                                   |
| 3672 3678                     | 10           | 0              | 303,981                       | 2,050                          | 306,031                                | 30,010                                      | 78,881   | 420,396                               | 0                                   |
| 3672 3699                     | 9            | 0              | 2,137                         | 80,054                         | 82,191                                 | 74,380                                      | 9,918,265  | 10,073,946                            | 0                                   |
| 3674 3679                     | 28           | 0              | 16,475                        | 0                              | 16,475                                 | 1,934,381                                   | 69,629   | 2,016,198                             | 0                                   |
| 3675 3677                     | 1            | 0              | 90,819                        | 0                              | 90,819                                 | 20,383                                      | 17,946   | 129,148                               | 0                                   |
| 3691 3692                     | 13           | 0              | 5,861                         | 207                            | 6,068                                  | 95,508                                      | 216,449  | 672,026                               | 0                                   |
| 3694 3699                     | 2            | 0              | 760                           | 120,250                        | 121,010                                | 9,000                                       | 5  | 129,500                               | 0                                   |
| Total for SIC Code 36         | 212          | 2              | 2,220,202                     | 543,769                        | 2,763,971                              | 3,227,519                                   | 22,014,716   | 28,404,703                            | 304                                 |

**Note:** On-site Releases from Section 5 of Form R. On-site Waste Management from Section 8 of Form R. Off-site Releases are transfers off-site to disposal from Section 6 of Form R. Total Transfers Off-site for Further Waste Management from Section 6 of Form R. Total Production-related Waste sums Section 8 of Form R, except: Non-production-related Waste (remedial/catastrophic incidents).

ranges (SIC code 3631), refrigerators (SIC code 3632), and dishwashers (SIC code 3639). These facilities will report multiple SIC codes on their TRI forms. (Box 4-2 in Chapter 4 further explains reporting of multiple SIC codes and its affect on the analyses presented in the TRI data release.)

Table 9-2 examines TRI reporting from the 212 forms submitted with more than one code within SIC code 36. Two industries appear in five combinations each: printed circuit boards (SIC code 3672) and miscellaneous electronic components (SIC code 3679). Forms reporting multiple SIC codes are a smaller factor in the electrical equipment manufacture than in many other sectors. This indicates more of a concentration in this sector on single or closely related product lines.

## On- and Off-site Releases

Of the 41.8 million pounds of on- and off-site releases reported in the electrical equipment sector, 23.8 million pounds were air emissions, or 56.9% of the total releases. Table 9-3 and Figure 9-1 present release data for electrical equipment manufacturing.

Off-site releases (transfers to disposal) were the second largest release category, with 16.1 million pounds (38.6%). Discharges to surface water totaled 1.5 million pounds (3.5%). On-site land releases were 436,000 pounds (1.0%), about equally divided between RCRA subtitle C landfills and other on-site land releases. Only 27 pounds of underground injection was reported in this sector.

Four industries reported more than 2 million pounds each of air emissions. These were



Table 9-3. TRI On-site and Off-site Releases, 1996: Electrical Equipment, SIC Code 36 (in Rank Order)

| SIC Code | Industry                              | Total Air Emissions<br>Pounds | Surface Water Discharges<br>Pounds | Underground Injection   |                            | On-site Land Releases               |                                       | Off-site Releases                |  |   |
|----------|---------------------------------------|-------------------------------|------------------------------------|-------------------------|----------------------------|-------------------------------------|---------------------------------------|----------------------------------|--|---|
|          |                                       |                               |                                    | Class I Wells<br>Pounds | Class II-V Wells<br>Pounds | RCRA Subtitle C Landfills<br>Pounds | Other On-site Land Releases<br>Pounds | Total On-site Releases<br>Pounds | Transfers Off-site to Disposal<br>Pounds | Total On- and Off-site Releases<br>Pounds |
| 3672     | Printed Circuit Boards                | 1,125,321                     | 67,982                             | 5                       | 5                          | 1,619                               | 2,868                                 | 1,197,800                        | 7,347,373                                | 8,545,173                                 |
| 3641     | Electric Lamps                        | 2,373,158                     | 2                                  | 0                       | 0                          | 0                                   | 0                                     | 2,373,160                        | 728,039                                  | 3,101,199                                 |
| 3674     | Semiconductors & Related Devices      | 1,163,923                     | 1,035,005                          | 12                      | 0                          | 0                                   | 28,706                                | 2,227,646                        | 741,476                                  | 2,969,122                                 |
| 3632     | Household Refrigerators & Freezers    | 2,751,418                     | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 2,751,418                        | 47,550                                   | 2,798,968                                 |
|          | Multiple within SIC 36                | 2,153,400                     | 66,292                             | 0                       | 0                          | 0                                   | 510                                   | 2,220,202                        | 543,769                                  | 2,763,971                                 |
| 3621     | Motors & Generators                   | 2,484,120                     | 113                                | 5                       | 0                          | 1,600                               | 1,862                                 | 2,487,700                        | 99,028                                   | 2,586,728                                 |
| 3692     | Primary Batteries, Dry & Wet          | 367,770                       | 224                                | 0                       | 0                          | 0                                   | 0                                     | 367,994                          | 2,210,035                                | 2,578,029                                 |
| 3633     | Household Laundry Equipment           | 1,626,148                     | 411                                | 0                       | 0                          | 0                                   | 118,698                               | 1,745,257                        | 161,947                                  | 1,907,204                                 |
| 3679     | Electronic Components, nec*           | 1,518,106                     | 275                                | 0                       | 0                          | 15,986                              | 2,249                                 | 1,536,616                        | 332,553                                  | 1,869,169                                 |
| 3691     | Storage Batteries                     | 172,066                       | 3,441                              | 0                       | 0                          | 62,380                              | 5,106                                 | 242,993                          | 1,480,262                                | 1,723,255                                 |
| 3675     | Electronic Capacitors                 | 876,970                       | 1,270                              | 0                       | 0                          | 37,350                              | 1,448                                 | 917,038                          | 641,297                                  | 1,558,335                                 |
| 3695     | Magnetic & Optical Recording Media    | 1,236,187                     | 1,000                              | 0                       | 0                          | 26,818                              | 0                                     | 1,264,005                        | 139,443                                  | 1,403,448                                 |
| 3612     | Transformers, Except Electronic       | 1,032,444                     | 19                                 | 0                       | 0                          | 0                                   | 9,457                                 | 1,041,920                        | 246,650                                  | 1,288,570                                 |
| 3639     | Household Appliances, nec*            | 931,843                       | 308                                | 0                       | 0                          | 0                                   | 0                                     | 932,151                          | 208,891                                  | 1,141,042                                 |
| 3671     | Electron Tubes                        | 355,841                       | 276,825                            | 0                       | 0                          | 5                                   | 0                                     | 632,671                          | 339,378                                  | 972,049                                   |
| 3634     | Electric Housewares & Fans            | 555,621                       | 110                                | 0                       | 0                          | 0                                   | 760                                   | 556,491                          | 1,250                                    | 557,741                                   |
| 3651     | Household Audio & Video Equipment     | 443,614                       | 250                                | 0                       | 0                          | 0                                   | 0                                     | 443,864                          | 2,604                                    | 446,468                                   |
| 3643     | Current-carrying Wiring Devices       | 169,241                       | 505                                | 0                       | 0                          | 0                                   | 361                                   | 170,107                          | 237,174                                  | 407,281                                   |
| 3624     | Carbon & Graphite Products            | 342,874                       | 274                                | 0                       | 0                          | 0                                   | 4,110                                 | 347,258                          | 53,653                                   | 400,911                                   |
| 3694     | Engine Electrical Equipment           | 175,629                       | 0                                  | 0                       | 0                          | 22,849                              | 45,844                                | 244,322                          | 105,717                                  | 350,039                                   |
| 3644     | Noncurrent-carrying Wiring Devices    | 298,675                       | 18                                 | 0                       | 0                          | 0                                   | 600                                   | 299,293                          | 7,734                                    | 307,027                                   |
| 3646     | Commercial Lighting Fixtures          | 227,393                       | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 227,393                          | 250                                      | 227,643                                   |
| 3699     | Electrical Equipment & Supplies, nec* | 138,515                       | 582                                | 0                       | 0                          | 1,500                               | 510                                   | 141,107                          | 51,952                                   | 193,059                                   |
| 3678     | Electronic Connectors                 | 164,356                       | 75                                 | 0                       | 0                          | 0                                   | 2,025                                 | 166,456                          | 26,446                                   | 192,902                                   |
| 3676     | Electronic Resistors                  | 60,053                        | 0                                  | 0                       | 0                          | 40,318                              | 0                                     | 100,371                          | 78,797                                   | 179,168                                   |
| 3613     | Switchgear & Switchboard Apparatus    | 118,157                       | 4,895                              | 0                       | 0                          | 0                                   | 506                                   | 123,558                          | 41,590                                   | 165,148                                   |
| 3645     | Residential Lighting Fixtures         | 153,711                       | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 153,711                          | 5,900                                    | 159,611                                   |
| 3629     | Electrical Industrial Apparatus, nec* | 93,486                        | 421                                | 0                       | 0                          | 0                                   | 10                                    | 93,917                           | 62,649                                   | 156,566                                   |
| 3631     | Household Cooking Equipment           | 80,830                        | 268                                | 0                       | 0                          | 0                                   | 0                                     | 81,098                           | 69,869                                   | 150,967                                   |
| 3677     | Electronic Coils & Transformers       | 133,079                       | 5                                  | 0                       | 0                          | 0                                   | 0                                     | 133,084                          | 1,750                                    | 134,834                                   |
| 3661     | Telephone & Telegraph Apparatus       | 122,372                       | 5                                  | 0                       | 0                          | 0                                   | 0                                     | 122,377                          | 4,006                                    | 126,383                                   |
| 3648     | Lighting Equipment, nec*              | 31,858                        | 2,030                              | 0                       | 0                          | 0                                   | 0                                     | 33,888                           | 59,300                                   | 93,188                                    |
| 3647     | Vehicular Lighting Equipment          | 70,206                        | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 70,206                           | 16,754                                   | 86,960                                    |
| 3625     | Relays & Industrial Controls          | 81,541                        | 10                                 | 0                       | 0                          | 0                                   | 0                                     | 81,551                           | 4,588                                    | 86,139                                    |
|          | Invalid SIC Code within SIC 36        | 49,571                        | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 49,571                           | 750                                      | 50,321                                    |
| 3669     | Communications Equipment, nec*        | 40,346                        | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 40,346                           | 7,248                                    | 47,594                                    |
| 3635     | Household Vacuum Cleaners             | 17,255                        | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 17,255                           | 500                                      | 17,755                                    |
| 3663     | Radio & TV Communications Equipment   | 10,580                        | 0                                  | 0                       | 0                          | 0                                   | 255                                   | 10,835                           | 5  | 10,840                                    |
| 3652     | Prerecorded Records & Tapes           | 5,479                         | 0                                  | 0                       | 0                          | 5                                   | 5                                     | 5,489                            | 5,081                                    | 10,570                                    |
|          | Total for SIC Code 36                 | 23,753,157                    | 1,462,615                          | 22                      | 5                          | 210,430                             | 225,890                               | 25,652,119                       | 16,113,258                               | 41,765,377                                |

Note: On-site Releases from Section 5 of Form R. Off-site Releases from Section 6 (off-site transfers to disposal) of Form R. Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the "multiple" category.

\*nec: not elsewhere classified.

household refrigerators and freezers (2.8 million pounds; SIC code 3632), motors and generators (2.5 million pounds, SIC code 3621), electric lamps (2.4 million pounds, SIC code 3641), and the forms reporting multiple codes in SIC code 36 (2.2 million pounds). As noted, printed circuit board manufacture accounted for the largest total releases and the largest off-site releases (transfers to disposal). Figure 9-2 shows releases by medium for the electrical equipment industries with the largest on- and off-site releases.

### Other On-site Waste Management

Recycling was the largest category in other on-site waste management, with 148.3 million pounds out of the total of 238.0 million pounds (62.3%), as shown in Table 9-4 and Figure 9-3. Production of storage batteries accounted for the largest amount of on-site recycling, 103.8 million pounds. This was more than seven times as much as the industry with the second-largest quantities of on-site recycling: magnetic and optical recording media

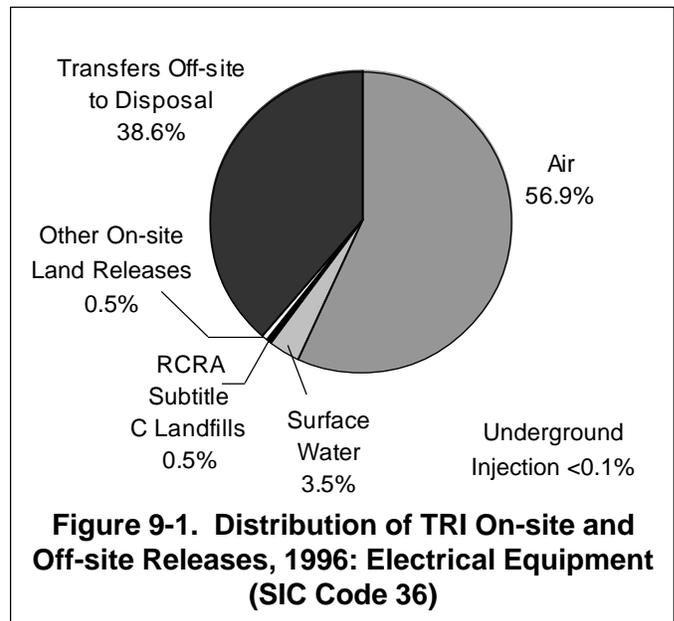


(SIC code 3695), which had 14.1 million pounds. Semiconductor production (SIC code 3674) accounted for 33.5 million pounds of on-site treatment, the largest reporting in that category. Carbon and graphite products (SIC code 3624), in the industrial apparatus group, reported the largest on-site energy recovery, 4.8 million pounds.

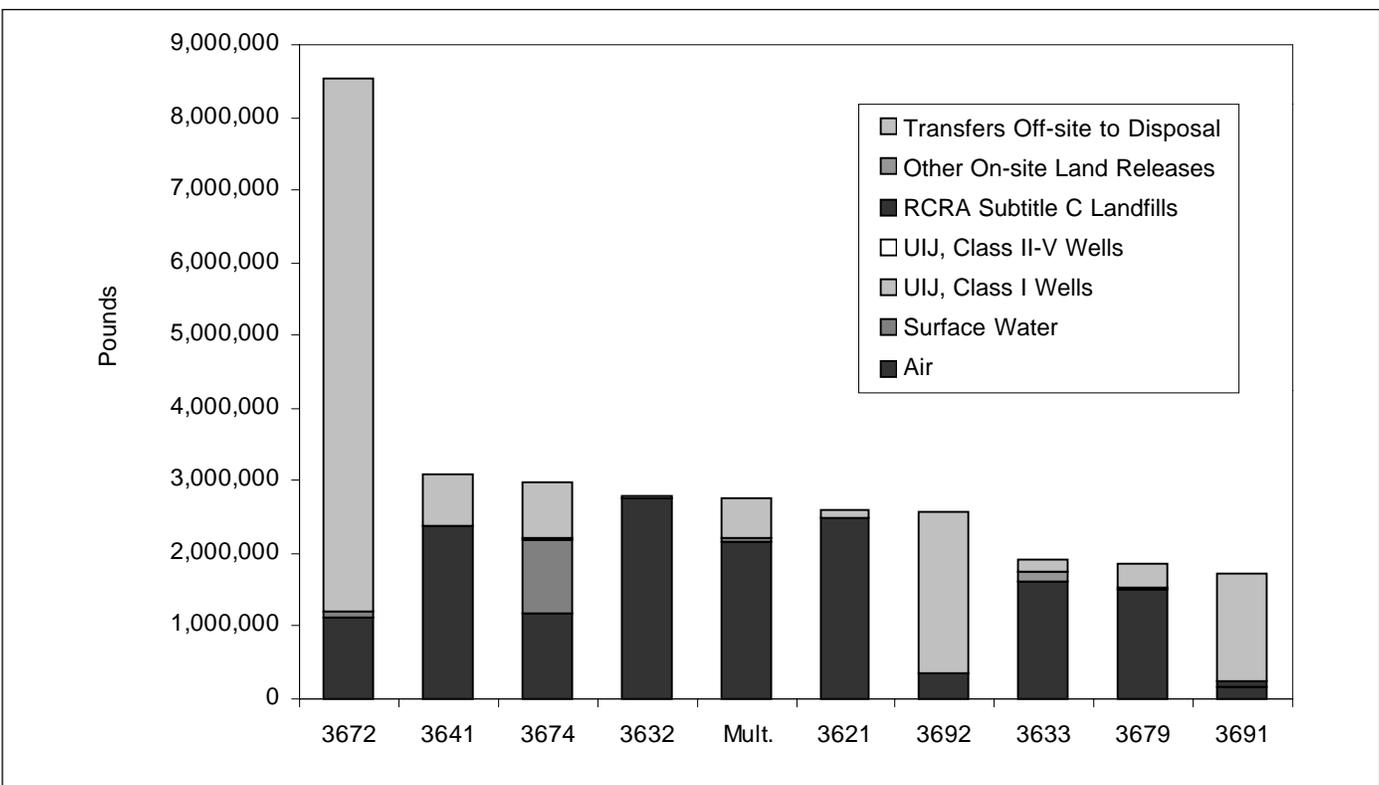
Figure 9-4 illustrates the distribution of on-site waste management reporting for the top 10 industries in the electrical equipment sector.

### Transfers Off-site for Further Waste Management

Almost two-thirds (61.6%) of the transfers off-site for further waste management in this sector were reported in storage battery manufacturing. This was 229.4 million pounds, of the 372.7-million-pound total. The bulk of this reporting—both by the



**Figure 9-1. Distribution of TRI On-site and Off-site Releases, 1996: Electrical Equipment (SIC Code 36)**  
 Note: On-site Releases from Section 5 of the Form R. Off-site Releases from Section 6 (off-site transfers to disposal) of Form R.



**Figure 9-2. TRI On-site and Off-site Releases, SIC Codes with Largest Releases, 1996: Electrical Equipment (SIC Code 36)**

Note: On-site Releases from Section 5 of Form R. Off-site Releases from Section 6 (off-site transfers to disposal) of Form R. UIJ = underground injection. Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the “multiple” category.



Table 9-4. TRI Other On-site Waste Management, 1996: Electrical Equipment, SIC Code 36 (in Rank Order)

| SIC Code | Industry                              | Recycled On-site Pounds | Energy Recovery On-site Pounds | Treated On-site Pounds | Total Other On-site Waste Management Pounds |
|----------|---------------------------------------|-------------------------|--------------------------------|------------------------|---|
| 3691     | Storage Batteries                     | 103,789,022             | 0                              | 680,526                | 104,469,548                                 |
| 3674     | Semiconductors & Related Devices      | 933,850                 | 81,600                         | 33,532,169             | 34,547,619                                  |
| 3695     | Magnetic & Optical Recording Media    | 14,062,691              | 0                              | 7,515,655              | 21,578,346                                  |
| 3672     | Printed Circuit Boards                | 2,000,164               | 2,354,650                      | 10,169,725             | 14,524,539                                  |
| 3679     | Electronic Components, nec*           | 2,272,825               | 4,059,106                      | 3,818,948              | 10,150,879                                  |
| 3692     | Primary Batteries, Dry & Wet          | 9,567,891               | 0                              | 461,970                | 10,029,861                                  |
| 3624     | Carbon & Graphite Products            | 353,874                 | 4,848,730                      | 4,358,084              | 9,560,688                                   |
| 3671     | Electron Tubes                        | 3,505,895               | 0                              | 5,635,898              | 9,141,793                                   |
| 3675     | Electronic Capacitors                 | 1,634,437               | 0                              | 2,655,047              | 4,289,484                                   |
| 3644     | Noncurrent-carrying Wiring Devices    | 3,655,994               | 37,895                         | 426,709                | 4,120,598                                   |
|          | Multiple within SIC 36                | 954,565                 | 0                              | 2,272,954              | 3,227,519                                   |
| 3643     | Current-carrying Wiring Devices       | 2,481,048               | 0                              | 336,389                | 2,817,437                                   |
| 3678     | Electronic Connectors                 | 101,608                 | 0                              | 1,492,702              | 1,594,310                                   |
| 3641     | Electric Lamps                        | 371,942                 | 0                              | 1,194,461              | 1,566,403                                   |
| 3645     | Residential Lighting Fixtures         | 1,472,695               | 0                              | 30                     | 1,472,725                                   |
| 3633     | Household Laundry Equipment           | 140,253                 | 0                              | 715,220                | 855,473                                     |
| 3699     | Electrical Equipment & Supplies, nec* | 13,063                  | 0                              | 768,807                | 781,870                                     |
| 3621     | Motors & Generators                   | 168,540                 | 0                              | 467,659                | 636,199                                     |
| 3613     | Switchgear & Switchboard Apparatus    | 0                       | 0                              | 587,653                | 587,653                                     |
| 3694     | Engine Electrical Equipment           | 242,400                 | 0                              | 224,462                | 466,862                                     |
| 3612     | Transformers, Except Electronic       | 63,568                  | 0                              | 297,040                | 360,608                                     |
| 3639     | Household Appliances, nec*            | 119,741                 | 42,000                         | 117,681                | 279,422                                     |
| 3676     | Electronic Resistors                  | 151,297                 | 0                              | 32,000                 | 183,297                                     |
| 3646     | Commercial Lighting Fixtures          | 0                       | 0                              | 168,917                | 168,917                                     |
| 3632     | Household Refrigerators & Freezers    | 16,000                  | 0                              | 122,190                | 138,190                                     |
| 3663     | Radio & TV Communications Equipment   | 116,171                 | 0                              | 0                      | 116,171                                     |
| 3647     | Vehicular Lighting Equipment          | 0                       | 0                              | 79,000                 | 79,000                                      |
| 3648     | Lighting Equipment, nec*              | 0                       | 0                              | 76,000                 | 76,000                                      |
| 3634     | Electric Housewares & Fans            | 0                       | 0                              | 71,400                 | 71,400                                      |
| 3651     | Household Audio & Video Equipment     | 63,458                  | 0                              | 0                      | 63,458                                      |
| 3669     | Communications Equipment, nec*        | 31,288                  | 0                              | 310                    | 31,598                                      |
| 3625     | Relays & Industrial Controls          | 0                       | 0                              | 24,624                 | 24,624                                      |
| 3677     | Electronic Coils & Transformers       | 8,624                   | 0                              | 0                      | 8,624                                       |
|          | Invalid SIC Code within SIC 36        | 0                       | 0                              | 7,735                  | 7,735                                       |
| 3631     | Household Cooking Equipment           | 4,040                   | 0                              | 2                      | 4,042                                       |
| 3629     | Electrical Industrial Apparatus, nec* | 1,816                   | 666                            | 0                      | 2,482                                       |
| 3661     | Telephone & Telegraph Apparatus       | 0                       | 0                              | 970                    | 970   |
| 3652     | Prerecorded Records & Tapes           | 0                       | 0                              | 527                    | 527   |
| 3635     | Household Vacuum Cleaners             | 206                     | 0                              | 0                      | 206   |
|          | Total for SIC Code 36                 | 148,298,966             | 11,424,647                     | 78,313,464             | 238,037,077                                 |

Note: Other On-site Waste Management from Section 8 of Form R. Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the “multiple” category.

\*nec: not elsewhere classified.

storage battery industry and for the sector as a whole—occurred in transfers to recycling. Overall, recycling represented 92.7% of the sector’s transfers for further waste management. Table 9-5 presents these data for four-digit SIC codes in electrical equipment manufacturing. Figure 9-5 illustrates the distribution of these transfers.

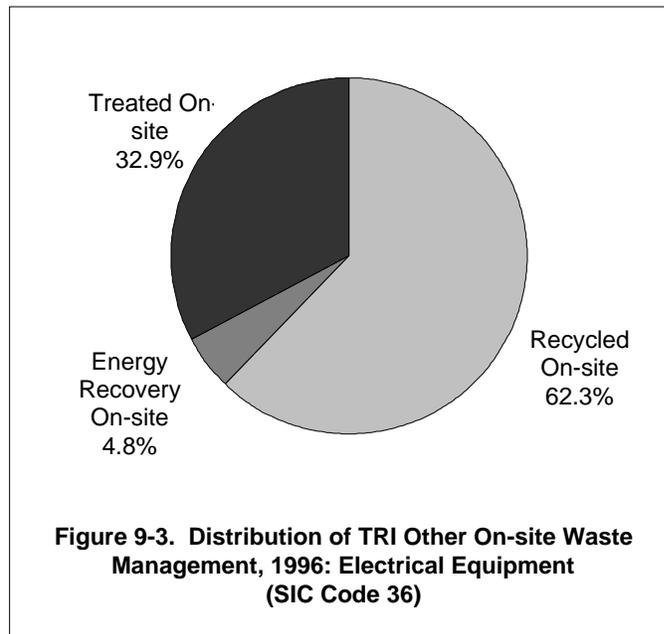
Recycling was also the largest off-site transfer type reported by other industries in SIC code 36 with relatively high totals for off-site transfers, but somewhat less exclusively, as shown in Table 9-5. Also, although semiconductors and related devices ranked fourth overall, this industry reported the largest amounts in transfers to energy recovery (3.2



million pounds) and transfers to POTWs (5.1 million pounds), and the second largest in transfers to treatment (1.8 million pounds). Printed circuit boards ranked first (with 2.0 million pounds) in transfers to treatment. Figure 9-6 illustrates reporting of off-site transfers for further waste management for the industries with the largest totals.

## 1996 TRI Data by State for Electrical Equipment

California had the largest number of forms in electrical equipment manufacture, as shown in Table 9-6, with 377 or 12.1% of the total. No other state had as many as 200. California did not rank



Note: Data from Section 8 of the Form R.

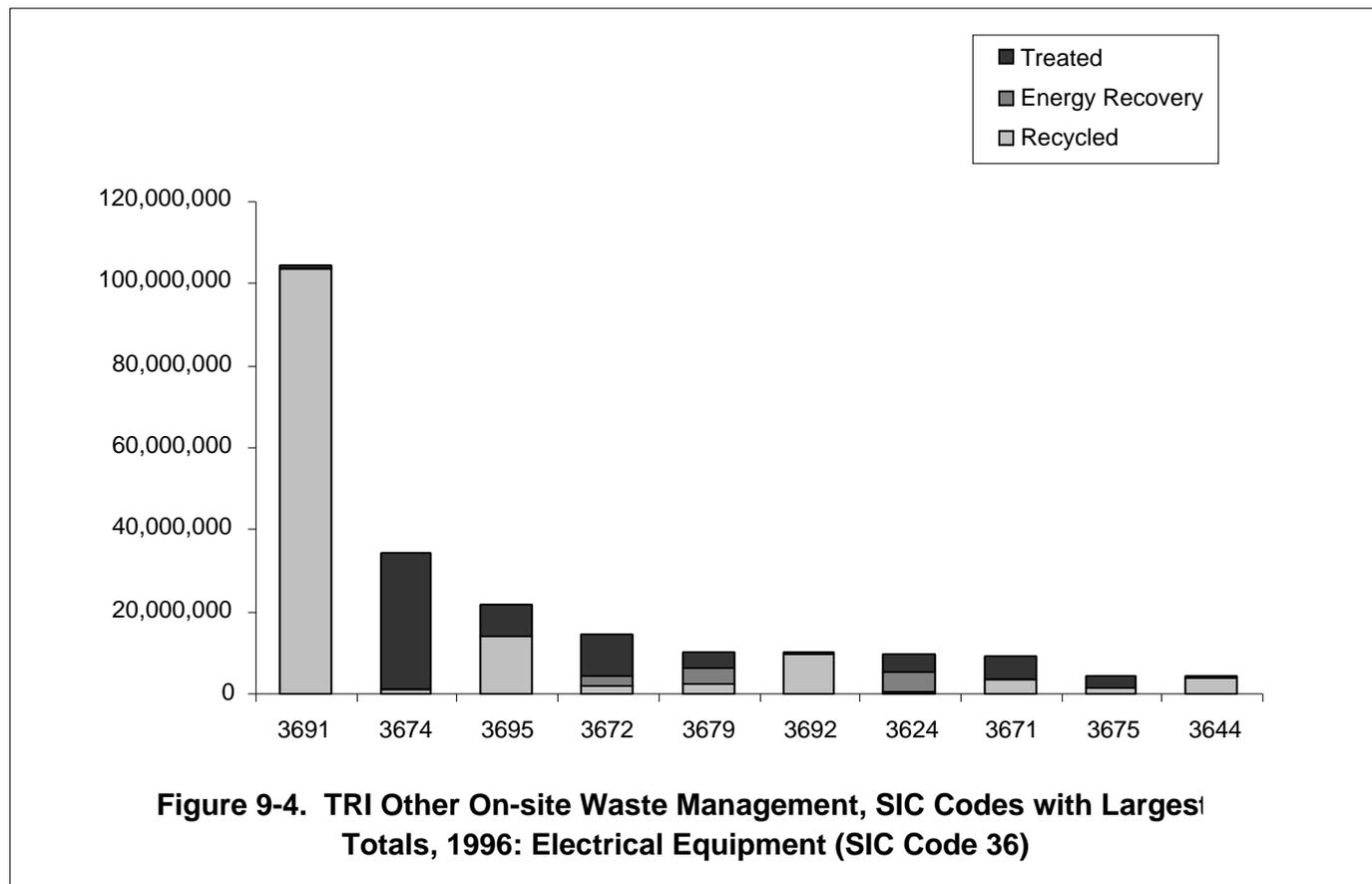


Figure 9-4. TRI Other On-site Waste Management, SIC Codes with Largest Totals, 1996: Electrical Equipment (SIC Code 36)

Note: Other On-site Waste Management from Section 8 of Form R.



Table 9-5. TRI Transfers Off-site for Further Waste Management, 1996: Electrical Equipment, SIC Code 36 (in Rank Order)

| SIC Code | Industry                              | Transfers to Recycling Pounds | Transfers to Energy Recovery Pounds | Transfers to Treatment Pounds | Transfers to POTWs Pounds | Other Off-site Transfers Pounds | Total Off-site Transfers for Further Waste Management Pounds |
|----------|---------------------------------------|-------------------------------|-------------------------------------|-------------------------------|---------------------------|---------------------------------|--|
| 3691     | Storage Batteries                     | 227,556,700                   | 20,344                              | 1,060,430                     | 762,021                   | 0                               | 229,399,495  |
| 3672     | Printed Circuit Boards                | 29,117,449                    | 1,636,044                           | 1,956,470                     | 1,606,958                 | 156,534                         | 34,473,455   |
|          | Multiple within SIC 36                | 20,283,719                    | 292,774                             | 273,570                       | 626,647                   | 538,006                         | 22,014,716   |
| 3674     | Semiconductors & Related Devices      | 2,223,075                     | 3,191,701                           | 1,785,498                     | 5,054,488                 | 0                               | 12,254,762   |
| 3621     | Motors & Generators                   | 9,263,970                     | 225,377                             | 44,373                        | 15,486                    | 0                               | 9,549,206  |
| 3613     | Switchgear & Switchboard Apparatus    | 8,139,717                     | 2,323                               | 44,943                        | 195,182                   | 0                               | 8,382,165  |
| 3671     | Electron Tubes                        | 6,419,546                     | 277,142                             | 359,820                       | 257,579                   | 0                               | 7,314,087  |
| 3679     | Electronic Components, nec*           | 5,617,060                     | 286,857                             | 134,678                       | 317,369                   | 250                             | 6,356,214  |
| 3612     | Transformers, Except Electronic       | 5,721,472                     | 104,576                             | 5,538                         | 871                       | 0                               | 5,832,457  |
| 3678     | Electronic Connectors                 | 4,758,385                     | 18,727                              | 15,867                        | 84,735                    | 0                               | 4,877,714  |
| 3648     | Lighting Equipment, nec*              | 4,183,734                     | 0                                   | 2,055                         | 750                       | 0                               | 4,186,539  |
| 3675     | Electronic Capacitors                 | 2,316,659                     | 271,600                             | 967,195                       | 320,555                   | 0                               | 3,876,009  |
| 3643     | Current-carrying Wiring Devices       | 2,926,192                     | 0                                   | 33,882                        | 13,046                    | 4                               | 2,973,124  |
| 3669     | Communications Equipment, nec*        | 2,691,945                     | 9,985                               | 7,875                         | 1,260                     | 0                               | 2,711,065  |
| 3699     | Electrical Equipment & Supplies, nec* | 1,749,593                     | 250                                 | 4,083                         | 631,508                   | 0                               | 2,385,434  |
| 3692     | Primary Batteries, Dry & Wet          | 1,915,651                     | 41,280                              | 110,493                       | 8,088                     | 0                               | 2,075,512  |
| 3695     | Magnetic & Optical Recording Media    | 277,653                       | 952,735                             | 127,440                       | 372,586                   | 0                               | 1,730,414  |
| 3641     | Electric Lamps                        | 1,125,452                     | 56,515                              | 204,838                       | 251,307                   | 0                               | 1,638,112  |
| 3632     | Household Refrigerators & Freezers    | 1,133,408                     | 273,347                             | 14,059                        | 68,486                    | 0                               | 1,489,300  |
| 3694     | Engine Electrical Equipment           | 1,371,989                     | 18,998                              | 11,270                        | 2,090                     | 0                               | 1,404,347  |
| 3629     | Electrical Industrial Apparatus, nec* | 1,243,891                     | 100,907                             | 6,553                         | 12,346                    | 0                               | 1,363,697  |
| 3625     | Relays & Industrial Controls          | 1,211,263                     | 1,384                               | 23,244                        | 1,250                     | 0                               | 1,237,141  |
| 3644     | Noncurrent-carrying Wiring Devices    | 1,039,784                     | 65,840                              | 5,061                         | 49,661                    | 0                               | 1,160,346  |
| 3633     | Household Laundry Equipment           | 647,221                       | 49,992                              | 2,037                         | 272,377                   | 0                               | 971,627  |
| 3639     | Household Appliances, nec*            | 390,588                       | 50,400                              | 2,970                         | 58,255                    | 0                               | 502,213  |
| 3634     | Electric Housewares & Fans            | 486,293                       | 2,444                               | 0                             | 3,200                     | 0                               | 491,937  |
| 3651     | Household Audio & Video Equipment     | 419,171                       | 40,995                              | 17,469                        | 1,497                     | 0                               | 479,132  |
| 3661     | Telephone & Telegraph Apparatus       | 294,672                       | 5,800                               | 251                           | 17                        | 0                               | 300,740  |
| 3677     | Electronic Coils & Transformers       | 253,478                       | 1,400                               | 9,781                         | 0                         | 0                               | 264,659  |
| 3631     | Household Cooking Equipment           | 246,086                       | 750                                 | 2,000                         | 3,610                     | 0                               | 252,446  |
| 3624     | Carbon & Graphite Products            | 201,050                       | 29,202                              | 2,990                         | 606                       | 0                               | 233,848  |
| 3676     | Electronic Resistors                  | 134,786                       | 8,327                               | 41,110                        | 2,000                     | 0                               | 186,223  |
| 3652     | Prerecorded Records & Tapes           | 88,397                        | 3,707                               | 715                           | 284                       | 0                               | 93,103   |
| 3647     | Vehicular Lighting Equipment          | 51,597                        | 29,215                              | 7,900                         | 1,000                     | 0                               | 89,712   |
| 3635     | Household Vacuum Cleaners             | 48,100                        | 0                                   | 250                           | 5                         | 0                               | 48,355   |
| 3646     | Commercial Lighting Fixtures          | 19,677                        | 10,515                              | 2,530                         | 750                       | 0                               | 33,472   |
|          | Invalid SIC Code within SIC 36        | 29,121                        | 0                                   | 0                             | 10                        | 0                               | 29,131   |
| 3663     | Radio & TV Communications Equipment   | 17,463                        | 0                                   | 500                           | 0                         | 0                               | 17,963   |
| 3645     | Residential Lighting Fixtures         | 5,338                         | 2,590                               | 4,800                         | 250                       | 0                               | 12,978   |
|          | Total for SIC Code 36                 | 345,621,345                   | 8,084,043                           | 7,294,538                     | 10,998,130                | 694,794                         | 372,692,850  |

**Note:** Off-site Transfers for Further Waste Management from Section 6 (excluding off-site transfers to disposal) of Form R. Other Off-site Transfers are transfers reported a without valid waste management code. Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the "multiple" category. \*nec: not elsewhere classified.

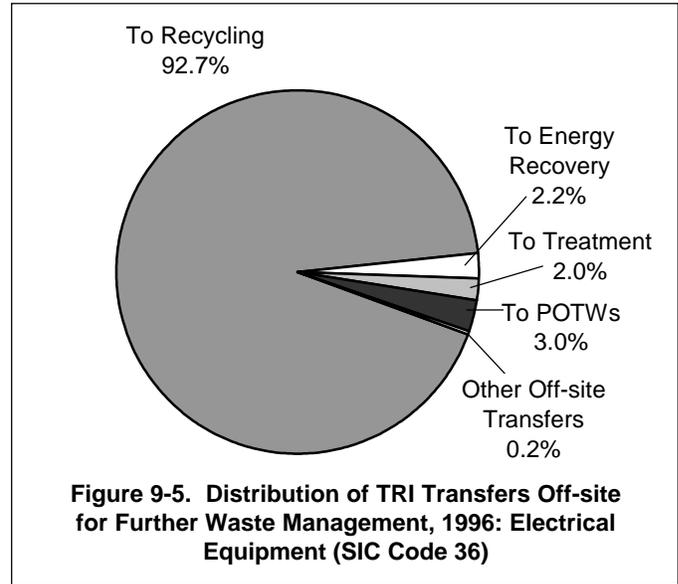
highest, however, in any reporting category shown in Table 9-6. The state with the largest on- and off-site releases was Pennsylvania, with 7.9 million pounds; this is largely the effect of a facility reporting error in off-site releases (transfers for disposal). Three states reported more than 2 million pounds each in on- and off-site releases: Kentucky (3.0 million pounds), Ohio (2.8 million pounds), and Indiana (2.6 million pounds).

Four states reported more than 20 million pounds in other on-site waste management. Indiana led this list with 25.3 million pounds, followed by Kansas with 24.6 million pounds, Tennessee with 23.2 million pounds, and Alabama with 21.2 million pounds. Kansas was first for transfers off-site for further waste management (36.1 million pounds) and for total production-related waste (61.0 million pounds). Second in the category of



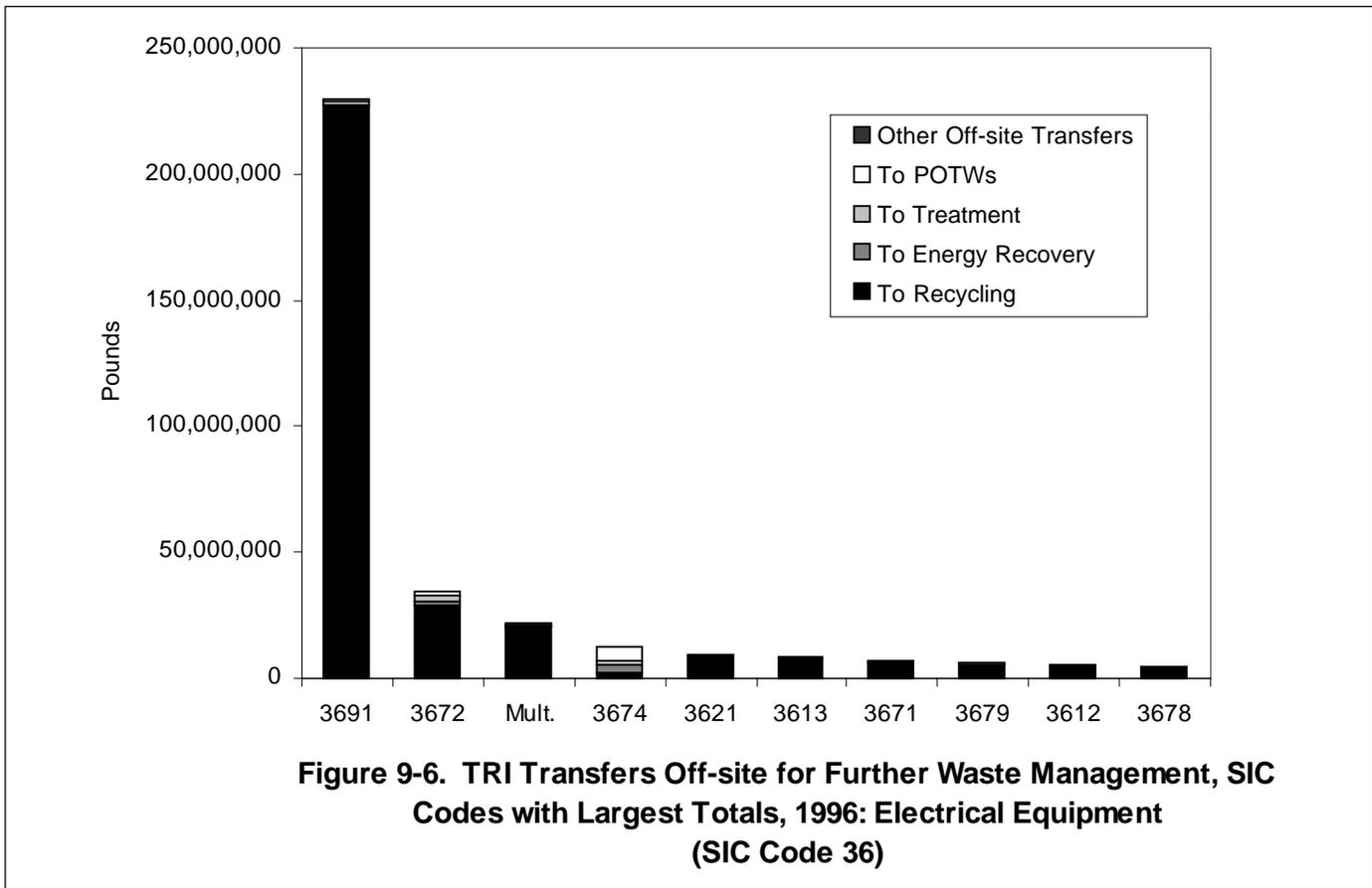
off-site transfers was Texas, with 33.8 million pounds, and California was third with 29.0 million pounds. For total production-related waste, California was second with 51.7 million pounds, and Indiana was third with 49.4 million pounds.

Map 9-1 shows the geographic distribution of total on- and off-site releases in the electrical equipment sector.



**Figure 9-5. Distribution of TRI Transfers Off-site for Further Waste Management, 1996: Electrical Equipment (SIC Code 36)**

Note: Transfers Off-site for Further Waste Management from Section 6 (excluding transfers off-site to disposal) of Form R. Other Off-site Transfers are transfers reported without a valid waste management code.



**Figure 9-6. TRI Transfers Off-site for Further Waste Management, SIC Codes with Largest Totals, 1996: Electrical Equipment (SIC Code 36)**

Note: Off-site Transfers for Further Waste Management from Section 6 (excluding off-site transfers to disposal) of Form R. Other Off-site Transfers are transfers reported without a valid waste management code. Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the “multiple” category.



Table 9-6. Summary of TRI Information by State, 1996: Electrical Equipment, SIC Code 36

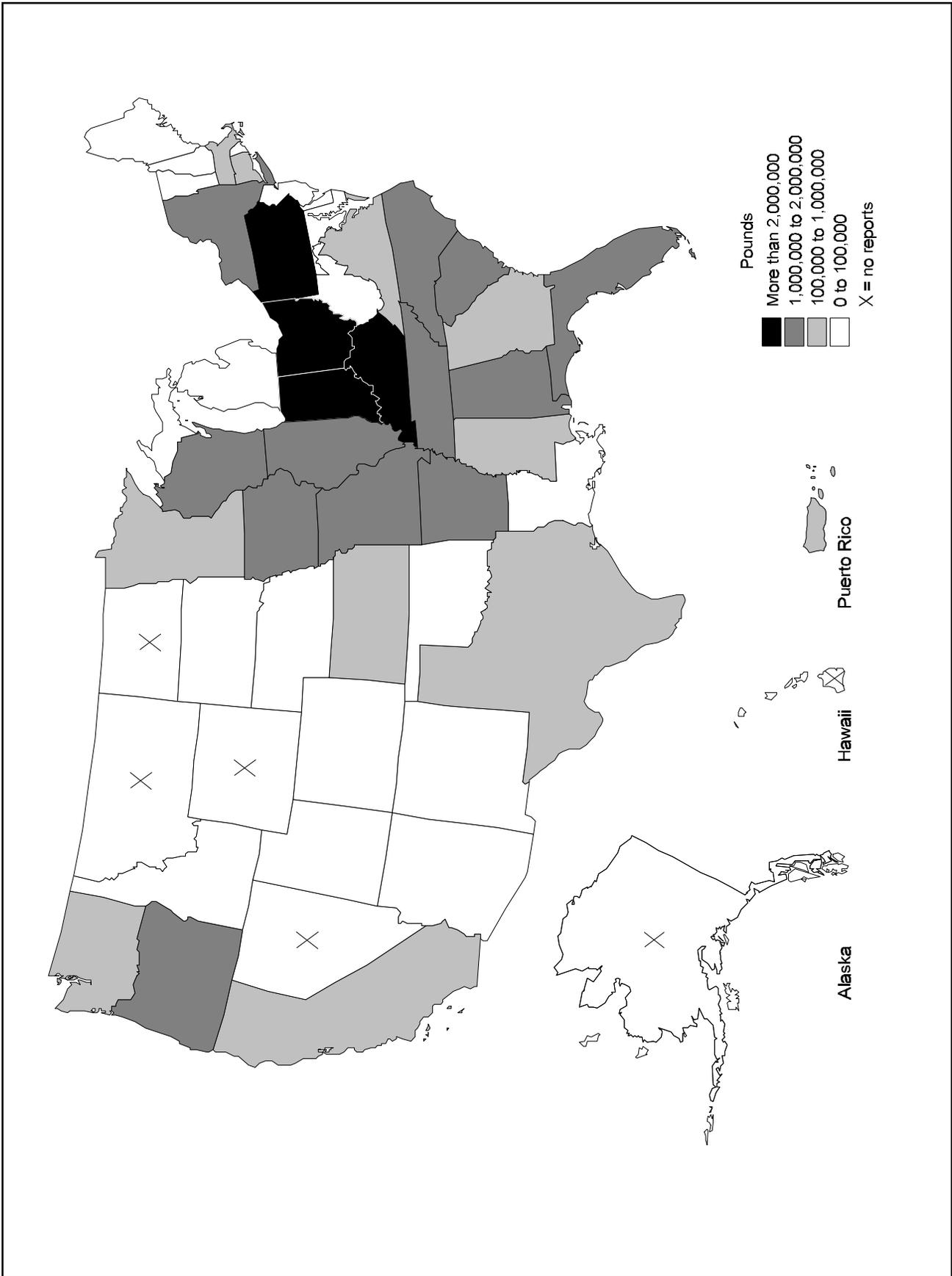
| State                 | Total Facilities Number | Total Forms Number | Form As Number | Total On-site Releases Pounds | Total Off-site Releases Pounds | Total On- and Off-site Releases Pounds | Total Other On-site Waste Management Pounds | Total Transfers Off-site for Further Waste Management Pounds | Total Production-related Waste Pounds | Non-Production-related Waste Pounds |
|-----------------------|-------------------------|--------------------|----------------|-------------------------------|--------------------------------|--|---|--|---------------------------------------|-------------------------------------|
| Alabama               | 12                      | 33                 | 1              | 1,960,575                     | 18,667                         | 1,979,242                              | 21,182,260                                  | 2,512,368  | 25,784,586                            | 1,601                               |
| Arizona               | 28                      | 91                 | 0              | 172,108                       | 20,380                         | 192,488                                | 5,289,170                                   | 4,574,626  | 9,725,187                             | 1                                   |
| Arkansas              | 17                      | 62                 | 0              | 1,462,988                     | 164,510                        | 1,627,498                              | 2,024,807                                   | 860,418  | 6,765,539                             | 0                                   |
| California            | 160                     | 377                | 2              | 643,092                       | 296,311                        | 939,403                                | 16,633,328                                  | 29,016,309   | 51,701,428                            | 0                                   |
| Colorado              | 16                      | 44                 | 1              | 60,392                        | 4,587                          | 64,979                                 | 5,105,124                                   | 1,092,289  | 6,339,452                             | 0                                   |
| Connecticut           | 25                      | 47                 | 2              | 363,618                       | 2,021                          | 365,639                                | 552,087                                     | 3,714,434  | 4,622,167                             | 0                                   |
| Delaware              | 1                       | 2                  | 0              | 210                           | 0                              | 210                                    | 0   | 4,966,134  | 4,966,364                             | 0                                   |
| Florida               | 26                      | 63                 | 1              | 106,885                       | 1,234,545                      | 1,341,430                              | 1,637,861                                   | 8,186,619  | 11,732,348                            | 120                                 |
| Georgia               | 26                      | 61                 | 0              | 361,825                       | 216,504                        | 578,329                                | 6,347,504                                   | 18,754,544   | 26,055,775                            | 156                                 |
| Idaho                 | 4                       | 12                 | 1              | 45,810                        | 19,429                         | 65,239                                 | 196,964                                     | 116,059  | 328,400                               | 0                                   |
| Illinois              | 77                      | 174                | 13             | 1,036,696                     | 165,222                        | 1,201,918                              | 1,631,833                                   | 17,138,164   | 20,912,736                            | 1,255                               |
| Indiana               | 57                      | 149                | 9              | 2,243,441                     | 344,645                        | 2,588,086                              | 25,317,676                                  | 21,145,315   | 49,414,408                            | 0                                   |
| Iowa                  | 19                      | 67                 | 0              | 1,175,622                     | 178,369                        | 1,353,991                              | 14,004,493                                  | 12,510,946   | 27,958,664                            | 1,408                               |
| Kansas                | 12                      | 29                 | 0              | 163,962                       | 264,305                        | 428,267                                | 24,632,371                                  | 36,145,448   | 61,025,104                            | 0                                   |
| Kentucky              | 22                      | 62                 | 0              | 2,879,379                     | 71,762                         | 2,951,141                              | 530,058                                     | 9,221,072  | 12,821,186                            | 10                                  |
| Louisiana             | 7                       | 19                 | 1              | 73,940                        | 67,600                         | 141,540                                | 170,631                                     | 12,613,759   | 12,880,508                            | 0                                   |
| Maine                 | 8                       | 21                 | 0              | 57,869                        | 115,690                        | 173,559                                | 1,029,983                                   | 282,821  | 1,479,599                             | 0                                   |
| Maryland              | 7                       | 11                 | 3              | 65,165                        | 1,000                          | 66,165                                 | 30,862                                      | 98,880   | 194,405                               | 0                                   |
| Massachusetts         | 46                      | 116                | 8              | 509,715                       | 133,435                        | 643,150                                | 1,289,248                                   | 3,234,513  | 5,744,353                             | 210                                 |
| Michigan              | 19                      | 26                 | 1              | 162,771                       | 1,916                          | 164,687                                | 16,302                                      | 2,710,893  | 2,796,438                             | 5,123                               |
| Minnesota             | 31                      | 65                 | 2              | 214,083                       | 25,616                         | 239,699                                | 1,623,403                                   | 6,057,883  | 7,920,977                             | 0                                   |
| Mississippi           | 12                      | 36                 | 0              | 676,952                       | 2,235                          | 679,187                                | 5,160,898                                   | 969,870  | 9,484,151                             | 814                                 |
| Missouri              | 39                      | 104                | 0              | 898,646                       | 464,939                        | 1,363,585                              | 17,032,797                                  | 21,087,131   | 39,413,821                            | 0                                   |
| Nebraska              | 7                       | 20                 | 0              | 83,128                        | 43,022                         | 126,150                                | 46,440                                      | 4,998,443  | 5,174,686                             | 0                                   |
| Nevada                | 2                       | 2                  | 0              | 0                             | 0                              | 0                                      | 0   | 250  | 1,271                                 | 0                                   |
| New Hampshire         | 17                      | 49                 | 0              | 135,402                       | 63,223                         | 198,625                                | 2,096,282                                   | 2,627,629  | 4,896,613                             | 0                                   |
| New Jersey            | 19                      | 25                 | 2              | 49,967                        | 14,396                         | 64,363                                 | 332,611                                     | 11,398,499   | 11,795,129                            | 1                                   |
| New Mexico            | 2                       | 16                 | 0              | 61,645                        | 27,992                         | 89,637                                 | 505,490                                     | 729,967  | 1,324,832                             | 0                                   |
| New York              | 52                      | 176                | 9              | 1,120,909                     | 454,222                        | 1,575,131                              | 10,708,429                                  | 15,410,994   | 29,316,567                            | 12,600                              |
| North Carolina        | 54                      | 117                | 3              | 563,055                       | 591,363                        | 1,154,418                              | 1,166,280                                   | 11,777,689   | 22,707,150                            | 442                                 |
| Ohio                  | 64                      | 167                | 4              | 1,530,546                     | 1,281,901                      | 2,812,447                              | 10,372,594                                  | 18,522,376   | 32,369,313                            | 0                                   |
| Oklahoma              | 12                      | 23                 | 2              | 67,944                        | 30                             | 67,974                                 | 20,260                                      | 571,107  | 657,298                               | 0                                   |
| Oregon                | 19                      | 71                 | 0              | 1,091,055                     | 2,948                          | 1,094,003                              | 4,952,476                                   | 7,379,840  | 13,329,531                            | 0                                   |
| Pennsylvania*         | 60                      | 130                | 5              | 683,686                       | 7,262,262                      | 7,945,948                              | 12,189,874                                  | 10,520,890   | 30,689,543                            | 2,150                               |
| Puerto Rico           | 19                      | 38                 | 4              | 31,305                        | 289,584                        | 320,889                                | 344,952                                     | 2,669,672  | 3,601,193                             | 0                                   |
| Rhode Island          | 6                       | 11                 | 0              | 39,381                        | 45,560                         | 84,941                                 | 241,006                                     | 929,355  | 1,253,319                             | 0                                   |
| South Carolina        | 31                      | 100                | 1              | 912,959                       | 950,218                        | 1,863,177                              | 10,220,736                                  | 12,835,533   | 25,496,737                            | 5,032                               |
| South Dakota          | 4                       | 5                  | 0              | 30,243                        | 32                             | 30,275                                 | 33,902                                      | 51,400   | 130,045                               | 0                                   |
| Tennessee             | 43                      | 116                | 2              | 1,523,077                     | 459,646                        | 1,982,723                              | 23,153,160                                  | 4,185,542  | 31,855,365                            | 17,370                              |
| Texas                 | 55                      | 169                | 4              | 467,314                       | 156,759                        | 624,073                                | 5,881,309                                   | 33,780,776   | 40,831,174                            | 14                                  |
| Utah                  | 8                       | 26                 | 0              | 32,655                        | 968                            | 33,623                                 | 360,616                                     | 1,427,190  | 1,551,086                             | 0                                   |
| Vermont               | 7                       | 18                 | 0              | 131,975                       | 3,325                          | 135,300                                | 706,507                                     | 382,160  | 1,224,072                             | 5                                   |
| Virginia              | 21                      | 51                 | 1              | 767,826                       | 119,582                        | 887,408                                | 571,732                                     | 4,778,205  | 6,266,457                             | 0                                   |
| Washington            | 11                      | 24                 | 1              | 194,027                       | 78,063                         | 272,090                                | 1,222,718                                   | 920,162  | 2,303,886                             | 0                                   |
| West Virginia         | 3                       | 4                  | 0              | 1,745                         | 18,489                         | 20,234                                 | 1,974                                       | 27,977   | 47,630                                | 0                                   |
| Wisconsin             | 46                      | 92                 | 7              | 796,531                       | 435,985                        | 1,232,516                              | 1,468,069                                   | 9,756,699  | 12,511,746                            | 3,060                               |
| Total for SIC Code 36 | 1,233                   | 3,121              | 90             | 25,652,119                    | 16,113,258                     | 41,765,377                             | 238,037,077                                 | 372,692,850  | 679,402,239                           | 51,372                              |

Note: On-site Releases from Section 5 of Form R. On-site Waste Management from Section 8 of Form R. Off-site Releases from Section 6 (transfers off-site to disposal) of Form R. Total Transfers Off-site for Further Waste Management from Section 6 (excluding transfers off-site to disposal) of Form R. Total Production-related Waste sums Section 8 (Current Year, Column B) of Form R, except: Non-production-related Waste (remedial/catastrophic incidents).

\* One Pennsylvania facility reported 6,792,500 pounds of off-site releases (transfers off-site to disposal) in error.



Map 9-1. Total On- and Off-site Releases, 1996: Electrical Equipment, SIC Code 36



Note: On-site Releases from Section 5 of Form R and Off-site Releases from Section 6 (transfers off-site to disposal) of Form R.



Table 9-7. The 15 Chemicals with the Largest Total On-site and Off-site Releases, 1996: Electrical Equipment, SIC Code 36 (in Rank Order)

| CAS Number | Chemical                                | Total Air Emissions<br>Pounds | Surface Water Discharges<br>Pounds | Underground Injection   |                            | On-site Land Releases               |                                       | Total On-site Releases<br>Pounds | Off-site Releases                        | Total On- & Off-site Releases<br>Pounds |
|------------|---|-------------------------------|------------------------------------|-------------------------|----------------------------|-------------------------------------|---------------------------------------|----------------------------------|--|---|
|            |   |                               |                                    | Class I Wells<br>Pounds | Class II-V Wells<br>Pounds | RCRA Subtitle C Landfills<br>Pounds | Other On-site Land Releases<br>Pounds |                                  | Transfers Off-site to Disposal<br>Pounds |   |
| —          | Lead compounds                          | 67,278                        | 3,494                              | 0                       | 0                          | 62,380                              | 5,452                                 | 138,604                          | 7,655,823                                | 7,794,427                               |
| 1330-20-7  | Xylene (mixed isomers)                  | 5,364,033                     | 250                                | 0                       | 0                          | 0                                   | 13,647                                | 5,377,930                        | 20,764                                   | 5,398,694                               |
| —          | Nitrate compounds                       | 8,065                         | 1,395,444                          | 0                       | 0                          | 0                                   | 0                                     | 1,403,509                        | 1,113,948                                | 2,517,457                               |
| —          | Glycol ethers                           | 2,415,624                     | 12,508                             | 0                       | 0                          | 0                                   | 750                                   | 2,428,882                        | 66,380                                   | 2,495,262                               |
| 1717-00-6  | 1,1-Dichloro-1-fluoroethane (HCFC-141b) | 2,387,085                     | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 2,387,085                        | 50,838                                   | 2,437,923                               |
| —          | Manganese compounds                     | 107,793                       | 647                                | 0                       | 0                          | 0                                   | 5                                     | 108,445                          | 2,072,948                                | 2,181,393                               |
| 108-88-3   | Toluene                                 | 2,094,414                     | 385                                | 0                       | 0                          | 0                                   | 7,002                                 | 2,101,801                        | 32,506                                   | 2,134,307                               |
| —          | Zinc compounds                          | 47,540                        | 3,335                              | 0                       | 0                          | 19,634                              | 58,163                                | 128,672                          | 1,924,162                                | 2,052,834                               |
| 79-01-6    | Trichloroethylene                       | 2,037,091                     | 7                                  | 0                       | 0                          | 0                                   | 0                                     | 2,037,098                        | 2,855                                    | 2,039,953                               |
| 78-93-3    | Methyl ethyl ketone                     | 1,149,824                     | 770                                | 0                       | 0                          | 0                                   | 0                                     | 1,150,594                        | 251                                      | 1,150,845                               |
| 75-09-2    | Dichloromethane                         | 1,123,964                     | 0                                  | 0                       | 0                          | 0                                   | 1,810                                 | 1,125,774                        | 23,667                                   | 1,149,441                               |
| 7664-41-7  | Ammonia                                 | 835,814                       | 16,950                             | 0                       | 0                          | 5                                   | 0                                     | 852,769                          | 73,276                                   | 926,045                                 |
| 127-18-4   | Tetrachloroethylene                     | 800,348                       | 1                                  | 0                       | 0                          | 0                                   | 0                                     | 800,349                          | 8,216                                    | 808,565                                 |
| 68-12-2    | N,N-Dimethylformamide                   | 784,201                       | 0                                  | 0                       | 0                          | 1,350                               | 0                                     | 785,551                          | 2,810                                    | 788,361                                 |
| —          | Barium compounds                        | 7,790                         | 1,572                              | 0                       | 0                          | 0                                   | 756                                   | 10,118                           | 764,898                                  | 775,016                                 |
|            | Subtotal                                | 19,230,864                    | 1,435,363                          | 0                       | 0                          | 83,369                              | 87,585                                | 20,837,181                       | 13,813,342                               | 34,650,523                              |
|            | Total for SIC Code 36                   | 23,753,157                    | 1,462,615                          | 22                      | 5                          | 210,430                             | 225,890                               | 25,652,119                       | 16,113,258                               | 41,765,377                              |

Note: On-site Releases from Section 5 of Form R. Off-site Releases from Section 6 (off-site transfers to disposal) of Form R.

## 1996 TRI Data by Chemical for Electrical Equipment

The top 15 chemicals for total on- and off-site releases in electrical equipment manufacture appear in Table 9-7. Lead compounds led this list (7.8 million pounds) and accounted for the largest portion of off-site releases (7.7 million pounds in transfers off-site to disposal). The major source of this reporting of lead compounds was printed circuit board manufacturing (SIC code 3672), with 6.8 million pounds of lead compounds in transfers to disposal.

Xylene, a solvent and cleaning agent, ranked second among all TRI chemicals for on- and off-site releases in electrical equipment reporting. Almost all of the 5.4 million pounds reported as releases was emitted to air. Two industries accounted for the majority of the xylene releases—

electric lamp bulbs and tubes (SIC code 3641), with 1.8 million pounds, and motors and generators (SIC code 3621), with 1.1 million pounds.

The top 15 chemicals accounted for 34.7 million pounds (83.0%) of the 41.8 million pounds of total releases in this sector in 1996.

## OSHA Carcinogens

On- and off-site releases in this sector of chemicals designated as OSHA carcinogens totaled 6.1 million pounds in 1996, as shown in Table 9-8. (OSHA carcinogens and the bases for their designation appear in Box 2-4 in Chapter 2.) The majority (5.3 million pounds, 87.2%) was released to air; 722,000 pounds was released off-site (transferred to disposal).

Of the top 15 chemicals for on- and off-site releases in the electrical equipment sector (see Table 9-7), four are OSHA carcinogens: trichloroethylene, dichloromethane, tetrachloroethylene, and N,N-dimethylformamide. Releases of these four



**Table 9-8. TRI On-site and Off-site Releases of OSHA Carcinogens by 4-digit SIC Code, 1996: Electrical Equipment, SIC Code 36 (in Rank Order)**

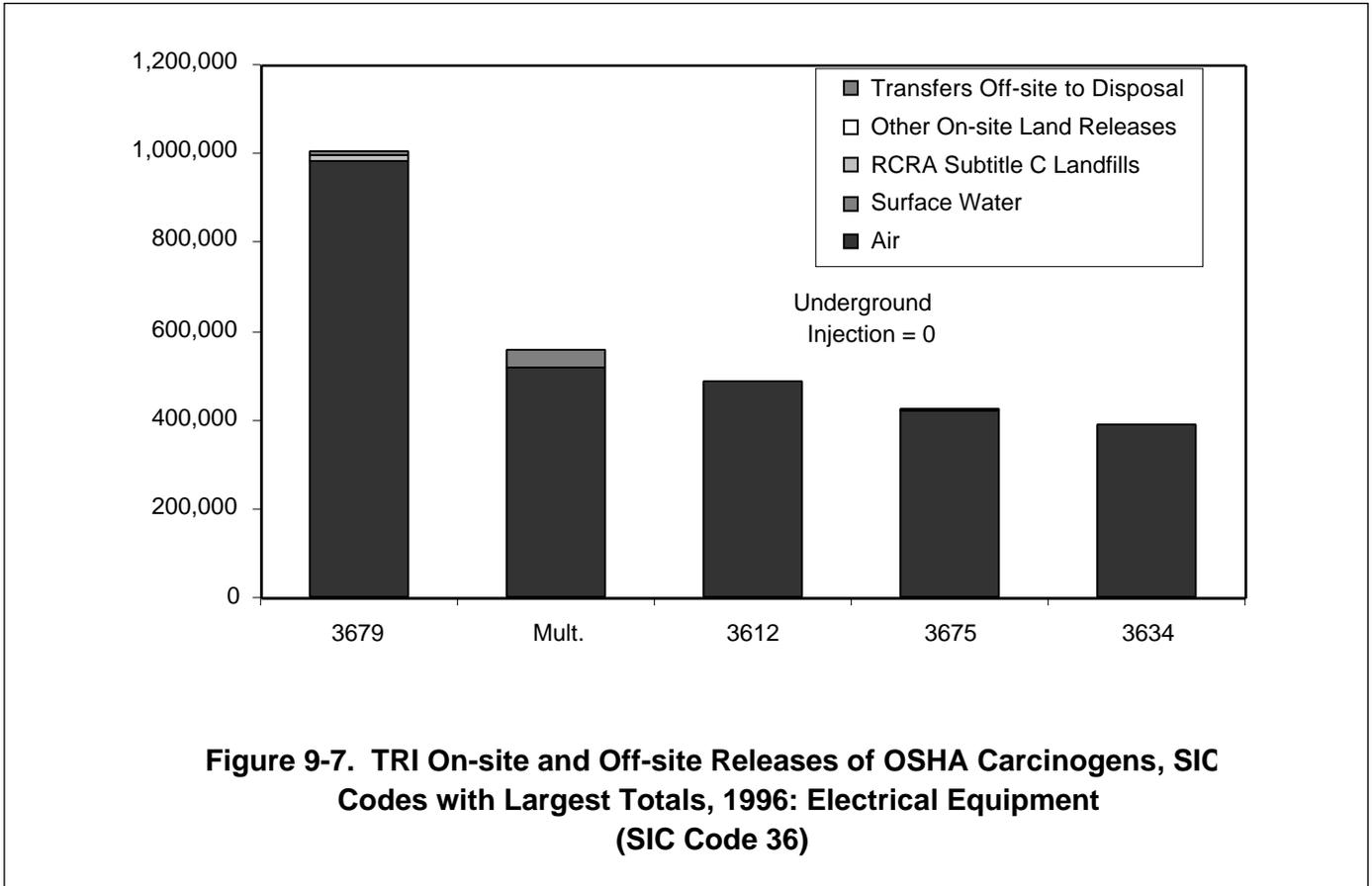
| SIC Code | Industry                              | Total Air Emissions<br>Pounds | Surface Water Discharges<br>Pounds | Underground Injection   |                            | On-site Land Releases               |                                       | Total On-site Releases<br>Pounds | Off-site Releases                        | Total On- & Off-site Releases<br>Pounds |
|----------|---------------------------------------|-------------------------------|------------------------------------|-------------------------|----------------------------|-------------------------------------|---------------------------------------|----------------------------------|--|---|
|          |                                       |                               |                                    | Class I Wells<br>Pounds | Class II-V Wells<br>Pounds | RCRA Subtitle C Landfills<br>Pounds | Other On-site Land Releases<br>Pounds |                                  | Transfers Off-site to Disposal<br>Pounds |   |
| 3679     | Electronic Components, nec*           | 982,128                       | 4                                  | 0                       | 0                          | 15,981                              | 0                                     | 998,113                          | 4,843                                    | 1,002,956                               |
|          | Multiple within SIC 36                | 518,643                       | 691                                | 0                       | 0                          | 0                                   | 0                                     | 519,334                          | 37,427                                   | 556,761                                 |
| 3612     | Transformers, Except Electronic       | 484,976                       | 5                                  | 0                       | 0                          | 0                                   | 1,808                                 | 486,789                          | 2,000                                    | 488,789                                 |
| 3675     | Electronic Capacitors                 | 422,147                       | 0                                  | 0                       | 0                          | 1,350                               | 2                                     | 423,499                          | 2,811                                    | 426,310                                 |
| 3634     | Electric Housewares & Fans            | 390,638                       | 110                                | 0                       | 0                          | 0                                   | 0                                     | 390,748                          | 250                                      | 390,998                                 |
| 3621     | Motors & Generators                   | 317,034                       | 5                                  | 0                       | 0                          | 0                                   | 5                                     | 317,044                          | 8,677                                    | 325,721                                 |
| 3624     | Carbon & Graphite Products            | 220,580                       | 19                                 | 0                       | 0                          | 0                                   | 4,105                                 | 224,704                          | 40,813                                   | 265,517                                 |
| 3674     | Semiconductors & Related Devices      | 206,373                       | 7                                  | 0                       | 0                          | 0                                   | 0                                     | 206,380                          | 20,304                                   | 226,684                                 |
| 3651     | Household Audio & Video Equipment     | 223,370                       | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 223,370                          | 2,603                                    | 225,973                                 |
| 3691     | Storage Batteries                     | 20,236                        | 557                                | 0                       | 0                          | 0                                   | 0                                     | 20,793                           | 195,312                                  | 216,105                                 |
| 3641     | Electric Lamps                        | 15,139                        | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 15,139                           | 142,408                                  | 157,547                                 |
| 3672     | Printed Circuit Boards                | 154,617                       | 276                                | 0                       | 0                          | 0                                   | 0                                     | 154,893                          | 750                                      | 155,643                                 |
| 3694     | Engine Electrical Equipment           | 66,112                        | 0                                  | 0                       | 0                          | 15                                  | 39,617                                | 105,744                          | 45,782                                   | 151,526                                 |
| 3692     | Primary Batteries, Dry & Wet          | 149,618                       | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 149,618                          | 0  | 149,618                                 |
| 3671     | Electron Tubes                        | 132,778                       | 45                                 | 0                       | 0                          | 0                                   | 0                                     | 132,823                          | 48                                       | 132,871                                 |
| 3678     | Electronic Connectors                 | 126,851                       | 49                                 | 0                       | 0                          | 0                                   | 0                                     | 126,900                          | 5,281                                    | 132,181                                 |
| 3645     | Residential Lighting Fixtures         | 129,989                       | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 129,989                          | 0  | 129,989                                 |
| 3695     | Magnetic & Optical Recording Media    | 10,464                        | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 10,464                           | 108,485                                  | 118,949                                 |
| 3661     | Telephone & Telegraph Apparatus       | 117,171                       | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 117,171                          | 6  | 117,177                                 |
| 3639     | Household Appliances, nec*            | 102,358                       | 84                                 | 0                       | 0                          | 0                                   | 0                                     | 102,442                          | 4,630                                    | 107,072                                 |
| 3677     | Electronic Coils & Transformers       | 87,107                        | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 87,107                           | 750                                      | 87,857                                  |
| 3644     | Noncurrent-carrying Wiring Devices    | 87,112                        | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 87,112                           | 250                                      | 87,362                                  |
| 3643     | Current-carrying Wiring Devices       | 52,328                        | 0                                  | 0                       | 0                          | 0                                   | 10                                    | 52,338                           | 25,506                                   | 77,844                                  |
| 3629     | Electrical Industrial Apparatus, nec* | 74,387                        | 12                                 | 0                       | 0                          | 0                                   | 5                                     | 74,404                           | 2,649                                    | 77,053                                  |
| 3613     | Switchgear & Switchboard Apparatus    | 50,599                        | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 50,599                           | 510                                      | 51,109                                  |
| 3646     | Commercial Lighting Fixtures          | 47,486                        | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 47,486                           | 0  | 47,486                                  |
| 3699     | Electrical Equipment & Supplies, nec* | 37,594                        | 293                                | 0                       | 0                          | 250                                 | 0                                     | 38,137                           | 355                                      | 38,492                                  |
| 3625     | Relays & Industrial Controls          | 35,365                        | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 35,365                           | 2,300                                    | 37,665                                  |
| 3647     | Vehicular Lighting Equipment          | 13,056                        | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 13,056                           | 16,754                                   | 29,810                                  |
| 3631     | Household Cooking Equipment           | 1,029                         | 258                                | 0                       | 0                          | 0                                   | 0                                     | 1,287                            | 23,189                                   | 24,476                                  |
| 3669     | Communications Equipment, nec*        | 20,236                        | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 20,236                           | 0  | 20,236                                  |
| 3633     | Household Laundry Equipment           | 325                           | 194                                | 0                       | 0                          | 0                                   | 0                                     | 519                              | 19,575                                   | 20,094                                  |
| 3635     | Household Vacuum Cleaners             | 17,255                        | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 17,255                           | 500                                      | 17,755                                  |
| 3676     | Electronic Resistors                  | 11,967                        | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 11,967                           | 0  | 11,967                                  |
| 3652     | Prerecorded Records & Tapes           | 5,479                         | 0                                  | 0                       | 0                          | 5                                   | 5                                     | 5,489                            | 5,081                                    | 10,570                                  |
| 3663     | Radio & TV Communications Equipment   | 4,413                         | 0                                  | 0                       | 0                          | 0                                   | 250                                   | 4,663                            | 0  | 4,663                                   |
| 3632     | Household Refrigerators & Freezers    | 3,973                         | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 3,973                            | 0  | 3,973                                   |
|          | Invalid SIC Code within SIC 36        | 3,355                         | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 3,355                            | 0  | 3,355                                   |
| 3648     | Lighting Equipment, nec*              | 15                            | 130                                | 0                       | 0                          | 0                                   | 0                                     | 145                              | 1,800                                    | 1,945                                   |
|          | Subtotal                              | 5,344,303                     | 2,739                              | 0                       | 0                          | 17,601                              | 45,807                                | 5,410,450                        | 721,649                                  | 6,132,099                               |
|          | Total for SIC Code 36                 | 23,753,157                    | 1,462,615                          | 22                      | 5                          | 210,430                             | 225,890                               | 25,652,119                       | 16,113,258                               | 41,765,377                              |

**Note:** On-site Releases from Section 5 of Form R. Off-site Releases from Section 6 (off-site transfers to disposal) of Form R. Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the "multiple" category.

\*nec: not elsewhere classified.

chemicals totaled 4.8 million pounds (78.1%) of the 6.1-million-pound total. The OSHA carcinogen with the fifth highest releases was styrene, with 523,000 pounds. The OSHA carcinogen with the largest off-site releases (transfers to disposal) was nickel compounds with 275,000 pounds.

Miscellaneous electronic components (SIC code 3679) reported the largest amount, 1.0 million pounds (16.4%), almost all of which was in air emissions. Figure 9-7 shows the on- and off-site releases of the four-digit SIC codes with the largest OSHA carcinogen releases.



**Figure 9-7. TRI On-site and Off-site Releases of OSHA Carcinogens, SIC Codes with Largest Totals, 1996: Electrical Equipment (SIC Code 36)**

**Note:** On-site Releases from Section 5 of Form R. Off-site Releases from Section 6 (off-site transfers to disposal) of Form R. Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the “multiple” category.

## 1996 TRI Chemicals in Waste for Electrical Equipment

The electrical equipment sector reported a total of 679.4 million pounds of TRI chemicals in production-related waste for 1996, as shown in Table 9-9. Off-site recycling amounted to 381.2 million pounds, or 56.1% of total production-related waste. On-site recycling was the next largest category, with 148.3 million pounds, or 21.8%.

With 251.8 million pounds recycled off-site and 103.8 million pounds recycled on-site, storage battery manufacturing (SIC code 3691) accounted for the majority of this reporting. These two amounts represented 52.3% of the total reporting of

TRI chemicals in production-related waste in this sector. The second-largest total production-related waste was that of printed circuit board manufacture (SIC code 3672, 59.0 million pounds) and third was semiconductor production (SIC code 3674, 49.3 million pounds).

After on- and off-site recycling, on-site treatment was the next largest waste management option for the electrical equipment sector, with 78.3 million pounds. Quantities released totaled 35.5 million pounds. Treatment off-site and energy recovery on- and off-site were reported in smaller quantities, each less than 2.5% of total production-related waste.

Figure 9-8 shows the distribution of on-site waste management, off-site waste management, and quantities released on- and off-site in this sector for



**Table 9-9. Quantities of TRI Chemicals in Waste by 4-digit SIC Code, 1996: Electrical Equipment, SIC Code 36 (in Rank Order)**

| SIC Code | Industry                              | Recycled On-site Pounds | Energy Recovery On-site Pounds | Treated On-site Pounds | Recycled Off-site Pounds | Energy Recovery Off-site Pounds | Treated Off-site Pounds | Quantity Released On- and Off-site Pounds | Total Production-related Waste Pounds | Non-Production-related Waste Pounds |
|----------|---------------------------------------|-------------------------|--------------------------------|------------------------|--------------------------|---------------------------------|-------------------------|---|---------------------------------------|-------------------------------------|
| 3691     | Storage Batteries                     | 103,789,022             | 0                              | 680,526                | 251,752,730              | 20,220                          | 411,404                 | 2,076,404                                 | 358,730,306                           | 3,536                               |
| 3672     | Printed Circuit Boards                | 2,000,164               | 2,354,650                      | 10,169,725             | 36,764,610               | 1,635,374                       | 3,813,057               | 2,213,760                                 | 58,951,340                            | 103                                 |
| 3674     | Semiconductors & Related Devices      | 933,850                 | 81,600                         | 33,532,169             | 2,242,554                | 3,370,499                       | 6,252,279               | 2,919,617                                 | 49,332,568                            | 17,220                              |
|          | Multiple within SIC 36                | 954,565                 | 0                              | 2,272,954              | 21,214,184               | 292,764                         | 947,760                 | 2,722,476                                 | 28,404,703                            | 304                                 |
| 3695     | Magnetic & Optical Recording Media    | 14,062,691              | 0                              | 7,515,655              | 441,425                  | 920,884                         | 280,946                 | 1,612,436                                 | 24,834,037                            | 1,601                               |
| 3679     | Electronic Components, nec*           | 2,272,825               | 4,059,106                      | 3,818,948              | 5,616,869                | 288,112                         | 382,236                 | 1,911,110                                 | 18,349,206                            | 3,075                               |
| 3671     | Electron Tubes                        | 3,505,895               | 0                              | 5,635,898              | 6,632,579                | 277,142                         | 359,291                 | 1,248,358                                 | 17,659,163                            | 0                                   |
| 3692     | Primary Batteries, Dry & Wet          | 9,567,891               | 0                              | 461,970                | 1,931,009                | 40,700                          | 790,510                 | 1,950,072                                 | 14,742,152                            | 0                                   |
| 3621     | Motors & Generators                   | 168,540                 | 0                              | 467,659                | 8,986,433                | 224,185                         | 49,125                  | 2,484,275                                 | 12,830,217                            | 1,408                               |
| 3624     | Carbon & Graphite Products            | 353,874                 | 4,848,730                      | 4,358,084              | 202,335                  | 29,202                          | 2,211                   | 437,815                                   | 10,232,251                            | 130                                 |
| 3675     | Electronic Capacitors                 | 1,634,437               | 0                              | 2,655,047              | 2,577,974                | 229,600                         | 1,085,693               | 1,646,625                                 | 9,829,376                             | 2                                   |
| 3613     | Switchgear & Switchboard Apparatus    | 0                       | 0                              | 587,653                | 8,240,982                | 2,323                           | 251,723                 | 196,943                                   | 9,279,624                             | 17,370                              |
| 3612     | Transformers, Except Electronic       | 63,568                  | 0                              | 297,040                | 6,525,846                | 104,581                         | 5,448                   | 1,275,780                                 | 8,272,263                             | 108                                 |
| 3678     | Electronic Connectors                 | 101,608                 | 0                              | 1,492,702              | 4,870,608                | 29,608                          | 145,821                 | 228,730                                   | 6,869,077                             | 0                                   |
| 3641     | Electric Lamps                        | 371,942                 | 0                              | 1,194,461              | 1,230,298                | 74,215                          | 463,687                 | 3,115,757                                 | 6,450,360                             | 60                                  |
| 3643     | Current-carrying Wiring Devices       | 2,481,048               | 0                              | 336,389                | 2,948,681                | 0                               | 48,985                  | 439,093                                   | 6,254,196                             | 0                                   |
| 3644     | Noncurrent-carrying Wiring Devices    | 3,655,994               | 37,895                         | 426,709                | 1,043,577                | 56,532                          | 55,755                  | 301,021                                   | 5,577,483                             | 0                                   |
| 3632     | Household Refrigerators & Freezers    | 16,000                  | 0                              | 122,190                | 1,249,348                | 273,347                         | 82,545                  | 2,733,330                                 | 4,476,760                             | 5,200                               |
| 3648     | Lighting Equipment, nec*              | 0                       | 0                              | 76,000                 | 4,172,321                | 0                               | 2,000                   | 92,351                                    | 4,342,672                             | 0                                   |
| 3633     | Household Laundry Equipment           | 140,253                 | 0                              | 715,220                | 656,909                  | 50,098                          | 198,523                 | 1,910,161                                 | 3,671,164                             | 0                                   |
| 3699     | Electrical Equipment & Supplies, nec* | 13,063                  | 0                              | 768,807                | 1,903,192                | 485                             | 640,896                 | 175,440                                   | 3,501,883                             | 0                                   |
| 3694     | Engine Electrical Equipment           | 242,400                 | 0                              | 224,462                | 2,223,320                | 18,848                          | 20,302                  | 275,318                                   | 3,004,650                             | 0                                   |
| 3669     | Communications Equipment, nec*        | 31,288                  | 0                              | 310                    | 2,705,995                | 9,985                           | 7,875                   | 47,520                                    | 2,802,973                             | 0                                   |
| 3639     | Household Appliances, nec*            | 119,741                 | 42,000                         | 117,681                | 389,038                  | 50,895                          | 59,374                  | 1,163,354                                 | 1,942,083                             | 0                                   |
| 3629     | Electrical Industrial Apparatus, nec* | 1,816                   | 666                            | 0                      | 1,317,704                | 105,551                         | 15,854                  | 160,950                                   | 1,602,541                             | 1,156                               |
| 3645     | Residential Lighting Fixtures         | 1,472,695               | 0                              | 30                     | 5,338                    | 2,590                           | 10,700                  | 102,177                                   | 1,593,530                             | 0                                   |
| 3625     | Relays & Industrial Controls          | 0                       | 0                              | 24,624                 | 1,216,200                | 1,384                           | 9,842                   | 97,744                                    | 1,349,794                             | 0                                   |
| 3634     | Electric Housewares & Fans            | 0                       | 0                              | 71,400                 | 491,842                  | 2,444                           | 3,000                   | 554,325                                   | 1,123,011                             | 0                                   |
| 3651     | Household Audio & Video Equipment     | 63,458                  | 0                              | 0                      | 419,171                  | 40,746                          | 22,333                  | 446,185                                   | 991,893                               | 0                                   |
| 3676     | Electronic Resistors                  | 151,297                 | 0                              | 32,000                 | 175,748                  | 8,327                           | 40,839                  | 90,073                                    | 498,284                               | 0                                   |
| 3661     | Telephone & Telegraph Apparatus       | 0                       | 0                              | 970                    | 295,091                  | 5,800                           | 97                      | 126,128                                   | 428,086                               | 0                                   |
| 3646     | Commercial Lighting Fixtures          | 0                       | 0                              | 168,917                | 17,901                   | 13,279                          | 2,309                   | 222,786                                   | 425,192                               | 0                                   |
| 3677     | Electronic Coils & Transformers       | 8,624                   | 0                              | 0                      | 259,474                  | 1,400                           | 10,038                  | 143,933                                   | 423,469                               | 0                                   |
| 3631     | Household Cooking Equipment           | 4,040                   | 0                              | 2                      | 252,085                  | 765                             | 4,739                   | 149,686                                   | 411,317                               | 0                                   |
| 3647     | Vehicular Lighting Equipment          | 0                       | 0                              | 79,000                 | 51,197                   | 31,315                          | 6,400                   | 99,691                                    | 267,603                               | 0                                   |
| 3663     | Radio & TV Communications Equipment   | 116,171                 | 0                              | 0                      | 17,430                   | 0                               | 296                     | 6,127                                     | 140,024                               | 0                                   |
| 3652     | Prerecorded Records & Tapes           | 0                       | 0                              | 527                    | 88,397                   | 3,708                           | 219                     | 10,572                                    | 103,423                               | 0                                   |
|          | Invalid SIC Code within SIC 36        | 0                       | 0                              | 7,735                  | 31,385                   | 0                               | 0                       | 48,401                                    | 87,521                                | 99                                  |
| 3635     | Household Vacuum Cleaners             | 206                     | 0                              | 0                      | 48,100                   | 0                               | 0                       | 17,738                                    | 66,044                                | 0                                   |
|          | Total for SIC Code 36                 | 148,298,966             | 11,424,647                     | 78,313,464             | 381,209,880              | 8,216,908                       | 16,484,112              | 35,454,262                                | 679,402,239                           | 51,372                              |

**Note:** Data from Section 8 of Form R. Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the "multiple" category.

\*nec: not elsewhere classified.

1996. Distribution of production-related waste for the top industries in the sector appears in Figure 9-9.

## Projected Quantities of TRI Chemicals in Waste

Table 9-10 summarizes the electrical equipment sector's projections for on- and off-site waste management through 1998. (As explained in

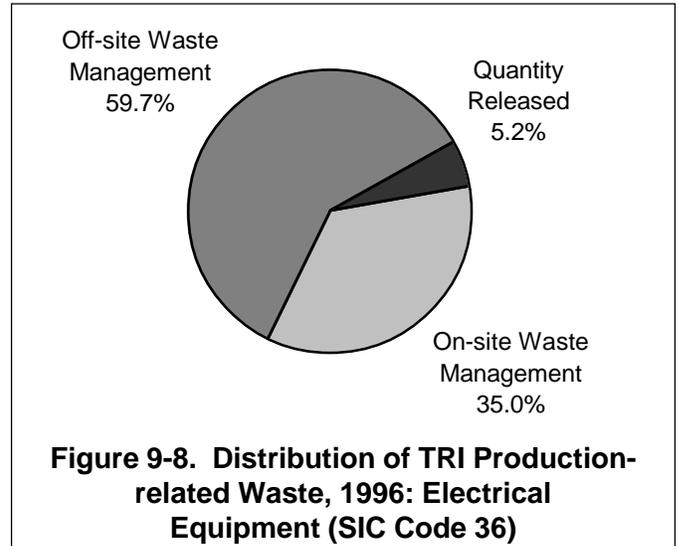
Chapter 2, facilities not only report current data but project waste management quantities for the next two years in their TRI submissions.) Total production-related waste is projected to increase by 4.4% (30.1 million pounds). Projected changes include a 12.0% decrease in quantities released on- and off-site through 1998, from 35.5 million pounds to 31.2 million pounds. The largest percentage change is projected in on-site energy recovery, a 27.2% decrease, but this method represents a small portion overall of the sector's



management of TRI chemicals in waste (1.7% of production-related waste in 1996). The largest reduction in pounds is projected in off-site recycling, a 5.6-million-pound decrease.

Increases are projected in on-site recycling and treatment. For on-site recycling, the projected change is a 17.8% increase, or 26.4 million pounds. For on-site treatment, the expected increase is 19.7%, or 15.4 million pounds. These increases, along with smaller quantities and percentages in off-site energy recovery and treatment, contributed to the overall projected increase of 4.4% in total production-related waste by 1998.

Figure 9-10 displays the projected percentage changes in on-site waste management, off-site



Note: Data from Section 8 of Form R.

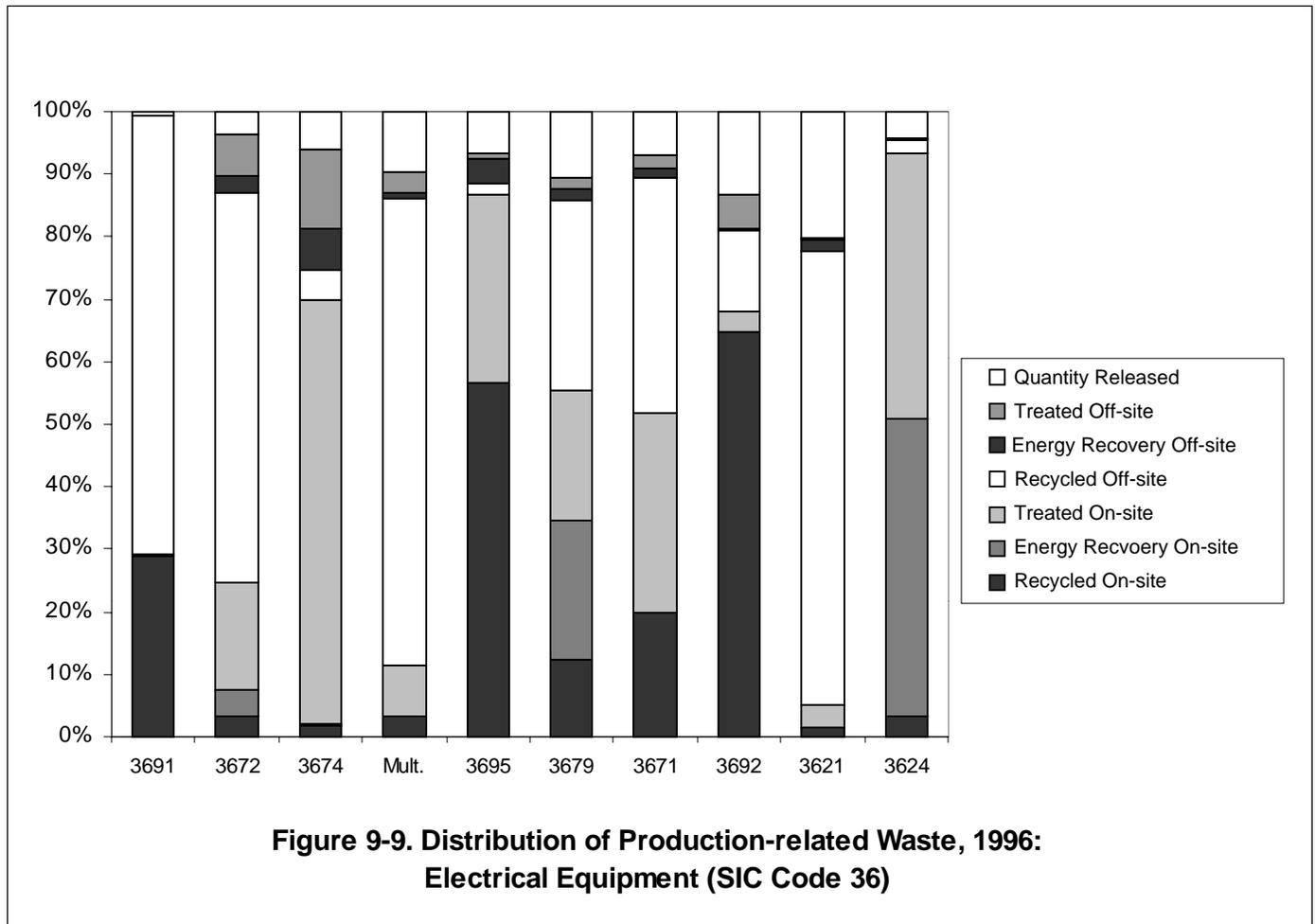


Figure 9-9. Distribution of Production-related Waste, 1996: Electrical Equipment (SIC Code 36)

Note: Data from Section 8 of Form R. Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the “multiple” category.



**Table 9-10. Current Year and Projected Quantities of TRI Chemicals in Waste, 1996-1998: Electrical Equipment, SIC Code 36**

| Waste Management Activity                      | Current Year 1996          |                  | Projected 1997             |                  | Projected 1998             |                  |
|--|----------------------------|------------------|----------------------------|------------------|----------------------------|------------------|
|  | Total Pounds               | Percent of Total | Total Pounds               | Percent of Total | Total Pounds               | Percent of Total |
| <u>On-site Waste Management</u>                |                            |                  |                            |                  |                            |                  |
| Recycled On-site                               | 148,298,966                | 21.8             | 160,052,084                | 23.2             | 174,658,980                | 24.6             |
| Energy Recovery On-site                        | 11,424,647                 | 1.7              | 8,115,845                  | 1.2              | 8,312,982                  | 1.2              |
| Treated On-site                                | 78,313,464                 | 11.5             | 87,241,082                 | 12.7             | 93,756,654                 | 13.2             |
| <u>Off-site Waste Management</u>               |                            |                  |                            |                  |                            |                  |
| Recycled Off-site                              | 381,209,880                | 56.1             | 375,729,870                | 54.6             | 375,611,989                | 52.9             |
| Energy Recovery Off-site                       | 8,216,908                  | 1.2              | 8,413,913                  | 1.2              | 8,465,817                  | 1.2              |
| Treated Off-site                               | 16,484,112                 | 2.4              | 16,860,308                 | 2.4              | 17,499,728                 | 2.5              |
| Quantity Released On- and Off-site             | 35,454,262                 | 5.2              | 32,094,402                 | 4.7              | 31,197,319                 | 4.4              |
| Total Production-related Waste for SIC Code 36 | 679,402,239                | 100.0            | 688,507,504                | 100.0            | 709,503,469                | 100.0            |
| Waste Management Activity                      | Projected Change 1996-1997 |                  | Projected Change 1997-1998 |                  | Projected Change 1996-1998 |                  |
|  | Percent                    |                  | Percent                    |                  | Percent                    |                  |
| <u>On-site Waste Management</u>                |                            |                  |                            |                  |                            |                  |
| Recycled On-site                               | 7.9                        |                  | 9.1                        |                  | 17.8                       |                  |
| Energy Recovery On-site                        | -29.0                      |                  | 2.4                        |                  | -27.2                      |                  |
| Treated On-site                                | 11.4                       |                  | 7.5                        |                  | 19.7                       |                  |
| <u>Off-site Waste Management</u>               |                            |                  |                            |                  |                            |                  |
| Recycled Off-site                              | -1.4                       |                  | 0.0                        |                  | -1.5                       |                  |
| Energy Recovery Off-site                       | 2.4                        |                  | 0.6                        |                  | 3.0                        |                  |
| Treated Off-site                               | 2.3                        |                  | 3.8                        |                  | 6.2                        |                  |
| Quantity Released On- and Off-site             | -9.5                       |                  | -2.8                       |                  | -12.0                      |                  |
| Total Production-related Waste for SIC Code 36 | 1.3                        |                  | 3.0                        |                  | 4.4                        |                  |

**Note:** Current year and projected year amounts are all taken from Section 8 of Form R for 1996.

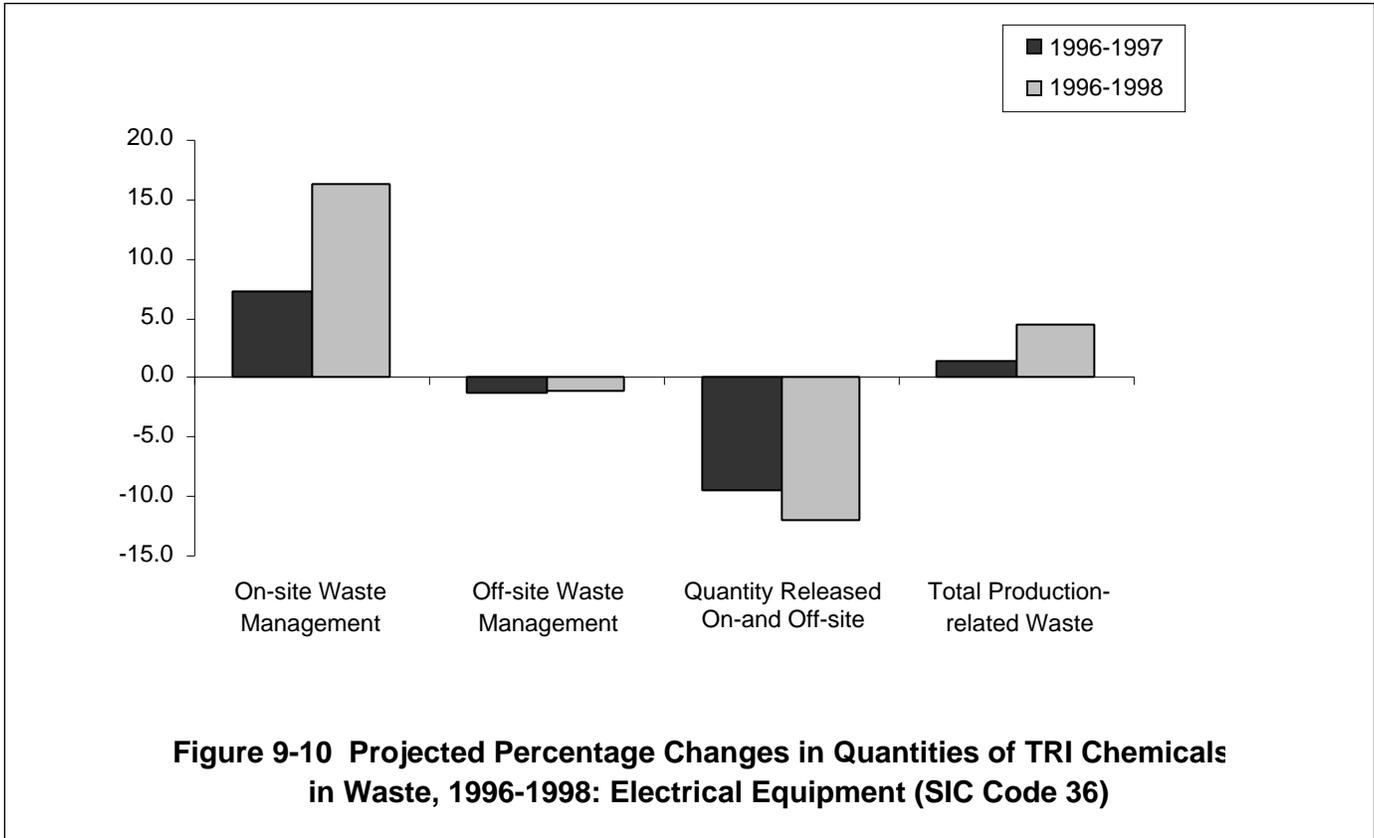
waste management, quantities released on- and off-site, and total production-related waste.

The projected changes also indicate some difference over time in where electrical equipment manufacturers expect to manage TRI chemicals in waste, but not necessarily in how they expect to do so. On-site recycling is projected to increase from 21.8% of production-related waste in 1996 to 24.6% in 1998, while off-site recycling is projected to decrease from 56.1% to 52.9%. These are, and would remain, the largest waste management

activities in electrical equipment manufacturing. These distributions, which also appear in Table 9-10, thus suggest relatively little movement up the waste management hierarchy, explained in Chapter 2, although the projected decreasing role of releases indicates some progress.

## Source Reduction Activity

Table 9-11 shows that 21.9% of forms submitted in electrical equipment manufacturing indicated one or more source reduction activities in 1996. Printed



Note: Current year and projected year amounts are all taken from Section 8 of Form R for 1996.

circuit boards (SIC code 3672) and semiconductors (SIC code 3674) were the two industries with the largest numbers of such forms (122 and 118, respectively); these were also the industries with the largest total submissions in 1996. More than one third (34.8%) of the forms submitted in storage battery manufacturing (SIC code 3691) indicated source reduction activity. Improved operating practices were cited most often on forms in SIC code 36 (335 forms); the second largest category was process modifications (244 forms).

## Year-to-Year Comparisons for Electrical Equipment

### 1995-1996 TRI Data for Electrical Equipment

From 1995 to 1996, the number of forms submitted with electrical equipment SIC codes decreased 6.3%. The number of Form A certification statements in these submissions also decreased (by 10.9%); unlike most TRI sectors where the number of Form A certification statements increased in 1996. Table 9-12 provides TRI data for the electrical equipment sector for the two years.



Table 9-11. Number of Forms Reporting Source Reduction Activity, 1996: Electrical Equipment, SIC Code 36

| SIC Code | Industry                              | Total Forms Number | Forms Reporting Source Reduction Activities |                              | Category of Source Reduction Activity |                          |                                  |                                   |                              |                                |  |                              |
|----------|---------------------------------------|--------------------|---|------------------------------|---------------------------------------|--------------------------|----------------------------------|-----------------------------------|------------------------------|--------------------------------|--|------------------------------|
|          |                                       |                    | Number                                      | Percent of All Forms Percent | Good Operating Practices Number       | Inventory Control Number | Spill and Leak Prevention Number | Raw Material Modifications Number | Process Modifications Number | Cleaning and Degreasing Number | Surface Preparation and Finishing Number | Product Modifications Number |
| 3612     | Transformers, Except Electronic       | 90                 | 12  | 13.3                         | 7                                     | 0                        | 0                                | 1                                 | 2                            | 2                              | 4  | 1                            |
| 3613     | Switchgear & Switchboard Apparatus    | 84                 | 9   | 10.7                         | 3                                     | 1                        | 2                                | 2                                 | 1                            | 2                              | 0  | 0                            |
| 3621     | Motors & Generators                   | 191                | 53  | 27.7                         | 24                                    | 3                        | 8                                | 11                                | 5                            | 3                              | 8  | 3                            |
| 3624     | Carbon & Graphite Products            | 40                 | 7   | 17.5                         | 2                                     | 2                        | 1                                | 2                                 | 1                            | 0                              | 0  | 0                            |
| 3625     | Relays & Industrial Controls          | 26                 | 4   | 15.4                         | 1                                     | 0                        | 0                                | 1                                 | 1                            | 1                              | 0  | 0                            |
| 3629     | Electrical Industrial Apparatus, nec* | 25                 | 7   | 28.0                         | 2                                     | 0                        | 0                                | 3                                 | 4                            | 0                              | 0  | 0                            |
| 3631     | Household Cooking Equipment           | 26                 | 7   | 26.9                         | 1                                     | 0                        | 0                                | 1                                 | 4                            | 0                              | 1  | 1                            |
| 3632     | Household Refrigerators & Freezers    | 64                 | 6   | 9.4                          | 0                                     | 0                        | 0                                | 6                                 | 0                            | 0                              | 3  | 0                            |
| 3633     | Household Laundry Equipment           | 60                 | 11  | 18.3                         | 4                                     | 0                        | 0                                | 1                                 | 0                            | 0                              | 4  | 3                            |
| 3634     | Electric Housewares & Fans            | 28                 | 5   | 17.9                         | 1                                     | 0                        | 2                                | 0                                 | 2                            | 0                              | 0  | 0                            |
| 3635     | Household Vacuum Cleaners             | 3                  | 1   | 33.3                         | 0                                     | 0                        | 0                                | 0                                 | 0                            | 0                              | 1  | 0                            |
| 3639     | Household Appliances, nec*            | 45                 | 9   | 20.0                         | 3                                     | 0                        | 0                                | 1                                 | 5                            | 1                              | 1  | 0                            |
| 3641     | Electric Lamps                        | 65                 | 9   | 13.8                         | 4                                     | 0                        | 1                                | 3                                 | 2                            | 2                              | 1  | 2                            |
| 3643     | Current-carrying Wiring Devices       | 80                 | 17  | 21.3                         | 10                                    | 4                        | 1                                | 3                                 | 2                            | 2                              | 0  | 2                            |
| 3644     | Noncurrent-carrying Wiring Devices    | 42                 | 7   | 16.7                         | 5                                     | 0                        | 2                                | 1                                 | 0                            | 2                              | 1  | 0                            |
| 3645     | Residential Lighting Fixtures         | 15                 | 3   | 20.0                         | 0                                     | 0                        | 0                                | 0                                 | 0                            | 1                              | 2  | 2                            |
| 3646     | Commercial Lighting Fixtures          | 19                 | 3   | 15.8                         | 3                                     | 0                        | 1                                | 0                                 | 3                            | 0                              | 0  | 0                            |
| 3647     | Vehicular Lighting Equipment          | 16                 | 1   | 6.3                          | 0                                     | 0                        | 0                                | 1                                 | 0                            | 1                              | 0  | 0                            |
| 3648     | Lighting Equipment, nec*              | 18                 | 1   | 5.6                          | 0                                     | 0                        | 0                                | 0                                 | 0                            | 0                              | 0  | 1                            |
| 3651     | Household Audio & Video Equipment     | 21                 | 7   | 33.3                         | 0                                     | 1                        | 0                                | 1                                 | 1                            | 0                              | 3  | 1                            |
| 3652     | Prerecorded Records & Tapes           | 5                  | 3   | 60.0                         | 3                                     | 0                        | 0                                | 1                                 | 1                            | 1                              | 0  | 0                            |
| 3661     | Telephone & Telegraph Apparatus       | 15                 | 1   | 6.7                          | 0                                     | 0                        | 0                                | 0                                 | 0                            | 1                              | 0  | 0                            |
| 3663     | Radio & TV Communications Equipment   | 27                 | 2   | 7.4                          | 0                                     | 0                        | 0                                | 0                                 | 1                            | 0                              | 1  | 0                            |
| 3669     | Communications Equipment, nec*        | 13                 | 4   | 30.8                         | 2                                     | 1                        | 0                                | 4                                 | 3                            | 0                              | 0  | 2                            |
| 3671     | Electron Tubes                        | 70                 | 14  | 20.0                         | 8                                     | 0                        | 1                                | 0                                 | 3                            | 3                              | 0  | 2                            |
| 3672     | Printed Circuit Boards                | 582                | 122   | 21.0                         | 56                                    | 12                       | 14                               | 24                                | 63                           | 14                             | 5  | 9                            |
| 3674     | Semiconductors & Related Devices      | 499                | 118   | 23.6                         | 60                                    | 23                       | 14                               | 25                                | 47                           | 3                              | 3  | 1                            |
| 3675     | Electronic Capacitors                 | 63                 | 23  | 36.5                         | 5                                     | 0                        | 1                                | 6                                 | 12                           | 2                              | 0  | 2                            |
| 3676     | Electronic Resistors                  | 12                 | 6   | 50.0                         | 4                                     | 0                        | 0                                | 2                                 | 4                            | 2                              | 0  | 0                            |
| 3677     | Electronic Coils & Transformers       | 23                 | 2   | 8.7                          | 2                                     | 0                        | 0                                | 0                                 | 0                            | 0                              | 0  | 0                            |
| 3678     | Electronic Connectors                 | 60                 | 10  | 16.7                         | 5                                     | 1                        | 0                                | 0                                 | 3                            | 1                              | 0  | 0                            |
| 3679     | Electronic Components, nec*           | 194                | 50  | 25.8                         | 27                                    | 3                        | 2                                | 12                                | 20                           | 11                             | 1  | 3                            |
| 3691     | Storage Batteries                     | 181                | 63  | 34.8                         | 49                                    | 6                        | 20                               | 1                                 | 17                           | 1                              | 0  | 5                            |
| 3692     | Primary Batteries, Dry & Wet          | 55                 | 21  | 38.2                         | 12                                    | 1                        | 5                                | 2                                 | 14                           | 1                              | 2  | 0                            |
| 3694     | Engine Electrical Equipment           | 42                 | 7   | 16.7                         | 4                                     | 2                        | 0                                | 1                                 | 1                            | 1                              | 0  | 0                            |
| 3695     | Magnetic & Optical Recording Media    | 39                 | 13  | 33.3                         | 9                                     | 0                        | 1                                | 3                                 | 6                            | 0                              | 0  | 0                            |
| 3699     | Electrical Equipment & Supplies, nec* | 61                 | 5   | 8.2                          | 2                                     | 2                        | 0                                | 0                                 | 1                            | 0                              | 0  | 0                            |
|          | Multiple within SIC 36                | 212                | 39  | 18.4                         | 16                                    | 6                        | 3                                | 12                                | 14                           | 2                              | 0  | 8                            |
|          | Invalid SIC Code within SIC 36        | 10                 | 2   | 20.0                         | 1                                     | 0                        | 0                                | 0                                 | 1                            | 0                              | 0  | 0                            |
|          | Total for SIC Code 36                 | 3,121              | 684   | 21.9                         | 335                                   | 68                       | 79                               | 131                               | 244                          | 60                             | 41                                       | 48                           |

Note: Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the "multiple" category.

\*nec: not elsewhere classified.

### On- and Off-site Releases

From 1995 to 1996, on- and off-site releases increased by 3.2%, a net increase of 1.3 million pounds. This resulted primarily from a 60.1% increase in off-site releases (transfers to disposal) of 6.0 million pounds. The increase reported in transfers to disposal of lead compounds in the printed circuit board industry (SIC code 3672) was 6.4 million pounds (partly offset by decreases in other chemicals and SIC codes).

Air emissions decreased by 19.6%, or 5.8 million pounds; reductions occurred in both fugitive and point-source emissions. The large percentage increase in surface water discharges—189.0%, or 957,000 pounds—reflects an increase in discharges of nitrate compounds (902,000 pounds) reported in semiconductor manufacturing (SIC code 3674).

Table 9-12 and Figure 9-11 summarize on- and off-site release data for electrical equipment manufacturing for 1995 and 1996.



**Table 9-12. Comparison of TRI On-site and Off-site Releases, Other On-site Waste Management, and Transfers Off-site for Further Waste Management, 1995-1996: Electrical Equipment, SIC Code 36**

|  | 1995<br>Number | 1996<br>Number | Change<br>1995 to 1996<br>Percent |
|--|----------------|----------------|-----------------------------------|
| Total Facilities                                       | 1,271          | 1,233          | -3.0                              |
| Total Forms  | 3,332          | 3,121          | -6.3                              |
| Form Rs  | 3,231          | 3,031          | -6.2                              |
| Form As  | 101            | 90             | -10.9                             |
|  | Pounds         | Pounds         | Percent                           |
| <u>On-site Releases</u>                                |                |                |                                   |
| Total Air Emissions                                    | 29,526,026     | 23,753,157     | -19.6                             |
| Fugitive Air   | 7,617,276      | 6,351,489      | -16.6                             |
| Point Source Air                                       | 21,908,750     | 17,401,668     | -20.6                             |
| Surface Water Discharges                               | 506,027        | 1,462,615      | 189.0                             |
| Underground Injection                                  | 5              | 27             | 440.0                             |
| On-site Land Releases                                  | 360,363        | 436,320        | 21.1                              |
| Total On-site Releases                                 | 30,392,421     | 25,652,119     | -15.6                             |
| <u>Off-site Releases</u>                               |                |                |                                   |
| Transfers Off-site to Disposal                         | 10,063,276     | 16,113,258     | 60.1                              |
| Total On- and Off-site Releases                        | 40,455,697     | 41,765,377     | 3.2                               |
| <u>Other On-site Waste Management</u>                  |                |                |                                   |
| Recycled On-site                                       | 99,843,391     | 148,298,966    | 48.5                              |
| Energy Recovery On-site                                | 10,495,234     | 11,424,647     | 8.9                               |
| Treated On-site  | 101,176,929    | 78,313,464     | -22.6                             |
| Total Other On-site Waste Management                   | 211,515,554    | 238,037,077    | 12.5                              |
| <u>Transfers Off-site for Further Waste Management</u> |                |                |                                   |
| Transfers to Recycling                                 | 380,005,358    | 345,621,345    | -9.0                              |
| Transfers to Energy Recovery                           | 10,500,554     | 8,084,043      | -23.0                             |
| Transfers to Treatment                                 | 9,026,805      | 7,294,538      | -19.2                             |
| Transfers to POTWs                                     | 11,589,298     | 10,998,130     | -5.1                              |
| Other Off-site Transfers                               | 10,758         | 694,794        | 6,358.4                           |
| Total Transfers Off-site for Further Waste Management  | 411,132,773    | 372,692,850    | -9.3                              |

**Note:** On-site Releases from Section 5 of Form R and Off-site Releases from Section 6 (transfers off-site to disposal) of Form R. Other On-site Waste Management from Section 8 of Form R. Transfers Off-site for Further Waste Management from Section 6 (excluding transfers off-site to disposal) of Form R. Breakdown of Underground Injection and On-site Land Releases not required in 1995. Other Off-site Transfers are transfers reported without a valid waste management code.



Other On-site Waste Management

Table 9-12 also gives 1995-1996 data for on-site waste management. On-site recycling increased by 48.5 million pounds, which was 48.5%, more than twice the decrease in on-site treatment of 22.9 million pounds, or 22.6%. The increase in on-site recycling arose largely from an increase of 46.1 million pounds of lead compounds, reported in storage battery manufacturing (SIC code 3691).

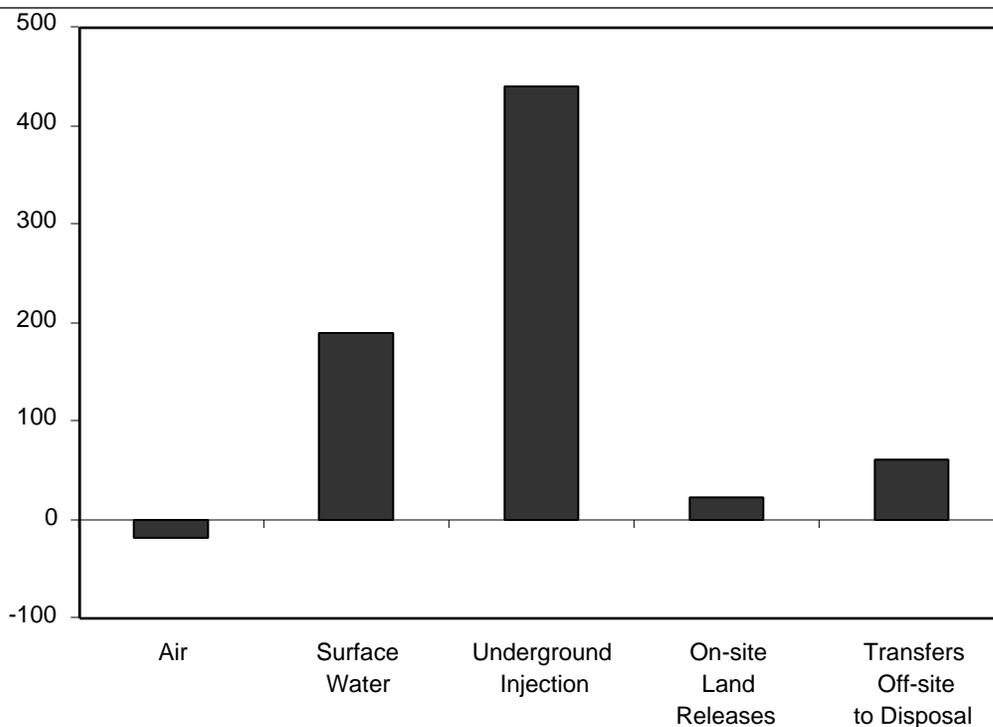
Energy recovery, the smallest waste management option in reporting in the electrical equipment sector, increased 929,000 pounds, or 8.9%. Overall, on-site waste management in this sector showed a 26.5-million-pound increase, or 12.5%.

Transfers Off-site for Further Waste Management

All types of transfers off-site for further waste management (except those with invalid codes)

decreased from 1995 to 1996 in the electrical equipment sector. These data also appear on Table 9-12. The largest reduction in pounds occurred in reported transfers to recycling—34.4 million pounds. This was a 9.0% reduction. The largest reduction in off-site transfers to recycling was in reporting of lead in the storage battery industry (SIC code 3691). As seen in the descriptions of facilities with large increases and decreases, later in this chapter, these were not the same facilities as reported increases in on-site recycling of lead compounds, mentioned above.

Transfers to energy recovery decreased by 2.4 million pounds (23.0%) and transfers to treatment by 1.7 million pounds (19.2%). The smallest decrease was reported in transfers to POTWs, 591,000 pounds or 5.1%. The overall reduction in transfers off-site for further waste management was 38.4 million pounds, or 9.3%.



**Figure 9-11. Percentage Change in On-site and Off-site Releases, 1995-1996: Electrical Equipment (SIC Code 36)**

Note: On-site Releases from Section 5 of Form R and Off-site Releases from Section 6 (transfers off-site to disposal) of Form R. Breakdown of On-site Land Releases and Underground Injection not required in 1995.



### 1988-1996 TRI Data for Electrical Equipment

As explained in Chapter 3, comparisons from the 1988 TRI baseline year to the current year rely on the list of “core” TRI chemicals that were reportable, with the same reporting definition, in all years. These multi-year comparisons also review only the data elements that were collected in all years, which excludes from this section any analysis that distinguishes RCRA subtitle C landfills from other land releases as well as analysis based on the types of underground injection wells. On-site waste management data and transfers off-site to recycling and to energy recovery have been collected only since 1991; these data are included, but cannot be compared across the full 1988-1996 period.

The number of forms reporting electrical equipment SIC codes dropped 37.6% from 1988 to 1996, as

presented in Table 9-13. On- and off-site releases of the 1988-1996 “core” chemicals decreased by 74.6%, or 99.0 million pounds, and decreases occurred in all release media, as shown in Figure 9-12. Reductions were 16.2% in off-site releases (transfers to disposal) and 37.0% in on-site land releases. In all other release types, the percentage decrease was more than 80%.

Other on-site waste management activities show increases and off-site transfers to recycling and energy recovery show decreases from 1994 to 1996. These data were not collected in 1988.

For the full comparison period, 1988 to 1996, transfers to treatment decreased two thirds (66.7%, or 11.3 million pounds), and transfers to POTWs by half (48.1%, or 2.5 million pounds).

As noted earlier in this chapter, production in this sector nearly doubled from 1988 to 1996, rising

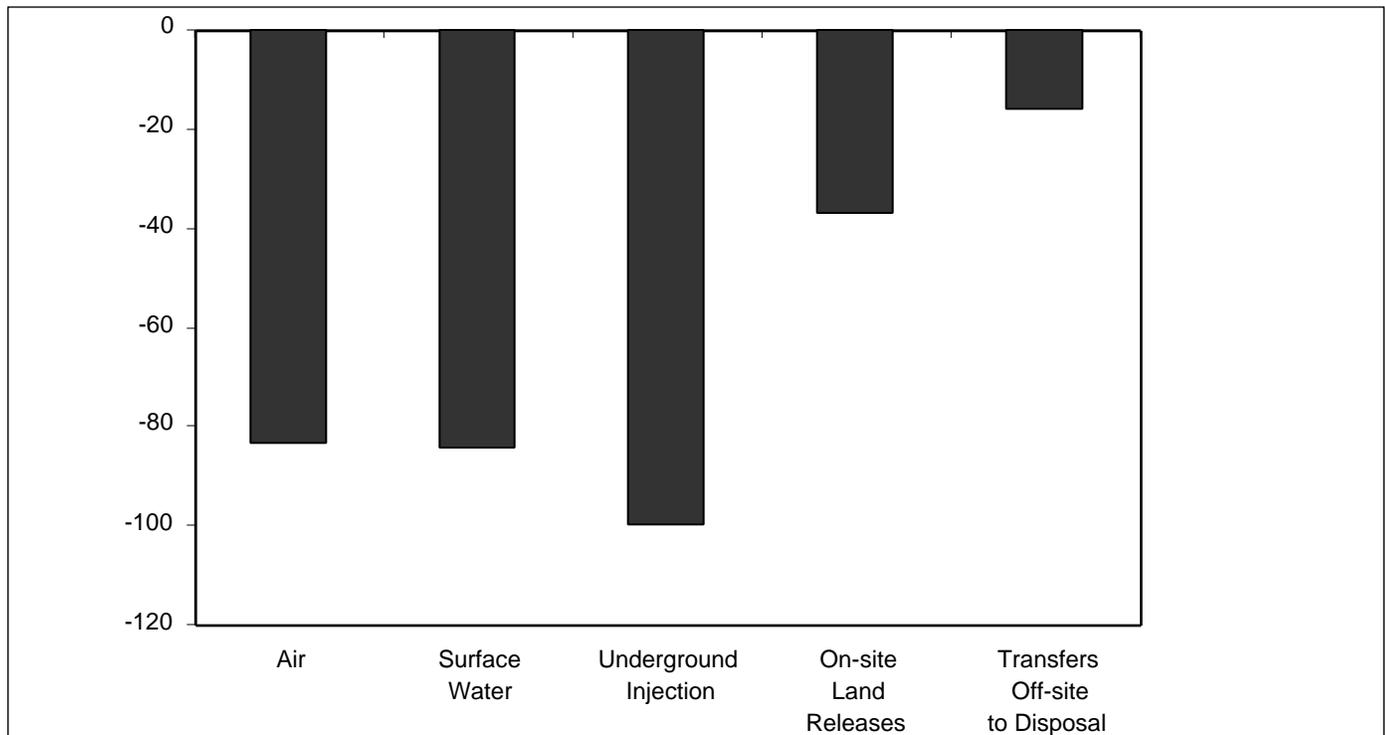


Figure 9-12. Percentage Change in On-site and Off-site Releases, 1988-1996: Electrical Equipment (SIC Code 36)

Note: Does not include delisted chemicals, chemicals added in 1990, 1991, 1994, and 1995, and aluminum oxide, ammonia, hydrochloric acid, and sulfuric acid. On-site Releases from section 5 of Form R and Off-site Releases from section 6 (transfers off-site to disposal) of Form R. Breakdown of On-site Land Releases and Underground Injection not required before 1996.



**Table 9-13. Comparison of TRI On-site and Off-site Releases, Other On-site Waste Management, and Transfers Off-site for Further Waste Management, 1988 and 1994-1996: Electrical Equipment, SIC Code 36**

|  | 1988<br>Number | 1994<br>Number | 1995<br>Number | 1996<br>Number | Change<br>1988 to 1996<br>Percent |
|--|----------------|----------------|----------------|----------------|-----------------------------------|
| Total Facilities                                       | 1,634          | 1,213          | 1,157          | 1,147          | -29.8                             |
| Total Forms  | 4,047          | 2,688          | 2,586          | 2,524          | -37.6                             |
| Form Rs  | 4,047          | 2,688          | 2,511          | 2,465          | -39.1                             |
| Form As  | NA             | NA             | 75             | 59             | NA                                |
|  | Pounds         | Pounds         | Pounds         | Pounds         | Percent                           |
| <u>On-site Releases</u>                                |                |                |                |                |                                   |
| Total Air Emissions                                    | 114,527,670    | 28,729,995     | 23,256,608     | 18,866,942     | -83.5                             |
| Fugitive Air   | 34,327,953     | 6,067,827      | 5,265,968      | 4,501,128      | -86.9                             |
| Point Source Air                                       | 80,199,717     | 22,662,168     | 17,990,640     | 14,365,814     | -82.1                             |
| Surface Water Discharges                               | 309,962        | 54,944         | 47,383         | 48,491         | -84.4                             |
| Underground Injection                                  | 36,999         | 0              | 5              | 27             | -99.9                             |
| On-site Land Releases                                  | 587,728        | 153,909        | 333,628        | 370,532        | -37.0                             |
| Total On-site Land Releases                            | 115,462,359    | 28,938,848     | 23,637,624     | 19,285,992     | -83.3                             |
| <u>Off-site Releases</u>                               |                |                |                |                |                                   |
| Transfers Off-site to Disposal                         | 17,256,677     | 7,732,906      | 7,819,505      | 14,467,045     | -16.2                             |
| Total On- and Off-site Releases                        | 132,719,036    | 36,671,754     | 31,457,129     | 33,753,037     | -74.6                             |
| <u>Other On-site Waste Management</u>                  |                |                |                |                |                                   |
| Recycled On-site                                       | NA             | 96,159,323     | 97,970,855     | 145,834,353    | NA                                |
| Energy Recovery On-site                                | NA             | 2,073,744      | 2,191,839      | 2,026,264      | NA                                |
| Treated On-site  | NA             | 47,183,395     | 51,213,177     | 51,682,275     | NA                                |
| Other On-site Waste Management                         | NA             | 145,416,462    | 151,375,871    | 199,542,892    | NA                                |
| <u>Transfers Off-site for Further Waste Management</u> |                |                |                |                |                                   |
| Transfers to Recycling                                 | NA             | 346,513,941    | 369,640,348    | 335,785,441    | NA                                |
| Transfers to Energy Recovery                           | NA             | 9,301,907      | 9,342,647      | 7,046,203      | NA                                |
| Transfers to Treatment                                 | 16,894,091     | 7,156,203      | 6,379,829      | 5,617,617      | -66.7                             |
| Transfers to POTWs                                     | 5,297,962      | 2,523,844      | 2,713,929      | 2,750,887      | -48.1                             |
| Other Off-site Transfers                               | 1,314,257      | 13,837         | 10,758         | 586,488        | -55.4                             |
| Total Transfers Off-site for Further Waste Management  | NA             | 365,509,732    | 388,087,511    | 351,786,636    | NA                                |

**Note:** Does not include delisted chemicals, chemicals added in 1990, 1991, 1994, and 1995, and aluminum oxide, ammonia, hydrochloric acid, and sulfuric acid. **On-site Releases** from Section 5 of Form R and **Off-site Releases** from Section 6 (transfers off-site to disposal) of Form R. **Other On-site Waste Management** from Section 8 of Form R. **Transfers Off-site for Further Waste Management** from Section 6 (excluding transfers off-site to disposal) of Form R. Breakdown of Underground Injection and On-site Land Releases not required before 1996. For 1994-1996, Other Off-site Transfers are transfers reported without a valid waste management code. For 1988, Other Off-site Transfers are transfers reported without a valid waste management code or codes not required to be reported in 1988. **NA:** not required to be reported in that year.

90.3% in that period; employment, declining in the late 1980s, has also grown. TRI facilities report absolute amounts of waste managed and of environmental releases, not adjusted for changes in production levels. Even with rapid growth in production in this sector, however, all categories of

releases have been decreasing. One factor is the decrease in ozone-depleting chemicals, as the United States moved to ban their production in accordance with the Montreal Protocol. Production of 1,1,1-trichloroethane, for example, was banned effective January 1, 1996. As described below, one



facility with large decreases in releases since 1988 stopped using this chemical in 1992. Other facilities with large decreases also made process and equipment changes to eliminate or reduce use of TRI chemicals.

### 1988-1996 Data for Four-Digit Industries in Electrical Equipment

Tables 9-14 through 9-16, summarize on- and off-site releases, other on-site waste management, and transfers off-site for further waste management for 1988 and 1994-1996 for industries at the four-digit SIC code level within SIC code 36.

#### **On- and Off-site Releases**

The largest reduction in on- and off-site releases for 1988-1996 was reported in the miscellaneous electronic components industry (SIC code 3679). This was a decrease of 31.8 million pounds or 97.3%. Air emissions in this industry totaled 31.3 million pounds in 1988 and 517,000 pounds in 1996; at the same time, off-site releases (transfers to disposal) decreased from 1.4 million pounds to 332,000 pounds. The second largest reduction occurred in forms reporting multiple codes in SIC code 36. This was a reduction of 12.3 million pounds, or 85.5%. Most of the change for multiple codes occurred in air emissions (from 12.3 million pounds to 1.7 million pounds), followed by off-site transfers (1.7 million pounds to 408,000 pounds).

The miscellaneous electronic components industry (SIC code 3679) reported reductions in releases of 12.0 million pounds of methyl ethyl ketone, 5.3 million pounds of toluene, and 3.8 million pounds of dichloromethane. In this same industry, reductions of two ozone-depleting chemicals were 3.5 million pounds of Freon 113 and 2.5 million pounds of 1,1,1-trichloroethane. The only larger reported decrease of an ozone-depleting chemical was that of the forms reporting multiple SIC codes in the electrical equipment sector: 3.2 million pounds of 1,1,1-trichloroethane.

Although the sector overall showed large decreases, three industries recorded increases from 1988 to 1996. The largest was reported in manufacturing of printed circuit boards (SIC code 3672), 2.5 million pounds or 47.5%. Smaller increases were reported in manufacture of primary batteries, dry and wet (484,000 pounds, or 23.5%; SIC code 3692) and magnetic and optical recording media (214,000 pounds, or 17.9%; SIC code 3695). All other industries had net decreases.

Table 9-14 supplies on- and off-site release data for all four-digit SIC codes in the electrical equipment sector.

#### **Other On-site Waste Management**

Three electrical equipment industries reported decreases of more than 1 million pounds in other on-site waste management from 1994 to 1996. (These data were not collected in 1988.) They were electronic capacitors (SIC code 3675), with a 2.6-million-pound reduction, or 38.3%; residential lighting fixtures (SIC code 3645), with 1.4 million pounds, or 49.6%; and miscellaneous electronic components (SIC code 3679), with 1.0 million pounds, or 20.7%. These were decreases in on-site recycling and/or on-site treatment.

By far the largest increase was reported in manufacturing of storage batteries (SIC code 3691). This was an increase of 38.1 million pounds or 58.0%. This increase occurred in on-site recycling. The next largest increase was 5.1 million pounds for manufacture of primary batteries, dry and wet (SIC code 3692), an increase of 107.3%, which reflected increases in on-site recycling and on-site treatment.

On-site waste management data for industries in SIC code 36 appear in Table 9-15.

#### **Transfers Off-site for Further Waste Management**

Table 9-16 presents data on transfers off-site for further waste management, for the 1988-1996 period, for four-digit SIC codes in SIC code 36.



Table 9-14. TRI On-site and Off-site Releases by 4-digit SIC Code, 1988 and 1994-1996: Electrical Equipment, SIC Code 36

| SIC Code | Industry                              | Year | On-site Releases              |                                    |                                 |                            | Off-site Releases                |  | Total On- and Off-site Releases<br>Pounds |
|----------|---------------------------------------|------|-------------------------------|------------------------------------|---------------------------------|----------------------------|----------------------------------|--|---|
|          |                                       |      | Total Air Emissions<br>Pounds | Surface Water Discharges<br>Pounds | Underground Injection<br>Pounds | Releases to Land<br>Pounds | Total On-site Releases<br>Pounds | Transfers Off-site to Disposal<br>Pounds |   |
| 3612     | Transformers, Except Electronic       | 96   | 1,032,444                     | 19                                 | 0                               | 9,457                      | 1,041,920                        | 246,650                                  | 1,288,570                                 |
|          |                                       | 95   | 1,092,601                     | 31                                 | 0                               | 6,005                      | 1,098,637                        | 118,098                                  | 1,216,735                                 |
|          |                                       | 94   | 974,330                       | 226                                | 0                               | 6,071                      | 980,627                          | 294,244                                  | 1,274,871                                 |
|          |                                       | 88   | 2,540,195                     | 3                                  | 0                               | 250                        | 2,540,448                        | 469,894                                  | 3,010,342                                 |
| 3613     | Switchgear & Switchboard Apparatus    | 96   | 116,583                       | 4,895                              | 0                               | 506                        | 121,984                          | 40,840                                   | 162,824                                   |
|          |                                       | 95   | 165,447                       | 2,848                              | 0                               | 10                         | 168,305                          | 38,215                                   | 206,520                                   |
|          |                                       | 94   | 268,662                       | 3,696                              | 0                               | 1,255                      | 273,613                          | 13,948                                   | 287,561                                   |
|          |                                       | 88   | 1,103,264                     | 10,076                             | 0                               | 0                          | 1,113,340                        | 297,104                                  | 1,410,444                                 |
| 3621     | Motors & Generators                   | 96   | 2,408,579                     | 113                                | 5                               | 3,462                      | 2,412,159                        | 98,778                                   | 2,510,937                                 |
|          |                                       | 95   | 2,580,307                     | 143                                | 0                               | 49,835                     | 2,630,285                        | 112,559                                  | 2,742,844                                 |
|          |                                       | 94   | 3,154,781                     | 139                                | 0                               | 2,169                      | 3,157,089                        | 77,208                                   | 3,234,297                                 |
|          |                                       | 88   | 5,900,349                     | 1,020                              | 0                               | 1,563                      | 5,902,932                        | 567,069                                  | 6,470,001                                 |
| 3624     | Carbon & Graphite Products            | 96   | 328,576                       | 258                                | 0                               | 5                          | 328,839                          | 11,225                                   | 340,064                                   |
|          |                                       | 95   | 215,309                       | 256                                | 0                               | 715                        | 216,280                          | 6,807                                    | 223,087                                   |
|          |                                       | 94   | 90,182                        | 256                                | 0                               | 21,208                     | 111,646                          | 29,928                                   | 141,574                                   |
|          |                                       | 88   | 603,714                       | 1,038                              | 0                               | 750                        | 605,502                          | 134,344                                  | 739,846                                   |
| 3625     | Relays & Industrial Controls          | 96   | 50,368                        | 10                                 | 0                               | 0                          | 50,378                           | 4,588                                    | 54,966                                    |
|          |                                       | 95   | 53,328                        | 20                                 | 0                               | 0                          | 53,348                           | 2,775                                    | 56,123                                    |
|          |                                       | 94   | 90,177                        | 270                                | 0                               | 0                          | 90,447                           | 3,169                                    | 93,616                                    |
|          |                                       | 88   | 619,180                       | 510                                | 0                               | 684                        | 620,374                          | 47,932                                   | 668,306                                   |
| 3629     | Electrical Industrial Apparatus, nec* | 96   | 93,486                        | 421                                | 0                               | 10                         | 93,917                           | 62,649                                   | 156,566                                   |
|          |                                       | 95   | 47,947                        | 194                                | 0                               | 0                          | 48,141                           | 61,645                                   | 109,786                                   |
|          |                                       | 94   | 109,079                       | 297                                | 0                               | 0                          | 109,376                          | 17,397                                   | 126,773                                   |
|          |                                       | 88   | 642,290                       | 314                                | 0                               | 0                          | 642,604                          | 208,795                                  | 851,399                                   |
| 3631     | Household Cooking Equipment           | 96   | 80,830                        | 268                                | 0                               | 0                          | 81,098                           | 69,869                                   | 150,967                                   |
|          |                                       | 95   | 228,518                       | 254                                | 0                               | 0                          | 228,772                          | 47,369                                   | 276,141                                   |
|          |                                       | 94   | 1,017,589                     | 5                                  | 0                               | 0                          | 1,017,594                        | 80,081                                   | 1,097,675                                 |
|          |                                       | 88   | 1,062,677                     | 500                                | 0                               | 0                          | 1,063,177                        | 97,831                                   | 1,161,008                                 |
| 3632     | Household Refrigerators & Freezers    | 96   | 1,084,455                     | 0                                  | 0                               | 0                          | 1,084,455                        | 4,900                                    | 1,089,355                                 |
|          |                                       | 95   | 1,989,246                     | 0                                  | 0                               | 0                          | 1,989,246                        | 7,140                                    | 1,996,386                                 |
|          |                                       | 94   | 2,136,246                     | 0                                  | 0                               | 0                          | 2,136,246                        | 5,273                                    | 2,141,519                                 |
|          |                                       | 88   | 5,044,610                     | 790                                | 0                               | 500                        | 5,045,900                        | 37,518                                   | 5,083,418                                 |
| 3633     | Household Laundry Equipment           | 96   | 1,626,116                     | 411                                | 0                               | 98,688                     | 1,725,215                        | 161,947                                  | 1,887,162                                 |
|          |                                       | 95   | 2,011,979                     | 505                                | 0                               | 85,321                     | 2,097,805                        | 115,690                                  | 2,213,495                                 |
|          |                                       | 94   | 1,941,740                     | 198                                | 0                               | 0                          | 1,941,938                        | 121,759                                  | 2,063,697                                 |
|          |                                       | 88   | 2,375,306                     | 1,236                              | 0                               | 948                        | 2,377,490                        | 990,450                                  | 3,367,940                                 |
| 3634     | Electric Housewares & Fans            | 96   | 555,621                       | 110                                | 0                               | 760                        | 556,491                          | 1,250                                    | 557,741                                   |
|          |                                       | 95   | 568,829                       | 60                                 | 0                               | 10                         | 568,899                          | 6,735                                    | 575,634                                   |
|          |                                       | 94   | 542,669                       | 120                                | 0                               | 0                          | 542,789                          | 11,888                                   | 554,677                                   |
|          |                                       | 88   | 945,962                       | 167                                | 0                               | 0                          | 946,129                          | 219,916                                  | 1,166,045                                 |
| 3635     | Household Vacuum Cleaners             | 96   | 17,255                        | 0                                  | 0                               | 0                          | 17,255                           | 500                                      | 17,755                                    |
|          |                                       | 95   | 31,200                        | 0                                  | 0                               | 0                          | 31,200                           | 750                                      | 31,950                                    |
|          |                                       | 94   | 70,719                        | 0                                  | 0                               | 0                          | 70,719                           | 1,250                                    | 71,969                                    |
|          |                                       | 88   | 122,350                       | 0                                  | 0                               | 0                          | 122,350                          | 0  | 122,350                                   |
| 3639     | Household Appliances, nec*            | 96   | 604,044                       | 259                                | 0                               | 0                          | 604,303                          | 205,107                                  | 809,410                                   |
|          |                                       | 95   | 529,684                       | 5                                  | 0                               | 0                          | 529,689                          | 59,295                                   | 588,984                                   |
|          |                                       | 94   | 827,029                       | 5                                  | 0                               | 0                          | 827,034                          | 49,500                                   | 876,534                                   |
|          |                                       | 88   | 1,420,752                     | 0                                  | 0                               | 0                          | 1,420,752                        | 98,900                                   | 1,519,652                                 |

Note: On-site Releases from Section 5 of Form R and Off-site Releases from Section 6 (transfers off-site to disposal) of Form R. Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the "multiple" category.

\*nec: not elsewhere classified.



Chapter 9 – TRI Data for Electrical Equipment

Table 9-14 . TRI On-site and Off-site Releases by 4-digit SIC Code, 1988 and 1994-1996: Electrical Equipment, SIC Code 36, Continued

| SIC Code | Industry                            | Year | On-site Releases           |                                 |                              |                         | Total On-site Releases Pounds | Off-site Releases                     | Total On- and Off-site Releases Pounds |
|----------|-------------------------------------|------|----------------------------|---------------------------------|------------------------------|-------------------------|-------------------------------|---------------------------------------|--|
|          |                                     |      | Total Air Emissions Pounds | Surface Water Discharges Pounds | Underground Injection Pounds | Releases to Land Pounds |                               | Transfers Off-site to Disposal Pounds |  |
| 3641     | Electric Lamps                      | 96   | 2,362,734                  | 2                               | 0                            | 0                       | 2,362,736                     | 607,775                               | 2,970,511                              |
|          |                                     | 95   | 2,768,629                  | 1                               | 0                            | 0                       | 2,768,630                     | 712,037                               | 3,480,667                              |
|          |                                     | 94   | 2,607,271                  | 4                               | 0                            | 0                       | 2,607,275                     | 542,353                               | 3,149,628                              |
|          |                                     | 88   | 2,586,244                  | 252                             | 0                            | 0                       | 2,586,496                     | 987,998                               | 3,574,494                              |
| 3643     | Current-carrying Wiring Devices     | 96   | 143,164                    | 505                             | 0                            | 361                     | 144,030                       | 233,140                               | 377,170                                |
|          |                                     | 95   | 336,882                    | 250                             | 0                            | 1,420                   | 338,552                       | 317,699                               | 656,251                                |
|          |                                     | 94   | 374,038                    | 5                               | 0                            | 520                     | 374,563                       | 220,595                               | 595,158                                |
|          |                                     | 88   | 1,236,848                  | 4                               | 0                            | 57,948                  | 1,294,800                     | 221,824                               | 1,516,624                              |
| 3644     | Noncurrent-carrying Wiring Devices  | 96   | 298,675                    | 18                              | 0                            | 600                     | 299,293                       | 7,100                                 | 306,393                                |
|          |                                     | 95   | 369,291                    | 16                              | 0                            | 1,200                   | 370,507                       | 69,894                                | 440,401                                |
|          |                                     | 94   | 447,411                    | 5                               | 0                            | 2,000                   | 449,416                       | 163,250                               | 612,666                                |
|          |                                     | 88   | 1,822,413                  | 1,500                           | 0                            | 340                     | 1,824,253                     | 209,363                               | 2,033,616                              |
| 3645     | Residential Lighting Fixtures       | 96   | 153,711                    | 0                               | 0                            | 0                       | 153,711                       | 5,900                                 | 159,611                                |
|          |                                     | 95   | 193,305                    | 0                               | 0                            | 0                       | 193,305                       | 9,900                                 | 203,205                                |
|          |                                     | 94   | 299,153                    | 0                               | 0                            | 0                       | 299,153                       | 11,150                                | 310,303                                |
|          |                                     | 88   | 526,165                    | 69                              | 0                            | 0                       | 526,234                       | 12,787                                | 539,021                                |
| 3646     | Commercial Lighting Fixtures        | 96   | 227,393                    | 0                               | 0                            | 0                       | 227,393                       | 250                                   | 227,643                                |
|          |                                     | 95   | 326,421                    | 0                               | 0                            | 0                       | 326,421                       | 500                                   | 326,921                                |
|          |                                     | 94   | 439,603                    | 0                               | 0                            | 0                       | 439,603                       | 0                                     | 439,603                                |
|          |                                     | 88   | 605,259                    | 0                               | 0                            | 0                       | 605,259                       | 46,062                                | 651,321                                |
| 3647     | Vehicular Lighting Equipment        | 96   | 65,519                     | 0                               | 0                            | 0                       | 65,519                        | 16,754                                | 82,273                                 |
|          |                                     | 95   | 197,214                    | 15                              | 0                            | 0                       | 197,229                       | 18,724                                | 215,953                                |
|          |                                     | 94   | 413,238                    | 15                              | 0                            | 0                       | 413,253                       | 18,576                                | 431,829                                |
|          |                                     | 88   | 511,911                    | 22                              | 0                            | 0                       | 511,933                       | 108,087                               | 620,020                                |
| 3648     | Lighting Equipment, nec*            | 96   | 31,858                     | 2,030                           | 0                            | 0                       | 33,888                        | 59,300                                | 93,188                                 |
|          |                                     | 95   | 26,890                     | 500                             | 0                            | 0                       | 27,390                        | 52,867                                | 80,257                                 |
|          |                                     | 94   | 56,248                     | 505                             | 0                            | 5                       | 56,758                        | 64,734                                | 121,492                                |
|          |                                     | 88   | 213,393                    | 0                               | 0                            | 0                       | 213,393                       | 250                                   | 213,643                                |
| 3651     | Household Audio & Video Equipment   | 96   | 320,881                    | 250                             | 0                            | 0                       | 321,131                       | 2,604                                 | 323,735                                |
|          |                                     | 95   | 276,023                    | 250                             | 0                            | 0                       | 276,273                       | 3,574                                 | 279,847                                |
|          |                                     | 94   | 681,368                    | 250                             | 0                            | 0                       | 681,618                       | 2,866                                 | 684,484                                |
|          |                                     | 88   | 1,127,888                  | 500                             | 0                            | 0                       | 1,128,388                     | 179,630                               | 1,308,018                              |
| 3652     | Prerecorded Records & Tapes         | 96   | 5,479                      | 0                               | 0                            | 10                      | 5,489                         | 5,081                                 | 10,570                                 |
|          |                                     | 95   | 11,837                     | 0                               | 0                            | 0                       | 11,837                        | 11                                    | 11,848                                 |
|          |                                     | 94   | 94,489                     | 0                               | 0                            | 0                       | 94,489                        | 11                                    | 94,500                                 |
|          |                                     | 88   | 105,446                    | 0                               | 0                            | 0                       | 105,446                       | 6,983                                 | 112,429                                |
| 3661     | Telephone & Telegraph Apparatus     | 96   | 122,372                    | 5                               | 0                            | 0                       | 122,377                       | 4,006                                 | 126,383                                |
|          |                                     | 95   | 125,422                    | 1                               | 0                            | 0                       | 125,423                       | 616                                   | 126,039                                |
|          |                                     | 94   | 158,195                    | 1                               | 0                            | 0                       | 158,196                       | 463                                   | 158,659                                |
|          |                                     | 88   | 5,179,394                  | 4,186                           | 0                            | 0                       | 5,183,580                     | 160,892                               | 5,344,472                              |
| 3663     | Radio & TV Communications Equipment | 96   | 10,580                     | 0                               | 0                            | 255                     | 10,835                        | 5                                     | 10,840                                 |
|          |                                     | 95   | 29,465                     | 0                               | 0                            | 5                       | 29,470                        | 0                                     | 29,470                                 |
|          |                                     | 94   | 82,757                     | 0                               | 0                            | 5                       | 82,762                        | 3,900                                 | 86,662                                 |
|          |                                     | 88   | 687,045                    | 1                               | 0                            | 250                     | 687,296                       | 19,631                                | 706,927                                |
| 3669     | Communications Equipment, nec*      | 96   | 28,676                     | 0                               | 0                            | 0                       | 28,676                        | 7,248                                 | 35,924                                 |
|          |                                     | 95   | 88,642                     | 0                               | 0                            | 0                       | 88,642                        | 3,832                                 | 92,474                                 |
|          |                                     | 94   | 172,329                    | 2                               | 0                            | 0                       | 172,331                       | 5,047                                 | 177,378                                |
|          |                                     | 88   | 1,055,561                  | 0                               | 0                            | 0                       | 1,055,561                     | 48,931                                | 1,104,492                              |

Note: On-site Releases from Section 5 of Form R and Off-site Releases from Section 6 (transfers off-site to disposal) of Form R. Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the "multiple" category.

\*nec: not elsewhere classified.



**Table 9-14. TRI On-site and Off-site Releases by 4-digit SIC Code, 1988 and 1994-1996: Electrical Equipment, SIC Code 36, Continued**

| SIC Code | Industry                           | Year | On-site Releases              |                                    |                                 |                            | Total On-site Releases<br>Pounds | Off-site Releases                        | Total On- and Off-site Releases<br>Pounds |
|----------|------------------------------------|------|-------------------------------|------------------------------------|---------------------------------|----------------------------|----------------------------------|--|---|
|          |                                    |      | Total Air Emissions<br>Pounds | Surface Water Discharges<br>Pounds | Underground Injection<br>Pounds | Releases to Land<br>Pounds |                                  | Transfers Off-site to Disposal<br>Pounds |   |
| 3671     | Electron Tubes                     | 96   | 342,577                       | 4,636                              | 0                               | 5                          | 347,218                          | 331,828                                  | 679,046                                   |
|          |                                    | 95   | 887,629                       | 3,529                              | 0                               | 0                          | 891,158                          | 870,176                                  | 1,761,334                                 |
|          |                                    | 94   | 1,670,238                     | 6,418                              | 0                               | 0                          | 1,676,656                        | 1,376,579                                | 3,053,235                                 |
|          |                                    | 88   | 1,235,312                     | 4,850                              | 0                               | 0                          | 1,240,162                        | 619,788                                  | 1,859,950                                 |
| 3672     | Printed Circuit Boards             | 96   | 498,264                       | 14,909                             | 10                              | 4,487                      | 517,670                          | 7,133,555                                | 7,651,225                                 |
|          |                                    | 95   | 454,263                       | 9,678                              | 0                               | 15,571                     | 479,512                          | 636,779                                  | 1,116,291                                 |
|          |                                    | 94   | 637,708                       | 8,528                              | 0                               | 48,251                     | 694,487                          | 503,891                                  | 1,198,378                                 |
|          |                                    | 88   | 3,033,962                     | 1,475                              | 0                               | 0                          | 3,035,437                        | 2,151,232                                | 5,186,669                                 |
| 3674     | Semiconductors & Related Devices   | 96   | 809,320                       | 7,708                              | 12                              | 28,706                     | 845,746                          | 613,912                                  | 1,459,658                                 |
|          |                                    | 95   | 829,321                       | 9,707                              | 5                               | 12,010                     | 851,043                          | 471,308                                  | 1,322,351                                 |
|          |                                    | 94   | 1,119,864                     | 14,896                             | 0                               | 15,250                     | 1,150,010                        | 713,761                                  | 1,863,771                                 |
|          |                                    | 88   | 6,097,631                     | 30,025                             | 36,749                          | 500                        | 6,164,905                        | 1,099,248                                | 7,264,153                                 |
| 3675     | Electronic Capacitors              | 96   | 873,970                       | 1,270                              | 0                               | 37,448                     | 912,688                          | 638,487                                  | 1,551,175                                 |
|          |                                    | 95   | 1,484,227                     | 1,682                              | 0                               | 2,266                      | 1,488,175                        | 653,543                                  | 2,141,718                                 |
|          |                                    | 94   | 1,765,353                     | 2,080                              | 0                               | 10,820                     | 1,778,253                        | 578,618                                  | 2,356,871                                 |
|          |                                    | 88   | 4,013,553                     | 165,166                            | 0                               | 66,590                     | 4,245,309                        | 1,077,784                                | 5,323,093                                 |
| 3676     | Electronic Resistors               | 96   | 41,453                        | 0                                  | 0                               | 0                          | 41,453                           | 38,479                                   | 79,932                                    |
|          |                                    | 95   | 159,982                       | 0                                  | 0                               | 0                          | 159,982                          | 18,499                                   | 178,481                                   |
|          |                                    | 94   | 264,378                       | 0                                  | 0                               | 0                          | 264,378                          | 8,544                                    | 272,922                                   |
|          |                                    | 88   | 1,452,771                     | 0                                  | 0                               | 250                        | 1,453,021                        | 16,388                                   | 1,469,409                                 |
| 3677     | Electronic Coils & Transformers    | 96   | 120,729                       | 5                                  | 0                               | 0                          | 120,734                          | 1,750                                    | 122,484                                   |
|          |                                    | 95   | 138,843                       | 1                                  | 0                               | 250                        | 139,094                          | 1,500                                    | 140,594                                   |
|          |                                    | 94   | 97,088                        | 1                                  | 0                               | 251                        | 97,340                           | 10,575                                   | 107,915                                   |
|          |                                    | 88   | 267,968                       | 0                                  | 0                               | 0                          | 267,968                          | 6,320                                    | 274,288                                   |
| 3678     | Electronic Connectors              | 96   | 153,904                       | 75                                 | 0                               | 2,025                      | 156,004                          | 26,446                                   | 182,450                                   |
|          |                                    | 95   | 278,037                       | 88                                 | 0                               | 4,640                      | 282,765                          | 34,150                                   | 316,915                                   |
|          |                                    | 94   | 337,142                       | 338                                | 0                               | 8,650                      | 346,130                          | 42,471                                   | 388,601                                   |
|          |                                    | 88   | 2,179,847                     | 850                                | 0                               | 250                        | 2,180,947                        | 110,048                                  | 2,290,995                                 |
| 3679     | Electronic Components, nec*        | 96   | 516,758                       | 275                                | 0                               | 18,230                     | 535,263                          | 332,226                                  | 867,489                                   |
|          |                                    | 95   | 815,653                       | 108                                | 0                               | 115                        | 815,876                          | 248,913                                  | 1,064,789                                 |
|          |                                    | 94   | 993,152                       | 227                                | 0                               | 2,306                      | 995,685                          | 291,483                                  | 1,287,168                                 |
|          |                                    | 88   | 31,276,241                    | 16,139                             | 0                               | 11,020                     | 31,303,400                       | 1,372,209                                | 32,675,609                                |
| 3691     | Storage Batteries                  | 96   | 143,291                       | 3,191                              | 0                               | 67,486                     | 213,968                          | 577,262                                  | 791,230                                   |
|          |                                    | 95   | 129,859                       | 2,518                              | 0                               | 126,374                    | 258,751                          | 823,725                                  | 1,082,476                                 |
|          |                                    | 94   | 129,856                       | 3,781                              | 0                               | 260                        | 133,897                          | 250,450                                  | 384,347                                   |
|          |                                    | 88   | 684,391                       | 5,713                              | 0                               | 19,590                     | 709,694                          | 1,059,371                                | 1,769,065                                 |
| 3692     | Primary Batteries, Dry & Wet       | 96   | 333,129                       | 224                                | 0                               | 0                          | 333,353                          | 2,210,035                                | 2,543,388                                 |
|          |                                    | 95   | 401,190                       | 175                                | 0                               | 45                         | 401,410                          | 1,467,033                                | 1,868,443                                 |
|          |                                    | 94   | 384,430                       | 185                                | 0                               | 35                         | 384,650                          | 1,467,952                                | 1,852,602                                 |
|          |                                    | 88   | 1,122,297                     | 87                                 | 0                               | 0                          | 1,122,384                        | 936,965                                  | 2,059,349                                 |
| 3694     | Engine Electrical Equipment        | 96   | 175,118                       | 0                                  | 0                               | 68,693                     | 243,811                          | 105,717                                  | 349,528                                   |
|          |                                    | 95   | 246,065                       | 0                                  | 0                               | 167                        | 246,232                          | 90,341                                   | 336,573                                   |
|          |                                    | 94   | 248,699                       | 0                                  | 0                               | 158                        | 248,857                          | 107,292                                  | 356,149                                   |
|          |                                    | 88   | 2,159,811                     | 1                                  | 0                               | 7,737                      | 2,167,549                        | 570,180                                  | 2,737,729                                 |
| 3695     | Magnetic & Optical Recording Media | 96   | 1,236,187                     | 1,000                              | 0                               | 26,818                     | 1,264,005                        | 139,443                                  | 1,403,448                                 |
|          |                                    | 95   | 1,417,216                     | 3,905                              | 0                               | 24,649                     | 1,445,770                        | 202,482                                  | 1,648,252                                 |
|          |                                    | 94   | 1,675,427                     | 255                                | 0                               | 33,100                     | 1,708,782                        | 192,902                                  | 1,901,684                                 |
|          |                                    | 88   | 1,114,752                     | 750                                | 0                               | 0                          | 1,115,502                        | 74,435                                   | 1,189,937                                 |

**Note:** On-site Releases from Section 5 of Form R and Off-site Releases from Section 6 (transfers off-site to disposal) of Form R. Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the "multiple" category.

\*nec: not elsewhere classified.



Table 9-14. TRI On-site and Off-site Releases by 4-digit SIC Code, 1988 and 1994-1996: Electrical Equipment, SIC Code 36, Continued

| SIC Code                       | Industry                              | Year | On-site Releases           |                                 |                              |                         | Off-site Releases             |                                       | Total On- and Off-site Releases Pounds |
|--------------------------------|---------------------------------------|------|----------------------------|---------------------------------|------------------------------|-------------------------|-------------------------------|---------------------------------------|--|
|                                |                                       |      | Total Air Emissions Pounds | Surface Water Discharges Pounds | Underground Injection Pounds | Releases to Land Pounds | Total On-site Releases Pounds | Transfers Off-site to Disposal Pounds |  |
| 3699                           | Electrical Equipment & Supplies, nec* | 96   | 138,250                    | 582                             | 0                            | 2,010                   | 140,842                       | 51,675                                | 192,517                                |
|                                |                                       | 95   | 171,487                    | 550                             | 0                            | 3,010                   | 175,047                       | 58,327                                | 233,374                                |
|                                |                                       | 94   | 292,497                    | 795                             | 0                            | 1,260                   | 294,552                       | 64,200                                | 358,752                                |
|                                |                                       | 88   | 1,732,072                  | 13,595                          | 0                            | 250                     | 1,745,917                     | 245,564                               | 1,991,481                              |
| Multiple within SIC Code 36    |                                       | 96   | 1,666,709                  | 5,042                           | 0                            | 510                     | 1,672,261                     | 408,014                               | 2,080,275                              |
|                                |                                       | 95   | 1,464,316                  | 10,076                          | 0                            | 10                      | 1,474,402                     | 473,668                               | 1,948,070                              |
|                                |                                       | 94   | 1,940,660                  | 11,167                          | 0                            | 265                     | 1,952,092                     | 376,956                               | 2,329,048                              |
|                                |                                       | 88   | 12,276,889                 | 8,411                           | 0                            | 418,058                 | 12,703,358                    | 1,677,000                             | 14,380,358                             |
| Invalid SIC Code within SIC 36 |                                       | 96   | 47,884                     | 0                               | 0                            | 0                       | 47,884                        | 750                                   | 48,634                                 |
|                                |                                       | 95   | 114,104                    | 17                              | 0                            | 0                       | 114,121                       | 2,329                                 | 116,450                                |
|                                |                                       | 94   | 124,200                    | 274                             | 0                            | 70                      | 124,544                       | 8,642                                 | 133,186                                |
|                                |                                       | 88   | 7,841,957                  | 40,712                          | 250                          | 250                     | 7,883,169                     | 1,067,954                             | 8,951,123                              |
| Total for SIC Code 36          |                                       | 96   | 18,866,942                 | 48,491                          | 27                           | 370,532                 | 19,285,992                    | 14,467,045                            | 33,753,037                             |
|                                |                                       | 95   | 23,256,608                 | 47,383                          | 5                            | 333,628                 | 23,637,624                    | 7,819,505                             | 31,457,129                             |
|                                |                                       | 94   | 28,729,995                 | 54,944                          | 0                            | 153,909                 | 28,938,848                    | 7,732,906                             | 36,671,754                             |
|                                |                                       | 88   | 114,527,670                | 309,962                         | 36,999                       | 587,728                 | 115,462,359                   | 17,256,677                            | 132,719,036                            |

Note: On-site Releases from Section 5 of Form R and Off-site Releases from Section 6 (transfers off-site to disposal) of Form R. Forms with more than one-4-digit SIC code within SIC code 36 are assigned to the "multiple" category.

\*nec: not elsewhere classified.

(Some transfer types were not collected prior to 1991.) The largest decrease from 1994-1996 appeared in manufacture of storage batteries (SIC code 3691), a 13.9-million-pound reduction (5.7%). This was primarily a reduction in off-site recycling. The telephone and telegraph apparatus industry (SIC code 3661) had a decrease of 3.3 million pounds or 91.6%. On-site recycling also accounted for the largest portion of this reduction. Three other industries had decreases of more than 1 million pounds: miscellaneous electronic components (SIC code 3679), 1.8 million pounds or 23.3%; engine electrical equipment (SIC code 3694), 1.7 million pounds or 54.4%; semiconductors (SIC code 3674), 1.4 million pounds or 20.8%

The largest increase in transfers off-site for further waste management was reported in the printed circuit board industry (SIC code 3672), and this was 2.8 million pounds, or 12.6%. An increase in this industry in off-site recycling more than offset smaller reductions other off-site transfer types. Five industries reported increases of 1.5 million to 2.0

million pounds: electron tubes (SIC code 3671), 2.0 million pounds; miscellaneous communications equipment (SIC code 3669), 1.8 million pounds; miscellaneous lighting equipment (SIC code 3648), 1.8 million pounds; the multiple-SIC-code category, 1.8 million pounds; and electronic connectors (SIC code 3678), 1.5 million pounds.

***Facilities with Large Increases and Decreases in Releases, 1988-1996***

The facility with the largest increases in on- and off-site releases for 1988 to 1996, Duracell USA in Lancaster, South Carolina (SIC code 3692), reported an increase of zinc compounds and manganese compounds totaling 587,000 pounds. The Duracell plant manufactures AA and AAA alkaline batteries. Zinc and manganese are the primary electrolytic components of alkaline batteries. Duracell attributes the increases to significant increases in production. The net increase for the facility between 1991 and 1996 was 559,000 pounds.



**Table 9-15. TRI Other On-site Waste Management by 4-digit SIC Code, 1988 and 1994-1996: Electrical Equipment, SIC Code 36**

| SIC Code | Industry                              | Year | Recycled On-site Pounds | Energy Recovery On-site Pounds | Treated On-site Pounds | Total Other On-site Waste Management Pounds |
|----------|---------------------------------------|------|-------------------------|--------------------------------|------------------------|---|
| 3612     | Transformers, Except Electronic       | 96   | 63,568                  | 0                              | 276,040                | 339,608                                     |
|          |                                       | 95   | 63,518                  | 0                              | 138,421                | 201,939                                     |
|          |                                       | 94   | 40,810                  | 0                              | 195,563                | 236,373                                     |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3613     | Switchgear & Switchboard Apparatus    | 96   | 0                       | 0                              | 259,795                | 259,795                                     |
|          |                                       | 95   | 0                       | 0                              | 406,774                | 406,774                                     |
|          |                                       | 94   | 11,900                  | 0                              | 397,486                | 409,386                                     |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3621     | Motors & Generators                   | 96   | 168,540                 | 0                              | 467,659                | 636,199                                     |
|          |                                       | 95   | 176,079                 | 0                              | 257,677                | 433,756                                     |
|          |                                       | 94   | 191,108                 | 0                              | 327,835                | 518,943                                     |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3624     | Carbon & Graphite Products            | 96   | 7,550                   | 0                              | 1,962,834              | 1,970,384                                   |
|          |                                       | 95   | 6,700                   | 0                              | 1,009,100              | 1,015,800                                   |
|          |                                       | 94   | 5,600                   | 0                              | 1,438,000              | 1,443,600                                   |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3625     | Relays & Industrial Controls          | 96   | 0                       | 0                              | 24,624                 | 24,624                                      |
|          |                                       | 95   | 1,000                   | 0                              | 13,075                 | 14,075                                      |
|          |                                       | 94   | 1,500                   | 0                              | 45,745                 | 47,245                                      |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3629     | Electrical Industrial Apparatus, nec* | 96   | 1,816                   | 666                            | 0                      | 2,482                                       |
|          |                                       | 95   | 0                       | 0                              | 2,492                  | 2,492                                       |
|          |                                       | 94   | 23,530                  | 0                              | 12,180                 | 35,710                                      |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3631     | Household Cooking Equipment           | 96   | 4,040                   | 0                              | 2                      | 4,042                                       |
|          |                                       | 95   | 9,500                   | 0                              | 2                      | 9,502                                       |
|          |                                       | 94   | 7,300                   | 0                              | 0                      | 7,300                                       |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3632     | Household Refrigerators & Freezers    | 96   | 16,000                  | 0                              | 122,190                | 138,190                                     |
|          |                                       | 95   | 539,580                 | 0                              | 127,143                | 666,723                                     |
|          |                                       | 94   | 465,000                 | 0                              | 0                      | 465,000                                     |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3633     | Household Laundry Equipment           | 96   | 140,253                 | 0                              | 425,633                | 565,886                                     |
|          |                                       | 95   | 227,108                 | 0                              | 480,821                | 707,929                                     |
|          |                                       | 94   | 230,212                 | 0                              | 448,620                | 678,832                                     |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3634     | Electric Housewares & Fans            | 96   | 0                       | 0                              | 70,000                 | 70,000                                      |
|          |                                       | 95   | 0                       | 0                              | 48,000                 | 48,000                                      |
|          |                                       | 94   | 0                       | 0                              | 102,440                | 102,440                                     |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3635     | Household Vacuum Cleaners             | 96   | 206                     | 0                              | 0                      | 206   |
|          |                                       | 95   | 838                     | 0                              | 0                      | 838   |
|          |                                       | 94   | 5,062                   | 0                              | 0                      | 5,062                                       |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3639     | Household Appliances, nec*            | 96   | 112,750                 | 42,000                         | 105,600                | 260,350                                     |
|          |                                       | 95   | 121,931                 | 0                              | 0                      | 121,931                                     |
|          |                                       | 94   | 119,500                 | 0                              | 1,600                  | 121,100                                     |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |

**Note:** Data from Section 8 of Form R. Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the "multiple" category.

\*nec: not elsewhere classified.



Table 9-15. TRI Other On-site Waste Management by 4-digit SIC Code, 1988 and 1994-1996: Electrical Equipment, SIC Code 36, Continued

| SIC Code | Industry                            | Year | Recycled On-site Pounds | Energy Recovery On-site Pounds | Treated On-site Pounds | Total Other On-site Waste Management Pounds |
|----------|-------------------------------------|------|-------------------------|--------------------------------|------------------------|---|
| 3641     | Electric Lamps                      | 96   | 371,942                 | 0                              | 799,381                | 1,171,323                                   |
|          |                                     | 95   | 104,048                 | 0                              | 490,066                | 594,114                                     |
|          |                                     | 94   | 201,611                 | 0                              | 595,228                | 796,839                                     |
|          |                                     | 88   | NA                      | NA                             | NA                     | NA  |
| 3643     | Current-carrying Wiring Devices     | 96   | 2,481,048               | 0                              | 203,841                | 2,684,889                                   |
|          |                                     | 95   | 1,487,977               | 0                              | 60,854                 | 1,548,831                                   |
|          |                                     | 94   | 1,045,082               | 0                              | 228,541                | 1,273,623                                   |
|          |                                     | 88   | NA                      | NA                             | NA                     | NA  |
| 3644     | Noncurrent-carrying Wiring Devices  | 96   | 3,655,373               | 37,895                         | 426,709                | 4,119,977                                   |
|          |                                     | 95   | 3,343,886               | 31,066                         | 392,319                | 3,767,271                                   |
|          |                                     | 94   | 81,573                  | 16,423                         | 330,734                | 428,730                                     |
|          |                                     | 88   | NA                      | NA                             | NA                     | NA  |
| 3645     | Residential Lighting Fixtures       | 96   | 1,472,680               | 0                              | 0                      | 1,472,680                                   |
|          |                                     | 95   | 2,337,476               | 0                              | 0                      | 2,337,476                                   |
|          |                                     | 94   | 2,922,282               | 0                              | 0                      | 2,922,282                                   |
|          |                                     | 88   | NA                      | NA                             | NA                     | NA  |
| 3646     | Commercial Lighting Fixtures        | 96   | 0                       | 0                              | 168,917                | 168,917                                     |
|          |                                     | 95   | 0                       | 0                              | 184,506                | 184,506                                     |
|          |                                     | 94   | 7,958                   | 0                              | 110,437                | 118,395                                     |
|          |                                     | 88   | NA                      | NA                             | NA                     | NA  |
| 3647     | Vehicular Lighting Equipment        | 96   | 0                       | 0                              | 46,000                 | 46,000                                      |
|          |                                     | 95   | 18,197                  | 0                              | 46,000                 | 64,197                                      |
|          |                                     | 94   | 33,737                  | 0                              | 37,485                 | 71,222                                      |
|          |                                     | 88   | NA                      | NA                             | NA                     | NA  |
| 3648     | Lighting Equipment, nec*            | 96   | 0                       | 0                              | 76,000                 | 76,000                                      |
|          |                                     | 95   | 0                       | 0                              | 58,000                 | 58,000                                      |
|          |                                     | 94   | 0                       | 0                              | 0                      | 0   |
|          |                                     | 88   | NA                      | NA                             | NA                     | NA  |
| 3651     | Household Audio & Video Equipment   | 96   | 63,458                  | 0                              | 0                      | 63,458                                      |
|          |                                     | 95   | 125,771                 | 0                              | 36,000                 | 161,771                                     |
|          |                                     | 94   | 93,980                  | 0                              | 70,800                 | 164,780                                     |
|          |                                     | 88   | NA                      | NA                             | NA                     | NA  |
| 3652     | Prerecorded Records & Tapes         | 96   | 0                       | 0                              | 527                    | 527   |
|          |                                     | 95   | 0                       | 0                              | 639                    | 639   |
|          |                                     | 94   | 0                       | 0                              | 10,784                 | 10,784                                      |
|          |                                     | 88   | NA                      | NA                             | NA                     | NA  |
| 3661     | Telephone & Telegraph Apparatus     | 96   | 0                       | 0                              | 0                      | 0   |
|          |                                     | 95   | 495                     | 0                              | 0                      | 495   |
|          |                                     | 94   | 32,234                  | 0                              | 0                      | 32,234                                      |
|          |                                     | 88   | NA                      | NA                             | NA                     | NA  |
| 3663     | Radio & TV Communications Equipment | 96   | 116,171                 | 0                              | 0                      | 116,171                                     |
|          |                                     | 95   | 56,976                  | 0                              | 0                      | 56,976                                      |
|          |                                     | 94   | 71,437                  | 0                              | 0                      | 71,437                                      |
|          |                                     | 88   | NA                      | NA                             | NA                     | NA  |
| 3669     | Communications Equipment, nec*      | 96   | 28,388                  | 0                              | 310                    | 28,698                                      |
|          |                                     | 95   | 40,796                  | 0                              | 260                    | 41,056                                      |
|          |                                     | 94   | 199,478                 | 0                              | 15,007                 | 214,485                                     |
|          |                                     | 88   | NA                      | NA                             | NA                     | NA  |

Note: Data from Section 8 of Form R. Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the "multiple" category.

\*nec: not elsewhere classified.



**Table 9-15. TRI Other On-site Waste Management by 4-digit SIC Code, 1988 and 1994-1996: Electrical Equipment, SIC Code 36, Continued**

| SIC Code | Industry                         | Year | Recycled On-site Pounds | Energy Recovery On-site Pounds | Treated On-site Pounds | Total Other On-site Waste Management Pounds |
|----------|----------------------------------|------|-------------------------|--------------------------------|------------------------|---|
| 3671     | Electron Tubes                   | 96   | 3,264,095               | 0                              | 4,636,398              | 7,900,493                                   |
|          |                                  | 95   | 5,316,048               | 0                              | 3,163,795              | 8,479,843                                   |
|          |                                  | 94   | 2,139,252               | 0                              | 1,864,807              | 4,004,059                                   |
|          |                                  | 88   | NA                      | NA                             | NA                     | NA  |
| 3672     | Printed Circuit Boards           | 96   | 1,889,041               | 614,656                        | 4,018,166              | 6,521,863                                   |
|          |                                  | 95   | 112,494                 | 438,057                        | 3,081,769              | 3,632,320                                   |
|          |                                  | 94   | 953,082                 | 297,084                        | 5,495,759              | 6,745,925                                   |
|          |                                  | 88   | NA                      | NA                             | NA                     | NA  |
| 3674     | Semiconductors & Related Devices | 96   | 448,850                 | 81,600                         | 21,448,053             | 21,978,503                                  |
|          |                                  | 95   | 398,600                 | 598,000                        | 20,207,926             | 21,204,526                                  |
|          |                                  | 94   | 291,563                 | 431,804                        | 16,551,542             | 17,274,909                                  |
|          |                                  | 88   | NA                      | NA                             | NA                     | NA  |
| 3675     | Electronic Capacitors            | 96   | 1,634,437               | 0                              | 2,535,839              | 4,170,276                                   |
|          |                                  | 95   | 1,155,140               | 0                              | 5,717,687              | 6,872,827                                   |
|          |                                  | 94   | 1,260,555               | 0                              | 5,499,504              | 6,760,059                                   |
|          |                                  | 88   | NA                      | NA                             | NA                     | NA  |
| 3676     | Electronic Resistors             | 96   | 43,797                  | 0                              | 32,000                 | 75,797                                      |
|          |                                  | 95   | 160,360                 | 0                              | 0                      | 160,360                                     |
|          |                                  | 94   | 170,840                 | 0                              | 0                      | 170,840                                     |
|          |                                  | 88   | NA                      | NA                             | NA                     | NA  |
| 3677     | Electronic Coils & Transformers  | 96   | 8,624                   | 0                              | 0                      | 8,624                                       |
|          |                                  | 95   | 8,000                   | 0                              | 0                      | 8,000                                       |
|          |                                  | 94   | 3,000                   | 0                              | 0                      | 3,000                                       |
|          |                                  | 88   | NA                      | NA                             | NA                     | NA  |
| 3678     | Electronic Connectors            | 96   | 101,608                 | 0                              | 1,017,609              | 1,119,217                                   |
|          |                                  | 95   | 112,759                 | 0                              | 976,721                | 1,089,480                                   |
|          |                                  | 94   | 103,820                 | 0                              | 872,028                | 975,848                                     |
|          |                                  | 88   | NA                      | NA                             | NA                     | NA  |
| 3679     | Electronic Components, nec*      | 96   | 1,116,486               | 1,249,447                      | 1,633,781              | 3,999,714                                   |
|          |                                  | 95   | 1,370,828               | 1,083,416                      | 1,450,610              | 3,904,854                                   |
|          |                                  | 94   | 1,567,718               | 1,289,703                      | 2,186,473              | 5,043,894                                   |
|          |                                  | 88   | NA                      | NA                             | NA                     | NA  |
| 3691     | Storage Batteries                | 96   | 103,783,022             | 0                              | 165,873                | 103,948,895                                 |
|          |                                  | 95   | 57,163,908              | 0                              | 1,630,740              | 58,794,648                                  |
|          |                                  | 94   | 65,108,048              | 0                              | 700,224                | 65,808,272                                  |
|          |                                  | 88   | NA                      | NA                             | NA                     | NA  |
| 3692     | Primary Batteries, Dry & Wet     | 96   | 9,567,891               | 0                              | 329,452                | 9,897,343                                   |
|          |                                  | 95   | 8,187,830               | 0                              | 80,000                 | 8,267,830                                   |
|          |                                  | 94   | 4,772,958               | 0                              | 810                    | 4,773,768                                   |
|          |                                  | 88   | NA                      | NA                             | NA                     | NA  |
| 3694     | Engine Electrical Equipment      | 96   | 242,400                 | 0                              | 17,829                 | 260,229                                     |
|          |                                  | 95   | 810,544                 | 0                              | 25,464                 | 836,008                                     |
|          |                                  | 94   | 981,882                 | 0                              | 8,725                  | 990,607                                     |
|          |                                  | 88   | NA                      | NA                             | NA                     | NA  |

**Note:** Data from Section 8 of Form R. Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the "multiple" category.

\*nec: not elsewhere classified.



Table 9-15. TRI Other On-site Waste Management by 4-digit SIC Code, 1988 and 1994-1996: Electrical Equipment, SIC Code 36, Continued

| SIC Code | Industry                              | Year | Recycled On-site Pounds | Energy Recovery On-site Pounds | Treated On-site Pounds | Total Other On-site Waste Management Pounds |
|----------|---------------------------------------|------|-------------------------|--------------------------------|------------------------|---|
| 3695     | Magnetic & Optical Recording Media    | 96   | 14,062,691              | 0                              | 7,515,655              | 21,578,346                                  |
|          |                                       | 95   | 12,665,555              | 0                              | 8,298,602              | 20,964,157                                  |
|          |                                       | 94   | 12,285,166              | 0                              | 7,694,313              | 19,979,479                                  |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
| 3699     | Electrical Equipment & Supplies, nec* | 96   | 13,063                  | 0                              | 757,807                | 770,870                                     |
|          |                                       | 95   | 17,675                  | 0                              | 619,664                | 637,339                                     |
|          |                                       | 94   | 70,580                  | 0                              | 577,600                | 648,180                                     |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
|          | Multiple within SIC Code 36           | 96   | 954,565                 | 0                              | 2,130,016              | 3,084,581                                   |
|          |                                       | 95   | 1,829,238               | 41,300                         | 2,197,288              | 4,067,826                                   |
|          |                                       | 94   | 659,965                 | 38,730                         | 1,351,125              | 2,049,820                                   |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
|          | Invalid SIC Code within SIC 36        | 96   | 0                       | 0                              | 7,735                  | 7,735                                       |
|          |                                       | 95   | 0                       | 0                              | 10,762                 | 10,762                                      |
|          |                                       | 94   | 0                       | 0                              | 12,000                 | 12,000                                      |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |
|          | Total for SIC Code 36                 | 96   | 145,834,353             | 2,026,264                      | 51,682,275             | 199,542,892                                 |
|          |                                       | 95   | 97,970,855              | 2,191,839                      | 51,213,177             | 151,375,871                                 |
|          |                                       | 94   | 96,159,323              | 2,073,744                      | 47,183,395             | 145,416,462                                 |
|          |                                       | 88   | NA                      | NA                             | NA                     | NA  |

Note: Data from Section 8 of Form R. Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the “multiple” category.

\*nec: not elsewhere classified.

Increases in releases by SIC code 36 facilities are relatively small, compared to the other industry sectors presented in this *1996 TRI Public Data Release*. The second, third, and fourth facilities for increased releases in the electrical equipment sector reported an average increase of about 446,000 pounds.

3M in Hutchinson, Minnesota (SIC code 3679), ranked first in decreases of releases (14.2 million pounds) due in large part to reductions in the amount of methyl ethyl ketone (MEK) in point source air emissions. This facility manufactures sticky and magnetic tape. MEK is used as a solvent in the magnetic tape coating process. The reduction was achieved by installing carbon-bed type solvent recovery units that allow for the recovery and reuse of MEK, as well as the utilization of thermal oxidation.

Hadco Corporation in Derry, New Hampshire (SIC code 3679 in 1988), ranked second in decreases of releases with a net reduction of 2.3 million pounds. Hadco, a producer of printed wiring boards, reported a reduction of 1.9 million pounds (combined fugitive and point source air emissions) in dichloromethane (methylene chloride). The chemical was used as a cleaning agent in the manufacturing process. The facility reduced methylene chloride releases by installing activated carbon vapor recovery units and then wholly eliminated its use by substituting an aqueous cleaning solution. Hadco was a participant in EPA’s Excellence in Leadership program, or Project XL. The project’s goal is to “allow the EPA, state environmental agencies and regulated sources to develop and implement alternative strategies that replace or modify regulatory requirements, produce superior environmental performance, and promote



**Table 9-16. TRI Transfers Off-site for Further Waste Management by 4-digit SIC Code, 1988 and 1994-1996: Electrical Equipment, SIC Code 36**

| SIC Code | Industry                              | Year | Transfers to Recycling Pounds | Transfers to Energy Recovery Pounds | Transfers to Treatment Pounds | Transfers to POTWs Pounds | Other Off-site Transfers Pounds | Total Transfers Off-site for Further Waste Management Pounds |
|----------|---------------------------------------|------|-------------------------------|-------------------------------------|-------------------------------|---------------------------|---------------------------------|--|
| 3612     | Transformers, Except Electronic       | 96   | 5,721,472                     | 104,576                             | 3,588                         | 871                       | 0                               | 5,830,507  |
|          |                                       | 95   | 6,519,476                     | 101,036                             | 1,530                         | 4,405                     | 0                               | 6,626,447  |
|          |                                       | 94   | 6,066,543                     | 101,976                             | 13,516                        | 1,794                     | 0                               | 6,183,829  |
|          |                                       | 88   | NA                            | NA                                  | 127,135                       | 4,502                     | 18,911                          | NA   |
| 3613     | Switchgear & Switchboard Apparatus    | 96   | 8,139,717                     | 2,323                               | 40,723                        | 64,932                    | 0                               | 8,247,695  |
|          |                                       | 95   | 8,809,254                     | 3,000                               | 22,632                        | 104,250                   | 0                               | 8,939,136  |
|          |                                       | 94   | 8,594,021                     | 3,499                               | 59,824                        | 150,630                   | 0                               | 8,807,974  |
|          |                                       | 88   | NA                            | NA                                  | 129,594                       | 30,622                    | 0                               | NA   |
| 3621     | Motors & Generators                   | 96   | 9,260,470                     | 225,377                             | 43,705                        | 15,486                    | 0                               | 9,545,038  |
|          |                                       | 95   | 9,089,006                     | 229,205                             | 40,644                        | 70,310                    | 0                               | 9,429,165  |
|          |                                       | 94   | 9,618,271                     | 232,286                             | 44,362                        | 1,390                     | 0                               | 9,896,309  |
|          |                                       | 88   | NA                            | NA                                  | 344,488                       | 6,066                     | 287,389                         | NA   |
| 3624     | Carbon & Graphite Products            | 96   | 201,050                       | 13,280                              | 2,990                         | 601                       | 0                               | 217,921  |
|          |                                       | 95   | 115,029                       | 33,900                              | 3,197                         | 1,086                     | 0                               | 153,212  |
|          |                                       | 94   | 220,187                       | 25,260                              | 2,964                         | 1,114                     | 0                               | 249,525  |
|          |                                       | 88   | NA                            | NA                                  | 15,982                        | 1,000                     | 13,973                          | NA   |
| 3625     | Relays & Industrial Controls          | 96   | 1,186,663                     | 1,384                               | 15,504                        | 50                        | 0                               | 1,203,601  |
|          |                                       | 95   | 890,447                       | 0                                   | 13,950                        | 274                       | 0                               | 904,671  |
|          |                                       | 94   | 665,599                       | 5,650                               | 22,166                        | 4,210                     | 0                               | 697,625  |
|          |                                       | 88   | NA                            | NA                                  | 44,348                        | 7,666                     | 0                               | NA   |
| 3629     | Electrical Industrial Apparatus, nec* | 96   | 1,243,891                     | 100,907                             | 6,553                         | 12,346                    | 0                               | 1,363,697  |
|          |                                       | 95   | 1,452,418                     | 88,760                              | 7,096                         | 15                        | 0                               | 1,548,289  |
|          |                                       | 94   | 1,355,252                     | 77,043                              | 1,228                         | 10                        | 0                               | 1,433,533  |
|          |                                       | 88   | NA                            | NA                                  | 235,577                       | 311                       | 0                               | NA   |
| 3631     | Household Cooking Equipment           | 96   | 246,086                       | 750                                 | 2,000                         | 2,860                     | 0                               | 251,696  |
|          |                                       | 95   | 333,450                       | 16,813                              | 3,010                         | 9,420                     | 0                               | 362,693  |
|          |                                       | 94   | 235,960                       | 114,761                             | 8,900                         | 8,019                     | 0                               | 367,640  |
|          |                                       | 88   | NA                            | NA                                  | 24,697                        | 1,000                     | 23,130                          | NA   |
| 3632     | Household Refrigerators & Freezers    | 96   | 1,005,926                     | 272,447                             | 530                           | 14,889                    | 0                               | 1,293,792  |
|          |                                       | 95   | 862,751                       | 298,413                             | 4,778                         | 1,419                     | 0                               | 1,167,361  |
|          |                                       | 94   | 737,408                       | 220,800                             | 1,841                         | 12,503                    | 0                               | 972,552  |
|          |                                       | 88   | NA                            | NA                                  | 801,758                       | 125,023                   | 1,210                           | NA   |
| 3633     | Household Laundry Equipment           | 96   | 647,221                       | 49,991                              | 2,025                         | 192,288                   | 0                               | 891,525  |
|          |                                       | 95   | 786,494                       | 100,432                             | 2,899                         | 131,500                   | 0                               | 1,021,325  |
|          |                                       | 94   | 702,909                       | 132,409                             | 3,370                         | 85,962                    | 0                               | 924,650  |
|          |                                       | 88   | NA                            | NA                                  | 476,033                       | 83,363                    | 250                             | NA   |
| 3634     | Electric Housewares & Fans            | 96   | 486,293                       | 2,444                               | 0                             | 3,200                     | 0                               | 491,937  |
|          |                                       | 95   | 277,630                       | 8,344                               | 0                             | 21,005                    | 0                               | 306,979  |
|          |                                       | 94   | 280,100                       | 8,439                               | 0                             | 32,090                    | 0                               | 320,629  |
|          |                                       | 88   | NA                            | NA                                  | 50,929                        | 15,661                    | 9,784                           | NA   |
| 3635     | Household Vacuum Cleaners             | 96   | 48,100                        | 0                                   | 250                           | 5                         | 0                               | 48,355   |
|          |                                       | 95   | 49,466                        | 0                                   | 0                             | 11                        | 0                               | 49,477   |
|          |                                       | 94   | 46,000                        | 0                                   | 14,880                        | 15                        | 0                               | 60,895   |
|          |                                       | 88   | NA                            | NA                                  | 15,500                        | 3,400                     | 0                               | NA   |
| 3639     | Household Appliances, nec*            | 96   | 389,451                       | 47,750                              | 2,970                         | 1,755                     | 0                               | 441,926  |
|          |                                       | 95   | 485,997                       | 15,055                              | 1,770                         | 1,000                     | 0                               | 503,822  |
|          |                                       | 94   | 490,828                       | 7,522                               | 2,129                         | 755                       | 0                               | 501,234  |
|          |                                       | 88   | NA                            | NA                                  | 53,907                        | 87,398                    | 0                               | NA   |

**Note: Transfers Off-site for Further Waste Management** from Section 6 (excluding transfers off-site to disposal) of Form R. Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the "multiple" category.

\*nec: not elsewhere classified.



**Table 9-16. TRI Transfers Off-site for Further Waste Management by 4-digit SIC Code, 1988 and 1994-1996: Electrical Equipment, SIC Code 36, Continued**

| SIC Code | Industry                            | Year | Transfers to Recycling Pounds | Transfers to Energy Recovery Pounds | Transfers to Treatment Pounds | Transfers to POTWs Pounds | Other Off-site Transfers Pounds | Total Transfers Off-site for Further Waste Management Pounds |
|----------|-------------------------------------|------|-------------------------------|-------------------------------------|-------------------------------|---------------------------|---------------------------------|--|
| 3641     | Electric Lamps                      | 96   | 1,125,452                     | 56,515                              | 191,633                       | 4,211                     | 0                               | 1,377,811  |
|          |                                     | 95   | 1,352,351                     | 70,145                              | 243,992                       | 2,347                     | 0                               | 1,668,835  |
|          |                                     | 94   | 1,215,699                     | 72,615                              | 140,690                       | 454                       | 0                               | 1,429,458  |
|          |                                     | 88   | NA                            | NA                                  | 153,212                       | 26,809                    | 145,860                         | NA   |
| 3643     | Current-carrying Wiring Devices     | 96   | 2,895,782                     | 0                                   | 33,316                        | 11,296                    | 4                               | 2,940,398  |
|          |                                     | 95   | 4,173,187                     | 0                                   | 39,138                        | 63,680                    | 0                               | 4,276,005  |
|          |                                     | 94   | 3,770,883                     | 0                                   | 35,710                        | 79,547                    | 0                               | 3,886,140  |
|          |                                     | 88   | NA                            | NA                                  | 177,619                       | 44,031                    | 93,669                          | NA   |
| 3644     | Noncurrent-carrying Wiring Devices  | 96   | 1,039,784                     | 54,362                              | 4,261                         | 49,350                    | 0                               | 1,147,757  |
|          |                                     | 95   | 985,199                       | 66,249                              | 3,153                         | 829                       | 0                               | 1,055,430  |
|          |                                     | 94   | 591,395                       | 77,197                              | 1,504                         | 7,961                     | 0                               | 678,057  |
|          |                                     | 88   | NA                            | NA                                  | 166,735                       | 8,142                     | 94                              | NA   |
| 3645     | Residential Lighting Fixtures       | 96   | 5,338                         | 2,590                               | 4,800                         | 250                       | 0                               | 12,978   |
|          |                                     | 95   | 5,110                         | 750                                 | 4,800                         | 505                       | 0                               | 11,165   |
|          |                                     | 94   | 11,500                        | 9,650                               | 3,750                         | 1,005                     | 0                               | 25,905   |
|          |                                     | 88   | NA                            | NA                                  | 39,589                        | 1,000                     | 0                               | NA   |
| 3646     | Commercial Lighting Fixtures        | 96   | 19,677                        | 10,515                              | 2,530                         | 750                       | 0                               | 33,472   |
|          |                                     | 95   | 11,881                        | 11,240                              | 4,150                         | 0                         | 0                               | 27,271   |
|          |                                     | 94   | 1,100                         | 4,269                               | 1,650                         | 0                         | 0                               | 7,019  |
|          |                                     | 88   | NA                            | NA                                  | 65,916                        | 0                         | 352                             | NA   |
| 3647     | Vehicular Lighting Equipment        | 96   | 51,597                        | 29,215                              | 7,150                         | 1,000                     | 0                               | 88,962   |
|          |                                     | 95   | 68,302                        | 24,450                              | 10,070                        | 1,265                     | 0                               | 104,087  |
|          |                                     | 94   | 91,647                        | 37,167                              | 13,210                        | 265                       | 0                               | 142,289  |
|          |                                     | 88   | NA                            | NA                                  | 53,314                        | 77,476                    | 750                             | NA   |
| 3648     | Lighting Equipment, nec*            | 96   | 4,183,734                     | 0                                   | 2,055                         | 750                       | 0                               | 4,186,539  |
|          |                                     | 95   | 3,567,875                     | 0                                   | 1,250                         | 250                       | 0                               | 3,569,375  |
|          |                                     | 94   | 2,369,875                     | 0                                   | 250                           | 15                        | 0                               | 2,370,140  |
|          |                                     | 88   | NA                            | NA                                  | 50,000                        | 817                       | 0                               | NA   |
| 3651     | Household Audio & Video Equipment   | 96   | 419,171                       | 40,995                              | 17,469                        | 1,497                     | 0                               | 479,132  |
|          |                                     | 95   | 740,290                       | 37,302                              | 17,065                        | 17,363                    | 0                               | 812,020  |
|          |                                     | 94   | 681,148                       | 29,278                              | 22,130                        | 20,765                    | 0                               | 753,321  |
|          |                                     | 88   | NA                            | NA                                  | 160,610                       | 182,700                   | 8,000                           | NA   |
| 3652     | Prerecorded Records & Tapes         | 96   | 88,397                        | 3,707                               | 715                           | 284                       | 0                               | 93,103   |
|          |                                     | 95   | 59,161                        | 480                                 | 862                           | 276                       | 0                               | 60,779   |
|          |                                     | 94   | 69,833                        | 445                                 | 1,512                         | 285                       | 0                               | 72,075   |
|          |                                     | 88   | NA                            | NA                                  | 3,777                         | 755                       | 0                               | NA   |
| 3661     | Telephone & Telegraph Apparatus     | 96   | 294,672                       | 5,800                               | 1                             | 17                        | 0                               | 300,490  |
|          |                                     | 95   | 2,991,074                     | 591                                 | 6                             | 83                        | 0                               | 2,991,754  |
|          |                                     | 94   | 3,577,617                     | 0                                   | 2,365                         | 15,748                    | 0                               | 3,595,730  |
|          |                                     | 88   | NA                            | NA                                  | 219,059                       | 210,319                   | 0                               | NA   |
| 3663     | Radio & TV Communications Equipment | 96   | 17,463                        | 0                                   | 500                           | 0                         | 0                               | 17,963   |
|          |                                     | 95   | 9,686                         | 0                                   | 4,032                         | 5                         | 0                               | 13,723   |
|          |                                     | 94   | 167,775                       | 250                                 | 6,387                         | 305                       | 0                               | 174,717  |
|          |                                     | 88   | NA                            | NA                                  | 11,250                        | 18                        | 0                               | NA   |
| 3669     | Communications Equipment, nec*      | 96   | 2,691,945                     | 9,985                               | 7,875                         | 1,260                     | 0                               | 2,711,065  |
|          |                                     | 95   | 1,845,751                     | 10,413                              | 39,562                        | 1,755                     | 0                               | 1,897,481  |
|          |                                     | 94   | 758,153                       | 15,863                              | 101,209                       | 15,005                    | 0                               | 890,230  |
|          |                                     | 88   | NA                            | NA                                  | 132,064                       | 27,591                    | 0                               | NA   |

**Note: Transfers Off-site for Further Waste Management** from Section 6 (excluding transfers off-site to disposal) of Form R. Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the "multiple" category.

\*nec: not elsewhere classified.



**Table 9-16. TRI Transfers Off-site for Further Waste Management by 4-digit SIC Code, 1988 and 1994-1996: Electrical Equipment, SIC Code 36, Continued**

| SIC Code | Industry                           | Year | Transfers to Recycling Pounds | Transfers to Energy Recovery Pounds | Transfers to Treatment Pounds | Transfers to POTWs Pounds | Other Off-site Transfers Pounds | Total Transfers Off-site for Further Waste Management Pounds |
|----------|------------------------------------|------|-------------------------------|-------------------------------------|-------------------------------|---------------------------|---------------------------------|--|
| 3671     | Electron Tubes                     | 96   | 6,419,546                     | 277,142                             | 357,620                       | 138,779                   | 0                               | 7,193,087  |
|          |                                    | 95   | 4,890,466                     | 223,267                             | 528,922                       | 106,771                   | 0                               | 5,749,426  |
|          |                                    | 94   | 3,985,905                     | 97,110                              | 967,716                       | 172,033                   | 0                               | 5,222,764  |
|          |                                    | 88   | NA                            | NA                                  | 230,454                       | 171,358                   | 0                               | NA   |
| 3672     | Printed Circuit Boards             | 96   | 21,313,781                    | 1,558,887                           | 1,180,153                     | 648,451                   | 48,228                          | 24,749,500   |
|          |                                    | 95   | 19,930,674                    | 78,901                              | 860,448                       | 557,342                   | 10,008                          | 21,437,373   |
|          |                                    | 94   | 17,553,901                    | 2,548,298                           | 1,446,880                     | 436,657                   | 0                               | 21,985,736   |
|          |                                    | 88   | NA                            | NA                                  | 1,862,200                     | 1,054,009                 | 16,680                          | NA   |
| 3674     | Semiconductors & Related Devices   | 96   | 895,619                       | 2,449,368                           | 1,031,589                     | 1,055,726                 | 0                               | 5,432,302  |
|          |                                    | 95   | 1,007,532                     | 3,175,066                           | 1,402,859                     | 1,076,161                 | 0                               | 6,661,618  |
|          |                                    | 94   | 1,188,983                     | 3,207,714                           | 1,485,020                     | 966,940                   | 13,832                          | 6,862,489  |
|          |                                    | 88   | NA                            | NA                                  | 3,442,518                     | 699,728                   | 317,503                         | NA   |
| 3675     | Electronic Capacitors              | 96   | 2,315,804                     | 271,400                             | 967,190                       | 320,293                   | 0                               | 3,874,687  |
|          |                                    | 95   | 2,603,302                     | 363,785                             | 1,403,824                     | 320,041                   | 0                               | 4,690,952  |
|          |                                    | 94   | 2,270,813                     | 105,825                             | 1,083,874                     | 182,100                   | 0                               | 3,642,612  |
|          |                                    | 88   | NA                            | NA                                  | 899,073                       | 351,141                   | 125,924                         | NA   |
| 3676     | Electronic Resistors               | 96   | 122,488                       | 4,543                               | 41,110                        | 0                         | 0                               | 168,141  |
|          |                                    | 95   | 216,881                       | 17,300                              | 14,224                        | 0                         | 0                               | 248,405  |
|          |                                    | 94   | 213,622                       | 22,469                              | 34,635                        | 3                         | 0                               | 270,729  |
|          |                                    | 88   | NA                            | NA                                  | 237,733                       | 3                         | 84,646                          | NA   |
| 3677     | Electronic Coils & Transformers    | 96   | 252,178                       | 1,400                               | 9,781                         | 0                         | 0                               | 263,359  |
|          |                                    | 95   | 571,950                       | 10,224                              | 11,901                        | 0                         | 0                               | 594,075  |
|          |                                    | 94   | 126,155                       | 3,832                               | 7,665                         | 0                         | 0                               | 137,652  |
|          |                                    | 88   | NA                            | NA                                  | 32,027                        | 0                         | 71,799                          | NA   |
| 3678     | Electronic Connectors              | 96   | 4,758,385                     | 18,727                              | 15,617                        | 8,635                     | 0                               | 4,801,364  |
|          |                                    | 95   | 5,364,519                     | 49,790                              | 4,717                         | 6,538                     | 0                               | 5,425,564  |
|          |                                    | 94   | 3,157,635                     | 80,078                              | 41,844                        | 11,642                    | 0                               | 3,291,199  |
|          |                                    | 88   | NA                            | NA                                  | 304,723                       | 94,662                    | 750                             | NA   |
| 3679     | Electronic Components, nec*        | 96   | 5,488,055                     | 172,384                             | 104,568                       | 28,509                    | 250                             | 5,793,766  |
|          |                                    | 95   | 6,475,888                     | 163,773                             | 99,557                        | 72,560                    | 750                             | 6,812,528  |
|          |                                    | 94   | 7,171,275                     | 103,950                             | 113,960                       | 162,210                   | 0                               | 7,551,395  |
|          |                                    | 88   | NA                            | NA                                  | 2,421,331                     | 827,062                   | 35,015                          | NA   |
| 3691     | Storage Batteries                  | 96   | 227,476,604                   | 20,344                              | 1,051,662                     | 2,580                     | 0                               | 228,551,190  |
|          |                                    | 95   | 254,486,447                   | 33,679                              | 28,619                        | 1,401                     | 0                               | 254,550,146  |
|          |                                    | 94   | 242,362,170                   | 21,126                              | 61,117                        | 1,825                     | 0                               | 242,446,238  |
|          |                                    | 88   | NA                            | NA                                  | 587,702                       | 21,482                    | 250                             | NA   |
| 3692     | Primary Batteries, Dry & Wet       | 96   | 1,901,008                     | 12,680                              | 77,493                        | 1,125                     | 0                               | 1,992,306  |
|          |                                    | 95   | 3,698,528                     | 5,895                               | 138,514                       | 502                       | 0                               | 3,843,439  |
|          |                                    | 94   | 1,654,045                     | 83,869                              | 286,249                       | 258                       | 0                               | 2,024,421  |
|          |                                    | 88   | NA                            | NA                                  | 235,855                       | 440                       | 0                               | NA   |
| 3694     | Engine Electrical Equipment        | 96   | 1,371,739                     | 18,689                              | 11,270                        | 2,090                     | 0                               | 1,403,788  |
|          |                                    | 95   | 3,195,127                     | 205,498                             | 5,748                         | 2,321                     | 0                               | 3,408,694  |
|          |                                    | 94   | 3,045,622                     | 12,853                              | 18,329                        | 939                       | 0                               | 3,077,743  |
|          |                                    | 88   | NA                            | NA                                  | 166,940                       | 6,764                     | 900                             | NA   |
| 3695     | Magnetic & Optical Recording Media | 96   | 277,653                       | 952,735                             | 127,440                       | 3,327                     | 0                               | 1,361,155  |
|          |                                    | 95   | 391,963                       | 964,890                             | 31,839                        | 23,276                    | 0                               | 1,411,968  |
|          |                                    | 94   | 503,432                       | 1,500,145                           | 31,498                        | 93,037                    | 0                               | 2,128,112  |
|          |                                    | 88   | NA                            | NA                                  | 365,807                       | 71,227                    | 0                               | NA   |

**Note:** Transfers Off-site for Further Waste Management from Section 6 (excluding transfers off-site to disposal) of Form R. Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the "multiple" category.

\*nec: not elsewhere classified.



**Table 9-16. TRI Transfers Off-site for Further Waste Management by 4-digit SIC Code, 1988 and 1994-1996: Electrical Equipment, SIC Code 36, Continued**

| SIC Code                       | Industry                              | Year | Transfers to Recycling<br>Pounds | Transfers to Energy Recovery<br>Pounds | Transfers to Treatment<br>Pounds | Transfers to POTWs<br>Pounds | Other Off-site Transfers<br>Pounds | Total Transfers Off-site for Further Waste Management<br>Pounds |
|--------------------------------|---------------------------------------|------|----------------------------------|--|----------------------------------|------------------------------|------------------------------------|---|
| 3699                           | Electrical Equipment & Supplies, nec* | 96   | 1,749,593                        | 250                                    | 4,083                            | 1,508                        | 0                                  | 1,755,434   |
|                                |                                       | 95   | 2,254,592                        | 545                                    | 9,430                            | 151                          | 0                                  | 2,264,718   |
|                                |                                       | 94   | 2,514,616                        | 3,070                                  | 13,140                           | 277                          | 0                                  | 2,531,103   |
|                                |                                       | 88   | NA                               | NA                                     | 144,655                          | 93,649                       | 1,300                              | NA  |
| Multiple within SIC Code 36    |                                       | 96   | 20,004,515                       | 252,741                                | 244,898                          | 159,906                      | 538,006                            | 21,200,066  |
|                                |                                       | 95   | 18,884,686                       | 2,933,456                              | 1,369,641                        | 113,802                      | 0                                  | 23,301,585  |
|                                |                                       | 94   | 18,009,035                       | 335,189                                | 1,010,779                        | 56,037                       | 5                                  | 19,411,045  |
|                                |                                       | 88   | NA                               | NA                                     | 1,295,495                        | 862,817                      | 10,384                             | NA  |
| Invalid SIC Code within SIC 36 |                                       | 96   | 29,121                           | 0                                      | 0                                | 10                           | 0                                  | 29,131  |
|                                |                                       | 95   | 186,508                          | 0                                      | 0                                | 10                           | 0                                  | 186,518   |
|                                |                                       | 94   | 437,029                          | 0                                      | 47,950                           | 39                           | 0                                  | 485,018   |
|                                |                                       | 88   | NA                               | NA                                     | 1,114,485                        | 97,950                       | 45,734                             | NA  |
| Total for SIC Code 36          |                                       | 96   | 335,785,441                      | 7,046,203                              | 5,617,617                        | 2,750,887                    | 586,488                            | 351,786,636   |
|                                |                                       | 95   | 369,640,348                      | 9,342,647                              | 6,379,829                        | 2,713,929                    | 10,758                             | 388,087,511   |
|                                |                                       | 94   | 346,513,941                      | 9,301,907                              | 7,156,203                        | 2,523,844                    | 13,837                             | 365,509,732   |
|                                |                                       | 88   | NA                               | NA                                     | 16,894,091                       | 5,297,962                    | 1,314,257                          | NA  |

**Note: Transfers Off-site for Further Waste Management** from Section 6 (excluding transfers off-site to disposal) of Form R. Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the “multiple” category.

\*nec: not elsewhere classified.

greater accountability to stakeholders. Under [Project XL], the EPA [allowed] Hadco to demonstrate that its metal-rich sludge can be safely reclaimed without all of the strict regulatory controls imposed by law and that the experiment will yield substantial economic and environmental benefits.” (EPA Web site, <http://www.epa.gov/region01/pr/files/pr092997d.html>) Hadco attributes much of its reduction in releases to participation in Project XL.

The third facility for decreased releases was Lucent Technologies, Inc., in North Andover, Massachusetts (SIC code 3661 in 1988). A corporate mandate to eliminate ozone depleters and chlorinated solvents led to the facility’s release reduction and eventual elimination of 1,1,1-trichloroethane by 1992. The chemical was used as a developer in a photo-lithography process to manufacture hybrid integrated circuits for telecommunications equipment. The facility had an overall reduction in releases of 1.7 million pounds between 1988 and 1996.

The Bureau of Engraving, Inc., in Minneapolis, Minnesota, was the fourth largest deceiver in releases (1.38 million pounds). In 1988, the facility reported exactly the same amounts of chloromethane (SIC code 3679 in 1988 and no code reported in 1996) and dichloromethane (SIC code 3675 in 1988 and no code reported in 1996). The facility said that the 1988 reporting for chloromethane was an error and may represent double-counting of reported amounts for dichloromethane. This facility manufactures printed circuit boards and stopped using dichloromethane (methylene chloride) in 1992. The chemical, used as a cleaning agent, was replaced with a pumice cleaning rinse.

Fifth for decreases was Whirlpool Corporation in Fort Smith, Arkansas (SIC code 3632) with a net reduction of 1.36 million pounds. The Whirlpool facility, which manufactures refrigerators, painted the steel refrigerator cabinets on site, resulting in large air emissions of toluene (used as a paint-thinning agent). Between 1988 and 1989, this



process was taken off-line and only pre-painted cabinets were received, resulting in a 764,000-pound decrease in air emissions of toluene from this facility.

### **Other Apparent Increases and Decreases in Releases, 1988-1996**

In the TRI database, there are other facilities with large apparent increases and decreases, which have been identified as reporting errors or plant closures. Because these are errors or plant closures and not actual changes in the data, these facilities are not discussed in detail here. There is one such facility in the electrical equipment sector:

Thomson Consumer Electronics, Dunmore, Pennsylvania, increase of 6.7 million pounds, reporting error.

### **1991-1996 Waste Management Data for Electrical Equipment**

Table 9-17 summarizes on- and off-site waste management data for the electrical equipment sector for 1991, when TRI began collecting this information, and the three most recent years (1994-1996). Total production-related waste decreased from 663.9 million pounds to 612.2 million pounds from 1991 to 1996, a decrease of 7.8%. During this period, on-site waste management decreased from 280.8 million pounds to 199.5 million pounds, or 28.9%. At the same time, off-site waste management increased from 312.6 million pounds to 386.2 million pounds (23.5%). In both cases, change in the quantities recycled was the largest factor. Reporting of quantities released decreased by two thirds (62.5%) over this period, from 70.5 million pounds to 26.4 million pounds.

Figure 9-13 shows the percentage changes for on- and off-site waste management types.

As production-related waste has increased in the electrical equipment sector's reporting to TRI in the more recent years, recycling on-site and off-site have also increased, while off-site treatment and

quantities released have continued to decline. These developments suggest some progress in improved waste management options, as called for in the waste management hierarchy (explained in Chapter 2). Several facilities attribute their large reported increases to production increases and to new production as operations came on-line, as described below. This is consistent with the remarkable level of growth in this sector, compared to U.S. manufacturing overall, as noted at the beginning of this chapter. At the same time, however, production decreases have also been cited to explain reductions in reported quantities.

### ***Facilities with Large Increases and Decreases in Waste Management, 1991-1996***

All five facilities for increases in production-related waste from 1991 to 1996 were lead storage battery manufacturers (SIC code 3691). Exide Corporation facilities ranked as the first (Salina, Kansas, 24.5 million pounds); third (Bristol, Tennessee, 15.2 million pounds); and fourth (Manchester, Iowa, 13.7 million pounds). The Salina facility increased on-site recycling of lead compounds by 22.0 million pounds. The increase is due to the installation of a "re-melt pot" used to recycled lead chips that are left over from the battery manufacturing process. The increase at the Bristol facility consisted of 15.1 million pounds of lead compounds. This facility, a new plant, did not go into production until 1994, and thus there were no data for the facility in comparison year 1991. The Manchester facility had an increase of 10.8 million pounds in on-site recycling and a 2.6-million-pound increase in off-site recycling. The increase is attributed to a substantial increase in production. An increase in the amount of lead sent to an off-site smelter for recycling also contributed to the reported increase in off-site recycling.

Johnson Controls Battery facilities are ranked second and fifth for increases in production-related waste. The number two facility is actually a warehouse (San Antonio, Texas, 19.6 million pounds) and was not operational until the summer of 1995. This warehouse stores used lead-acid

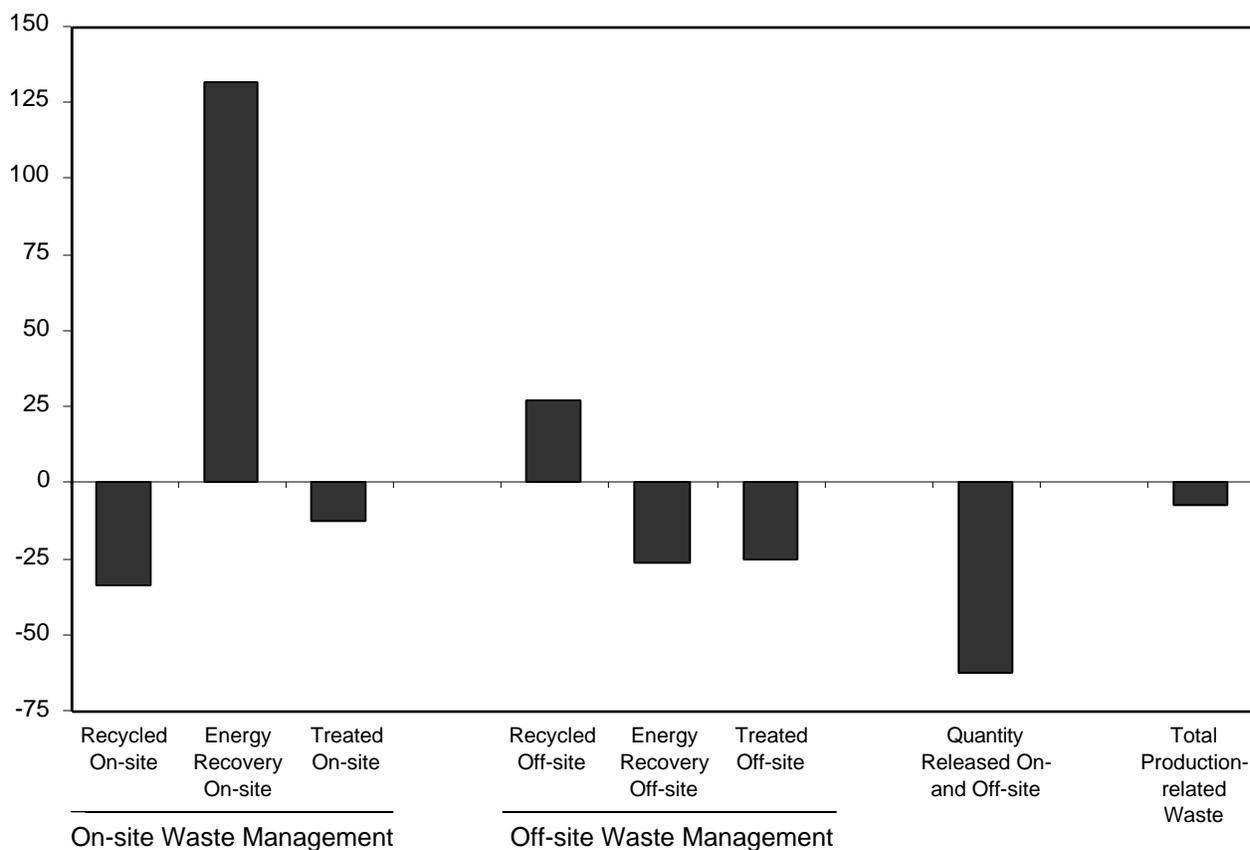


**Chapter 9 – TRI Data for Electrical Equipment**

**Table 9-17. TRI Waste Management Data, 1991, 1994-1996: Electrical Equipment, SIC Code 36**

| <b>Waste Management Activity</b>       | <b>1991</b><br>Pounds                        | <b>1994</b><br>Pounds                        | <b>1995</b><br>Pounds                        | <b>1996</b><br>Pounds |
|--|--|--|--|-----------------------|
| <u>On-site Waste Management</u>        |  |  |  |                       |
| Recycled On-site                       | 220,655,709                                  | 96,198,523                                   | 97,975,655                                   | 145,834,353           |
| Energy Recovery On-site                | 874,367                                      | 2,073,744                                    | 2,191,839                                    | 2,026,264             |
| Treated On-site                        | 59,297,721                                   | 47,183,395                                   | 51,213,177                                   | 51,682,275            |
| <b>Total On-site Waste Management</b>  | <b>280,827,797</b>                           | <b>145,455,662</b>                           | <b>151,380,671</b>                           | <b>199,542,892</b>    |
| <u>Off-site Waste Management</u>       |  |  |  |                       |
| Recycled Off-site                      | 292,457,523                                  | 341,856,348                                  | 391,101,969                                  | 371,277,615           |
| Energy Recovery Off-site               | 9,542,531                                    | 9,807,798                                    | 9,326,881                                    | 6,987,062             |
| Treated Off-site                       | 10,582,423                                   | 9,539,582                                    | 9,409,191                                    | 7,928,674             |
| <b>Total Off-site Waste Management</b> | <b>312,582,477</b>                           | <b>361,203,728</b>                           | <b>409,838,041</b>                           | <b>386,193,351</b>    |
| Quantity Released On- and Off-site     | 70,508,528                                   | 40,412,712                                   | 30,824,661                                   | 26,418,498            |
| <b>Total Production-related Waste</b>  | <b>663,918,802</b>                           | <b>547,072,102</b>                           | <b>592,043,373</b>                           | <b>612,154,741</b>    |
| Non- Production-related Waste          | 710,695                                      | 59,944                                       | 169,133                                      | 30,797                |
| <b>Waste Management Activity</b>       | <b>Change</b><br><b>1994-1995</b><br>Percent | <b>Change</b><br><b>1995-1996</b><br>Percent | <b>Change</b><br><b>1991-1996</b><br>Percent |                       |
| <u>On-site Waste Management</u>        |  |  |  |                       |
| Recycled On-site                       | 1.8  | 48.8   | -33.9  |                       |
| Energy Recovery On-site                | 5.7  | -7.6   | 131.7  |                       |
| Treated On-site                        | 8.5  | 0.9  | -12.8  |                       |
| <b>Total On-site Waste Management</b>  | <b>4.1</b>                                   | <b>31.8</b>                                  | <b>-28.9</b>                                 |                       |
| <u>Off-site Waste Management</u>       |  |  |  |                       |
| Recycled Off-site                      | 14.4   | -5.1   | 27.0   |                       |
| Energy Recovery Off-site               | -4.9   | -25.1  | -26.8  |                       |
| Treated Off-site                       | -1.4   | -15.7  | -25.1  |                       |
| <b>Total Off-site Waste Management</b> | <b>13.5</b>                                  | <b>-5.8</b>                                  | <b>23.5</b>                                  |                       |
| Quantity Released On- and Off-site     | -23.7  | -14.3  | -62.5  |                       |
| <b>Total Production-related Waste</b>  | <b>8.2</b>                                   | <b>3.4</b>                                   | <b>-7.8</b>                                  |                       |
| Non- Production-related Waste          | 182.2  | -81.8  | -95.7  |                       |

**Note:** Does not include delisted chemicals, chemicals added in 1994 and 1995, ammonia, hydrochloric acid, and sulfuric acid. Data from Section 8 of Form R (Current Year, Column B) of year indicated.



**Figure 9-13. Percentage Change in Quantities of TRI Chemicals in Waste, 1991-1996: Electrical Equipment (SIC Code 36)**

**Note:** Does not include delisted chemicals, chemicals added in 1994 and 1995, ammonia, hydrochloric acid, and sulfuric acid. Data from Section 8 of Form R (Current Year, Column B) of year indicated.

battery cores and ships them to smelters for recycling; 19.4 million pounds of lead compounds were reported as recycled off-site in 1996. Because the facility was not in operation until 1995, there were no data for comparison year 1991. The number five facility (St. Joseph, Missouri) reported an 11.4-million-pound increase in off-site recycling of lead compounds (99.5% of the overall increase). This battery manufacturing plant noted that several regulations, all passed since 1991, have essentially put many such facilities out of the business of recycling lead on-site. The cost of obtaining permits and monitoring under several environmental regulations made it impractical for many lead storage battery manufacturers to operate secondary smelters for recycling lead compounds, according to this facility. Regulations cited

included the Boiler Industrial Furnace rule of RCRA, Owner/Operator of a Hazardous Waste Treatment, Storage, or Disposal Facility provisions, and the Point Source Discharge (PSD) rule under the Clean Air Act.

The top facility in decreases of production-related waste was IBM in Endicott, New York (SIC code 3672). The facility reported a total decrease of 49.9 million pounds, more than 35 million of which were reported as reductions in 1,1,1-trichloromethane and dichloromethane. There were no reported amounts of either chemical in any category of production-related waste in 1996.

The second and third facilities for decreases are lead storage battery manufacturers (SIC code



3691). Johnson Controls Battery in Geneva, Illinois (ranked second) reduced reporting of production-related waste by 34.7 million pounds. The facility had large decreases in both on-site recycling (10 million pounds) and off-site recycling (24.7 million pounds) of lead compounds. Douglas Battery Manufacturing Company in Winston-Salem, North Carolina (ranked third), reported a total decrease of 30.6 million pounds, 30.3 million pounds of which were due to a drop in the amount of lead compounds recycled off-site. In addition to declining production levels between 1991 and 1996, the Douglas facility attributed part of the change to an improvement in a process involving the use of a lead oxide paste. As a result, smaller amounts of lead compounds are left over and sent off-site for recycling.

The fourth facility, Dover Electronics Company in Conklin, New York (SIC code 3679), reported a reduction of 26.1 million pounds. All of this decrease was due to a drop in the amount of tetrachloroethylene used as a degreaser in the production of multi-layered ceramic substrates used in circuit board construction. The facility no longer manufactures the ceramic substrates and no longer uses tetrachloroethylene. No amount of the chemical was reported in 1996.

### **Other Apparent Increases and Decreases in Production-Related Waste, 1991-1996**

In the TRI database, there are other facilities with large apparent increases and decreases, which have been identified as reporting errors or plant closures. Because these are errors or plant closures and not actual changes in the data, these facilities are not discussed in detail here. There is one such facility in the electrical equipment sector:

Johnson Controls Battery, Louisville, Kentucky, decrease of 19.3 million pounds, plant closure.

### **Facilities Contacted for Explanations (alphabetical by facility):**

3M, Hutchinson, Minnesota: Mike Bennett, March 23, 1998 (explanation provided)

Bureau of Engraving, Inc., Minneapolis, Minnesota: Bill Curry, March 23, 1998 (explanation provided)

Douglas Battery Manufacturing Company, Winston-Salem, North Carolina: Al Csontos, March 24, 1998 (explanation provided)

Dover Electronics Company, Conklin, New York: James O'Brien, March 23, 1998 (explanation provided)

Duracell USA, Lancaster, South Carolina: Jeff Johnston, March 24, 1998 (explanation provided)

Exide Corporation, Bristol, Tennessee: Norman Enix, March 23, 1998 (explanation provided)

Exide Corporation, Manchester, Iowa: Gary Drees, March 23, 1998 (explanation provided)

Exide Corporation, Salina, Kansas: Tina Ziegelmeier, March 23, 1998 (explanation provided)

Hadco Corporation, Derry, New Hampshire: Ron Blanchette, March 23, 1998 (explanation provided)

IBM, Endicott, New York (no explanation provided)

Johnson Controls Battery, Geneva, Illinois (no explanation provided)

Johnson Controls Battery, Louisville, Kentucky: Debbie Hastings, March 23, 1998 (explanation provided)

Johnson Controls Battery, San Antonio, Texas: Iris Williams, March 23, 1998 (explanation provided)

Johnson Controls Battery, St. Joseph, Missouri: Cary Mans, March 23, 1998 (explanation provided)

Lucent Technologies, Inc., North Andover, Massachusetts: Anne Reynolds, March 23, 1998 (explanation provided)

Thomson Consumer Electronics, Dunmore, Pennsylvania: Bob Murray, April 20, 1998 (explanation provided)

Whirlpool Corporation, Fort Smith, Arkansas: Scott Horton, March 24, 1998 (explanation provided)



## Sources

- Executive Office of the President, Office of Management and Budget, *Standard Industrial Classification Manual, 1987*: Standard Industrial Classification (SIC) codes and industry descriptions.
- U.S. Industry & Trade Outlook '98*, DRI/McGraw Hill, Standard & Poor's, and U.S. Department of Commerce, International Trade Administration, 1998: economic analyses, also provides some information on environment and industrial processes for selected industries.
- U.S. Census Bureau, *1996 Annual Survey of Manufactures: Statistics for Industry Groups and Industries*, M96(AS)-1, February 1998 <<http://www.census.gov/prod/www/titles.html#mm>>: value of shipments and employment. Supplemental data from U.S. Census Bureau <<http://www.census.gov>> for some industries.
- U.S. Environmental Protection Agency, Office of Enforcement and Compliance Assurance, Office of Compliance, *Profile of the Electronics and Computer Industry*, Sector Notebook Project, EPA/310-R-95-002, September 1995 <<http://es.epa.gov/oeca/sector/index.html>>: industry processes and technologies, pollutant sources, and selected economic data.



## ERRATA

As noted in **Chapter 9, Toxics Release Inventory Data for Electrical Equipment**, one facility (Thomson Consumer Electronics, Dunmore, Pennsylvania) had an apparent increase of 6.7 million pounds in on- and off-site releases from 1988 to 1996. A facility representative identified this as an error in its 1996 reporting. The reporting error was noted in the text (page 369), and information was added as a footnote to **Table 9-6, Summary of TRI Information by State, 1996**, in the main volume, and as a footnote to **Pennsylvania** in the *State Fact Sheets*.

This reporting error affects other data tables in Chapter 9, including those in which industries in the electrical equipment sector are ranked. Thomson Consumer Electronics submitted ten forms in SIC code 3672, printed circuit boards. This facility also revised its reported SIC code from 3672, to 3671, electron tubes. This errata sheet includes revised versions of **Table 9-1, Summary of TRI Information by 4-digit SIC Code**, and **Table 9-3, TRI On-site and Off-site Releases, 1996**, incorporating the corrected data.

On its 1996 Form R for lead compounds, the facility had reported 6,792,500 pounds of off-site releases (transfers off-site to disposal, in Section 6 of Form R) and a total of 6,800,695 pounds of production-related waste (largely in off-site recycling, in Section 8 of Form R) in error. The facility has revised its submission to zero off-site releases and 212,287 pounds of total production-related waste. The revision affected data for both off-site releases and off-site waste management, nearly all tables and figures in Chapter 9 and the discussion of them in the text.

Due to the incorrectly reported SIC code and the error associated with quantities of waste managed reported by this facility, the printed circuit board industry (SIC code 3672) was improperly ranked. EPA has corrected this error and prepared new tables that reflect this new ranking. Note that there will be a discrepancy between these tables and the rest of the data release (e.g., total releases and production-related waste for SIC code 36 shown in this errata will not correspond to data in Chapter 4).

# 1996 Toxics Release Inventory: Public Data Release

Table 9-1. Summary of TRI Information by 4-digit SIC Code, 1996: Electrical Equipment, SIC Code 36, Revised

| Total<br>Off-site<br>Releases<br>Rank | Total<br>Production-<br>related<br>Waste<br>Rank | SIC<br>Code | Industry                              | Total<br>Facilities<br>Number | Total<br>Forms<br>Number | Form As<br>Number | Total<br>On-site<br>Releases<br>Pounds | Total<br>Off-site<br>Releases<br>Pounds | Total<br>On- and<br>Off-site<br>Releases<br>Pounds |
|---------------------------------------|--|-------------|---------------------------------------|-------------------------------|--------------------------|-------------------|--|---|--|
| 13                                    | 13   | 3612        | Transformers, Except Electronic       | 38                            | 90                       | 2                 | 1,041,920                              | 246,650                                 | 1,288,570  |
| 26                                    | 12   | 3613        | Switchgear & Switchboard Apparatus    | 42                            | 84                       | 3                 | 123,558                                | 41,590                                  | 165,148  |
| 5                                     | 9  | 3621        | Motors & Generators                   | 79                            | 191                      | 8                 | 2,487,700                              | 99,028                                  | 2,586,728  |
| 19                                    | 10   | 3624        | Carbon & Graphite Products            | 26                            | 40                       | 0                 | 347,258                                | 53,653                                  | 400,911  |
| 34                                    | 27   | 3625        | Relays & Industrial Controls          | 14                            | 26                       | 1                 | 81,551                                 | 4,588                                   | 86,139   |
| 28                                    | 25   | 3629        | Electrical Industrial Apparatus, nec* | 16                            | 25                       | 1                 | 93,917                                 | 62,649                                  | 156,566  |
| 29                                    | 34   | 3631        | Household Cooking Equipment           | 9                             | 26                       | 0                 | 81,098                                 | 69,869                                  | 150,967  |
| 3                                     | 18   | 3632        | Household Refrigerators & Freezers    | 13                            | 64                       | 1                 | 2,751,418                              | 47,550                                  | 2,798,968  |
| 7                                     | 20   | 3633        | Household Laundry Equipment           | 10                            | 60                       | 0                 | 1,745,257                              | 161,947                                 | 1,907,204  |
| 16                                    | 28   | 3634        | Electric Housewares & Fans            | 16                            | 28                       | 2                 | 556,491                                | 1,250                                   | 557,741  |
| 37                                    | 39   | 3635        | Household Vacuum Cleaners             | 2                             | 3                        | 0                 | 17,255                                 | 500                                     | 17,755   |
| 14                                    | 24   | 3639        | Household Appliances, nec*            | 12                            | 45                       | 1                 | 932,151                                | 208,891                                 | 1,141,042  |
| 1                                     | 15   | 3641        | Electric Lamps                        | 26                            | 65                       | 0                 | 2,373,160                              | 728,039                                 | 3,101,199  |
| 18                                    | 16   | 3643        | Current-carrying Wiring Devices       | 47                            | 80                       | 6                 | 170,107                                | 237,174                                 | 407,281  |
| 21                                    | 17   | 3644        | Noncurrent-carrying Wiring Devices    | 18                            | 42                       | 2                 | 299,293                                | 7,734                                   | 307,027  |
| 27                                    | 26   | 3645        | Residential Lighting Fixtures         | 10                            | 15                       | 5                 | 153,711                                | 5,900                                   | 159,611  |
| 22                                    | 32   | 3646        | Commercial Lighting Fixtures          | 12                            | 19                       | 1                 | 227,393                                | 250                                     | 227,643  |
| 33                                    | 35   | 3647        | Vehicular Lighting Equipment          | 6                             | 16                       | 0                 | 70,206                                 | 16,754                                  | 86,960   |
| 32                                    | 19   | 3648        | Lighting Equipment, nec*              | 8                             | 18                       | 1                 | 33,888                                 | 59,300                                  | 93,188   |
| 17                                    | 29   | 3651        | Household Audio & Video Equipment     | 13                            | 21                       | 0                 | 443,864                                | 2,604                                   | 446,468  |
| 39                                    | 37   | 3652        | Prerecorded Records & Tapes           | 4                             | 5                        | 0                 | 5,489                                  | 5,081                                   | 10,570   |
| 31                                    | 31   | 3661        | Telephone & Telegraph Apparatus       | 12                            | 15                       | 3                 | 122,377                                | 4,006                                   | 126,383  |
| 38                                    | 36   | 3663        | Radio & TV Communications Equipment   | 8                             | 27                       | 0                 | 10,835                                 | 5                                       | 10,840   |
| 36                                    | 23   | 3669        | Communications Equipment, nec*        | 11                            | 13                       | 0                 | 40,346                                 | 7,248                                   | 47,594   |
| 15                                    | 6  | 3671        | Electron Tubes **                     | 15                            | 80                       | 0                 | 632,671                                | 339,378                                 | 972,049  |
| 9                                     | 2  | 3672        | Printed Circuit Boards **             | 213                           | 572                      | 11                | 1,197,800                              | 554,873                                 | 1,752,673  |
| 2                                     | 3  | 3674        | Semiconductors & Related Devices      | 131                           | 499                      | 6                 | 2,227,646                              | 741,476                                 | 2,969,122  |
| 11                                    | 11   | 3675        | Electronic Capacitors                 | 27                            | 63                       | 0                 | 917,038                                | 641,297                                 | 1,558,335  |
| 25                                    | 30   | 3676        | Electronic Resistors                  | 7                             | 12                       | 0                 | 100,371                                | 78,797                                  | 179,168  |
| 30                                    | 33   | 3677        | Electronic Coils & Transformers       | 16                            | 23                       | 0                 | 133,084                                | 1,750                                   | 134,834  |
| 24                                    | 14   | 3678        | Electronic Connectors                 | 24                            | 60                       | 1                 | 166,456                                | 26,446                                  | 192,902  |
| 8                                     | 7  | 3679        | Electronic Components, nec*           | 106                           | 194                      | 21                | 1,536,616                              | 332,553                                 | 1,869,169  |
| 10                                    | 1  | 3691        | Storage Batteries                     | 77                            | 181                      | 1                 | 242,993                                | 1,480,262                               | 1,723,255  |
| 6                                     | 8  | 3692        | Primary Batteries, Dry & Wet          | 22                            | 55                       | 0                 | 367,994                                | 2,210,035                               | 2,578,029  |
| 20                                    | 22   | 3694        | Engine Electrical Equipment           | 20                            | 42                       | 0                 | 244,322                                | 105,717                                 | 350,039  |
| 12                                    | 5  | 3695        | Magnetic & Optical Recording Media    | 17                            | 39                       | 0                 | 1,264,005                              | 139,443                                 | 1,403,448  |
| 23                                    | 21   | 3699        | Electrical Equipment & Supplies, nec* | 23                            | 61                       | 10                | 141,107                                | 51,952                                  | 193,059  |
| 4                                     | 4  |             | Multiple within SIC 36                | 75                            | 212                      | 2                 | 2,220,202                              | 543,769                                 | 2,763,971  |
| 35                                    | 38   |             | Invalid SIC Code within SIC 36        | 8                             | 10                       | 1                 | 49,571                                 | 750                                     | 50,321   |
| Total for SIC Code 36                 |  |             |                                       | 1,233                         | 3,121                    | 90                | 25,652,119                             | 9,320,758                               | 34,972,877   |

**Note:** On-site Releases from Section 5 of Form R. On-site Waste Management from Section 8 of Form R. Off-site Releases from Section 6 (transfers off-site to disposal) of Form R. Total Transfers Off-site for Further Waste Management from Section 6 (excluding transfers off-site to disposal) of Form R.

Total Production-related Waste sums Section 8 (Current Year, Column B) of Form R, except: Non-production-related Waste (remedial/catastrophic incidents). Facilities/forms with more than one 4-digit SIC code within SIC code 36 are assigned to the "multiple" category.

\* nec: not elsewhere classified.

\*\* Due to a facility reporting an incorrect SIC code and an error associated with quantities of waste managed reported by the same facility, the printed circuit board industry (SIC code 3672) and the electron tube industry (SIC code 3671) were improperly ranked. This table now reflects the correct ranking.

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Table 9-1. Summary of TRI Information by 4-digit SIC Code, 1996: Electrical Equipment, SIC Code 36, Revised, Continued

| SIC Code | Industry                              | Total Other On-site Waste Management<br>Pounds | Total Transfers Off-site for Further Waste Management<br>Pounds | Total Production-related Waste<br>Pounds | Non-Production-related Waste<br>Pounds |
|----------|---------------------------------------|--|---|--|--|
| 3612     | Transformers, Except Electronic       | 360,608  | 5,832,457   | 8,272,263                                | 108                                    |
| 3613     | Switchgear & Switchboard Apparatus    | 587,653  | 8,382,165   | 9,279,624                                | 17,370                                 |
| 3621     | Motors & Generators                   | 636,199  | 9,549,206   | 12,380,217                               | 1,408                                  |
| 3624     | Carbon & Graphite Products            | 9,560,688                                      | 233,848   | 10,232,251                               | 130                                    |
| 3625     | Relays & Industrial Controls          | 24,624   | 1,237,141   | 1,349,794                                | 0                                      |
| 3629     | Electrical Industrial Apparatus, nec* | 2,482  | 1,363,697   | 1,602,541                                | 1,156                                  |
| 3631     | Household Cooking Equipment           | 4,042  | 252,446   | 411,317                                  | 0                                      |
| 3632     | Household Refrigerators & Freezers    | 138,190  | 1,489,300   | 4,476,760                                | 5,200                                  |
| 3633     | Household Laundry Equipment           | 855,473  | 971,627   | 3,671,164                                | 0                                      |
| 3634     | Electric Housewares & Fans            | 71,400   | 491,937   | 1,123,011                                | 0                                      |
| 3635     | Household Vacuum Cleaners             | 206  | 48,355  | 66,044                                   | 0                                      |
| 3639     | Household Appliances, nec*            | 279,422  | 502,213   | 1,942,083                                | 0                                      |
| 3641     | Electric Lamps                        | 1,566,403                                      | 1,638,112   | 6,450,360                                | 60                                     |
| 3643     | Current-carrying Wiring Devices       | 2,817,437                                      | 2,973,124   | 6,254,196                                | 0                                      |
| 3644     | Noncurrent-carrying Wiring Devices    | 4,120,598                                      | 1,160,346   | 5,577,483                                | 0                                      |
| 3645     | Residential Lighting Fixtures         | 1,472,725                                      | 12,978  | 1,593,530                                | 0                                      |
| 3646     | Commercial Lighting Fixtures          | 168,917  | 33,472  | 425,192                                  | 0                                      |
| 3647     | Vehicular Lighting Equipment          | 79,000   | 89,712  | 267,603                                  | 0                                      |
| 3648     | Lighting Equipment, nec*              | 76,000   | 4,186,539   | 4,342,672                                | 0                                      |
| 3651     | Household Audio & Video Equipment     | 63,458   | 479,132   | 991,893                                  | 0                                      |
| 3652     | Prerecorded Records & Tapes           | 527  | 93,103  | 103,423                                  | 0                                      |
| 3661     | Telephone & Telegraph Apparatus       | 970  | 300,740   | 428,086                                  | 0                                      |
| 3663     | Radio & TV Communications Equipment   | 116,171  | 17,963  | 140,024                                  | 0                                      |
| 3669     | Communications Equipment, nec*        | 31,598   | 2,711,065   | 2,802,973                                | 0                                      |
| 3671     | Electron Tubes **                     | 10,519,069                                     | 7,561,899   | 19,771,411                               | 0                                      |
| 3672     | Printed Circuit Boards **             | 13,147,263                                     | 34,438,035  | 50,250,684                               | 103                                    |
| 3674     | Semiconductors & Related Devices      | 34,547,619                                     | 12,254,762  | 49,332,568                               | 17,220                                 |
| 3675     | Electronic Capacitors                 | 4,289,484                                      | 3,876,009   | 9,829,376                                | 2                                      |
| 3676     | Electronic Resistors                  | 183,297  | 186,223   | 498,284                                  | 0                                      |
| 3677     | Electronic Coils & Transformers       | 8,624  | 264,659   | 423,469                                  | 0                                      |
| 3678     | Electronic Connectors                 | 1,594,310                                      | 4,877,714   | 6,869,077                                | 0                                      |
| 3679     | Electronic Components, nec*           | 10,150,879                                     | 6,356,214   | 18,349,206                               | 3,075                                  |
| 3691     | Storage Batteries                     | 104,469,548                                    | 229,399,495   | 358,730,306                              | 3,536                                  |
| 3692     | Primary Batteries, Dry & Wet          | 10,029,861                                     | 2,075,512   | 14,742,152                               | 0                                      |
| 3694     | Engine Electrical Equipment           | 466,862  | 1,404,347   | 3,004,650                                | 0                                      |
| 3695     | Magnetic & Optical Recording Media    | 21,578,346                                     | 1,730,414   | 24,834,037                               | 1,601                                  |
| 3699     | Electrical Equipment & Supplies, nec* | 781,870  | 2,385,434   | 3,501,883                                | 0                                      |
|          | Multiple within SIC 36                | 3,227,519                                      | 22,014,716  | 28,404,703                               | 304                                    |
|          | Invalid SIC Code within SIC 36        | 7,735  | 29,131  | 87,521                                   | 99                                     |
|          | Total for SIC Code 36                 | 238,037,077                                    | 372,905,242   | 672,813,831                              | 51,372                                 |

**Note:** On-site Releases from Section 5 of Form R. On-site Waste Management from Section 8 of Form R. Off-site Releases from Section 6 (transfers off-site to disposal) of Form R. Total Transfers Off-site for Further Waste Management from Section 6 (excluding transfers off-site to disposal) of Form R.

Total Production-related Waste sums Section 8 (Current Year, Column B) of Form R, except: Non-production-related Waste (remedial/catastrophic incidents). Facilities/forms with more than one 4-digit SIC code within SIC code 36 are assigned to the "multiple" category.

\* nec: not elsewhere classified.

\*\* Due to a facility reporting an incorrect SIC code and an error associated with quantities of waste managed reported by the same facility, the printed circuit board industry (SIC code 3672) and the electron tube industry (SIC code 3671) were improperly ranked. This table now reflects the correct ranking.

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**Table 9-3. TRI On-site and Off-site Releases, 1996: Electrical Equipment, SIC Code 36 (in Rank Order), Revised**

| SIC Code | Industry                              | Total Air Emissions Pounds | Surface Water Discharges Pounds | Underground Injection |                         |                             | On-site Land Releases                   |                               | Off-site Releases           |            | Total On- and Off-site Releases Pounds |
|----------|---------------------------------------|----------------------------|---------------------------------|-----------------------|-------------------------|-----------------------------|---|-------------------------------|-----------------------------|------------|--|
|          |                                       |                            |                                 | Class I Wells Pounds  | Class II-V Wells Pounds | Subtitle C Landfills Pounds | RCRA Other On-site Land Releases Pounds | Total On-site Releases Pounds | Off-site to Disposal Pounds |            |  |
| 3641     | Electric Lamps                        | 2,373,158                  | 2                               | 0                     | 0                       | 0                           | 0                                       | 2,373,160                     | 728,039                     | 3,101,199  |  |
| 3674     | Semiconductors & Related Devices      | 1,163,923                  | 1,035,005                       | 12                    | 0                       | 0                           | 28,706                                  | 2,227,646                     | 741,476                     | 2,969,122  |  |
| 3632     | Household Refrigerators & Freezers    | 2,751,418                  | 0                               | 0                     | 0                       | 0                           | 0                                       | 2,751,418                     | 47,550                      | 2,798,968  |  |
|          | Multiple within SIC 36                | 2,153,400                  | 66,292                          | 0                     | 0                       | 0                           | 510                                     | 2,220,202                     | 543,769                     | 2,763,971  |  |
| 3621     | Motors & Generators                   | 2,484,120                  | 113                             | 5                     | 0                       | 1,600                       | 1,862                                   | 2,487,700                     | 99,028                      | 2,586,728  |  |
| 3692     | Primary Batteries, Dry & Wet          | 367,770                    | 224                             | 0                     | 0                       | 0                           | 0                                       | 367,994                       | 2,210,035                   | 2,578,029  |  |
| 3633     | Household Laundry Equipment           | 1,626,148                  | 411                             | 0                     | 0                       | 0                           | 118,698                                 | 1,745,257                     | 161,947                     | 1,907,204  |  |
| 3679     | Electronic Components, nec*           | 1,518,106                  | 275                             | 0                     | 0                       | 15,986                      | 2,249                                   | 1,536,616                     | 332,553                     | 1,869,169  |  |
| 3672     | Printed Circuit Boards **             | 1,125,321                  | 67,982                          | 5                     | 5                       | 1,619                       | 2,868                                   | 1,197,800                     | 554,873                     | 1,752,673  |  |
| 3691     | Storage Batteries                     | 172,066                    | 3,441                           | 0                     | 0                       | 62,380                      | 5,106                                   | 242,993                       | 1,480,262                   | 1,723,255  |  |
| 3675     | Electronic Capacitors                 | 876,970                    | 1,270                           | 0                     | 0                       | 37,350                      | 1,448                                   | 917,038                       | 641,297                     | 1,558,335  |  |
| 3695     | Magnetic & Optical Recording Media    | 1,236,187                  | 1,000                           | 0                     | 0                       | 26,818                      | 0                                       | 1,264,005                     | 139,443                     | 1,403,448  |  |
| 3612     | Transformers, Except Electronic       | 1,032,444                  | 19                              | 0                     | 0                       | 0                           | 9,457                                   | 1,041,920                     | 246,650                     | 1,288,570  |  |
| 3639     | Household Appliances, nec*            | 931,843                    | 308                             | 0                     | 0                       | 0                           | 0                                       | 932,151                       | 208,891                     | 1,141,042  |  |
| 3671     | Electron Tubes                        | 355,841                    | 276,825                         | 0                     | 0                       | 5                           | 0                                       | 632,671                       | 339,378                     | 972,049    |  |
| 3634     | Electric Housewares & Fans            | 555,621                    | 110                             | 0                     | 0                       | 0                           | 760                                     | 556,491                       | 1,250                       | 557,741    |  |
| 3651     | Household Audio & Video Equipment     | 443,614                    | 250                             | 0                     | 0                       | 0                           | 0                                       | 443,864                       | 2,604                       | 446,468    |  |
| 3643     | Current-carrying Wiring Devices       | 169,241                    | 505                             | 0                     | 0                       | 0                           | 361                                     | 170,107                       | 237,174                     | 407,281    |  |
| 3624     | Carbon & Graphite Products            | 342,874                    | 274                             | 0                     | 0                       | 0                           | 4,110                                   | 347,258                       | 53,653                      | 400,911    |  |
| 3694     | Engine Electrical Equipment           | 175,629                    | 0                               | 0                     | 0                       | 22,849                      | 45,844                                  | 244,322                       | 105,717                     | 350,039    |  |
| 3644     | Noncurrent-carrying Wiring Devices    | 298,675                    | 18                              | 0                     | 0                       | 0                           | 600                                     | 299,293                       | 7,734                       | 307,027    |  |
| 3646     | Commercial Lighting Fixtures          | 227,393                    | 0                               | 0                     | 0                       | 0                           | 0                                       | 227,393                       | 250                         | 227,643    |  |
| 3699     | Electrical Equipment & Supplies, nec* | 138,515                    | 582                             | 0                     | 0                       | 1,500                       | 510                                     | 141,107                       | 51,952                      | 193,059    |  |
| 3678     | Electronic Connectors                 | 164,356                    | 75                              | 0                     | 0                       | 0                           | 2,025                                   | 166,456                       | 26,446                      | 192,902    |  |
| 3676     | Electronic Resistors                  | 60,053                     | 0                               | 0                     | 0                       | 40,318                      | 0                                       | 100,371                       | 78,797                      | 179,168    |  |
| 3613     | Switchgear & Switchboard Apparatus    | 118,157                    | 4,895                           | 0                     | 0                       | 0                           | 506                                     | 123,558                       | 41,590                      | 165,148    |  |
| 3645     | Residential Lighting Fixtures         | 153,711                    | 0                               | 0                     | 0                       | 0                           | 0                                       | 153,711                       | 5,900                       | 159,611    |  |
| 3629     | Electrical Industrial Apparatus, nec* | 93,486                     | 421                             | 0                     | 0                       | 0                           | 10                                      | 93,917                        | 62,649                      | 156,566    |  |
| 3631     | Household Cooking Equipment           | 80,830                     | 268                             | 0                     | 0                       | 0                           | 0                                       | 81,098                        | 69,869                      | 150,967    |  |
| 3677     | Electronic Coils & Transformers       | 133,079                    | 5                               | 0                     | 0                       | 0                           | 0                                       | 133,084                       | 1,750                       | 134,834    |  |
| 3661     | Telephone & Telegraph Apparatus       | 122,372                    | 5                               | 0                     | 0                       | 0                           | 0                                       | 122,377                       | 4,006                       | 126,383    |  |
| 3648     | Lighting Equipment, nec               | 31,858                     | 2,030                           | 0                     | 0                       | 0                           | 0                                       | 33,888                        | 59,300                      | 93,188     |  |
| 3647     | Vehicular Lighting Equipment          | 70,206                     | 0                               | 0                     | 0                       | 0                           | 0                                       | 70,206                        | 16,754                      | 86,960     |  |
| 3625     | Relays & Industrial Controls          | 81,541                     | 10                              | 0                     | 0                       | 0                           | 0                                       | 81,551                        | 4,588                       | 86,139     |  |
|          | Invalid SIC Code within SIC 36        | 49,571                     | 0                               | 0                     | 0                       | 0                           | 0                                       | 49,571                        | 750                         | 50,321     |  |
| 3669     | Communications Equipment, nec*        | 40,346                     | 0                               | 0                     | 0                       | 0                           | 0                                       | 40,346                        | 7,248                       | 47,594     |  |
| 3635     | Household Vacuum Cleaners             | 17,255                     | 0                               | 0                     | 0                       | 0                           | 0                                       | 17,255                        | 500                         | 17,755     |  |
| 3663     | Radio & TV Communications Equipment   | 10,580                     | 0                               | 0                     | 0                       | 0                           | 255                                     | 10,835                        | 5                           | 10,840     |  |
| 3652     | Prerecorded Records & Tapes           | 5,479                      | 0                               | 0                     | 0                       | 5                           | 5                                       | 5,489                         | 5,081                       | 10,570     |  |
|          | Total for SIC Code 36                 | 23,753,157                 | 1,462,615                       | 22                    | 5                       | 210,430                     | 225,890                                 | 25,652,119                    | 9,320,758                   | 34,972,877 |  |

**Note:** On-site Releases from Section 5 of Form R. Off-site Releases from Section 6 (off-site transfers to disposal) of Form R. Forms with more than one 4-digit SIC code within SIC code 36 are assigned to the "multiple" category.

\* nec: not elsewhere classified.

\*\* Due to a facility reporting an incorrect SIC code and an error associated with quantities of waste managed reported by the same facility, the printed circuit board industry (SIC code 3672) was improperly ranked. This table now reflects the correct ranking.

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Table 9-7. The 15 Chemicals with the Largest Total On-site and Off-site Releases, 1996: Electrical Equipment, SIC Code 36, Revised

| CAS Number | Chemical                                | Total Air Emissions<br>Pounds | Surface Water Discharges<br>Pounds | Underground Injection   |                            | On-site Land Releases               |                                       | Total On-site Releases<br>Pounds | Off-site Releases                        | Total On- and Off-site Releases<br>Pounds |
|------------|---|-------------------------------|------------------------------------|-------------------------|----------------------------|-------------------------------------|---------------------------------------|----------------------------------|--|---|
|            |   |                               |                                    | Class I Wells<br>Pounds | Class II-V Wells<br>Pounds | RCRA Subtitle C Landfills<br>Pounds | Other On-site Land Releases<br>Pounds |                                  | Transfers Off-site to Disposal<br>Pounds |   |
| 1330-20-7  | Xylene (mixed isomers)                  | 5,364,033                     | 250                                | 0                       | 0                          | 0                                   | 13,647                                | 5,377,930                        | 20,764                                   | 5,398,694                                 |
| —          | Nitrate compounds                       | 8,065                         | 1,395,444                          | 0                       | 0                          | 0                                   | 0                                     | 1,403,509                        | 1,113,948                                | 2,517,457                                 |
| —          | Glycol ethers                           | 2,415,624                     | 12,508                             | 0                       | 0                          | 0                                   | 750                                   | 2,428,882                        | 66,380                                   | 2,495,262                                 |
| 1717-00-6  | 1,1-Dichloro-1-fluoroethane (HCFC-141b) | 2,387,085                     | 0                                  | 0                       | 0                          | 0                                   | 0                                     | 2,387,085                        | 50,838                                   | 2,437,923                                 |
| —          | Manganese compounds                     | 107,793                       | 647                                | 0                       | 0                          | 0                                   | 5                                     | 108,445                          | 2,072,948                                | 2,181,393                                 |
| 108-88-3   | Toluene                                 | 2,094,414                     | 385                                | 0                       | 0                          | 0                                   | 7,002                                 | 2,101,801                        | 32,506                                   | 2,134,307                                 |
| —          | Zinc compounds                          | 47,540                        | 3,335                              | 0                       | 0                          | 19,634                              | 58,163                                | 128,672                          | 1,924,162                                | 2,052,834                                 |
| 79-01-6    | Trichloroethylene                       | 2,037,091                     | 7                                  | 0                       | 0                          | 0                                   | 0                                     | 2,037,098                        | 2,855                                    | 2,039,953                                 |
| 78-93-3    | Methyl ethyl ketone                     | 1,149,824                     | 770                                | 0                       | 0                          | 0                                   | 0                                     | 1,150,594                        | 251                                      | 1,150,845                                 |
| 75-09-2    | Dichloromethane                         | 1,123,964                     | 0                                  | 0                       | 0                          | 0                                   | 1,810                                 | 1,125,774                        | 23,667                                   | 1,149,441                                 |
| —          | Lead compounds*                         | 67,278                        | 3,494                              | 0                       | 0                          | 62,380                              | 5,452                                 | 138,604                          | 863,323                                  | 1,001,927                                 |
| 7664-41-7  | Ammonia                                 | 835,814                       | 16,950                             | 0                       | 0                          | 5                                   | 0                                     | 852,769                          | 73,276                                   | 926,045                                   |
| 127-18-4   | Tetrachloroethylene                     | 800,348                       | 1                                  | 0                       | 0                          | 0                                   | 0                                     | 800,349                          | 8,216                                    | 808,565                                   |
| 68-12-2    | N,N-Dimethylformamide                   | 784,201                       | 0                                  | 0                       | 0                          | 1,350                               | 0                                     | 785,551                          | 2,810                                    | 788,361                                   |
| —          | Barium compounds                        | 7,790                         | 1,572                              | 0                       | 0                          | 0                                   | 756                                   | 10,118                           | 764,898                                  | 775,016                                   |
|            | Subtotal                                | 19,230,864                    | 1,435,363                          | 0                       | 0                          | 83,369                              | 87,585                                | 20,837,181                       | 7,020,842                                | 27,858,023                                |
|            | Total for SIC Code 36                   | 23,753,157                    | 1,462,615                          | 22                      | 5                          | 210,430                             | 225,890                               | 25,652,119                       | 9,320,758                                | 34,972,877                                |

Note: On-site Releases from Section 5 of Form R. Off-site Releases from Section 6 (off-site transfers to disposal) of Form R.

\* Due to a facility reporting an incorrect amount of off-site releases of lead compounds, this chemical is improperly ranked. This table now reflects the correct ranking.

### Hadco Corporation's Participation in EPA's 33/50 Program

In Chapter 9 of the 1996 Public Data Release, Hadco Corporation ranked second in decreases of releases with a net reduction of 2.3 million pounds. EPA incorrectly reported that Hadco attributed much of its reduction to participation in Project XL. In fact, Hadco attributes much of its reduction to EPA's 33/50 Program. Initially committing to a 98% reduction in 33/50 chemicals, Hadco now reports a 100% reduction.

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**Table 9-2. Multiple SIC Codes, 1996: Electrical Equipment, SIC Code 36**

| SIC Codes                     | Total Forms Number | Form As Number | Total On-site Releases Pounds | Total Off-site Releases Pounds | Total On- and Off-site Releases Pounds | Total Other On-site Waste Management Pounds | Total Transfers Off-site for Further Waste Management Pounds | Total Production-related Waste Pounds | Non-Production-related Waste Pounds |
|-------------------------------|--------------------|----------------|-------------------------------|--------------------------------|--|---|--|---------------------------------------|-------------------------------------|
| 3612 3621                     | 3                  | 0              | 14,400                        | 17                             | 14,417                                 | 0   | 193,353  | 207,770                               | 0                                   |
| 3612 3621 3699                | 4                  | 0              | 0                             | 0                              | 0                                      | 0   | 440,013  | 872,527                               | 0                                   |
| 3612 3625                     | 1                  | 0              | 0                             | 0                              | 0                                      | 0   | 21,967   | 0                                     | 0                                   |
| 3613 3625                     | 6                  | 0              | 3,445                         | 1,005                          | 4,450                                  | 104   | 778,031  | 782,739                               | 0                                   |
| 3613 3629                     | 3                  | 1              | 15,840                        | 0                              | 15,840                                 | 0   | 23,363   | 39,103                                | 0                                   |
| 3621 3624                     | 4                  | 0              | 1,516                         | 11,705                         | 13,221                                 | 0   | 1,625,010  | 1,628,335                             | 0                                   |
| 3621 3625                     | 2                  | 0              | 8,772                         | 0                              | 8,772                                  | 4,633                                       | 4,795  | 208,019                               | 0                                   |
| 3621 3634 3672                | 1                  | 0              | 17,969                        | 0                              | 17,969                                 | 3,812                                       | 0  | 21,781                                | 0                                   |
| 3621 3694                     | 7                  | 0              | 81,122                        | 27,779                         | 108,901                                | 29,000                                      | 1,445,602  | 1,542,038                             | 0                                   |
| 3625 3643                     | 3                  | 0              | 17,388                        | 3,332                          | 20,720                                 | 18,902                                      | 356,580  | 396,185                               | 0                                   |
| 3625 3651 3661 3663 3669 3699 | 1                  | 1              | 0                             | 0                              | 0                                      | 0   | 0  | 0                                     | 0                                   |
| 3625 3676                     | 2                  | 0              | 15,360                        | 0                              | 15,360                                 | 440   | 0  | 17,200                                | 0                                   |
| 3629 3643                     | 5                  | 0              | 21,249                        | 1,700                          | 22,949                                 | 0   | 627,000  | 728,942                               | 0                                   |
| 3631 3632                     | 13                 | 0              | 210,421                       | 22,019                         | 232,440                                | 83,890                                      | 516,890  | 891,410                               | 0                                   |
| 3631 3632 3633 3639           | 16                 | 0              | 263,945                       | 44,330                         | 308,275                                | 7,900                                       | 936,150  | 1,252,325                             | 0                                   |
| 3632 3639                     | 10                 | 0              | 828,525                       | 750                            | 829,275                                | 500,700                                     | 73,593   | 1,406,304                             | 0                                   |
| 3641 3646 3648                | 1                  | 0              | 255                           | 0                              | 255                                    | 0   | 60,600   | 60,600                                | 0                                   |
| 3641 3694                     | 1                  | 0              | 10                            | 11                             | 21                                     | 0   | 62,638   | 62,653                                | 0                                   |
| 3643 3644                     | 9                  | 0              | 1,022                         | 21,871                         | 22,893                                 | 3,100                                       | 930,199  | 953,562                               | 0                                   |
| 3643 3644 3646                | 5                  | 0              | 33                            | 0                              | 33                                     | 0   | 184,381  | 207,884                               | 0                                   |
| 3645 3646                     | 5                  | 0              | 10,762                        | 0                              | 10,762                                 | 160,038                                     | 19,237   | 189,804                               | 0                                   |
| 3646 3648                     | 4                  | 0              | 4                             | 975                            | 979                                    | 0   | 7,211  | 7,699                                 | 0                                   |
| 3648 3692                     | 1                  | 0              | 130                           | 2,600                          | 2,730                                  | 36,000                                      | 20,600   | 59,730                                | 0                                   |
| 3651 3671 3672 3679 3694      | 9                  | 0              | 14,100                        | 71,000                         | 85,100                                 | 613,000                                     | 466,650  | 1,159,900                             | 0                                   |
| 3651 3672                     | 2                  | 0              | 250                           | 0                              | 250                                    | 3,380                                       | 250  | 3,395                                 | 0                                   |
| 3652 3695                     | 1                  | 0              | 71,670                        | 6                              | 71,676                                 | 19,816                                      | 44,897   | 136,305                               | 154                                 |
| 3661 3672                     | 7                  | 0              | 9,514                         | 0                              | 9,514                                  | 249,000                                     | 1,936,862  | 2,195,734                             | 0                                   |
| 3661 3679                     | 2                  | 0              | 67,705                        | 0                              | 67,705                                 | 0   | 0  | 73,450                                | 0                                   |
| 3662 3679                     | 2                  | 0              | 260                           | 0                              | 260                                    | 0   | 538,048  | 269,043                               | 0                                   |
| 3663 3671                     | 15                 | 0              | 5,858                         | 18,949                         | 24,807                                 | 297,640                                     | 57,646   | 374,945                               | 0                                   |
| 3663 3671 3679                | 5                  | 0              | 7,115                         | 32,100                         | 39,215                                 | 421,710                                     | 603,285  | 1,031,120                             | 0                                   |
| 3663 3678 3679                | 6                  | 0              | 150                           | 15,656                         | 15,806                                 | 39,109                                      | 8,388,585  | 8,443,591                             | 0                                   |
| 3663 3679                     | 1                  | 0              | 0                             | 0                              | 0                                      | 28,000                                      | 0  | 28,000                                | 0                                   |
| 3669 3672                     | 4                  | 0              | 8,505                         | 5                              | 8,510                                  | 84,763                                      | 105,732  | 199,010                               | 0                                   |
| 3669 3694                     | 1                  | 0              | 0                             | 0                              | 0                                      | 0   | 9,400  | 9,400                                 | 0                                   |
| 3671 3674                     | 1                  | 0              | 4,530                         | 0                              | 4,530                                  | 0   | 40,630   | 45,200                                | 0                                   |
| 3671 3679                     | 1                  | 0              | 0                             | 0                              | 0                                      | 0   | 22,918   | 22,918                                | 0                                   |
| 3672 3674                     | 4                  | 0              | 2,596                         | 0                              | 2,596                                  | 15,549                                      | 47,541   | 65,046                                | 0                                   |
| 3672 3678                     | 2                  | 0              | 0                             | 0                              | 0                                      | 32,039                                      | 2,088  | 34,127                                | 0                                   |
| 3672 3679                     | 11                 | 0              | 34,294                        | 0                              | 34,294                                 | 180,298                                     | 309,812  | 524,223                               | 0                                   |
| 3672 3699                     | 1                  | 0              | 0                             | 0                              | 0                                      | 0   | 24,385   | 24,385                                | 0                                   |
| 3674 3679                     | 8                  | 0              | 8,301                         | 0                              | 8,301                                  | 247,784                                     | 87,335   | 343,087                               | 150                                 |
| 3675 3676                     | 8                  | 0              | 243,511                       | 42,887                         | 286,398                                | 8,300                                       | 178,797  | 472,053                               | 0                                   |
| 3675 3677                     | 3                  | 0              | 223,843                       | 0                              | 223,843                                | 46,761                                      | 388,114  | 658,363                               | 0                                   |
| 3675 3679                     | 1                  | 0              | 255                           | 104,822                        | 105,077                                | 0   | 30,777   | 136,109                               | 0                                   |
| 3691 3692                     | 6                  | 0              | 4,817                         | 0                              | 4,817                                  | 82,851                                      | 355,494  | 441,169                               | 0                                   |
| 3694 3699                     | 4                  | 0              | 760                           | 120,250                        | 121,010                                | 9,000                                       | 48,257   | 177,520                               | 0                                   |
| Total for SIC Code 36         | 212                | 2              | 2,220,202                     | 543,769                        | 2,763,971                              | 3,227,519                                   | 22,014,716   | 28,404,703                            | 304                                 |

**Note:** On-site Releases from Section 5 of Form R. On-site Waste Management from Section 8 of Form R. Off-site Releases are transfers off-site to disposal from Section 6 of Form R. Total Transfers Off-site for Further Waste Management from Section 6 of Form R. Total Production-related Waste sums Section 8 of Form R, except: Non-production-related Waste (remedial/catastrophic incidents).

In Chapter 9 of the first volume of the *1996 Toxics Release Inventory Public Data Release* (published May 1998), the table that presented data from TRI forms reporting more than one SIC code in SIC code 36 in 1996 (Table 9-2 on page 335) contained incorrect data. The total row in Table 9-2 was correct, but the detailed data were not. This errata sheet presents the correct data, above.

One sentence in the first full paragraph on page 335 reflected the incorrect data. The revised text follows.

Table 9-2 examines TRI reporting from the 212 forms submitted with more than one code within SIC code 36. Printed circuit boards (SIC code 3672) appeared in nine combinations. Forms reporting multiple SIC codes are a smaller factor in electrical equipment manufacture than in many other sectors. This indicates more of a concentration in this sector on single or closely related product lines.