Illinois
Environmental
Protection Agency

Office of Chemical Safety
1021 N. Grand Avenue East
Springfield, IL 62702

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ELEVENTH ANNUAL

TOXIC CHEMICAL REPORT

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A summary of information contained in the
Toxic Chemical Report Forms for calendar year 1997

APRIL 1999

Illinois Environmental Protection Agency
Springfield, Illinois

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PREFACE

Toxic chemical release reporting by facilities in Illinois continues to indicate overall reductions in releases of harmful chemicals to the environment. The most impressive change has been a 57 percent decrease in air emissions of carcinogens since 1988, including a decrease of 18 percent in 1997 alone.

This significant reduction in emissions of cancer-causing chemicals into our air is the result of compliance with federal and state regulatory programs, and voluntary actions by companies sometimes in response to citizen involvement at the state and local level. The Agency continues to make emissions reductions a top priority.

Releases of all toxic chemicals have decreased by approximately 38 percent from 1988 through 1997. The amount recycled has exceeded the amount released since 1992. At the top of the pollution prevention hierarchy, facilities which have indicated using various methods to reduce the generation of toxic chemical releases at the source, such as substitution of raw materials which are not toxic and reformulating raw material streams, have reported release reductions of nearly 88 percent for these chemicals from 1991 through 1997.

The Toxics Release Inventory continues to be an important tool in evaluating trends of all toxics releases to the environment.

Tom Skinner, Director

Illinois EPA

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EXECUTIVE SUMMARY

More than 2,100 unique facilities have reported toxic chemical release information to the Illinois EPA since the reporting program mandated by federal law began in 1987. Not including 1987, an average of 1,300 facilities have reported each year, with the actual number ranging between 1,092 and 1,398.

For calendar year 1997, 1,092 facilities submitted 3,410 individual toxic chemical release reports showing a total of 143.8 million pounds of releases and transfers. Zinc compounds had the highest reported releases and transfers, at 31.5 million pounds. The combined total of fugitive and stack air emissions topped all other environmental areas at 64.6 million pounds. Facilities in Standard Industrial Classification (SIC) Code 3312 (Steel Works, Blast Furnaces, Coke Ovens and Rolling Mills) exceeded all other industrial categories with reported releases and transfers of 40.3 million pounds.

In order to perform meaningful trend analyses of total toxic chemical releases, including offsite transfers, the Illinois EPA utilizes information reported by facilities for toxic chemicals which have been reportable in the same form for each of the years 1988-1997. Offsite transfers for recycle or energy recovery, reportable for 1991 and later years, are not considered.

A total of 760 facilities have reported every year from 1988-1997, which represent approximately 58 percent of all facilities reporting on an annual average basis. These facilities report approximately 79 percent of total releases each year. From 1988 through 1997, total releases for all reporting facilities have decreased by 38 percent while total releases for the 760 facilities have decreased by 31 percent.

The toxic chemical with the greatest reduction from 1988-1997 was toluene (73 percent decrease), which is a teratogen, reproductive toxin and fetal toxin. Facilities in the SIC category 2821 (Plastic Materials, Synthetic Resins and Nonvulcanizable Elastomers) as a group had the greatest reduction (61 percent) in this time period.

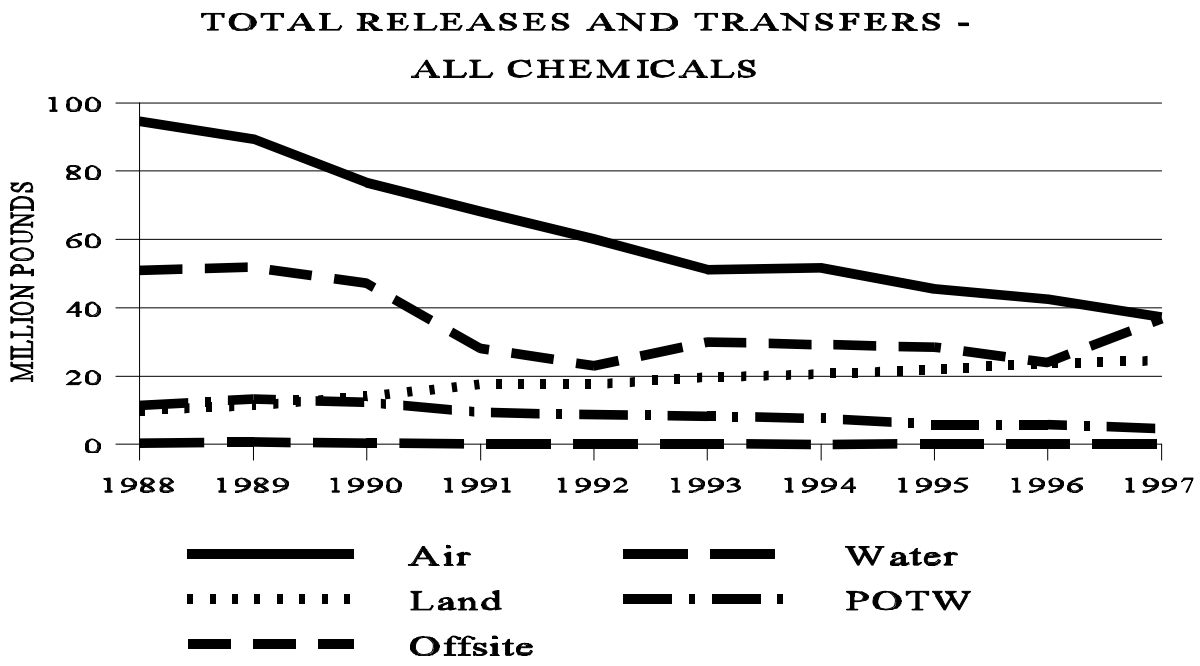
Total releases and transfers increased 8 percent from 1996 to 1997. This increase was mostly attributable to increases in offsite transfers of zinc compounds for disposal from a small number of facilities in SIC category 3312, coupled with decreases in offsite transfers of zinc compounds for recycle from those same facilities.

Air emissions of known or probable human carcinogens have decreased by 57 percent from 1988 to 1997, and by 18 percent from 1996 to 1997. The single chemical with the largest decrease in both periods of time was dichloromethane. Facilities in SIC category 3312 had the greatest decrease in air emissions of carcinogens from 1988 to 1997, resulting primarily from declines in emissions of benzene and trichloroethylene.

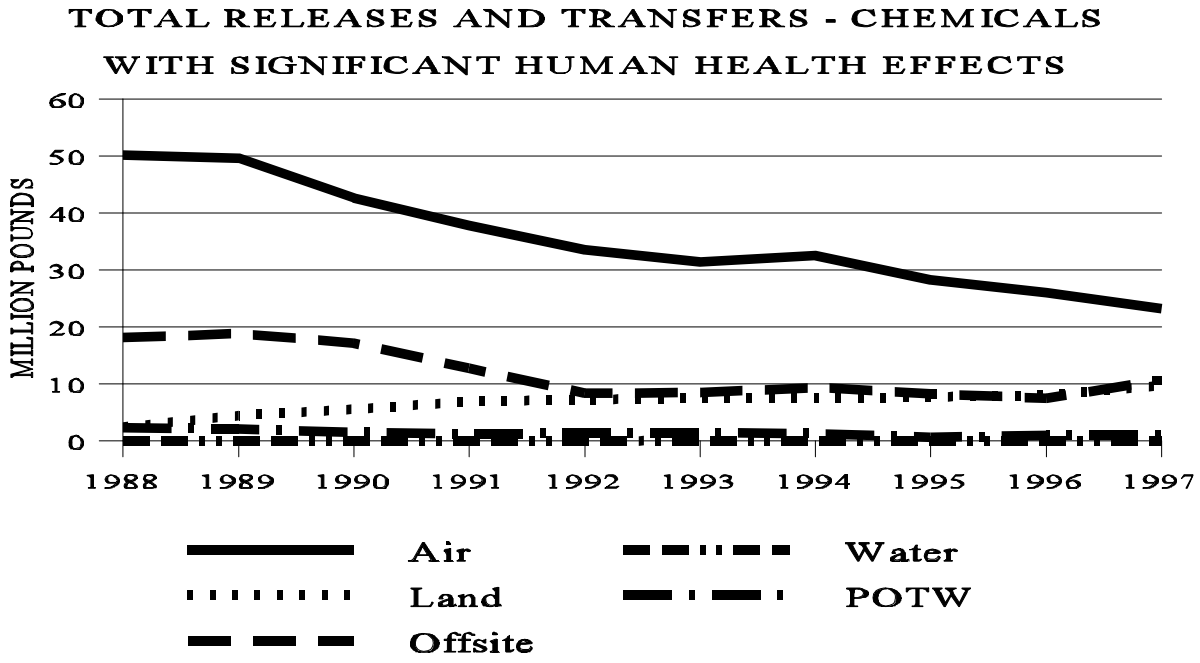
The toxic chemical with the greatest amount of releases from 1988 through 1997 was zinc compounds, totalling 199.7 million pounds. Considering only those toxic chemicals with significant human health effects, i.e. which are known or probable human carcinogens, teratogens, fetal toxicants and/or reproductive toxicants, toluene had the highest total of 112.5 million pounds.

The group of facilities in SIC Code 3312 reported 294.6 million pounds of releases from 1988 through 1997, the greatest for any industrial category, and also had the highest total of 93.3 million pounds in the period for those toxic chemicals with significant human health effects.

Facilities located in ZIP Code 61832 in Danville (Vermilion County) reported the highest total of air emissions from 1988 through 1997, totalling 37.2 million pounds. Considering only those toxic chemicals with significant human health effects, facilities located in ZIP Code 61832 also reported the highest total of 37.2 million pounds.



*** Underground Injection is virtually zero for all years.**



*** Underground Injection is virtually zero for all years.**

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INTRODUCTION

EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT

Congress adopted Title III as part of the Superfund Amendments and Reauthorization Act of 1986 (SARA). Title III is known as the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA). EPCRA establishes programs to provide the public with important information on the hazardous chemicals in their communities, as well as providing emergency planning and notification requirements which help protect the public in the event of a release of hazardous chemicals.

SECTION 313 (Annual Toxic Chemical Release Reporting)

Section 313 of EPCRA requires annual reports to be filed by certain companies which release any of over 600 listed toxic chemicals and compounds to the environment. This reporting covers routine releases that occur as a result of normal business operations within a calendar year, and non-routine or accidental releases.

In 1987, the Illinois General Assembly amended the Illinois Environmental Protection Act to provide for a coordinated state implementation of Section 313. This amendment also established an orderly procedure for the public to access this information. Under the Act, the Illinois Environmental Protection Agency (IEPA) is charged with the administration of Section 313 which requires industry to report annually to the U.S. EPA and state governments via the toxic chemical release form (Form R).

Form R includes all routine and non-routine releases of toxic chemicals to the air, water and land, as well as transfers of wastes to off-site treatment, storage and disposal facilities. The information reported is not necessarily derived from actual monitoring or measurements, but may be estimated from published emission factors, material balance calculations, or engineering calculations.

Form R information reported to the Illinois EPA is entered into a computer data base known as the Illinois Toxic Chemical Inventory (TCI), as required by the Illinois Environmental Protection Act.

SUMMARY OF FORM R

A complete copy of Form R is enclosed as Appendix A. In general, the information to be provided by the reporting facility can be summarized as follows:

- The name, location and type of business
- Whether the chemical is manufactured, processed, or otherwise used and the general categories of use of the chemical
- An estimate of the maximum amounts of the toxic chemical present at the facility at any time during the preceding year
- Waste treatment/disposal methods and efficiency of methods for each wastestream
- Quantity of the chemical entering each environmental medium (air, water, land) annually
- Source reduction and recycling activities for the toxic chemical
- A certification by a senior official that the report is complete and accurate

EXPLANATION OF TERMS

In order to better understand the form and references made to the information reported, selected terms have been defined as follows:

"**SIC Code**" - A two, three or four digit number code designated by the federal Office of Management and Budget in its "SIC Manual" which identifies an industry or industrial grouping. For example, the two-digit code "28" refers to the major group, "Chemicals and Allied Products," the three-digit "281" refers to the industry group, "Industrial Inorganic Chemicals," and the four-digit code "2812" refers to the specific industry, "Alkalies and Chlorine." The four-digit code identifies a specific facility rather than company.

"**Publicly Owned Treatment Works (POTW)**" - A wastewater treatment facility which is owned by a unit of government.

"**Off-Site Locations**" - Locations outside the boundaries of a facility to which wastes are transported for treatment or disposal.

"**Chemical Abstracts Service Registry Number (CAS #)**" - A numeric designation assigned by the American Chemical Society's Chemical Abstracts Service which uniquely identifies a chemical or chemical compound.

"**Fugitive or non-point air emissions**" - Releases to the air that are not conveyed through stacks, vents, pipes, ducts or any other confined air stream. Examples include leakage from valves, pump seals, flanges, compressors, sampling connections, open ended lines, evaporative losses from surface impoundments and production lines, and releases from building ventilation systems.

"**Stack or point air emissions**" - Releases to the air which are conveyed through stacks, vents, ducts, pipes or other confined air streams, and includes storage tank emissions and air releases from control equipment.

"**Wastestream**" - An ongoing generation of waste which results from an industrial process or originates in an industrial area and which can be consistently described by the same physical and chemical characteristics.

"**Releases to land**" - Refers to landfilling, land treatment/application farming, surface impoundment or any other releases of a toxic chemical to land within the boundaries of a facility.

FACILITIES COVERED

Facilities subject to reporting under Section 313 are those that have 10 or more full-time employees, that are in primary SIC codes 20 through 39, and that manufactured, processed or otherwise used a listed toxic chemical or chemical category in excess of specified threshold quantities.

The thresholds for reporting are different for users and manufacturers or processors of chemicals. For 1989 and subsequent reporting years, facilities using listed toxic chemicals in quantities over 10,000 pounds and facilities manufacturing or processing these chemicals in excess of 25,000 pounds are required to submit a Form R to both the Illinois EPA and the U.S. EPA by July 1 of the following year.

The SIC codes, which partly determine coverage, exclude utility companies, POTWs, and waste treatment, storage and disposal facilities from reporting under Section 313.

COMPLIANCE

In order to manage and process all of the data being supplied by industry under Section 313, the Illinois EPA developed a system of quality control. Obvious errors in the submissions were considered to be either "entry" or "technical" errors.

"Entry" errors, such as pages missing from the Form R or a submittal on a wrong form, prohibited the data from being entered into the Agency's computer database. The Illinois EPA contacts the facility with a letter or by phone asking the owner or operator to correct the noted deficiency.

"Technical" errors are handled much the same way; however, the Agency is able to initially enter the data in the computer for later edits once the facility provides the correct information. It has been noted that numerous "technical" errors are made by facilities in the areas of CAS numbers and chemical name spellings.

To ensure data accuracy and completeness and timely submission of data, various compliance activities are planned or have been carried out.

LIMITATIONS ON USE OF INFORMATION

It is emphasized that the reported toxic chemical release information on which this annual report is based includes total annual amounts of specific chemicals which are released to the environment. Reporting of information about concentrations or rate of release of toxic chemicals is not currently required. For that reason, this information cannot be used to assess specific instances of chemical exposure. Other factors such as meteorologic information must be known as well for such an assessment. See the next section for additional information.

CHEMICAL HAZARD ASSESSMENT

Having the data now available under EPCRA is only the first step in assessing the potential chemical hazards in Illinois. In order to comprehend this information and begin to realize how it may impact communities, other factors must be considered. The chemical properties and associated toxicology of the chemicals of concern should be considered.

TOXICOLOGY

In order to assess the significance of a chemical release of any kind, it is necessary to discuss some fundamentals of toxicology. Above all, it is necessary to appreciate the most basic concept of toxicology, "the dose makes the poison."

This fact indicates that all substances are poisons, even common items like table salt and sugar, if the dose is high enough. On the other hand, some substances are poisonous at relatively low doses. Many of the chemicals addressed by EPCRA Section 313 fall into this category.

Even with relatively poisonous substances no harm can occur unless there has been exposure to the substance (the dose). If there is no exposure, no matter how potent the poison, there can be no toxic response. For most types of chemical exposures, the body has defense mechanisms to protect against or repair the damage done by the chemical. As long as the protection and repair mechanisms are able to keep up with the effects of the chemical, no adverse effect is seen.

Once this threshold is exceeded, however, the magnitude of the response will be in direct proportion to the magnitude of the exposure. Eventually, if the exposure is long enough or severe enough, the chemical causes failure of some organs or organ systems, resulting in incapacitation and ultimately death of the organism. This points out two concepts in toxicology, the concept of a threshold of toxicity and the concept of a target organ of a chemical.

For certain types of toxic actions, it is generally accepted that, in theory, any amount of toxin, even the smallest, has an effect. Certain types of cancer and reproductive effects fall into this "no threshold" category.

Specifically, it is thought that this theory pertains to damage of genetic material by chemicals, by biological agents such as certain viruses, or by physical agents such as ionizing radiation.

Repair mechanisms are known to exist for genetic material, and damage often occurs in areas of the genetic material having no expressed function. Nevertheless, the theory holds that even one unrepaired injury to a key area of the genetic material can result in a mutated cell. If this cell continues to divide, it will produce a colony of genetically different cells. The consequences of this type of damage can be expressed as a birth defect, a mutation, a tumor, or the damage can cause a "silent mutation" in which there is no obvious effect (if the damage occurs in an area of the genetic material having no expressed function).

Since it is impossible to detect a single injury or even small numbers of injuries to the genetic material at this time, scientific studies to determine whether a chemical can cause genetic damage are designed to expose laboratory test organisms to high doses of the chemical in order to maximize the chances of seeing a response. For cancer tests, the results of positive tests at the high doses (doses which are almost always much larger than expected levels of human exposures) are then extrapolated downward to doses which are relevant to expected human exposures.

These extrapolations are usually expressed as the extra risk of contracting cancer above the "background" cancer incidence due to exposure to low levels of the chemical, such as one extra chance in 100,000 or one in a million. An extra risk of one chance in a hundred thousand or one in one million is generally considered insignificant, since there exists for everyone a similarly small, unavoidable risk of death due to natural disasters such as floods, tornadoes, lightning, etc.

These concepts of:

1. "the dose makes the poison";
2. the requirement for a route of exposure;
3. there may be specific target organs for a chemical;
4. thresholds exist for some responses; and
5. there are insignificant risk levels for those chemicals for which no threshold is thought to exist;

are concepts which may be used as part of the regulatory control strategy for releases of toxic chemicals to the environment.

As a result of spills, derailments, past disposal practices, industrial accidents, illegal dumping, etc., environmental, public safety and health agencies must on occasion respond to unplanned chemical releases to the environment. In fact, accidental conditions which result in major releases of toxic chemicals to the environment were the driving force behind passage of EPCRAs Community Right-to-Know requirements.

In cases of chemical emergencies it is critical to know the chemical, physical and toxicological properties of the chemical(s) released so that appropriate counter-measures can be undertaken as soon as possible. Knowledge of all important routes of exposure, any critical target organs, any especially sensitive populations, threshold and acutely toxic levels, and antidotes are all important in planning what to do should an emergency arise.

Even in cases which are not of an emergency nature, such as some spill cleanups, illegal dumpings or past disposal practices, it is important to know the toxicological properties of the chemicals involved. Relevant routes of exposure, sensitive organs or populations, threshold levels or levels of insignificance, and the potential fate of the chemicals in all environmental media are important subjects which must be addressed in assessing the amount of cleanup which may be necessary in the incident. In some cases, where similar-acting chemicals are involved, special care must be taken to account for additive effects on sensitive organs.

Information on the toxicological aspects of many chemicals of concern and on toxicology in general can be obtained from the references listed in Appendix B. In addition, Illinois EPA has produced Chemical Information Sheets for certain chemicals which are listed in EPCRA Section 313. This information is summarized in Appendix C.

Many references are available which explain the properties and usage of various chemicals. An abbreviated listing of these references is presented in Appendix D.

ILLINOIS EPA REGULATORY PROGRAMS

The Illinois EPA operates a number of programs which identify, limit, monitor or otherwise control releases of various chemicals including many toxic chemicals regulated under Section 313. The following is a brief summary of those programs.

Bureau of Air

Pollutant Monitoring - A statewide system of air monitoring instruments provides information on various air pollutants either continuously or every two to six days depending on instrument operation.

Permitting - Permits are required for processes and machinery that emit air pollutants. Permit conditions are imposed which are designed to ensure that state emission restrictions are met. Approximately 16,000 such operating permits have been issued for over 9,000 facilities in Illinois.

Chemical releases to the air can occur from point sources such as stacks and vents or from non-point (fugitive) sources such as emissions from open-top holding tanks, wastewater streams or ponds, or from production losses. If these releases are subsequently captured or destroyed, no exposure occurs and, therefore, no toxic response is possible.

For some permitted releases, permit requirements are written to control chemicals of toxicological importance to the extent possible such that any exposure would be at a level of insignificance to the general public. Certain releases not covered by permits can be monitored by the Agency's statewide air monitoring network.

Air Toxics Program - The Agency is delegated to implement and enforce the federal standards under Section 112 of the CAAA which limit the air releases of Hazardous Air Pollutants (HAPs). Expanded air toxics regulation has been authorized by legislation which added Section 9.5 to the Illinois Environmental Protection Act for the purpose of identifying and limiting releases of toxic air contaminants. Pursuant to Section 9.5, the Agency has evaluated a number of toxic air contaminants. As a result of this evaluation, a revised list of 343 chemicals and compounds has been adopted by the Illinois Pollution Control Board (IPCB) as the Illinois Toxic Air Contaminants List. The list consists of Illinois Toxic Air Contaminants, Hazardous Air Pollutants (HAPs) and Great Lakes and Great Waters pollutants.

Compliance/Enforcement - More than 3,000 facility inspections are conducted each year to verify compliance with regulations and permit conditions. Violations are referred to the Office of the Attorney General for prosecution.

Bureau of Land

Pollutant Monitoring - Information on waste stream characteristics, groundwater quality, hydrological and geological parameters and soil contamination are collected by the Illinois EPA and in many instances are also supplied to the Illinois EPA by regulated facilities.

Permitting - Permits are required for persons who treat, store or dispose of certain wastes. Applicants have to demonstrate that landfills are properly designed and constructed so as to prevent or minimize any adverse impacts to human health or the environment. In addition, any special wastes, industrial process waste, pollution control residual, or hazardous wastes, have to be properly identified and analyzed before they can be permitted to be landfilled. In many cases, hazardous wastes have to be recycled, incinerated, treated to certain standards or rendered non-hazardous prior to landfilling. Permits for land disposal facilities require the applicant to monitor groundwater and submit reports to the Agency. The groundwater monitoring programs thus identify whether there have been releases from regulated facilities, and the need for remedial action. Permits have been issued to approximately 190 public and private waste treatment, storage and disposal facilities.

Compliance/Enforcement - To ensure that treatment, storage and disposal facilities continue to meet interim or final operating, monitoring and reporting requirements, on-site investigations, sampling visits and records review are done to verify compliance with regulations and permit conditions. Through non-compliance letters, meeting with the facilities and appropriate referral of enforcement actions compliance is tracked and maintained.

Resource Conservation and Recovery Act (RCRA) - Subtitle C of RCRA provides the authority for the development and implementation of a comprehensive hazardous waste management program. The intent of the Act is to control hazardous wastes; to eliminate environmentally unsound disposal practices; to increase the opportunity for resource conservation and recovery; and to provide for the environmentally acceptable disposal of hazardous wastes.

The Hazardous and Solid Waste Amendments to RCRA in 1984 include, among other changes, the authority to make a facility take corrective action for any release.

Subtitle D of RCRA establishes a voluntary program through which states receive federal technical support to develop and implement solid waste management plans. These plans are intended to promote waste reduction and recycling of solid wastes, and require the closing or upgrading of all environmentally unsound dumps. Additionally, minimum technical standards are in place for all solid waste landfills.

Approximately 200 facilities are subject to regulation under the provisions of RCRA.

Bureau of Water - Division of Water Pollution Control

Pollutant Monitoring - A statewide network of 207 stream monitoring locations is routinely used to assess physical, chemical, biological and bacteriological properties of all surface water and also provides information on ambient conditions and water quality trends. This network is augmented by periodic intensive surveys of the 15 major river basins in the state as well as ongoing programs to measure pollutant levels in sediment and fish flesh.

Permitting - Specific pollutant concentration and mass limitations and monitoring/reporting requirements are incorporated into permits for discharge to surface waters for the approximately 2500 municipal, industrial and commercial dischargers in the state. Chemical releases to surface waters may be permitted if it can be shown that the release will conform to state and federal requirements for technology-based treatment and will not cause or contribute to violations of water quality standards established by the IPCB to protect designated uses of these waters. Thus, it may be required that the chemical be treated, removed, broken down or otherwise controlled to a

point where the remaining amount will not be harmful to humans, fish and other aquatic life and wildlife, depending on the designated use of the body of water. Revisions of the toxic provisions of the state's water quality standards currently before the IPCB are designed to increase the Agency's ability to protect these waters.

Compliance/Enforcement - Field staff visit several hundred facilities a year to determine compliance with permit conditions. Sampling by field staff and subsequent analyses characterize the chemical and physical make-up of the discharge. Biomonitoring and facility-related stream surveys are also used to quantify this impact on aquatic life in the receiving stream. Self-monitoring reports submitted by facilities, as required by permits, are evaluated for compliance. Unresolved violations are referred to the Office of Attorney General for prosecution.

Bureau of Water - Division of Public Water Supplies

Pollutant Monitoring - Monitoring is conducted through regular testing of samples of raw and treated water from each public water supply. Testing includes microbiological, inorganic and organic chemicals, and radiological parameters.

Permitting - Owners or official custodians of facilities that wish to install new equipment or water mains or to modify existing equipment or distribution systems are required to obtain a construction permit. Once construction has been completed, an operating permit must be obtained prior to start of operation before putting new construction into operation. Agency personnel review permit applications to insure proper system design and compliance with applicable regulations. Approximately 1,930 community water supply systems throughout the state are subject to the construction and operating permit requirements of the Agency. Permits are also issued for algae control, for pesticide application upstream of public water supply intakes, and for the waste disposal permit requirements that apply to public water supply treatment wastes.

The Agency administers the minimum and maximum setback zone procedures, which provide for a buffer area between public water supply wells and sources of possible chemical contamination of those wells, and is responsible for the hazard certification program, which registers all sites posing minimum hazard and provides an exemption from setback requirements.

Compliance/Enforcement - Agency field personnel regularly inspect public water supply systems and also respond to complaints and requests for assistance. Technical assistance provided by the Agency has proven to be extremely cost effective in helping supplies maintain adequate operations. In addition, other aspects of the groundwater protection program are conducted by the Agency. In cases of violations of water supply standards, permit requirements or certification requirements, the Agency will initiate enforcement action through the Office of the Attorney General.

Chemical Safety

Emergency Response - Regulations require immediate reporting of emergency releases of many chemicals to the state. The Illinois EPA works within the State response system to provide technical advice to spillers and responding governmental units during response, mitigation and cleanup of incidents involving chemical emergencies. Over 3100 such incidents were handled by the Agency in 1998.

Emergency Preparedness - The Agency also administers certain provisions of the Illinois Chemical Safety Act (ICSA). The ICSA requires facility contingency planning for dealing with releases of chemical substances, and provides for review and recommendations for improvement of contingency plans by the Illinois EPA following significant releases of chemical substances. Approximately 2,300 facilities are regulated under the provisions of the ICSA.

Federal PCB Compliance - The use of certain toxic substances such as Polychlorinated Biphenyls are regulated by the federal government under the authority of the Toxic Substances Control Act. Pursuant to a cooperative agreement, OCS staff conduct compliance inspections of such substances for the U.S. EPA who initiate any subsequent enforcement actions. This is one of the few Agency programs that addresses the use aspect of chemicals in contrast to addressing them as a waste, release or residue.

Compliance/Enforcement - Spills reported as emergencies are evaluated to determine the need for prevention and remediation measures. Cooperation is achieved in most cases, but formal compliance actions or even referral for prosecution are sometimes necessary to obtain the desired relief.

Pollution Prevention

The Illinois Pollution Prevention Act was passed in 1992. This act may lead to new approaches to preventing pollution in Illinois. The Toxic Pollution Prevention Act of 1989 provides that manufacturing industries in Illinois may elect to develop toxic pollution prevention innovation plans in order to reduce the releases of toxic substances by various manufacturing processes which operate in the state. The Illinois EPA is to concur in innovation plans which will be effective in preventing toxic pollution, provided the plan will achieve the level of toxic pollution prevention of other available processes, and provided the plan will not reasonably be expected to have any significant adverse effect on public health or the environment.

The Illinois Materials Exchange Service, operated by the Agency, identifies potential waste materials for which a facility is attempting to find a potential user so that the materials can be recycled instead of being discarded as a waste. The Illinois EPA also identifies potential waste materials which are being sought by facilities for use in their process as a raw material.

The Illinois EPA also operates an internship program in cooperation with several universities, in an effort to work with Illinois industries to identify opportunities to reduce the generation of waste through the manufacturing process.

UTILIZATION OF FORM R DATA

Data reported on Form R has been utilized in many ways. Some examples are as follows:

AIR TOXICS PROGRAM

Illinois EPA's Bureau of Air utilizes the Agency's Section 313 database to determine quantities of stack and fugitive air emissions of reported substances to support continuing development of regulatory proposals in response to legislation passed in 1987 to address air toxics. The Bureau of Air also utilizes Form R data to identify facilities for regulation under delegated provisions of the federal Clean Air Act Amendments.

ILLINOIS CHEMICAL SAFETY ACT (ICSA)

Section 313 (Form R) data is utilized in the process of adding facilities for coverage under the ICSA. Form R data is also being reviewed to determine compliance with the ICSA by facilities reporting under Section 313.

STORM WATER PERMITS

Form R data is used to identify facilities for storm water permitting activities under the federal Clean Water Act Amendments.

HAZARDOUS WASTE SITE OPERATIONS

Form R information is used by the Illinois EPA's Bureau of Land to identify toxic chemicals present at hazardous waste sites for a number of programmatic reasons.

POLLUTION PREVENTION

Form R data is being used to prioritize facilities for initiatives contained in the Illinois Toxic Pollution Prevention Act. Beginning with reporting year 1991, Form R data is being utilized as a tool for analyzing pollution prevention efforts.

NON-ROUTINE RELEASES

Beginning with reporting year 1991, Form R information is being utilized to verify that appropriate emergency notification has been given by facilities which have experienced non-routine releases of toxic chemicals.

FREEDOM OF INFORMATION ACT

Various individuals and citizen groups have requested Form R data for a variety of purposes, including generation of a report to a citizen groups constituency. Many such requests are made to support site investigations related to property transfer.

ENVIRONMENTAL TOXICOLOGY ACT

The Illinois Department of Public Health may use Form R data as input to the health assessments mandated by this Act for Superfund and Clean Illinois sites.

HEALTH AND HAZARDOUS SUBSTANCES REGISTRY ACT

The Illinois Department of Public Health has requested and received Form R data to use as inputs to this Registry.

INFORMATION SUPPORT DURING CHEMICAL EMERGENCIES

The Illinois EPA has used Form R data to determine what chemicals might have been released during facility chemical emergencies involving fire or explosion.

LOCAL SAFETY ACTIVITIES

In addition to handling planning and response activities under the Illinois Chemical Safety Act, local governments have been actively developing and pursuing emergency response and preparedness capabilities under Title III. Local officials used Form R data as input to their emergency response plans.

CHEMICAL EXPOSURE SCREENING

Local public health departments have requested identification of facilities in a certain area which release specific chemicals for the purpose of targeting exposure screening for facility employees.

ENVIRONMENTAL PERFORMANCE

The Illinois EPA uses Form R data as indicators of environmental performance in its Annual Environmental Conditions Report.

OTHER USES

An industrial trade association has requested pollution prevention information from Form Rs for some of its member facilities.

Form R data from the Illinois Toxic Chemical Inventory has been provided to be used, along with other data, to analyze critical environmental trends in Illinois.

U.S. EPA has requested Illinois Form R data to support such efforts as the 33/50 voluntary toxic release reduction program, at times before federal data was available.

Utility companies in Illinois have requested Form R information for their customers to support them in release reduction.

ANALYSIS OF FORM R INFORMATION

CHANGES IN REPORTING REQUIREMENTS

The following changes have been made by U.S. EPA for calendar year 1997:

- The following chemicals have been delisted:
  2-bromo-2-nitropropane-1,3-diol (bronopol) (CAS #52-51-7)
  2,6-dimethylphenol (CAS #576-26-1)

- The *de minimus* level for the following chemicals have been lowered from 1.0 to 0.1 percent:
  2,4-dinitrotoluene (CAS #121-14-2)
  2,6-dinitrotoluene (CAS #606-20-2)
  nitrobenzene (CAS #98-95-3)

CALENDAR YEAR 1997

BASIS

For the current calendar year analysis, all valid reports for chemicals reportable in 1997 are included in the release and transfer totals. This includes both new chemicals (reportable for the first time in 1997) and chemicals which may be reportable in a different form than when they were first listed. For this reason, release totals in this section differ from those given for 1997 in the “Trend Analysis, 1988-1997" section.

FACILITIES

Total Releases and Transfers

For calendar year 1997, 1,092 facilities submitted 3,410 toxic chemical release reports totalling 143.8 million pounds.

Table 1 lists the facilities reporting the top 20 total release and transfer amounts, not including offsite transfers for recycle or energy recovery.

Table 1

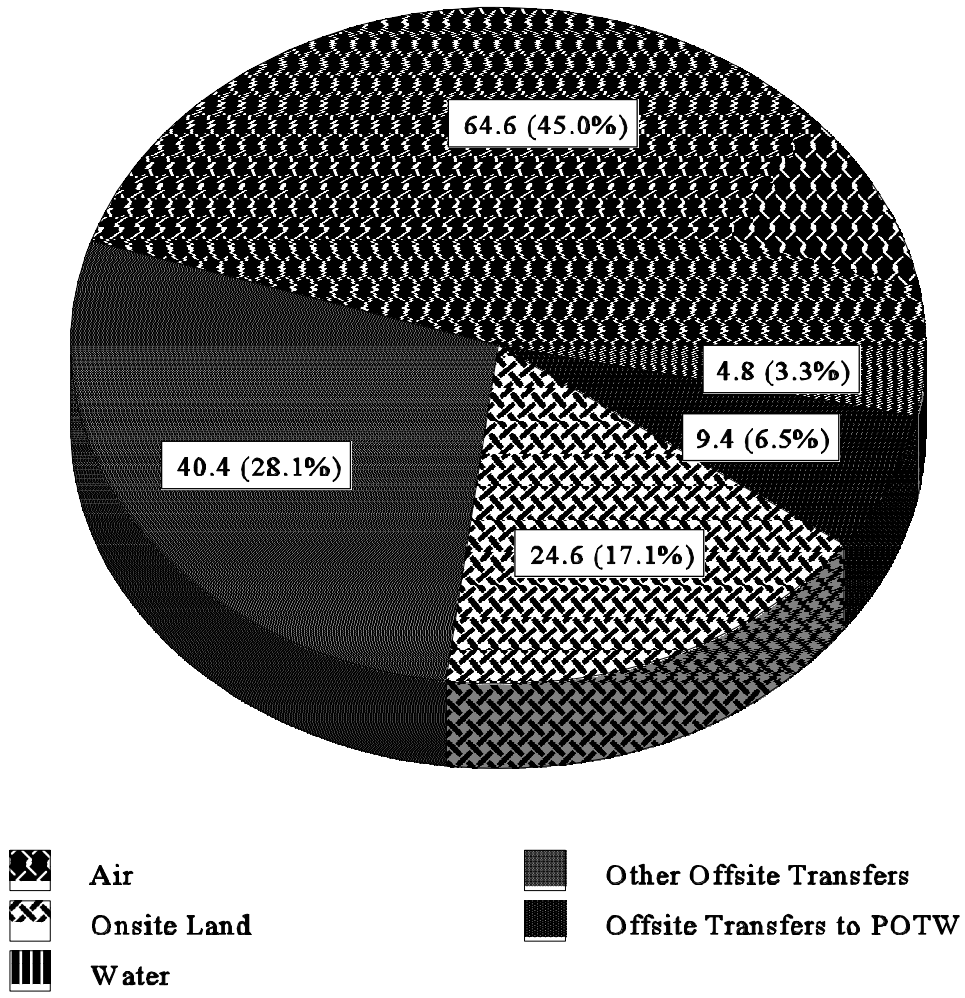
Total Releases and Transfers
(Million Pounds)
Top 20 Facilities

		Releases				Transfers		Total	
Facility Name	City	Fugitive Air	Stack Air	Water	Under-ground Injection	On-Site Land	Other Off-POTW	Off-Site	Releases & Transfers
Northwestern Steel & Wire Co.	Sterling	0.1	0.1	0.0	0.0	14.8	0.0	0.1	15.1
ADM Bioproducts	Decatur	0.0	6.3	0.0	0.0	0.0	0.0	0.0	6.7
Granite City Steel	Granite City	0.1	0.1	0.0	0.0	5.9	0.0	0.0	6.1
Keystone Steel & Wire Co.	Peoria	0.0	0.1	0.0	0.0	0.0	0.0	5.5	5.6
Birmingham Steel Corp. Kankakee IL Steel Div.	Bourbonnais	0.0	0.0	0.0	0.0	0.0	0.0	5.3	5.3
IMC Nitrogen Company	East Dubuque	0.0	4.2	0.1	0.0	0.0	0.0	0.0	4.3
Devro-Teepak	Danville	0.1	3.9	0.0	0.0	0.0	0.0	0.0	4.0
IBP, Inc. - Joslin, IL	Joslin	0.0	0.0	3.8	0.0	0.0	0.0	0.0	3.8
Acme Steel Co. Riverdale Plant	Riverdale	0.0	0.0	0.0	0.0	0.0	0.0	3.3	3.3
Koppers Industries, Inc.	Cicero	0.0	0.2	0.0	0.0	0.0	0.1	2.9	3.1
Austeel Lemont Co. Inc.	Lemont	0.0	0.0	0.0	0.0	1.7	0.0	1.2	2.9
Flexsys America, L.P. - Krummrich	Sauget	0.2	0.1	0.0	0.0	0.0	1.6	0.7	2.6
Archer Daniels Midland Co.	Decatur	0.1	1.8	0.0	0.0	0.0	0.0	0.0	1.9
Corn Products & Best Foods - Argo Plant	Bedford Park	0.3	0.9	0.0	0.0	0.0	0.6	0.0	1.8
Equistar Chemicals, LP	Morris	0.4	1.3	0.0	0.0	0.0	0.0	0.0	1.7
Viskase Corporation	Bedford Park	0.0	1.5	0.0	0.0	0.0	0.2	0.0	1.7
Mueller Co. Plant #4	Decatur	0.0	0.1	0.0	0.0	0.0	0.0	1.4	1.5
Solutia, Inc. - Krummrich, IL	Sauget	0.4	0.6	0.0	0.0	0.0	0.1	0.4	1.5
Archer Daniels Midland Co. Decatur West Plant	Decatur	0.1	1.3	0.0	0.0	0.0	0.0	0.0	1.4
Salem Gravure	Salem	1.3	0.1	0.0	0.0	0.0	0.0	0.0	1.4
Totals for Top 20 Facilities:		3.1	22.6	3.9	0.0	22.4	2.5	21.2	75.7
Totals for All Reporting Facilities:		14.2	50.4	4.8	0.0	24.6	9.4	40.4	143.8

Figure 1 shows the distribution of total releases and transfers for 1997.

FIGURE 1
TOTAL RELEASES & TRANSFERS DISTRIBUTION

(Million Pounds)



*** Underground Injection is virtually zero for all years.**

CHEMICALS

Releases and transfers of 191 different toxic chemicals and categories during 1997 were reported by Illinois facilities. Table 2 lists release and transfer information for the 20 chemicals with the highest reported total amounts.

Table 2

Total Releases and Transfers
(Million Pounds)
Top 20 Chemicals

CAS Number or Category	Chemical Name	Releases				Offsite Transfers		Total Releases & Transfers	
		Fugitive Air	Stack Air	Water	Under-ground Injection	Land	POTW	Other	
000010982	Zinc Compounds	0.3	0.4	0.0	0.0	14.3	0.1	16.4	31.5
007664417	Ammonia	0.6	11.0	0.1	0.0	0.0	1.8	0.6	14.1
000110543	n-Hexane	2.3	7.3	0.0	0.0	0.0	0.0	0.0	9.6
000010450	Manganese Compounds	0.1	0.0	0.0	0.0	6.1	0.0	3.2	9.4
000010511	Nitrate Compounds	0.0	0.0	4.6	0.0	0.0	1.1	0.1	5.8
000108883	Toluene	2.9	2.3	0.0	0.0	0.0	0.0	0.6	5.8
000075150	Carbon Disulfide	0.1	5.3	0.0	0.0	0.0	0.2	0.0	5.6
000067561	Methanol	0.8	1.2	0.0	0.0	0.0	1.3	0.7	4.0
001330207	Xylene (Mixed Isomers)	0.9	2.1	0.0	0.0	0.0	0.0	0.5	3.5
000010090	Chromium Compounds	0.0	0.0	0.0	0.0	1.8	0.0	1.4	3.2
000085449	Phthalic Anhydride	0.0	0.2	0.0	0.0	0.0	0.0	2.9	3.1
007664939	Sulfuric Acid	0.0	1.3	0.0	0.0	0.0	0.2	1.4	2.9
000010230	Glycol Ethers	0.7	1.7	0.0	0.0	0.0	0.3	0.2	2.9
007647010	Hydrochloric Acid	0.0	2.7	0.0	0.0	0.0	0.1	0.0	2.8
000079016	Trichloroethylene	0.6	2.0	0.0	0.0	0.0	0.0	0.1	2.7
000078933	Methyl Ethyl Ketone	0.7	1.0	0.0	0.0	0.0	0.3	0.6	2.6
000010420	Lead Compounds	0.0	0.0	0.0	0.0	1.0	0.0	1.5	2.5
000100425	Styrene	0.4	1.5	0.0	0.0	0.0	0.0	0.4	2.3
000075092	Dichloromethane	0.1	1.4	0.0	0.0	0.0	0.0	0.5	2.0
007440508	Copper	0.0	0.1	0.0	0.0	0.0	0.0	1.5	1.6
Totals for Top 20 Chemicals, Compounds:		10.5	41.5	4.7	0.0	23.2	5.4	32.6	117.9
Totals for All Reported Chemicals & Compounds: 14.2		50.4	4.8	0.0	24.6	9.4	40.4	143.8	

* Known to have “Significant” human health effects (i.e. are known or probable human carcinogens, teratogens, reproductive toxicants or fetal toxicants).

STANDARD INDUSTRIAL CLASSIFICATION (SIC) CATEGORIES

Facilities in 217 individual four-digit SIC codes have reported toxic chemical releases and transfers for calendar year 1997. Table 3 summarizes the information for the 20 SIC codes reporting the highest release and transfer totals.

Table 3

Total Releases and Transfers
(Million Pounds)
Top 20 SIC Codes

		Releases					Offsite Transfers		Total Releases &
SIC Code	Description	Fugitive Air	Stack Air	Water	Under-ground Injection	Land	POTW	Other	Transfers
3312	Steel Works, Blast Furnaces (Including Coke Ovens) and Rolling Mills	0.5	0.6	0.1	0.0	22.6	0.5	16.0	40.3
2865	Cyclic Organic Crudes & Intermediates, and Organic Dyes and Pigments	0.7	1.3	0.1	0.0	0.0	2.0	4.2	8.3
2075	Soybean Oil Mills	1.2	6.7	0.0	0.0	0.0	0.0	0.0	7.9
2821	Plastic Materials, Synthetic Resins and Nonvulcanizable Elastomers	1.1	3.7	0.2	0.0	0.0	0.7	1.2	6.9
2048	Prepared Feed & Feed Ingredients for Animals & Fowls, Except Dogs & Cats	0.0	6.3	0.0	0.0	0.0	0.0	0.4	6.7
3089	Plastic Products, Not Elsewhere Classified	0.1	5.6	0.0	0.0	0.0	0.2	0.1	6.0
2873	Nitrogenous Fertilizers	0.0	4.2	0.1	0.0	0.0	0.0	0.0	4.3
2011	Meat Packing Plants	0.0	0.0	3.8	0.0	0.0	0.1	0.0	3.9
3471	Electroplating, Plating, Polishing, Anodizing and Coloring	0.2	0.5	0.0	0.0	0.0	0.7	1.9	3.3
2752	Commercial Printing, Lithographic	2.3	0.8	0.0	0.0	0.0	0.0	0.0	3.1
2046	Wet Corn Milling	0.4	1.6	0.0	0.0	0.0	1.0	0.0	3.0
2869	Industrial Organic Chemicals, Not Elsewhere Classified	0.7	1.1	0.0	0.0	0.0	0.5	0.6	2.9
3341	Secondary Smelting & Refining of Nonferrous Metals	0.1	0.5	0.0	0.0	0.0	0.0	1.8	2.4
2819	Industrial Inorganic Chemicals, Not Elsewhere Classified	0.1	0.3	0.0	0.0	0.4	0.2	1.4	2.4
2911	Petroleum Refining	1.1	0.5	0.4	0.0	0.0	0.0	0.0	2.0
3711	Motor Vehicles & Passenger Car Bodies	0.5	0.8	0.0	0.0	0.0	0.3	0.4	2.0
3086	Plastic Foam Products	0.2	1.7	0.0	0.0	0.0	0.0	0.0	1.9
3315	Steel Wiredrawing and Steel Nails and Spikes	0.0	0.2	0.0	0.0	0.0	0.0	1.6	1.8
3366	Copper Foundries	0.0	0.1	0.0	0.0	0.0	0.0	1.4	1.5
3411	Metal Cans	0.4	1.0	0.0	0.0	0.0	0.0	0.0	1.4
Totals for Top 20 SIC Codes:		9.6	37.5	4.7	0.0	23.0	6.2	31.0	112.0
Totals for All SIC Codes:		14.2	50.4	4.8	0.0	24.6	9.4	40.4	143.8

ZIP CODES - AIR EMISSIONS

Air emissions for calendar year 1997 in the 20 ZIP codes with the highest reported totals are summarized in Table 4.

Table 4

Total Air Emissions
(Million Pounds)
Top 20 ZIP Codes

ZIP Code	County	City	Total Air Emissions		
			Fugitive	Stack	Total
62526	Macon	Decatur	0.5	10.0	10.5
61832	Vermilion	Danville	0.6	4.9	5.5
61025	JoDaviess	East Dubuque	0.0	4.2	4.2
60450	Grundy	Morris	0.4	1.6	2.0
60501	Cook	Summit	0.3	1.4	1.7
62206	St. Clair	Sauget	0.6	1.0	1.6
60638	Cook	Chicago	0.0	1.5	1.5
62881	Marion	Salem	1.3	0.2	1.5
61350	LaSalle	Ottawa	0.1	1.1	1.2
61701	McLean	Bloomington	0.1	1.1	1.2
60410	Will	Channahon	0.2	0.7	0.9
61054	Ogle	Mount Morris	0.6	0.2	0.8
62306	Adams	Quincy	0.1	0.7	0.8
60633	Cook	Chicago	0.1	0.7	0.8
60936	Ford	Gibson City	0.3	0.5	0.8
61938	Coles	Mattoon	0.3	0.4	0.7
61244	Rock Island	East Moline	0.1	0.6	0.7
60901	Kankakee	Kankakee	0.4	0.3	0.7
60185	DuPage	West Chicago	0.0	0.6	0.6
62084	Madison	Roxana	0.4	0.2	0.6
Top 20 Zip Codes:			6.4	31.9	38.3
Total for All Reporting Facilities:			9.6	37.5	47.1

TREND ANALYSIS, 1988-1997

BASIS

Reporting of toxic chemical release information as required by Section 313 of EPCRA began with reports for calendar year 1987. In that time period, there have been many additions to and deletions from the list of toxic chemicals, and allowances have been made for reporting only certain forms of selected chemicals. Coupled with the facts that the quality of data reported for 1987 is questionable and that reporting threshold amounts decreased from 1987 to 1989, it is nearly impossible to evaluate trends using all reported information from all facilities for all years.

Considering the dynamic nature of the Form R reporting program, in order to perform meaningful analyses of toxic chemical releases, especially with regard to evaluating release trends, the Illinois EPA utilizes information provided by facilities for toxic chemicals which have been reportable in the same form for all years, 1988 through 1997. Offsite transfers for recycle or energy recovery, which were reportable beginning with calendar year 1991, are not considered in trend analysis for this period. Other reported information may be used, as indicated, to illustrate specific points.

Illinois toxic chemical release data trends are analyzed from several different perspectives in this annual report, including specific facilities, specific chemicals, SIC code groups and ZIP codes. In each of these, separate analyses are shown for: (1) all reported chemicals; and for (2) those reported chemicals which are known to have "significant" human health effects (i.e., are known or probable human carcinogens, teratogens, reproductive toxins or fetal toxins). For display purposes, release amounts are shown for the base year, 1988, and for the last five years.

A number of chemical categories, which are primarily metal compounds, have been reportable beginning with reporting year 1987. USEPA did not assign identifying codes for those categories until 1991. For that reason, the Illinois EPA used the CAS number for the parent metal for the metal compounds and combined the release amounts of this parent metal and its compounds in data analysis presented in the First through Ninth Annual Toxic Chemical Reports. Beginning with the Tenth Annual Toxic Chemical Report, and continuing in this and all subsequent reports, the chemical categories are presented separately.

Total releases and transfers have decreased 38 percent from 1988 to 1997. The toxic chemical with the greatest reduction was toluene (73 percent decrease), which is a teratogen, reproductive toxin and fetal toxin. Facilities in the SIC category 2821 (Plastic Materials, Synthetic Resins and Nonvulcanizable Elastomers) as a group had the greatest reduction (61 percent).

Total releases and transfers increased 8 percent from 1996 to 1997. This increase was mostly attributable to increases in offsite transfers of zinc compounds for disposal from a small number of facilities in SIC category 3312 (Steel Works, Blast Furnaces (Including Coke Ovens) and Rolling Mills), coupled with decreases in offsite transfers of zinc compounds for recycle from those same facilities.

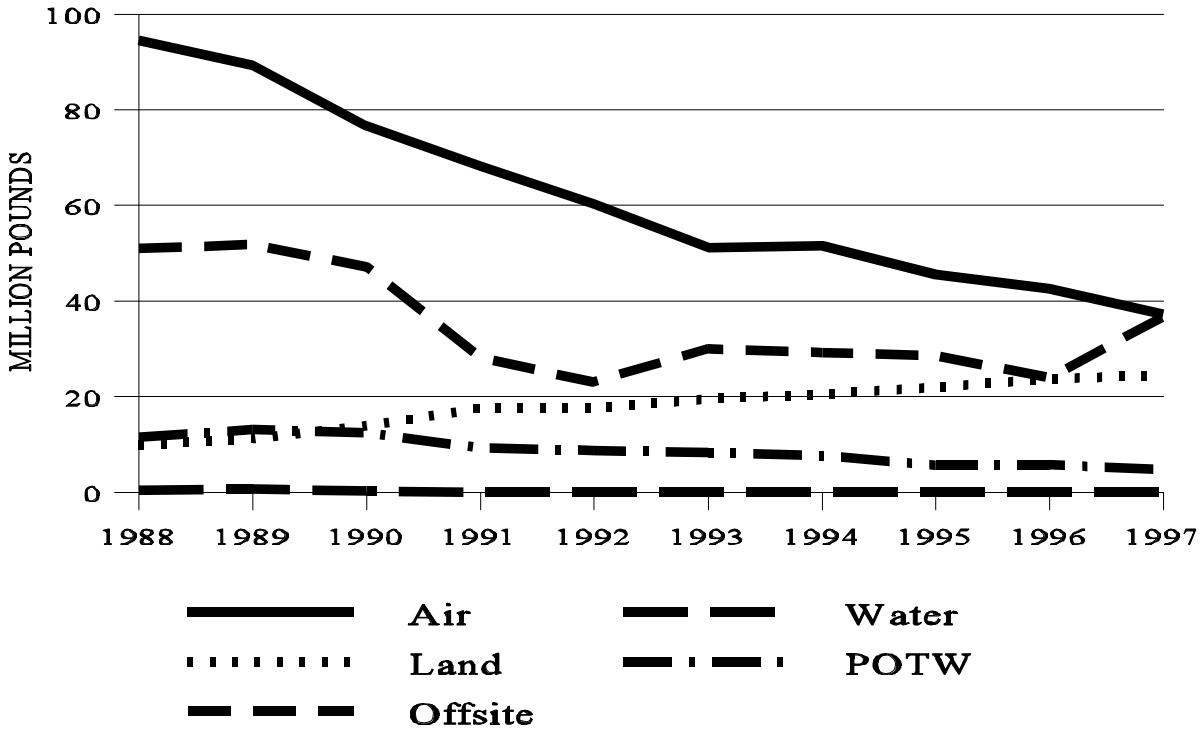
Air emissions of known or probable human carcinogens have decreased by 57% from 1988 to 1997, and by 18% from 1996 to 1997. The single chemical with the largest decrease in both periods of time was dichloromethane. Facilities in SIC category 3312 had the greatest decrease in air emissions of carcinogens from 1988 to 1997, resulting primarily from declines in emissions of benzene and trichloroethylene.

SUMMARY

Figures 2 and 3 summarize the overall totals for releases and transfers from 1988 through 1997.

FIGURE 2

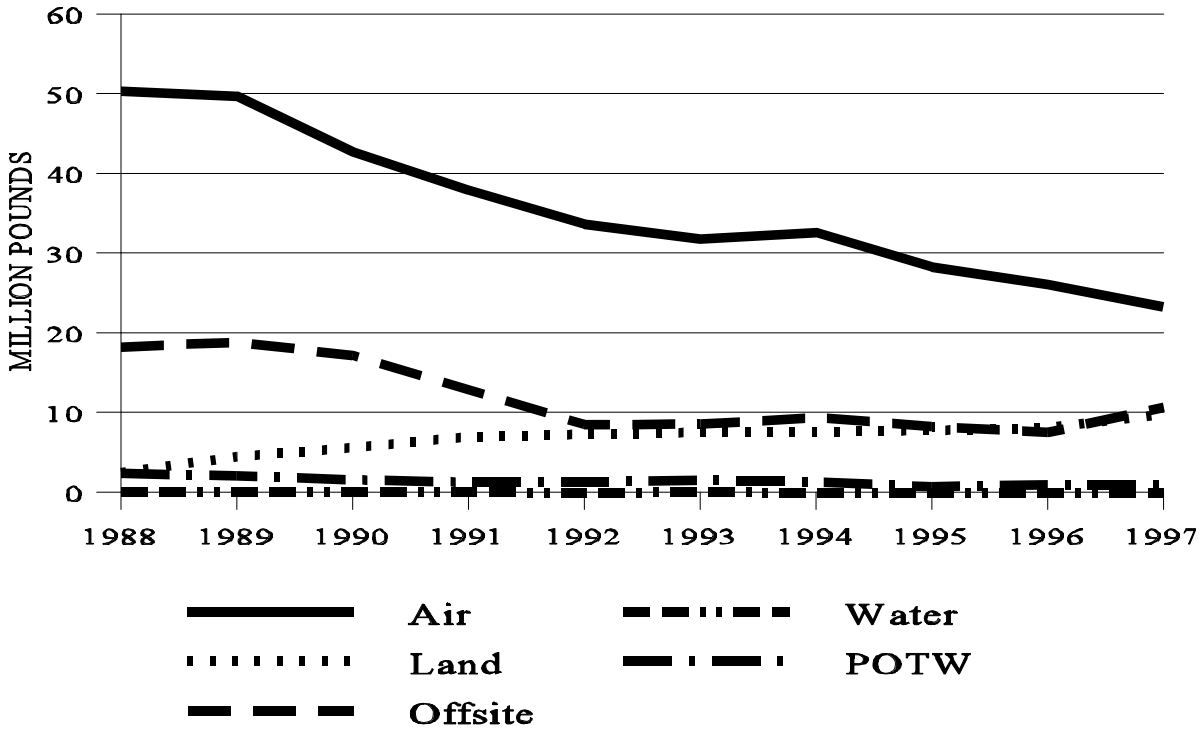
TOTAL RELEASES AND TRANSFERS - ALL CHEMICALS



* **Underground Injection is virtually zero for all years.**

FIGURE 3

TOTAL RELEASES AND TRANSFERS - CHEMICALS WITH SIGNIFICANT HUMAN HEALTH EFFECTS



* **Underground Injection is virtually zero for all years.**

FACILITIES

Tables 5 through 12 list information about facilities which have filed one or more Form Rs each year 1988 through 1997 for toxic chemicals reportable each year in the same form. The "Totals For All Reporting Facilities" are for all facilities which reported toxic chemicals which were reportable in the same form each year.

Total Releases and Transfers

Facilities reported releases totalling 1,240.7 pounds from 1988 through 1997. During this period, the top 20 facilities accounted for approximately 42 percent of those releases and transfers, as shown in Table 5.

Table 5

Total Release and Transfer Amounts
Top 20 Facilities

		Total Releases and Transfers (Million Pounds):						
		Base Yr.		Last Five Years				Total
Facility	City	1988	1993	1994	1995	1996	1997	88-97
Northwestern Steel & Wire Co.	Sterling	7.0	14.7	15.1	20.3	14.6	15.0	128.1
Keystone Steel & Wire Co.	Peoria	4.5	5.7	6.3	6.6	6.9	5.6	52.5
Granite City Steel	Granite City	4.9	5.1	5.0	5.4	6.0	6.1	52.2
Devro-Teepak	Danville	2.1	3.5	3.8	3.8	3.9	3.9	34.0
Cabot Corporation, Cab-O-Sil Division	Tuscola	3.9	2.8	3.5	2.4	2.0	0.3	31.8
Monsanto-Krummrich, IL	Sauget	6.3	2.0	1.9	2.1	0.8	0.8	27.1
Millennium Petrochemical - Morris Plant	Morris	4.3	1.8	1.3	1.0	1.6	1.7	21.5
Chicago Specialties, Inc.	Chicago	3.1	2.0	2.5	1.1	0.5	0.2	19.8
3M Tape Manufacturing Division	Bedford Park	1.7	1.5	1.6	0.6	0.5	0.5	15.8
Carus Chemical Company	LaSalle	1.6	1.7	1.7	1.4	1.1	1.3	15.3
Chicago Assembly Plant	Chicago	2.0	1.4	1.3	1.3	0.7	0.8	14.5
Viskase Corp.	Bedford Park	1.2	1.3	1.7	1.7	1.7	1.6	14.4
GE Company	Ottawa	2.4	1.0	1.0	1.1	1.0	1.0	12.6
Big River Zinc Corporation	Sauget	2.0	1.4	1.2	1.2	1.4	1.1	12.6
R.R. Donnelley & Sons Company	Mattoon	2.4	0.7	0.8	0.6	0.3	0.8	12.6
Acme Steel Company - Riverdale Plant	Riverdale	1.9	1.2	0.9	0.8	0.9	3.3	11.9
Shell Wood River Refining Co.	Roxana	1.7	1.0	1.2	0.5	0.6	0.5	11.8
Quebecor Printing Mt. Morris, Inc.	Mount Morris	1.7	1.2	1.0	0.9	1.3	0.9	11.8
Harcros Pigments Inc.	East St. Louis	2.2	0.0	0.0	0.0	0.0	0.0	11.1
Borden Chemical, Inc.	Forest Park	0.8	1.6	1.3	1.5	1.8	0.7	11.0
Totals for Top 20 Facilities:		58.3	51.6	53.1	54.3	47.6	46.1	522.4
Totals for All Reporting Facilities:		167.9	109.6	109.5	102.3	96.4	103.7	1,240.7

Considering only toxic chemicals known to have significant human health effects, facilities reported total releases and transfers of 558.7 million pounds during those same years. The top 20 facilities accounted for 45% of that total, as shown in Table 6.

Table 6

Total Release and Transfer Amounts
Chemicals With Significant Human Health Effects
Top 20 Facilities

		Total Releases and Transfers (Million Pounds):						
		Base Yr.		Last Five Years				Total
Facility	City	1988	1993	1994	1995	1996	1997	88-97
Northwestern Steel & Wire Co.	Sterling		2.7	6.4	6.2	6.7	6.2	7.3	56.7
Devro-Teepak	Danville		2.1	3.5	3.8	3.8	3.9	3.9	34.0
Viskase Corp.	Bedford Park		1.2	1.3	1.7	1.7	1.7	1.6	14.4
Carus Chemical Company	LaSalle		1.3	1.4	1.4	1.1	0.9	1.1	12.5
GE Company	Ottawa		2.3	1.0	1.0	1.0	1.0	1.0	12.3
R.R. Donnelley & Sons Company	Mattoon		2.3	0.6	0.7	0.6	0.3	0.7	12.0
Quebecor Printing Mt. Morris, Inc.	Mount Morris		1.7	1.2	1.0	0.8	1.2	0.8	11.5
3M Tape Manufacturing Division	Bedford Park		1.6	1.1	1.1	0.4	0.3	0.4	11.4
Monsanto - Krummrich, IL	Sauget		2.6	0.7	0.9	0.4	0.1	0.1	10.8
Granite City Steel	Granite City		1.2	0.9	0.8	0.7	0.8	0.8	10.5
Salem Gravure	Salem		0.7	0.5	1.6	1.2	1.1	1.3	8.4
Shell Wood River Refining Co.	Roxana		1.2	0.7	0.8	0.3	0.4	0.3	8.3
Keystone Steel & Wire Co.	Peoria		0.4	1.0	1.1	1.2	1.2	1.0	8.0
Chicago Specialties, Inc.	Chicago		1.5	1.0	0.7	0.0	0.0	0.0	7.8
Abbott Laboratories North Chicago Plant	North Chicago		0.6	0.9	1.0	0.7	0.4	0.6	7.8
Chicago Assembly Plant	Chicago		0.8	0.5	0.4	0.3	0.3	0.2	5.8
Zenith Electronics Corp. - Rauland Division	Melrose Park		0.8	0.9	1.0	0.5	0.2	0.4	5.8
Acme Steel Company - Riverdale Plant	Riverdale		1.0	0.6	0.5	0.5	0.4	0.7	5.3
Allied Tube & Conduit Corp.	Harvey		0.4	0.5	0.6	0.5	0.6	0.5	5.0
GFC-Bridgeview	Bridgeview		0.2	0.7	0.9	0.8	0.7	0.0	4.8
Totals for Top 20 Facilities:			26.6	25.4	27.2	23.2	21.7	22.7	253.1
Totals for All Reporting Facilities:			73.4	49.1	51.1	45.1	42.8	44.8	558.7

Decreases in Releases and Transfers

The top twenty facilities with decreases in releases and transfers of toxic chemicals from 1988 through 1997 are shown in Table 7.

Table 7

Total Release and Transfer Decreases
Top 20 Facilities

		Total Releases and Transfers (Million Pounds):						
				Last Five Years				Total Decrease
Facility	City	Base Yr. 1988	1993	1994	1995	1996	1997	88-97
Monsanto - Krummrich, IL	Sauget	6.3	2.0	1.9	2.1	0.8	0.8	5.5
Cabot Corporation, Cab-O-Sil Division	Tuscola	3.9	2.8	3.5	2.4	2.0	0.3	3.6
Millennium Petrochemical Morris Plant	Morris	4.3	1.8	1.3	1.0	1.6	1.7	3.2
Chicago Specialties, Inc.	Chicago	3.1	2.0	2.5	1.1	0.5	0.2	2.8
Harcros Pigments Inc.	East St. Louis	2.2	0.0	0.0	0.0	0.0	0.0	2.2
Stepan Company - Millsdale Plant	Elwood	2.6	0.4	0.3	0.6	0.7	0.6	2.1
Belvidere Assembly Plant	Belvidere	2.2	0.2	0.4	0.3	0.3	0.2	2.0
R.R. Donnelley & Sons Company	Mattoon	2.4	0.7	0.8	0.6	0.3	0.8	1.6
GE Company	Ottawa	2.4	1.0	1.0	1.1	1.0	1.0	1.4
Reichhold Chemicals, Inc.	Morris	1.4	0.0	0.0	0.0	0.1	0.1	1.3
3M Tape Manufacturing Division	Bedford Park	1.7	1.5	1.6	0.6	0.5	0.5	1.2
Shell Wood River Refining Co.	Roxana	1.7	1.0	1.2	0.5	0.6	0.5	1.2
Chicago Assembly Plant	Chicago	2.0	1.4	1.3	1.3	0.7	0.8	1.2
Olin Corporation	East Alton	1.3	0.4	0.4	0.2	0.2	0.2	1.1
Reynolds Metals Company	McCook	1.1	0.2	0.0	0.0	0.0	1.0	1.0
Millennium Petrochemicals Tuscola Plant	Tuscola	1.1	0.3	0.2	0.1	0.1	1.0	1.0
Reichhold Chemicals, Inc.	Morris	0.9	0.0	0.0	0.0	0.0	0.0	0.9
Pfanstiehl Laboratories, Inc.	Waukegan	0.9	0.0	0.0	0.0	0.0	0.0	0.9
Big River Zinc Corporation	Sauget	2.0	1.4	1.2	1.2	1.4	1.1	0.8
Witco Corporation	Mapleton	1.0	0.2	0.2	0.3	0.2	0.2	0.8
Totals for Top 20 Facilities:		45.1	17.3	17.8	13.4	11.0	9.1	35.8
Totals for 455 Facilities With Net Decreases:		93.3	43.1	43.5	35.4	30.9	24.6	68.7

The top twenty facilities with decreases in releases and transfers of chemicals with significant human health effects are shown in Table 8.

Table 8

Total Release and Transfer Decreases
Chemicals With Significant Human Health Effects
Top 20 Facilities

		Total Releases and Transfers (Million Pounds):						
		Base Yr.		Last Five Years				Total Decrease
Facility	City	1988	1993	1994	1995	1996	1997	88-97
Monsanto - Krummrich, IL	Sauget	2.6	0.7	0.9	0.4	0.1	0.1	2.5
R.R. Donnelley & Sons Company	Mattoon	2.3	0.6	0.7	0.6	0.3	0.7	1.6
Chicago Specialties, Inc.	Chicago	1.5	1.0	0.7	0.0	0.0	0.0	1.5
GE Company	Ottawa	2.3	1.0	1.0	1.0	1.0	1.0	1.4
3M Tape Manufacturing Division	Bedford Park	1.6	1.1	1.1	0.4	0.3	0.4	1.2
Belvidere Assembly Plant	Belvidere	1.2	0.1	0.2	0.2	0.1	0.1	1.1
Quebecor Printing Mt. Morris, Inc.	Mount Morris	1.7	1.2	1.0	0.8	1.2	0.8	0.9
Shell Wood River Refining Company	Roxana	1.2	0.7	0.8	0.3	0.4	0.3	0.8
Olin Corporation	East Alton	0.8	0.1	0.1	0.1	0.0	0.1	0.8
Beloit Corporation	Rockton	0.8	0.0	0.0	0.0	0.0	0.0	0.8
Akzo Nobel Coatings Inc.	Zion	0.7	0.0	0.0	0.1	0.1	0.1	0.7
Chicago Assembly Plant	Chicago	0.8	0.5	0.4	0.3	0.3	0.2	0.6
Reynolds Metals Company	McCook	0.4	0.0	0.0	0.0	0.0	0.0	0.4
Schrock Cabinet Co. Schrock Div.	Arthur	0.5	0.1	0.1	0.1	0.1	0.1	0.4
Curwood, Inc.	Murphysboro	0.4	0.0	0.0	0.0	0.0	0.0	0.4
Seymour of Sycamore, Inc.	Sycamore	0.4	0.0	0.0	0.0	0.0	0.0	0.4
FPM Heat Treating, Inc.	Elk Grove Village	0.4	0.1	0.1	0.1	0.0	0.0	0.4
Crawford Laboratories	Chicago	0.4	0.1	0.1	0.1	0.0	0.0	0.4
3M Cordova Plant	Cordova	0.7	0.2	0.3	0.2	0.4	0.3	0.4
Cambridge Industries, Inc.	Centralia	0.5	0.5	0.3	0.3	0.1	0.1	0.3
Totals for Top 20 Facilities:		21.2	7.9	7.7	4.9	4.4	4.3	17.0
Totals for 347 Facilities With Net Decreases:		44.0	20.9	20.6	15.0	13.6	12.2	31.8

Increases in Releases and Transfers

Release and transfer amounts reported by a number of facilities increased from 1988 through 1997. Table 9 shows the top twenty facilities ranked according to total release and transfer increases in pounds per year for the eight-year period.

Table 9

Total Release and Transfer Increases
Top 20 Facilities

		Total Releases and Transfers (Million Pounds):						
								Total
		Base Yr.		Last Five Years				Increase
Facility	City	1988	1993	1994	1995	1996	1997	88-97
Northwestern Steel & Wire Co.	Sterling	7.0	14.7	15.1	20.3	14.6	15.0	8.0
Birmingham Steel Corporation - Kankakee Illinois Steel Division	Bourbonnais	0.0	0.1	0.0	0.0	0.0	5.3	5.3
Devro-Teepak	Danville	2.1	3.5	3.8	3.8	3.9	3.9	1.8
Koppers Industries, Inc.	Cicero	1.3	0.1	0.1	0.2	2.6	3.0	1.7
Acme Steel Company - Riverdale Plant	Riverdale	1.9	1.2	0.9	0.8	0.9	3.3	1.5
Granite City Steel	Granite City	4.9	5.1	5.0	5.4	6.0	6.1	1.3
Keystone Steel & Wire Co.	Peoria	4.5	5.7	6.3	6.6	6.9	5.6	1.1
Laclede Steel Company	Alton	0.0	4.9	4.1	0.4	0.0	0.7	0.7
Salem Gravure	Salem	0.8	0.5	1.6	1.2	1.1	1.3	0.5
No-Sag Foam Products Corp. - Foam Operations	West Chicago	0.1	0.3	0.5	0.5	0.5	0.6	0.4
Viskase Corp.	Bedford Park	1.2	1.3	1.7	1.7	1.7	1.6	0.4
Monsanto - Searle, Parkway	Skokie	0.0	0.0	0.0	0.0	0.0	0.3	0.3
Witco Corporation	Blue Island	0.0	0.0	0.0	0.4	0.2	0.3	0.3
The BF Goodrich Company	Henry	0.1	0.0	0.1	0.3	0.4	0.4	0.3
Brockway Standard, Inc.	Franklin Park	0.1	0.1	0.1	0.1	0.2	0.3	0.3
JLM Chemicals Inc.	Alsip	0.2	0.6	0.6	0.5	0.5	0.5	0.3
IMC Nitrogen Company	East Dubuque	0.2	0.3	0.3	0.4	0.5	0.5	0.2
Dynachem, Inc.	Georgetown	0.0	0.3	0.4	0.3	0.3	0.3	0.2
Werner Co., Chicago Division	Franklin Park	0.0	0.1	0.1	0.2	0.2	0.3	0.2
Senior Flexonics, Inc.	Bartlett	0.1	0.4	0.3	0.3	0.6	0.3	0.2
Totals for Top 20 Facilities:		24.5	39.2	41.0	43.4	41.1	49.6	25.0
Totals for 234 Facilities With Increases:		30.0	48.5	50.8	53.7	50.2	60.7	30.7

Table 10 shows the top twenty facilities reporting increases in releases and transfers of toxic chemicals with significant human health effects.

Table 10

Total Release and Transfer Increases
Chemicals With Significant Human Health Effects
Top 20 Facilities

		Total Releases and Transfers (Million Pounds):						
		Base Yr.		Last Five Years				Total Increase
Facility	City	1988	1993	1994	1995	1996	1997	88-97
Northwestern Steel & Wire Co.	Sterling	2.7	6.4	6.2	6.7	6.2	7.3	4.6
Devro-Teepak	Danville	2.1	3.5	3.8	3.8	3.9	3.9	1.8
Birmingham Steel Corporation - Kankakee Illinois Steel Division	Bourbonnais	0.0	0.0	0.0	0.0	0.0	1.1	1.1
Salem Gravure	Salem	0.7	0.5	1.6	1.2	1.1	1.3	0.6
Keystone Steel & Wire Co.	Peoria	0.4	1.0	1.1	1.2	1.2	1.0	0.6
No-Sag Foam Products Corp. Foam Operations	West Chicago	0.0	0.2	0.4	0.5	0.5	0.6	0.6
Viskase Corp.	Bedford Park	1.2	1.3	1.7	1.7	1.7	1.6	0.4
Laclede Steel Company	Alton	0.0	0.2	0.3	0.1	0.0	0.3	0.3
Senior Flexonics, Inc.	Bartlett	0.1	0.4	0.3	0.3	0.6	0.3	0.2
The BF Goodrich Company	Henry	0.1	0.0	0.0	0.2	0.3	0.3	0.2
Werner Co., Chicago Division	Franklin Park	0.0	0.1	0.1	0.2	0.2	0.3	0.2
Anamet Electrical Inc.	Mattoon	0.1	0.0	0.0	0.0	0.0	0.2	0.2
Caterpillar Inc. - Mapleton Plant	Mapleton	0.0	0.2	0.2	0.3	0.2	0.2	0.2
Elco Textron	Rockford	0.0	0.2	0.2	0.1	0.2	0.2	0.2
Dynachem, Inc.	Georgetown	0.0	0.1	0.2	0.2	0.1	0.2	0.1
Monsanto - Searle, Parkway	Skokie	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Cerro Copper Products Company	Sauget	0.2	0.7	0.3	0.4	0.3	0.3	0.1
Case Corporation	East Moline	0.0	0.2	0.1	0.1	0.1	0.1	0.1
National Fiber Glass Products	Romeoville	0.0	0.1	0.1	0.1	0.1	0.1	0.1
John Deere Harvester Works/EM	East Moline	0.1	0.1	0.0	0.1	0.1	0.1	0.1
Totals for Top 20 Facilities:		7.7	15.2	16.6	17.2	16.8	19.5	11.8
Totals for 193 Facilities With Increases:		10.8	20.0	21.9	22.3	21.8	24.5	13.8

Pollution Prevention Efforts

Reporting of information about source reduction (pollution prevention) efforts has been required beginning with reporting year 1991. A total of 576 facilities have indicated undertaking such activities for one or more years from 1993 through 1997. The top twenty facilities in this category are shown in Table 11.

The fact that a facility claimed source reduction activities for a chemical does not necessarily mean that the reduction in releases and transfers of the chemical are attributable to those activities.

Table 11

Source Reduction-Based Release and Transfer Decreases
Top 20 Facilities
(Chemicals for Which Source Reduction Activities
Were Claimed Any Year, 93-97)

		Total Releases and Transfers (Million Pounds):						
		Base Yr.	Last Five Years					Total Reduction
Facility	City	1991	1993	1994	1995	1996	1997	91-97
Chicago Specialties, Inc.	Chicago	2.0	2.0	2.5	1.1	0.5	0.0	2.0
Harcros Pigments Inc.	East St. Louis	1.7	0.0	0.0	0.0	0.0	0.0	1.7
Viskase Corp.	Bedford Park	1.4	0.0	0.0	0.0	0.0	0.0	1.4
R.R. Donnelley & Sons Company	Mattoon	1.9	0.7	0.7	0.6	0.3	0.8	1.1
Abbott Laboratories - North Chicago Plant	North Chicago	1.4	0.7	0.7	0.7	0.3	0.5	0.9
Keystone Steel & Wire Co.	Peoria	0.9	0.2	0.0	0.0	0.0	0.0	0.9
Burkart Foam, Inc.	Cairo	0.8	0.0	0.0	0.0	0.0	0.0	0.8
Shell Wood River Refining Co.	Roxana	1.1	0.9	0.9	0.4	0.4	0.4	0.7
Acme Steel Company - Chicago Coke Plant	Chicago	0.6	0.1	0.2	0.2	0.0	0.0	0.6
Morton International	Lansing	0.5	0.3	0.1	0.1	0.0	0.0	0.5
Granite City Steel	Granite City	0.5	0.0	0.0	0.0	0.0	0.0	0.5
GE Company	Ottawa	0.9	1.0	1.0	1.1	0.0	0.4	0.5
Senior Flexonics, Inc.	Bartlett	0.4	0.1	0.0	0.0	0.0	0.0	0.4
Zenith Electronics Corp. - Rauland Division	Melrose Park	0.4	0.0	0.0	0.2	0.0	0.0	0.4
3M Tape Manufacturing Division	Bedford Park	0.5	0.7	0.3	0.2	0.1	0.1	0.4
Reynolds Metals Company	McCook	0.4	0.1	0.0	0.0	0.0	0.0	0.4
U.S. Can Company - Plant #36 Chicago Metal Services Center	Chicago	0.3	0.3	0.1	0.1	0.0	0.0	0.3
Cambridge Industries, Inc.	Centralia	0.3	0.0	0.2	0.1	0.1	0.0	0.3
Wisconsin Tool & Stamping	Schiller Park	0.3	0.0	0.0	0.1	0.1	0.1	0.2
Clear-Lam Packaging	Elk Grove Village	0.2	0.2	0.2	0.0	0.0	0.0	0.2
Totals for Top 20 Facilities:		16.5	7.3	6.9	4.9	1.8	2.3	4.2
Totals for 194 Facilities Reporting Decreases		24.3	12.7	10.8	7.6	4.1	4.2	20.2

Table 12 shows the twenty facilities reporting the greatest reductions based on source reduction efforts for chemicals with significant human health effects.

Table 12

Source Reduction-Based Release and Transfer Decreases
Top 20 Facilities
(Chemicals for Which Source Reduction Activities
Were Claimed Any Year, 93-97)
Chemicals With Significant Human Health Effects

		Total Releases and Transfers (Million Pounds):						
		Base Yr.	Last Five Years					Total Reduction
Facility	City	1991	1993	1994	1995	1996	1997	91-97
Viskase Corp.	Bedford Park	1.4	0.0	0.0	0.0	0.0	0.0	1.4
R.R. Donnelley & Sons Company	Mattoon	1.8	0.6	0.7	0.6	0.3	0.7	1.1
Abbott Laboratories - North Chicago Plant	North Chicago	1.4	0.7	0.6	0.6	0.3	0.5	0.9
Chicago Specialties, Inc.	Chicago	0.7	1.0	0.7	0.0	0.0	0.0	0.7
Burkart Foam, Inc.	Cairo	0.6	0.0	0.0	0.0	0.0	0.0	0.6
Shell Wood River Refining Company	Roxana	0.9	0.7	0.7	0.3	0.3	0.3	0.6
Granite City Steel	Granite City	0.5	0.0	0.0	0.0	0.0	0.0	0.5
GE Company	Ottawa	0.8	1.0	1.0	1.0	0.0	0.4	0.4
Morton International	Lansing	0.4	0.3	0.1	0.1	0.0	0.0	0.4
Senior Flexonics, Inc.	Bartlett	0.3	0.0	0.0	0.0	0.0	0.0	0.3
Cambridge Industries, Inc.	Centralia	0.3	0.0	0.2	0.1	0.1	0.0	0.3
Nascote Industries, Inc.	Nashville	0.5	0.4	0.5	0.6	0.2	0.3	0.2
Wisconsin Tool & Stamping	Schiller Park	0.3	0.0	0.0	0.1	0.1	0.1	0.2
Clear-Lam Packaging	Elk Grove Village	0.2	0.2	0.2	0.0	0.0	0.0	0.2
No-Sag Foam Products Corporation Foam Operations	West Chicago	0.2	0.0	0.0	0.0	0.0	0.0	0.2
Belvidere Assembly Plant	Belvidere	0.2	0.0	0.1	0.1	0.0	0.1	0.2
Acme Steel Company - Chicago Coke Plant	Chicago	0.1	0.0	0.0	0.0	0.0	0.0	0.1
World Color Alden Press	Elk Grove Village	0.1	0.0	0.0	0.0	0.0	0.0	0.1
Maytag, Galesburg Refrigeration	Galesburg	0.1	0.0	0.0	0.0	0.0	0.0	0.1
Fox Valley Systems, Inc.	Cary	0.1	0.1	0.0	0.0	0.0	0.0	0.1
Totals for Top 20 Facilities:		10.9	5.0	4.8	3.5	1.3	2.4	8.6
Totals for 136 Facilities Reporting Decreases:		14.9	7.9	6.4	4.9	2.8	3.3	11.6

Significant Environmental Achievement

A number of the facilities which have submitted toxic chemical release reports every year since 1988 have demonstrated performance which sets them apart from other facilities. Several criteria have been considered to identify these facilities:

- Toxic chemical release and transfer reduction greater than 1 million pounds, 1988 through 1997 (most current information)
- Low or decreasing number of accidental chemical releases, 1994-1998 (most current information)
- No significant releases as defined by the Illinois Chemical Safety Act (ICSA) from 1994 through 1998
- Participation in the Agency's voluntary Partners in Pollution Prevention program

The eight facilities meeting these criteria are listed in Table 13.

Table 13

Facilities Demonstrating Environmental Excellence

Facility	City	Total Release/ Transfer Reduction 88-97 (Million Pounds)	Number of Reported Spills 94	95	96	97	98
Monsanto - Krummrich Works	Sauget	5.5	0	1	0	0	1
Cabot Corp. - Cab-O-Sil Division	Tuscola	3.6	1	4	3	1	1
Millennium Petrochemical Morris Plant	Morris	3.2	4	4	0	1	0
Stepan Company - Millsdale Plant	Elwood	2.1	2	1	2	0	2
Chrysler Corporation - Belvidere Assembly Plant	Belvidere	2.0	1	0	0	0	0
Reichhold Chemicals Inc.	Morris	1.3	0	1	0	0	0
3M Tape Manufacturing Division	Bedford Park	1.2	1	1	0	0	0
Olin Corporation	East Alton	1.1	3	0	0	1	1

CHEMICALS

A total of 311 toxic chemicals and chemical categories have been reportable on Form R in the same form from 1988 through 1997. A total of 129 of these have been reported in Illinois every year.

Tables 14 through 25 summarize toxic chemical release and transfer amounts for each environmental media. The top twenty chemicals are listed for each media unless a smaller number of chemicals had non-zero release and transfer amounts.

Table 14

Total Air Emissions
Top 20 Chemicals

		Combined Stack and Fugitive Emissions (Million Pounds):						
CAS Number		Base Yr.	Last Five Years					Total Emissions
or Category	Chemical Name	1988	1993	1994	1995	1996	1997	88-97
000108883	Toluene	18.1	6.7	7.5	6.4	4.9	5.2	98.2
001330207	Xylene (Mixed Isomers)	6.9	4.8	5.0	3.4	3.5	2.9	52.6
000071556	1,1,1-Trichloroethane	10.5	2.1	0.7	0.3	0.1	0.0	47.8
000075150	Carbon Disulfide	3.3	4.7	5.3	5.3	5.4	5.4	47.1
000078933	Methyl Ethyl Ketone	4.8	4.0	3.5	2.7	2.2	1.8	38.2
000079016	Trichloroethylene	4.4	3.7	3.8	3.3	3.0	2.6	36.7
007782505	Chlorine	4.4	2.9	3.6	2.5	2.0	0.3	33.7
000075092	Dichloromethane	4.3	2.8	2.9	2.7	2.5	1.5	29.3
000010230	Glycol Ethers	2.3	2.7	2.7	2.7	2.3	2.4	27.0
000074851	Ethylene	5.3	1.7	1.3	1.0	1.6	1.6	23.4
000067561	Methanol	3.3	1.8	2.0	2.0	1.8	2.0	21.7
000100425	Styrene	1.9	1.9	2.2	2.1	2.0	1.9	17.9
000108101	Methyl Isobutyl Ketone	1.7	0.9	1.2	1.3	0.7	0.8	11.5
000071363	n-Butyl Alcohol	1.4	1.0	1.1	0.9	0.8	0.8	10.6
000076131	Freon 113	2.4	0.6	0.0	0.0	0.0	0.0	10.1
000010982	Zinc Compounds	2.2	0.7	0.7	0.7	1.7	0.7	8.9
000071432	Benzene	1.6	0.6	0.6	0.4	0.4	0.4	8.7
000127184	Tetrachloroethylene	2.0	0.6	0.5	0.5	0.4	0.3	8.2
000074873	Chloromethane	1.5	0.4	0.7	0.7	0.5	0.3	6.8
000108952	Phenol	0.5	0.4	0.7	0.8	0.7	0.6	5.4
Totals for Top 20 Chemicals:		82.8	45.0	46.0	39.7	36.5	31.5	543.8
Totals for All Chemicals:		94.6	51.2	51.7	45.6	42.6	37.3	617.7

Table 15

Total Air Emissions
Chemicals With Significant Human Health Effects
Top 20 Chemicals

CAS Number or Category	Chemical Name	Combined Stack and Fugitive Emissions (Million Pounds): Base Yr. 1988	Last Five Years 1993	1994	1995	1996	1997	Total Emissions 88-97
000108883	Toluene	18.1	6.7	7.5	6.4	4.9	5.2	98.2
001330207	Xylene (Mixed Isomers)	6.9	4.8	5.0	3.4	3.5	2.9	52.6
000075150	Carbon Disulfide	3.3	4.7	5.3	5.3	5.4	5.4	47.1
000078933	Methyl Ethyl Ketone	4.8	4.0	3.5	2.7	2.2	1.8	38.2
000079016	Trichloroethylene	4.4	3.7	3.8	3.3	3.0	2.6	36.7
000075092	Dichloromethane	4.3	2.8	2.9	2.7	2.5	1.5	29.3
000100425	Styrene	1.9	1.9	2.2	2.1	2.0	1.9	17.9
000071432	Benzene	1.6	0.6	0.6	0.4	0.4	0.4	8.7
000127184	Tetrachloroethylene	2.0	0.6	0.5	0.5	0.4	0.3	8.2
000107131	Acrylonitrile	1.1	0.4	0.4	0.4	0.4	0.4	5.3
000075003	Chloroethane	0.5	0.3	0.3	0.2	0.2	0.2	2.8
000075014	Vinyl Chloride	0.1	0.1	0.1	0.1	0.1	0.1	1.2
000010420	Lead Compounds	0.1	0.1	0.1	0.1	0.2	0.1	0.9
000050000	Formaldehyde	0.1	0.1	0.1	0.0	0.0	0.0	0.9
000010450	Manganese Compounds	0.1	0.1	0.1	0.1	0.2	0.1	0.8
000075218	Ethylene Oxide	0.3	0.1	0.0	0.0	0.0	0.0	0.8
007439965	Manganese	0.2	0.0	0.0	0.1	0.1	0.1	0.7
000107062	1,2-Dichloroethane	0.1	0.1	0.0	0.0	0.0	0.0	0.6
000062533	Aniline	0.1	0.0	0.0	0.0	0.0	0.0	0.5
000106990	1,3-Butadiene	0.1	0.1	0.1	0.0	0.1	0.1	0.5
Totals for Top 20 Chemicals:		50.1	31.2	32.5	27.8	25.6	23.1	351.9
Totals for All Chemicals:		50.3	31.5	32.6	28.3	26.1	23.3	356.0

Table 16

Total Water Releases
Top 20 Chemicals

CAS Number or Category	Chemical Name	Water Releases (Thousand Pounds): Base Yr. 1988	Last Five Years 1993	1994	1995	1996	1997	Total Releases 88-97
000107211	Ethylene Glycol	173.2	28.3	3.7	6.0	1.6	2.0	505.5
000111422	Diethanolamine	60.1	3.9	0.9	15.8	0.6	0.5	337.7
000067561	Methanol	16.5	18.6	10.1	26.9	32.4	41.2	306.7
007664382	Phosphoric Acid	43.6	0.5	1.0	1.0	1.0	0.0	251.6
000010982	Zinc Compounds	16.3	19.6	22.5	16.7	17.1	16.6	185.8
007782505	Chlorine	41.7	5.3	5.4	2.3	1.6	2.4	157.6
007439965	Manganese	26.4	12.4	11.9	10.9	9.4	9.1	142.7
007440508	Copper	10.8	7.9	8.6	7.4	6.4	5.7	83.4
007440666	Zinc (Fume or Dust)	16.8	5.7	4.6	2.9	0.0	0.0	73.1
000010090	Chromium Compounds	8.0	6.0	4.1	3.7	2.6	1.8	63.3
007429905	Aluminum (Fume or Dust)	2.5	10.0	9.6	0.0	0.0	0.0	59.6
000010230	Glycol Ethers	1.7	1.2	2.4	6.1	16.9	16.2	57.5
000010420	Lead Compounds	7.0	2.7	2.7	4.7	2.9	1.8	55.0
000010450	Manganese Compounds	3.0	8.7	6.6	6.1	5.5	3.3	53.3
007440393	Barium	0.1	4.2	3.9	3.5	0.0	0.0	41.1
000010100	Copper Compounds	3.1	1.2	1.7	1.1	2.1	1.2	38.1
007440020	Nickel	2.7	4.8	5.1	5.2	3.7	3.6	37.2
000108952	Phenol	4.4	2.7	3.0	3.7	2.9	2.4	36.3
000091203	Naphthalene	1.0	0.0	0.1	23.6	0.0	0.5	25.4
007723140	Phosphorus (Yellow or White)	2.0	2.2	2.2	2.2	3.2	3.1	23.6
Totals for Top 20 Chemicals:		440.9	145.9	110.1	149.8	110.2	111.4	2,534.5
Totals for All Chemicals:		486.9	172.2	133.2	175.8	128.1	128.0	2,796.8

Table 17

Total Water Releases
Chemicals With Significant Human Health Effects
Top 20 Chemicals

CAS Number or Category	Chemical Name	Water Releases (Thousand Pounds): Base Yr. 1988	Last Five Years 1993	1994	1995	1996	1997	Total Releases 88-97
007439965	Manganese	26.4	12.4	11.9	10.9	9.4	9.1	142.7
000010090	Chromium Compounds	8.0	6.0	4.1	3.7	2.6	1.8	63.3
000010420	Lead Compounds	7.0	2.7	2.7	4.7	2.9	1.8	55.0
000010450	Manganese Compounds	3.0	8.7	6.6	6.1	5.5	3.3	53.3
007440020	Nickel	2.7	4.8	5.1	5.2	3.7	3.6	37.2
007440473	Chromium	3.2	2.0	2.0	2.3	1.1	1.5	21.1
000010495	Nickel Compounds	3.2	2.2	2.6	1.1	1.1	1.1	20.5
000050000	Formaldehyde	2.2	2.5	1.7	1.8	2.1	2.6	20.0
007439921	Lead	2.1	2.0	1.7	1.2	0.6	0.5	15.6
000108883	Toluene	1.5	0.9	1.5	0.9	1.8	0.6	12.2
000071432	Benzene	1.3	1.8	1.0	1.3	0.6	0.1	10.9
001330207	Xylene (Mixed Isomers)	0.6	1.2	1.1	0.7	0.9	0.8	7.6
000100425	Styrene	1.6	0.6	0.7	0.1	0.6	0.0	6.8
000079107	Acrylic Acid	1.8	0.1	0.1	0.1	0.1	0.1	4.6
000075092	Dichloromethane	0.9	0.0	0.1	0.1	0.1	0.1	2.9
000075150	Carbon Disulfide	0.0	0.3	0.0	0.0	0.0	1.4	2.3
000075014	Vinyl Chloride	0.4	0.0	0.0	0.5	0.5	0.0	1.8
000079016	Trichloroethylene	0.6	0.0	0.0	0.0	0.0	0.0	1.6
000107131	Acrylonitrile	0.6	0.1	0.1	0.0	0.1	0.5	1.6
000078933	Methyl Ethyl Ketone	0.1	0.1	0.0	0.0	0.0	0.1	0.6
Totals for Top 20 Chemicals:		67.2	48.4	43.0	40.7	33.7	29.0	481.6
Totals for All Chemicals:		67.6	48.5	43.0	41.0	33.9	29.3	485.2

Table 18

Total On-Site Land Releases
Top 20 Chemicals

CAS Number or Category	Chemical Name	On-Site Land Releases (Million Pounds): Base Yr. 1988	Last Five Years 1993	1994	1995	1996	1997	Total Releases 88-97
000010982	Zinc Compounds	3.8	8.0	8.7	13.3	14.6	14.3	83.1
000010450	Manganese Compounds	0.8	5.2	4.9	5.6	5.1	6.1	44.4
007440666	Zinc (Fume or Dust)	3.1	3.8	4.0	0.1	0.0	0.0	23.0
000010090	Chromium Compounds	0.1	0.7	1.1	0.6	1.4	1.8	7.0
007439965	Manganese	0.5	0.6	0.7	0.6	0.7	0.8	6.7
000010420	Lead Compounds	0.3	0.6	0.7	0.8	0.8	1.0	5.8
007429905	Aluminum (Fume or Dust)	0.1	0.2	0.3	0.8	0.9	0.3	3.7
007440473	Chromium	0.2	0.2	0.1	0.1	0.1	0.1	1.5
000010040	Barium Compounds	0.0	0.0	0.0	0.0	0.0	0.0	1.2
007439921	Lead	0.2	0.1	0.1	0.0	0.0	0.0	0.7
0070.0382	Phosphoric Acid	0.0	0.1	0.0	0.0	0.0	0.1	0.6
0000500.0	Formaldehyde	0.3	0.0	0.0	0.0	0.0	0.0	0.6
000108952	Phenol	0.3	0.0	0.0	0.0	0.0	0.0	0.5
007697372	Nitric Acid	0.0	0.0	0.0	0.0	0.0	0.0	0.4
007440508	Copper	0.0	0.0	0.0	0.0	0.1	0.0	0.3
007440393	Barium	0.0	0.0	0.0	0.0	0.0	0.0	0.3
001330207	Xylene (Mixed Isomers)	0.0	0.0	0.0	0.0	0.0	0.0	0.2
000108883	Toluene	0.0	0.0	0.0	0.0	0.0	0.0	0.2
000095636	1,2,4-Trimethylbenzene	0.0	0.0	0.0	0.0	0.0	0.0	0.2
000107211	Ethylene Glycol	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Totals For Top 20 Chemicals:		9.7	19.5	20.6	21.9	23.7	24.5	180.6
Totals for All Chemicals:		10.0	19.7	20.6	22.0	23.8	24.6	181.6

Table 19

Total On-Site Land Releases
Chemicals With Significant Human Health Effects
Top 20 Chemicals

CAS Number or Category	Chemical Name	On-Site Land Releases (Thousand Pounds): Base Yr. 1988	Last Five Years 1993	1994	1995	1996	1997	Total Releases 88-97
000010450	Manganese Compounds	833.5	5,159.6	4,902.2	5,626.4	5,083.6	6,143.1	44,372.2
000010090	Chromium Compounds	66.0	732.7	1,073.7	643.8	1,390.5	1,752.1	6,950.9
007439965	Manganese	520.5	595.5	653.8	596.7	727.1	761.0	6,745.7
000010420	Lead Compounds	250.4	641.5	721.5	791.5	823.6	1,027.8	5,753.5
007440473	Chromium	187.7	232.6	76.2	77.3	70.0	51.8	1,529.4
007439921	Lead	177.8	106.4	119.3	10.5	1.7	0.0	733.6
000050000	Formaldehyde	330.8	15.7	2.8	1.9	0.2	0.2	563.6
001330207	Xylene (Mixed Isomers)	16.8	1.5	3.2	2.1	3.0	0.1	239.8
000108883	Toluene	42.8	4.9	2.3	15.3	0.6	10.3	238.2
007440020	Nickel	42.0	21.1	16.5	8.6	8.6	8.4	161.8
000079107	Acrylic Acid	0.2	0.1	0.1	0.0	0.1	0.1	94.7
000010495	Nickel Compounds	13.0	0.0	0.0	0.0	1.2	1.1	84.3
000071432	Benzene	0.6	0.4	0.6	3.8	0.9	2.8	45.2
000078933	Methyl Ethyl Ketone	0.1	0.0	6.9	8.8	5.4	0.0	21.4
000079016	Trichloroethylene	0.0	0.0	0.0	0.0	0.0	0.0	20.5
000010078	Cadmium Compounds	0.0	0.0	0.0	0.0	0.0	2.0	14.2
000127184	Tetrachloroethylene	0.0	0.0	0.0	0.0	4.4	0.0	4.5
000100425	Styrene	0.2	0.0	0.4	0.1	0.0	0.0	2.4
000107062	1,2-Dichloroethane	0.0	0.0	0.0	0.0	0.0	0.0	1.0
001332214	Asbestos (Friable)	0.0	0.0	0.0	0.0	0.0	0.0	0.7
Totals for Top 20 Chemicals:		2,482.4	7,512.0	7,579.5	7,786.8	8,120.9	9760.8	67,577.6
Totals for All Chemicals:		2,482.5	7,511.9	7,579.4	7,786.7	8,121.4	9761.2	67,579.3

* Less than 100 pounds but more than zero.

Table 20

Total Off-Site Transfers to POTW
Top 20 Chemicals

CAS Number or Category	Chemical Name	Off-Site Transfers to POTW (Million Pounds): Base Yr. 1988	Last Five Years 1993	1994	1995	1996	1997	Total Transfers 88-97
000067561	Methanol	3.0	3.4	2.0	1.7	1.8	1.3	27.9
000108952	Phenol	1.2	0.9	0.9	1.1	1.4	0.9	11.8
000106445	p-Cresol	0.7	0.9	1.7	0.9	0.4	0.0	8.7
000010230	Glycol Ethers	0.5	0.5	0.4	0.3	0.2	0.3	4.9
000062533	Aniline	0.7	0.8	0.6	0.1	0.0	0.0	4.7
000107211	Ethylene Glycol	0.4	0.2	0.2	0.1	0.1	0.2	3.3
007664382	Phosphoric Acid	0.8	0.2	0.1	0.1	0.1	0.3	2.7
001330207	Xylene (Mixed Isomers)	0.8	0.2	0.2	0.0	0.0	0.0	2.5
007697372	Nitric Acid	0.3	0.0	0.0	0.0	0.0	0.0	2.1
000108316	Maleic Anhydride	0.6	0.0	0.0	0.0	0.0	0.0	1.8
007664393	Hydrogen Fluoride	0.0	0.2	0.3	0.4	0.2	0.3	1.8
000075150	Carbon Disulfide	0.0	0.1	0.3	0.2	0.3	0.2	1.5
000111422	Diethanolamine	0.1	0.2	0.1	0.0	0.0	0.0	1.3
000071432	Benzene	0.5	0.0	0.0	0.0	0.0	0.0	1.3
000078933	Methyl Ethyl Ketone	0.0	0.1	0.1	0.2	0.3	0.3	1.2
000100027	4-Nitrophenol	0.4	0.0	0.0	0.0	0.0	0.0	1.1
000010982	Zinc Compounds	0.1	0.1	0.1	0.1	0.1	0.1	0.9
000108101	Methyl Isobutyl Ketone	0.0	0.0	0.0	0.0	0.0	0.0	0.5
000095476	o-Xylene	0.0	0.0	0.0	0.2	0.2	0.1	0.5
000095487	o-Cresol	0.0	0.0	0.1	0.1	0.0	0.0	0.5
Totals for Top 20 Chemicals:		10.1	7.8	7.1	5.5	5.1	4.0	81.0
Totals for All Chemicals:		11.6	8.4	7.7	5.9	5.8	4.8	88.1

Table 21

Total Off-Site Transfers to POTW
Chemicals With Significant Human Health Effects
Top 20 Chemicals

CAS Number or Category	Chemical Name	Off-Site Transfers to POTW (Thousand Pounds): Base Yr. 1988	Last Five Years 1993	1994	1995	1996	1997	Total Transfers 88-97
000062533	Aniline	688.4	754.5	600.7	69.3	36.0	41.0	4, 719.1
001330207	Xylene (Mixed Isomers)	769.0	218.8	219.5	11.4	21.5	14.2	2,459.0
000075150	Carbon Disulfide	37.0	130.2	256.9	247.4	336.8	174.8	1,454.0
000071432	Benzene	494.5	5.0	8.0	11.1	18.7	6.4	1,301.1
000078933	Methyl Ethyl Ketone	14.2	51.6	73.2	161.1	341.5	321.0	1,191.5
000075092	Dichloromethane	9.4	27.5	9.2	16.1	17.0	15.8	508.4
000108883	Toluene	14.1	98.5	75.5	36.0	39.8	19.9	436.9
000050000	Formaldehyde	47.6	30.0	30.5	21.7	24.4	10.0	321.8
007439965	Manganese	26.1	2.1	2.6	3.6	3.2	243.1	302.5
000079016	Trichloroethylene	4.0	28.1	35.9	2.8	69.2	24.2	282.4
000010090	Chromium Compounds	35.3	26.9	18.2	16.5	14.4	12.9	243.7
000010495	Nickel Compounds	57.2	15.3	12.8	12.8	17.3	14.5	194.3
000010450	Manganese Compounds	1.0	9.3	12.6	17.1	21.0	22.8	156.6
000075218	Ethylene Oxide	5.7	10.4	23.0	21.0	21.0	21.0	125.6
000107062	1,2-Dichloroethane	62.7	9.8	0.0	0.0	0.6	0.1	107.0
007440020	Nickel	12.4	8.7	8.8	9.2	11.9	12.2	100.1
007440473	Chromium	28.5	3.6	3.5	4.0	4.7	3.9	73.5
000010420	Lead Compounds	24.9	4.7	4.4	4.6	3.0	2.5	70.6
000079061	Acrylamide	0.7	0.9	0.9	0.6	0.4	4.0	54.7
000127184	Tetrachloroethylene	17.2	0.0	0.0	0.0	0.0	0.0	46.6
Totals for Top 20 Chemicals:		2,349.9	1,435.9	1,396.2	666.3	1,002.4	964.3	14,149.4
Totals for All Chemicals:		2,377.3	1,458.7	1,427.9	686.8	1,022.8	984.4	14,373.0

Table 22

Total Other Off-Site Transfers
Top 20 Chemicals
(Does Not Include Amount Recycled)

CAS Number or Category	Chemical Name	Other Off-Site Transfers (Million Pounds): Base Yr. 1988	Last Five Years 1993	1994	1995	1996	1997	Total Transfers 88-97
000010982	Zinc Compounds	10.3	12.9	12.9	14.0	8.2	16.4	106.6
000010450	Manganese Compounds	2.3	2.7	2.8	2.4	2.1	3.2	28.0
000067561	Methanol	3.7	2.8	1.8	1.0	0.6	0.7	22.6
000010040	Barium Compounds	2.5	0.5	0.4	0.3	0.3	0.2	15.8
000108883	Toluene	3.4	0.6	0.7	0.5	0.6	0.6	13.6
000085449	Phthalic Anhydride	3.3	0.1	0.0	0.0	2.4	2.9	11.5
000010100	Copper Compounds	1.4	0.4	0.4	0.3	0.3	0.3	10.2
000010420	Lead Compounds	1.3	0.8	1.0	0.7	0.6	1.5	9.9
007440508	Copper	1.1	0.8	0.9	0.8	0.8	1.5	9.9
000078933	Methyl Ethyl Ketone	2.2	0.4	0.3	0.3	0.3	0.6	9.1
001330207	Xylene (Mixed Isomers)	1.6	0.5	0.7	0.7	0.4	0.5	8.9
000010090	Chromium Compounds	0.8	1.0	0.7	0.6	1.2	1.4	8.7
007439965	Manganese	1.1	0.1	0.4	0.5	0.7	0.3	8.0
000075092	Dichloromethane	0.4	0.6	0.5	0.5	0.3	0.5	5.7
007440666	Zinc (Fume or Dust)	1.3	0.1	0.1	0.1	0.1	0.2	5.1
007782505	Chlorine	2.6	0.0	0.0	0.0	0.0	0.0	4.7
007440473	Chromium	1.0	0.2	0.2	0.3	0.2	0.8	4.5
007697372	Nitric Acid	0.2	0.4	0.4	0.8	0.7	0.5	3.8
000100425	Styrene	0.6	0.1	0.2	0.4	0.3	0.4	3.6
000071556	1,1,1-Trichloroethane	0.9	0.3	0.1	0.0	0.0	0.0	3.6
Totals for Top 20 Chemicals:		42.0	25.3	24.5	24.2	20.1	32.5	293.8
Totals for All Chemicals:		51.1	30.1	29.3	28.6	24.0	36.9	350.4

Table 23

Total Other Off-Site Transfers
Top 20 Chemicals
Chemicals With Significant Human Health Effects
(Does Not Include Amount Recycled)

CAS Number or Category	Chemical Name	Other Off-Site Transfers (Million Pounds): Base Yr. 1988	Last Five Years 1993	1994	1995	1996	1997	Total Transfers 88-97
000010450	Manganese Compounds	2.3	2.7	2.8	2.4	2.1	3.2	28.0
000108883	Toluene	3.4	0.6	0.7	0.5	0.6	0.6	13.6
000010420	Lead Compounds	1.3	0.8	1.0	0.7	0.6	1.5	9.9
000078933	Methyl Ethyl Ketone	2.0	0.4	0.3	0.3	0.3	0.6	9.1
001330207	Xylene (Mixed Isomers)	1.6	0.5	0.7	0.7	0.4	0.5	8.9
000010090	Chromium Compounds	0.8	1.0	0.7	0.6	1.2	1.4	8.7
007439965	Manganese	1.1	0.1	0.4	0.5	0.7	0.3	8.0
000075092	Dichloromethane	0.4	0.6	0.5	0.5	0.3	0.5	5.7
007440473	Chromium	1.0	0.2	0.2	0.3	0.2	0.8	4.5
000100425	Styrene	0.6	0.1	0.2	0.4	0.3	0.4	3.6
007440020	Nickel	0.5	0.1	0.1	0.1	0.1	0.1	3.5
007439921	Lead	1.3	0.1	0.2	0.1	0.1	0.2	3.5
000079016	Trichloroethylene	0.5	0.2	0.2	0.1	0.1	0.1	2.7
000062533	Aniline	0.2	0.4	0.2	0.0	0.0	0.0	2.1
000010495	Nickel Compounds	0.2	0.1	0.2	0.1	0.1	0.2	1.8
000067663	Chloroform	0.1	0.2	0.3	0.1	0.1	0.1	1.2
000071432	Benzene	0.0	0.1	0.3	0.1	0.0	0.0	1.2
000117817	Di-(2-ethylhexyl)phthalate (DEHP)	0.0	0.2	0.2	0.1	0.1	0.0	1.0
000127184	Tetrachloroethylene	0.2	0.1	0.1	0.1	0.1	0.0	1.0
000050000	Formaldehyde	0.1	0.0	0.0	0.1	0.0	0.0	0.5
Totals for Top 20 Chemicals:		17.8	8.5	9.3	7.8	7.4	10.5	118.5
Totals for All Chemicals:		18.2	8.6	9.4	8.3	7.5	10.7	120.2

Table 24

Total Releases and Transfers
Top 20 Chemicals
(Does Not Include Amount Recycled)

CAS Number or Category	Chemical Name	Total Releases and Transfers (Million Pounds): Base Yr. 1988	Last Five Years 1993	1994	1995	1996	1997	Total 88-97
000010982	Zinc Compounds	16.4	21.7	22.4	28.0	24.6	31.6	199.7
000108883	Toluene	21.6	7.4	8.3	7.0	5.5	5.8	112.5
000010450	Manganese Compounds	3.2	7.9	7.8	8.2	7.4	9.5	73.4
000067561	Methanol	9.9	8.0	5.8	4.7	4.3	4.1	72.5
001330207	Xylene (Mixed Isomers)	9.3	5.5	5.9	4.1	3.9	3.5	64.2
000071556	1,1,1-Trichloroethane	11.5	2.4	0.7	0.4	0.1	0.0	51.5
000075150	Carbon Disulfide	3.3	4.9	5.5	5.7	5.7	5.6	48.7
000078933	Methyl Ethyl Ketone	7.0	4.4	3.9	3.2	2.9	2.7	48.5
000079016	Trichloroethylene	4.9	3.9	4.1	3.4	3.1	2.7	39.7
007782505	Chlorine	7.1	2.9	3.7	2.5	2.0	0.3	38.8
000075092	Dichloromethane	4.7	3.4	3.4	3.2	2.8	1.9	35.5
000010230	Glycol Ethers	3.2	3.4	3.3	3.3	2.7	2.8	35.0
007440666	Zinc (Fume or Dust)	4.9	4.1	4.3	0.3	0.2	0.3	30.8
000074851	Ethylene	5.3	1.7	1.3	1.0	1.6	1.6	23.4
000100425	Styrene	2.5	2.0	2.4	2.5	2.3	2.3	21.6
000108952	Phenol	2.3	1.7	1.8	2.1	2.3	1.6	20.4
000010040	Barium Compounds	2.6	0.7	0.4	0.4	0.3	0.2	17.7
000010420	Lead Compounds	1.6	1.5	1.7	1.6	1.6	2.6	16.7
000010090	Chromium Compounds	1.0	1.8	1.8	1.3	2.6	3.1	16.3
007439965	Manganese	1.8	0.8	1.1	1.2	1.5	1.4	15.9
Totals for Top 20 Chemicals:		124.1	90.1	89.6	84.0	77.4	83.6	982.8
Totals for All Chemicals:		167.9	109.6	109.5	102.3	96.4	103.7	1,240.7

Table 25

Total Releases and Transfers
Top 20 Chemicals
Chemicals With Significant Human Health Effects
(Does Not Include Amount Recycled)

CAS Number or Category	Chemical Name	Total Releases and Transfers (Million Pounds): Base Yr. 1988	Last Five Years 1993	1994	1995	1996	1997	Total 88-97
000108883	Toluene	21.6	7.4	8.3	7.0	5.5	5.8	112.5
000010450	Manganese Compounds	3.2	7.9	7.8	8.2	7.4	9.5	73.4
001330207	Xylene (Mixed Isomers)	9.3	5.5	5.9	4.1	3.9	3.5	64.2
000075150	Carbon Disulfide	3.3	4.9	5.5	5.7	5.7	5.6	48.7
000078933	Methyl Ethyl Ketone	7.0	4.4	3.9	3.2	2.9	2.7	48.5
000079016	Trichloroethylene	4.9	3.9	4.1	3.4	3.1	2.7	39.7
000075092	Dichloromethane	4.7	3.4	3.4	3.2	2.8	1.9	35.5
000100425	Styrene	2.5	2.0	2.4	2.5	2.3	2.3	21.6
000010420	Lead Compounds	1.6	1.5	1.7	1.6	1.6	2.6	16.7
000010090	Chromium Compounds	1.0	1.8	1.8	1.3	2.6	3.1	16.3
007439965	Manganese	1.8	0.8	1.1	1.2	1.5	1.4	15.9
000071432	Benzene	2.1	0.6	0.9	0.6	0.5	0.4	11.3
000127184	Tetrachloroethylene	2.2	0.7	0.6	0.5	0.5	0.3	9.2
000062533	Aniline	1.0	1.1	0.8	0.1	0.1	0.1	7.4
007440473	Chromium	1.2	0.5	0.3	0.4	0.4	0.9	6.4
000107131	Acrylonitrile	1.1	0.4	0.4	0.4	0.4	0.4	5.4
007439921	Lead	1.5	0.3	0.3	0.2	0.1	0.3	4.6
007440020	Nickel	0.6	0.2	0.2	0.2	0.2	0.2	4.2
000075003	Chloroethane	0.5	0.3	0.3	0.2	0.2	0.2	2.8
000050000	Formaldehyde	0.6	0.2	0.1	0.2	0.1	0.1	2.3
Totals for Top 20 Chemicals:		71.7	47.8	49.8	44.2	41.8	44.0	546.6
Totals for All Chemicals:		73.4	49.1	51.1	45.1	42.8	44.8	558.7

STANDARD INDUSTRIAL CLASSIFICATION (SIC) CATEGORIES

Facilities in 180 individual four-digit SIC codes have reported toxic chemical releases from 1988 through 1997. Tables 26 and 27 summarize the release and transfer information for these SIC codes.

Table 26

Total Release and Transfer Amounts
Top 20 SIC Codes

SIC Code	Description	Total Releases and Transfers (Million Pounds): Base Yr. 1988	1993	Last Five Years 1994	1995	1996	1997	Total 88-97	% Increase(+) or Decrease(-) 88-97
3312	Steel Works, Blast Furnaces (Including Coke Ovens) and Rolling Mills	23.4	32.4	32.3	34.3	31.1	40.0	294.6	70.8
2821	Plastic Materials, Synthetic Resins and Nonvulcanizable Elastomers	14.7	8.4	7.7	6.4	5.8	5.7	81.2	-61.6
2865	Cyclic Organic Crudes & Intermediates, and Organic Dyes and Pigments	10.8	4.2	4.6	4.3	6.3	6.4	62.9	-41.0
2869	Industrial Organic Chemicals, Not Elsewhere Classified	8.6	5.7	3.6	2.8	3.4	2.0	62.0	-77.2
3089	Plastic Products, Not Elsewhere Classified	4.3	5.7	5.9	5.9	6.0	5.9	54.5	37.2
2819	Industrial Inorganic Chemicals, Not Elsewhere Classified	5.9	4.5	5.4	3.8	3.3	2.0	49.9	-65.4
2752	Commercial Printing, Lithographic	6.3	2.2	2.0	1.7	1.9	3.1	38.1	-50.7
3711	Motor Vehicles and Passenger Car Bodies	4.5	2.1	2.2	2.1	1.4	1.5	26.8	-67.6
2851	Paints, Varnishes, Lacquers, Enamels and Allied Products	3.9	1.8	1.1	1.2	1.3	1.3	24.1	-65.4
2911	Petroleum Refining	3.0	2.4	2.5	1.2	1.4	1.3	23.7	-55.9
3341	Secondary Smelting and Refining of Non Ferrous Metal	3.9	1.1	1.5	1.5	2.7	2.3	22.4	-39.5
3471	Electroplating, Plating, Polishing, Anodizing and Coloring	2.1	1.9	1.9	1.9	2.3	2.5	20.4	23.3
2754	Commercial Printing, Gravure	7.0	0.6	1.7	1.3	0.9	0.0	16.1	- 99.7
2672	Coated and Laminated Paper, Not Elsewhere Classified	1.8	1.8	2.2	1.0	0.8	0.7	15.2	-61.7
3086	Plastics Foam Products	0.8	1.7	2.0	2.1	2.0	1.1	15.0	33.1
3411	Metal Cans	0.9	1.7	1.4	1.2	1.1	1.2	13.9	33.7
3714	Motor Vehicle Parts and Accessories	1.4	1.4	0.8	0.6	0.3	0.2	13.8	- 86.1
3499	Fabricated Metal Prod., Not Else. Class.	1.4	1.1	0.8	0.9	1.2	1.2	13.7	-18.0
3479	Coating, Engraving, and Allied Services, Not Elsewhere Classified	1.8	1.1	1.3	1.2	1.1	1.2	13.7	- 32.7
2843	Surface Active Agents, Finishing Agents, Sulfonated Oils, and Assistants	3.8	0.6	0.6	1.4	1.2	1.0	13.0	- 74.1
Totals for Top 20 SIC Codes:		110.3	82.4	81.5	76.8	75.5	80.6	875.0	
Totals for All SIC Codes:		167.9	109.6	109.5	102.3	96.4	103.7	1,240.7	

Table 27

Total Release and Transfer Amounts
Chemicals With Significant Human Health Effects
Top 20 SIC Codes

SIC Code	Description	Total Releases and Transfers (Million Pounds): Base Yr. 1988	1993	1994	1995	1996	1997	Total 88-97	% Increase/ Decrease(-) 88-97
			Last Five Years						
3312	Steel Works, Blast Furnaces (Including Coke Ovens) and Rolling Mills	6.4	9.2	9.0	9.2	9.1	12.0	93.3	42.0
3089	Plastic Products, Not Elsewhere Classified	2.0	5.3	5.9	5.9	6.0	5.8	45.1	196.4
2752	Commercial Printing, Lithographic	5.7	2.0	1.7	1.4	1.8	2.9	35.0	-69.1
2821	Plastic Materials, Synthetic Resins and Nonvulcanizable Elastomers	5.5	3.0	3.1	2.6	2.5	2.4	33.9	-54.6
2865	Cyclic Organic Crudes and Intermediates, and Organic Dyes and Pigments	4.2	1.7	1.6	0.6	0.6	0.5	20.0	-84.9
2851	Paints, Varnishes, Lacquers, Enamels and Allied Products	3.1	1.1	0.7	0.7	0.8	0.8	17.3	-73.0
3086	Plastic Foam Products	0.7	1.4	1.8	2.0	1.9	1.1	13.3	188.1
2911	Petroleum Refining	1.9	1.2	1.2	0.6	0.7	0.6	13.2	-64.2
2754	Commercial Printing, Gravure	5.0	0.6	1.6	1.2	0.9	0.0	13.1	-81.9
3711	Motor Vehicles and Passenger Car Bodies	2.3	1.1	1.0	0.7	0.6	0.6	13.0	-73.6
2819	Industrial Inorganic Chemicals, Not Elsewhere Classified	1.3	1.4	1.5	1.1	0.9	1.1	12.7	-29.8
2672	Coated and Laminated Paper, Not Elsewhere Classified	1.7	1.4	1.6	0.8	0.6	0.6	11.7	-62.8
3471	Electroplating, Plating, Polishing, Anodizing and Coloring	1.1	1.0	0.9	0.9	1.3	1.4	10.9	18.9
3714	Motor Vehicle Parts and Accessories	0.9	1.0	0.6	0.5	0.2	0.1	10.3	-74.7
3499	Fabricated Metal Products, Not Elsewhere Classified	1.1	0.8	0.5	0.5	0.9	0.9	8.4	-19.6
3479	Coating, Engraving, and Allied Services, Not Elsewhere Classified	1.3	0.6	0.8	0.6	0.5	0.5	7.5	-58.9
3317	Steel Pipe and Tubes	0.5	0.9	0.9	0.8	0.7	0.5	7.1	60.6
3671	Electron Tubes	0.8	1.0	1.1	0.5	0.2	0.5	5.9	-72.9
2893	Printing Ink	0.5	0.4	0.5	0.5	0.3	0.1	5.5	-38.6
2869	Industrial Inorganic Chemicals, Not Elsewhere Classified	0.8	0.2	0.3	0.6	0.6	0.5	5.2	-37.5
Totals for Top 20 SIC Codes:		48.9	35.3	36.3	31.7	31.1	32.9	390.6	
Totals for All SIC Codes:		73.4	49.1	51.1	45.1	42.8	44.8	558.7	

ZIP CODES - AIR EMISSIONS

The geographic analysis of information in past reports has been summarized on a county basis. In an attempt to localize the reported information in an understandable format, the following summaries of toxic chemical release information presented in Tables 28 and 29 are based on five-digit zip codes. Also, the analysis presented here is restricted to air emissions to give some indication of the possibility of human exposure. Of course, ZIP code areas vary in size and population. Also, as the case has always been, toxic chemical release and transfer amounts are annual totals, so no inferences can be made from the following rankings relative to exposure dose and resultant human health effects of these air emissions in any of the ZIP codes listed. Figures 4 and 5 show the geographic location of the top ten ZIP codes, respectively, from Tables 28 and 29.

Table 28

Total Air Emissions
Top 20 ZIP Codes

ZIP			Total Air Emissions (Million Pounds): Base Yr.	Last Five Years					Total
Code	County	City	1988	1993	1994	1995	1996	1997	88-97
61832	Vermilion	Danville	2.5	3.9	4.2	3.9	4.0	3.9	37.2
61953	Douglas	Tuscola	5.0	3.0	3.7	2.5	2.1	0.4	36.6
60450	Grundy	Morris	5.4	2.0	1.7	1.3	1.9	1.9	24.6
62206	St. Clair	Sauget	3.6	0.8	0.7	0.8	0.8	1.0	15.7
60638	Cook	Bedford Park	1.6	1.4	1.6	1.6	1.5	1.5	15.3
60501	Cook	Summit	1.5	1.4	1.6	0.6	0.5	0.5	14.9
60633	Cook	Chicago	1.9	1.3	1.3	1.2	0.7	0.8	13.8
61938	Coles	Mattoon	2.4	0.7	0.7	0.6	0.3	0.8	13.0
62454	Crawford	Robinson	2.1	1.0	0.9	1.2	0.4	0.4	12.9
61350	LaSalle	Ottawa (Rural)	2.1	1.1	1.2	1.2	1.1	1.1	12.7
61054	Ogle	Mount Morris	1.6	1.2	1.0	0.9	1.3	0.9	11.5
62084	Madison	Roxana	1.6	1.0	1.1	0.5	0.5	0.5	10.4
60616	Cook	Chicago	2.3	0.2	0.0	0.1	0.0	0.0	10.0
62881	Marion	Salem	0.7	0.6	1.7	1.3	1.2	1.5	8.9
62040	Madison	Granite City	1.5	0.6	0.6	0.4	0.4	0.3	8.2
60007	Cook	Elk Grove Village	1.1	0.7	0.7	0.7	0.6	0.4	7.8
60131	Cook	Franklin Park	1.0	0.6	0.6	0.4	0.4	0.6	7.7
61008	Boone	Belvidere	2.2	0.2	0.4	0.3	0.3	0.2	7.5
60609	Cook	Chicago	0.8	0.7	0.7	0.6	0.4	0.4	7.5
60525	Cook	McCook	1.6	0.3	0.4	0.4	0.3	0.1	7.2
Totals for Top 20 ZIP Codes:			42.5	22.7	24.8	20.5	18.7	17.2	283.4
Totals for All ZIP Codes: 94.6			51.6	51.8	45.8	43.1	37.3	617.7	

FIGURE 4

CUMULATIVE TOTAL OF AIR EMISSIONS
1988-1997
TOP 10 ZIP CODES

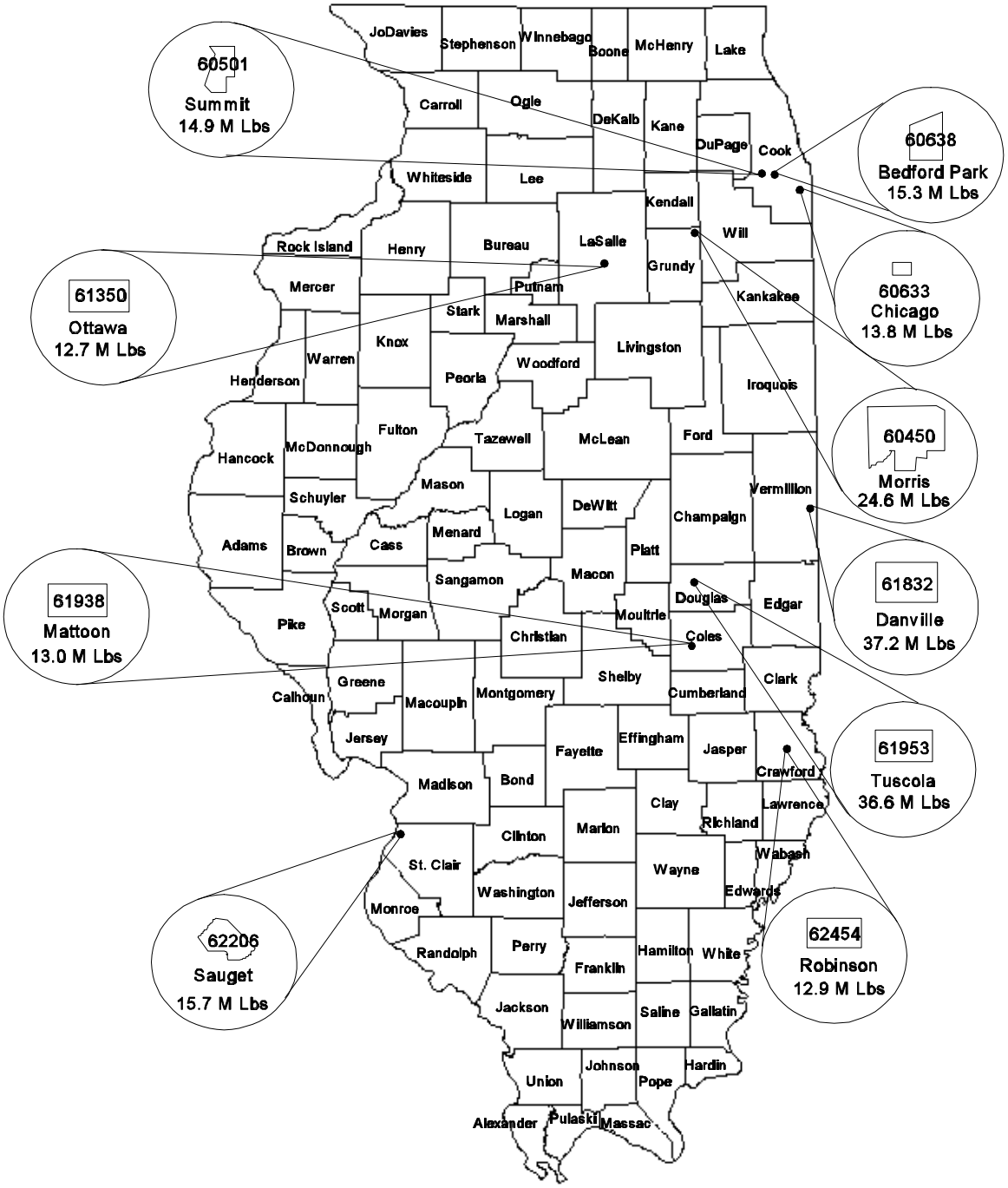


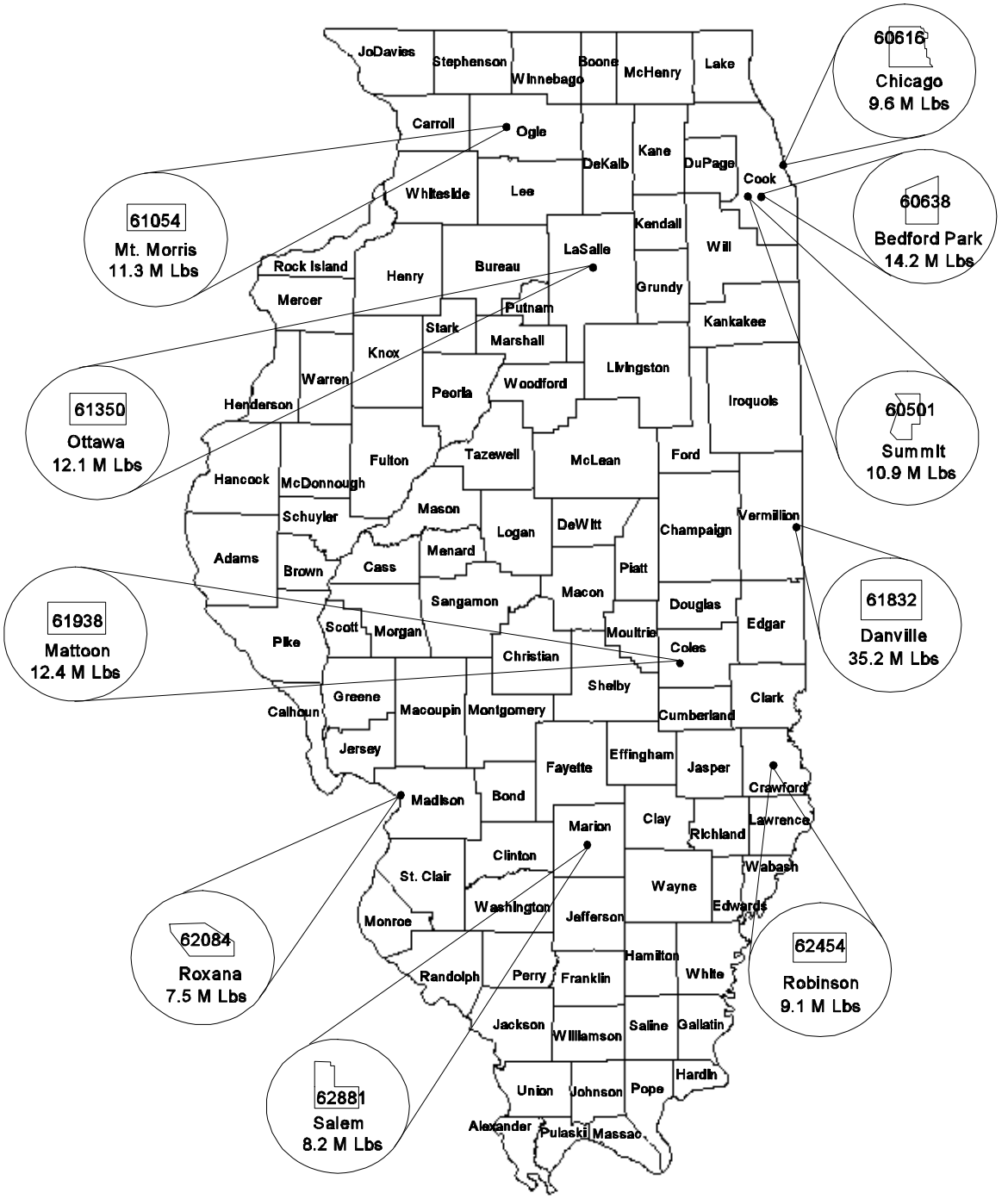
Table 29

Total Air Emissions
Chemicals With Significant Human Health Effects
Top 20 ZIP Codes

ZIP			Total Air Emissions (Million Pounds): Base Yr.	Last Five Years					Total
Code	County	City	1988	1993	1994	1995	1996	1997	88-97
61832	Vermilion	Danville	2.3	3.7	4.2	3.9	4.0	3.9	35.2
60638	Cook	Bedford Park	1.4	1.3	1.6	1.6	1.5	1.5	14.2
61938	Coles	Mattoon	2.4	0.7	0.7	0.6	0.3	0.7	12.4
61350	LaSalle	Ottawa (Rural)	2.1	1.1	1.1	1.1	1.1	1.1	12.1
61054	Ogle	Mount Morris	1.6	1.2	1.0	0.8	1.2	0.8	11.3
60501	Cook	Summit	1.5	1.1	1.1	0.4	0.3	0.4	10.9
60616	Cook	Chicago	2.3	0.1	0.0	0.0	0.0	0.0	9.6
62454	Crawford	Robinson	1.6	0.6	0.5	1.1	0.2	0.1	9.1
62881	Marion	Salem	0.6	0.6	1.6	1.2	1.1	1.4	8.2
62084	Madison	Roxana	1.1	0.7	0.7	0.3	0.3	0.3	7.5
62206	St. Clair	Sauget	1.0	0.5	0.4	0.3	0.3	0.3	6.0
60633	Cook	Chicago	0.8	0.5	0.4	0.3	0.3	0.2	6.0
60185	DuPage	West Chicago	0.4	0.2	0.4	0.9	0.6	0.6	5.7
60131	Cook	Franklin Park	0.7	0.5	0.5	0.3	0.3	0.3	5.7
60410	Will	Channahon	1.0	0.5	0.5	0.4	0.4	0.3	5.6
60007	Cook	Elk Grove Village	0.8	0.6	0.5	0.5	0.4	0.3	5.3
60455	Cook	Bridgeview	0.2	0.7	0.9	0.7	0.7	0.0	5.2
60160	Cook	Melrose Park	0.8	0.9	1.0	0.5	0.0	0.0	5.1
60426	Cook	Harvey	0.5	0.5	0.6	0.5	0.5	0.5	5.0
62914	Alexander	Cairo	0.5	0.5	0.4	0.0	0.6	0.4	4.6
Totals for Top 20 ZIP Codes:			23.6	16.5	18.1	15.4	14.1	13.1	184.7
Totals for All ZIP Codes: 50.3			31.5	32.6	28.3	26.1	23.3	356.0	

FIGURE 5

CUMULATIVE TOTAL OF AIR EMISSIONS
1988-1997
TOP 10 ZIP CODES
CHEMICALS WITH SIGNIFICANT HUMAN HEALTH EFFECTS



GENERAL TRENDS

The following charts depict the general trends of toxic chemical release information from 1988 through 1997. Figure 6 indicates the number of reporting facilities in each year. Figure 7 shows total releases and transfers for only the 760 facilities reporting all ten years. Figure 8 shows totals for all reporting facilities for those years. Figures 9 through 13 show the totals for each release and transfer route.

FIGURE 6

NUMBER OF FACILITIES REPORTING

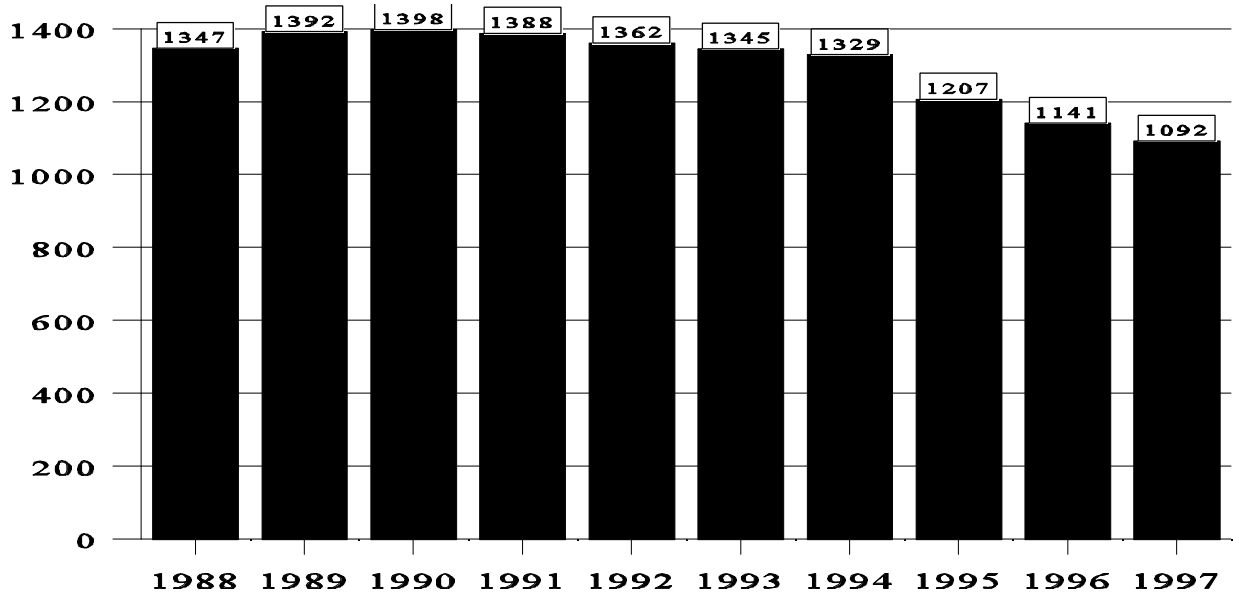


FIGURE 7

TOTAL RELEASES & TRANSFERS - FACILITIES REPORTING ALL TEN YEARS

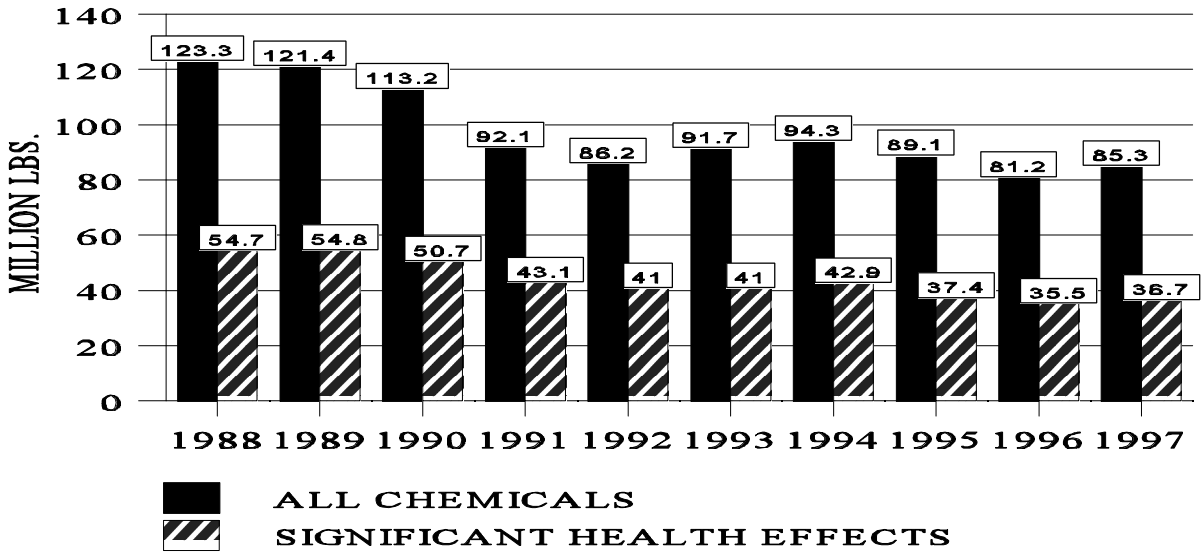


FIGURE 8

TOTAL RELEASES & TRANSFERS - ALL FACILITIES

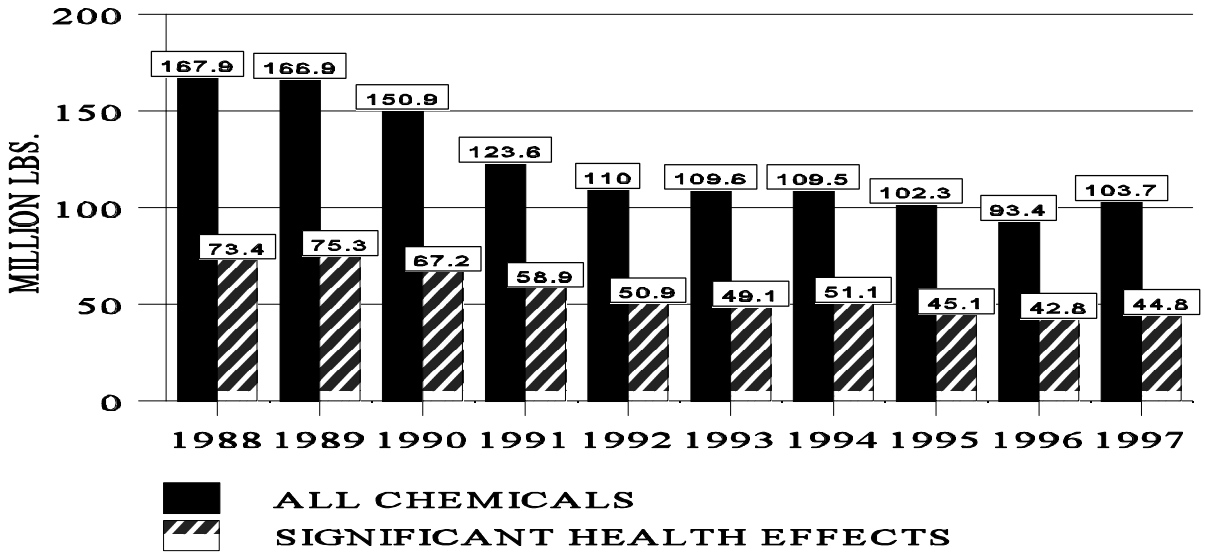


FIGURE 9

TOTAL AIR EMISSIONS

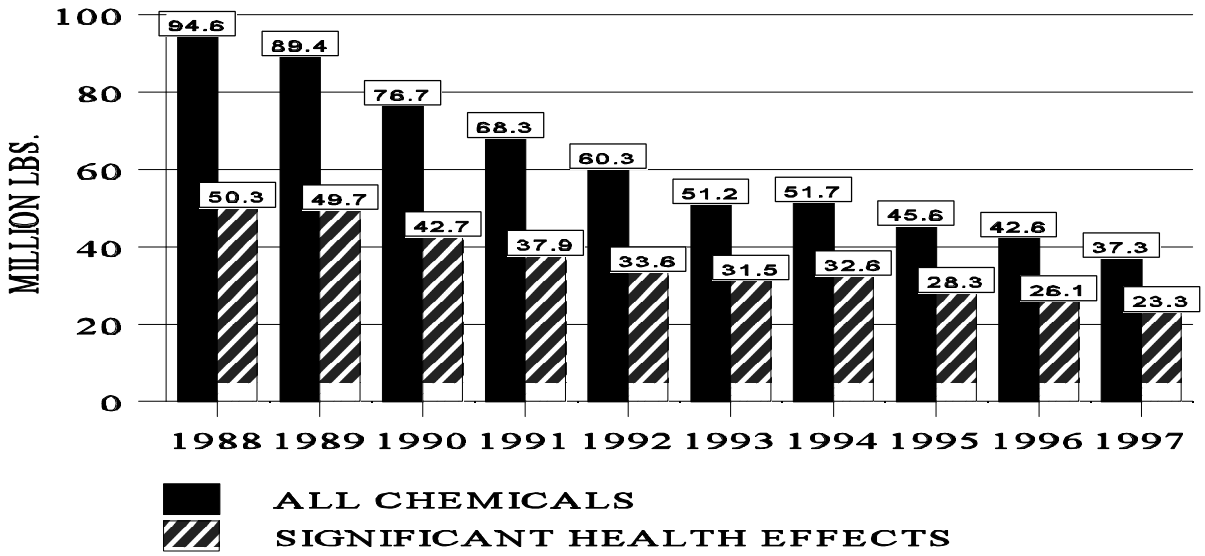


FIGURE 10

TOTAL WATER DISCHARGES

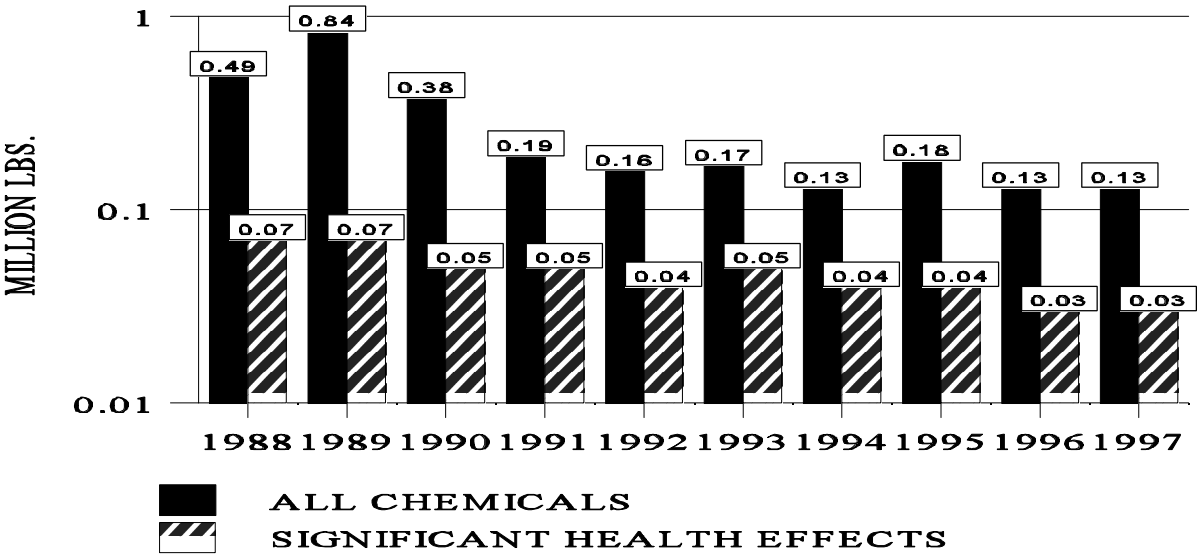


FIGURE 11

TOTAL RELEASES TO LAND ONSITE

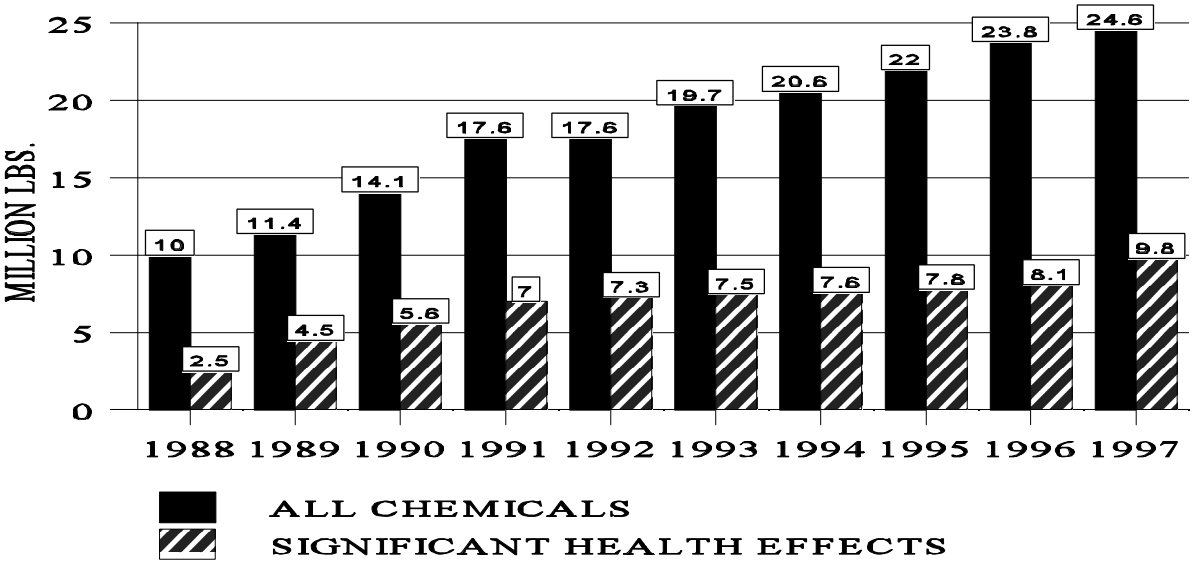


FIGURE 12

TOTAL OFFSITE TRANSFERS TO POTW

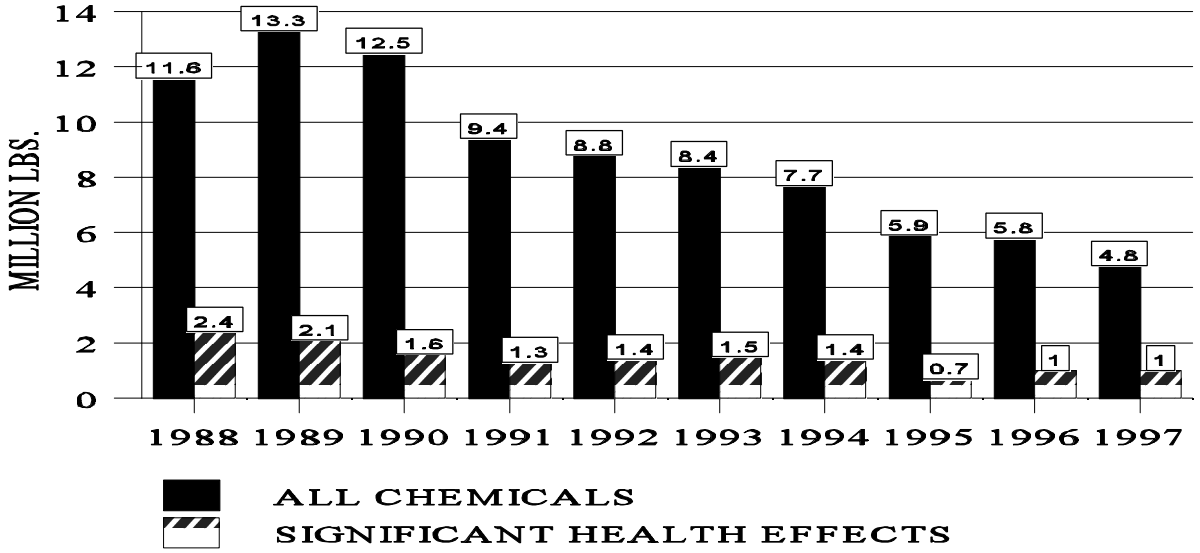
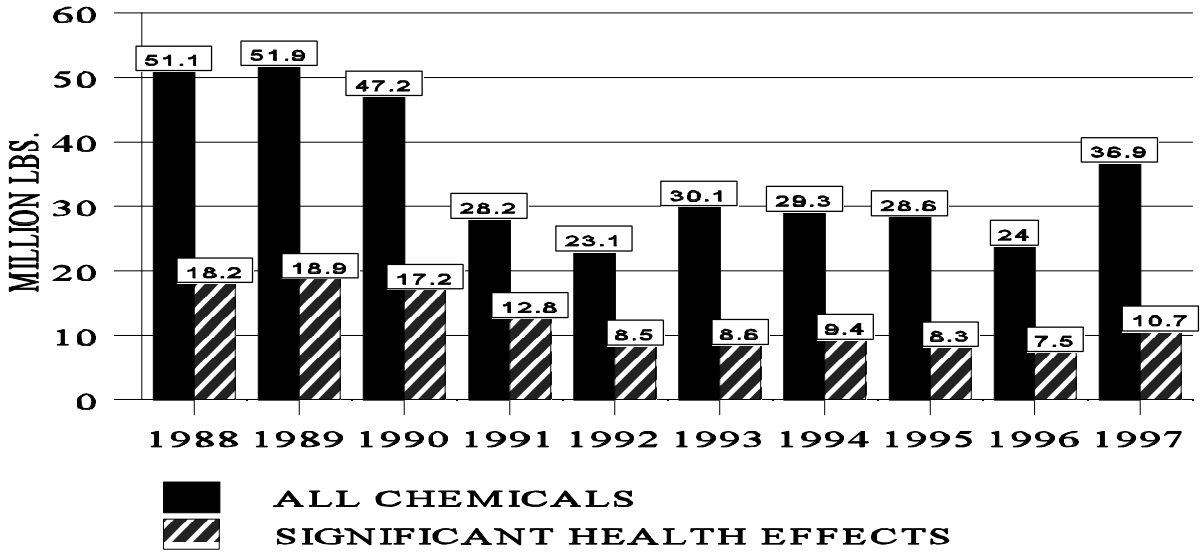


FIGURE 13

TOTAL OTHER OFFSITE TRANSFERS



APPENDIX A - FORM R

(Note: Due to the length of the instructions for completing Form R, only the form is included in Appendix A.)

EPA
United States Environmental Protection Agency

FORM R

TOXIC CHEMICAL RELEASE INVENTORY REPORTING FORM

Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986, also known as Title III of the Superfund Amendments and Reauthorization Act

WHERE TO SEND COMPLETED FORMS:
1. EPCRA Reporting Center, P.O. Box 3348, Merrifield, VA 22116-3348, ATTN: TOXIC CHEMICAL RELEASE INVENTORY
2. APPROPRIATE STATE OFFICE (See instructions in Appendix F)

Enter "X" here if this is a revision ☐

For EPA use only

IMPORTANT: See instructions to determine when "Not Applicable (NA)" boxes should be checked.

PART I. FACILITY IDENTIFICATION INFORMATION

SECTION 1. REPORTING YEAR 19 ____

SECTION 2. TRADE SECRET INFORMATION

2.1	Are you claiming the toxic chemical identified on page 2 trade secret? ☐ Yes (Answer question 2.2; Attach substantiation forms) ☐ No (Do not answer 2.2; go to Section 3)	2.2	Is this copy ☐ Sanitized ☐ Unsanitized (Answer only If "YES" in 2.1)

SECTION 3. CERTIFICATION (Important: Read and sign after completing all form sections.)

I hereby certify that I have reviewed the attached documents and that, to the best of my knowledge and belief, the submitted information is true and complete and that the amounts and values in this report are accurate based on reasonable estimates using data available to the preparers of this report.

Name and official title of owner/operator or senior management official:	Signature:	Date signed:

SECTION 4. FACILITY IDENTIFICATION

TRI Facility ID Number

4.1	Facility or Establishment Name	Facility or Establishment Name or Mailing Address (if different from street address)
	Street	Mailing Address
	City/County/State/Zip Code	City/County/State/Zip Code

4.2	This report contains Information for: (**Important**: check a or b; check c if applicable)	a. ☐ An entire facility b. ☐ Part of a facility c. ☐ A Federal facility
4.3	Technical Contact Name	Telephone Number (include area code)
4.4	Public Contact Name	Telephone Number (include area code)
4.5	SIC Code(s) (4 digits)	a. b. c. d. e. f.

		Degrees	Minutes	Seconds		Degrees	Minutes	Seconds
4.6	Latitude				Longitude			

4.7	Dun & Bradstreet Number(s) (9 digits)	4.8	EPA Identification Number(s) (RCRA I.D. No.) (12 characters)	4.9	Facility NPDES Permit Number(s) (9 characters)	4.10	Underground Injection Well Code (UIC) I.D. Number(s) (12 digits)
	a.		a.		a.		a.
	b.		b.		b.		b.

SECTION 5. PARENT COMPANY INFORMATION

5.1	Name of Parent Company	☐ NA	
5.2	Parent Company's Dun & Bradstreet Number	☐ NA	(9 digits)

EPA FORM R
PART II. CHEMICAL - SPECIFIC INFORMATION

TRI FACILITY ID NUMBER

Toxic Chemical, Category, or Generic Name

SECTION 1.TOXIC CHEMICAL IDENTITY

(Important: DO NOT complete this section if you completed Section 2 below.)

1.1	**CAS NUMBER** (IMPORTANT: Enter only one number exactly as it appears on the Section 313 list. Enter category code if reporting a chemical category.)
1.2	Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.)
1.3	Generic Chemical Name (Important: Complete **only** if Part I, Section 2.1 is checked "yes". Generic name must be structurally descriptive.)

SECTION 2. MIXTURE COMPONENT IDENTITY

(Important: DO NOT complete this section if you complete Section 1 above.)

2.1	Generic Chemical Name Provided by Supplier (Important: Maximum of 70 characters, including numbers, letters, spaces, and punctuation.)

SECTION 3. ACTIVITIES AND USES OF THE TOXIC CHEMICAL AT THE FACILITY (Important: Check all that apply.)

3.1 Manufacture the toxic chemical:	3.2 Process the toxic chemical:	3.3 Otherwise use the toxic chemical:
a. ☐ Produce b. ☐ Import		
If produce or import:		
c. ☐ For on-site use/processing	a. ☐ As a reactant	a. ☐ As a chemical processing aid
d. ☐ For sale/distribution	b. ☐ As a formulation component	b. ☐ As a manufacturing aid
e. ☐ As a byproduct	c. ☐ As an article component	c. ☐ Ancillary or other use
f. ☐ As an impurity	d. ☐ Repackaging	

SECTION 4. MAXIMUM AMOUNT OF THE TOXIC CHEMICAL ON-SITE AT ANY TIME DURING THE CALENDAR YEAR

4.1	☐ (Enter two-digit code from instruction package.)

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM

			A. Total Release (pounds/year)(enter range from instructions or estimate)	B. Basis of estimate (enter code)	C. % From Stormwater
5.1	Fugitive or non-point air emissions	NA ☐			
5.2	Stack or point air emissions	NA ☐			
5.3	Discharges to receiving streams or water bodies (enter one name per box)				
	Stream or Water Body Name				
5.3.1					
5.3.2					
5.3.3					
5.4.1	Underground Injection on-site to Class I Wells	NA ☐			
5.4.2	Underground Injection on-site to Class II-V Wells	NA ☐			

If additional pages of Part II, Section 5.3 are attached, indicate the total number of pages in this box ☐ and indicate which Part II, Section 5.3 page this is, here ☐ (example: 1,2,3, etc.)

Range Codes: A = 1 - 10 pounds; B = 11 - 499 pounds; C = 500 - 999 pounds.

EPA FORM R
PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER

Toxic Chemical, Category, or Generic Name

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM

		NA	A. **Total Release** (pounds/year) (enter range code from instructions or estimate)	B. **Basis of Estimate** (enter code)
5.5	Disposal to land on-site			
5.5.1A	RCRA Subtitle C landfills	☐		
5.5.1B	Other landfills	☐		
5.5.2	Land treatment/application farming	☐		
5.5.3	Surface impoundment	☐		
5.5.4	Other disposal	☐		

SECTION 6. TRANSFERS OF THE TOXIC CHEMICAL IN WASTES TO OFF-SITE LOCATIONS

6.1 DISCHARGES TO PUBLICLY OWNED TREATMENT WORKS (POTWs)

6.1.A. Total Quantity Transferred to POTWs and Basis of Estimate

6.1.A.1. Total Transfers (pounds/year) (enter range code or estimate)	**6.1.A.2 Basis of Estimate** (enter code)

6.1.B. ___ POTW Name

POTW Address

City | State | County | Zip

6.1.B. ___ POTW Name

POTW Address

City | State | County | Zip

If additional pages of Part II, Section 6.1 are attached, indicate the total number of pages in this box ☐ **and indicate which Part II, Section 6.1 page this is here** ☐ **(example: 1,2,3, etc.)**

SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS

6.2 ___OFF-SITE EPA IDENTIFICATION NUMBER (RCRA ID NO.)

Off-Site Location Name

Off-Site Address

City | State | County | Zip

Is location under control of reporting facility or parent company? ☐ **Yes** ☐ **No**

Range Codes: A = 1 - 10 pounds; B = 11 - 499 pounds; C = 500 - 999 pounds.

EPA FORM R
PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER

Toxic Chemical, Category, or Generic Name

SECTION 6. 2 TRANSFERS TO OTHER OFF-SITE LOCATIONS (continued)

A. Total Transfers (pounds/year) (enter range code or estimate)	B. Basis of Estimate (enter code)	C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code)
1.	1.	1.M
2.	2.	2.M
3.	3.	3.M
4.	4.	4.M

6.2 ___ OFF-SITE EPA IDENTIFICATION NUMBER (RCRA ID NO.)

Off-Site Location Name

Off-Site Address

City | State | County | Zip

Is location under control of reporting facility or parent company? ☐ **Yes** ☐ **No**

A. Total Transfers (pound/year) (enter range code or estimate)	B. Basis of Estimate (enter code)	C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code)
1.	1.	1.M
2.	2.	2.M
3.	3.	3.M
4.	4.	4.M

SECTION 7A. ON-SITE WASTE TREATMENT METHODS AND EFFICIENCY

☐ **Not Applicable (NA) - Check here if no on-site waste treatment is applied to any waste stream containing the toxic chemical or chemical category.**

a. General Waste Stream (enter code)	b. Waste Treatment Method(s) Sequence [enter 3-character code(s)]	c. Range of Influent Concentration	d. Waste Treatment Efficiency Estimate	e. Based on Operating Data?
7A.1a	7A.1b: 1 2 3 4 5 6 7 8	7A.1c	7A.1d	7A.1e
			%	Yes ☐ No ☐
7A.2a	7A.2b: 1 2 3 4 5 6 7 8	7A.2c	7A.2d	7A.2e
			%	Yes ☐ No ☐
7A.3a	7A.3b: 1 2 3 4 5 6 7 8	7A.3c	7A.3d	7A.3e
			%	Yes ☐ No ☐
7A.4a	7A.4b: 1 2 3 4 5 6 7 8	7A.4c	7A.4d	7A.4e
			%	Yes ☐ No ☐
7A.5a	7A.5b: 1 2 3 4 5 6 7 8	7A.5c	7A.5d	7A.5e
			%	Yes ☐ No ☐

If additional pages of Part II, Sections 6.2/7A are attached, indicate the total number of pages in this box ☐ and indicate which Part II, Sections 6.2/7A page this is, here. ☐ (example: 1.2.3. etc.)

Range Codes: A= 1-10 pounds; B=11- 499 pounds; C= 500 - 999 pounds.

EPA FORM R
PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER

Toxic Chemical, Category, or Generic Name

SECTION 7B. ON-SITE ENERGY RECOVERY PROCESSES

☐ **Not Applicable (NA) - Check here if no on-site energy recovery is applied to any waste stream containing the toxic chemical or chemical category.**

Energy Recovery Methods [enter 3-character code (s)]

1 ____ 2 ____ 3 ____ 4 ____

SECTION 7C. ON-SITE RECYCLING PROCESSES

☐ **Not applicable (NA) - Check here if no on-site recycling is applied to any waste stream containing the toxic chemical or chemical category.**

Recycling Methods [enter 3-character code(s)]

1 ____ 2 ____ 3 ____ 4 ____ 5 ____

6 ____ 7 ____ 8 ____ 9 ____ 10 ____

SECTION 8. SOURCE REDUCTION AND RECYCLING ACTIVITIES

	All quantity estimates can be reported using up to two significant figures.	**Column A** Prior Year (pounds/year)	**Column B** Current Reporting Year (pounds/year)	**Column C** Following Year (pounds/year)	**Column D** Second Following Year (pounds/year)
8.1	**Quantity released***				
8.2	**Quantity used for energy recovery on-site**				
8.3	**Quantity used for energy recovery off-site**				
8.4	**Quantity recycled on-site**				
8.5	**Quantity recycled off-site**				
8.6	**Quantity treated on-site**				
8.7	**Quantity treated off-site**				
8.8	**Quantity released to the environment as a result of remedial actions, catastrophic events, or one-time events not associated with production processes** (pounds/year)				
8.9	**Production ratio or activity index**				

8.10 Did your facility engage in any source reduction activities for this chemical during the reporting year? If not, enter "NA" in Section 8.10.1 and answer Section 8.11.

	Source Reduction Activities [enter code(s)]	**Methods to Identify Activity (enter codes)**		
8.10.1		a.	b.	c.
8.10.2		a.	b.	c.
8.10.3		a.	b.	c.
8.10.4		a.	b.	c.

8.11 Is additional optional information on source reduction, recycling, or pollution control activities included with this report? (Check one box) YES ☐ NO ☐

* Report releases pursuant to EPCRA Section 329(8) including "any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment." Do not include any quantity treated on-site or off-site.

APPENDIX B - TOXICOLOGY REFERENCES

General Public

Chemical Manufacturers Association, *Chemicals in the Community: Methods to Evaluate Airborne Chemical Levels*, May, 1988.

Kamrin, Michael A., Toxicology for the Citizen; Center for Environmental Toxicology, Michigan State University, 1985.

Ottoboni, M. Alice, *The Dose Makes the Poison: A Plain-language Guide to Toxicology*, Berekely: Vincente Books, 1984.

Sittig, Marshall, *Handbook of Toxic and Hazardous Chemicals and Carcinogens*, Park Ridge, NJ: Noyes Publications, 1985.

Tox FAQs; Fact sheets available from U.S. Dept. of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry; **http://atsdr1.atsdr.cdc.gov:8080/toxfaq.html.**

Public Health Practitioners

Casarett, Louis J.; Doull, John, *Casarett & Doull s Toxicology*, New York: Macmillan Publishing Co., 1986.

Gosselin, Robert E.; Smith, Roger P.; Hodge, Harold C.; Braddock, Jeanett E., *Clinical Toxicology of Commercial Products*, Baltimore: Williams and Wilkins, 1984.

"Guidelines for Carcinogen Risk Assessment," Federal Register, Wednesday, September 24, 1987. Vol. 51, No. 185.

"Guidelines for the Health Risk Assessment of Chemical Mixtures," Ibid.

"Guidelines for Mutagenicity Risk Assessment," Ibid.

"Guidelines for the Health Assessment of Suspect Developmental Toxicants." Ibid.

"Guidelines for Estimating Exposures," Ibid.

Hays, Wayland J., Jr., *Pesticides Studied in Man*, Baltimore: Williams and Wilkins, 1982.

IRIS, Integrated Risk Information System; USEPA; **http://www.epa.gov/iris.**

Kamrin, Michael A., *Toxicology - A Primer on Toxicology Principles and Applications*; Chelsea, MI: Lewis Publishers, 1988.

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APPENDIX C - CHEMICAL INFORMATION SHEETS

Chemical information sheets for the following chemicals are available from the Illinois EPA, Office of Chemical Safety:

Alachlor
Aldrin/Dieldrin
Ammonia
Arsenic
Benzene
1,3-Butadiene
Cadmium
Carbon Monoxide
Carbon Tetrachloride
Chloroform
Chromium
Coal Tar Creosote
Cyanide
Dichlorobenzenes
Dichloroethanes
Dichloroethylenes
Di(2-ethylhexyl)phthalate
Ethylbenzene
Lead
Mercury
Methylene Chloride
Methyl Ethyl Ketone
Methyl Isobutyl Ketone
Naphthalene
Nickel
Ozone
Pentachlorophenol
Polychlorinated Biphenyls
Polychlorinated Dibenzodioxins and Dibenzofurans
Polycyclic Aromatic Hydrocarbons
Sulfur Dioxide
Tetrachloroethylene
Toluene
Triazine Herbicides
1,1,1-Trichloroethane
Trichloroethylene
Trifluralin
Vinyl Chloride
Xylene
Glossary

The glossary of terms and the chemical information sheet for Methylene chloride (dichloromethane) are included as examples. For further information, please write to:

Office of Chemical Safety
Illinois Environmental Protection Agency
P. O. Box 19276
1021 N. Grand Avenue East
Springfield, Illinois 62794-9276

GLOSSARY

absorption - the movement of a chemical into the bloodstream or other body fluid or tissue after its entrance into the body through the skin, lungs or gastrointestinal tract.

acute - sharp, severe; having a relatively rapid onset, often with severe symptoms and a relatively short course. In toxicology refers to a single large exposure to a chemical (acute exposure), or to the development of symptoms of poisoning soon after a single exposure to a substance (acute toxicity).

ACGIH - the American Conference of Governmental Industrial Hygienists. It recommends upper limits (see TLV) for exposure to workplace chemicals.

bioconcentration - the process in and by which chemical substances are accumulated in living organisms above their concentration in the environment. For example, a chemical is spilled into a river or lake and is ingested and stored by small organisms like plankton; small fish eat the plankton; and large fish eat the smaller fish. As this process occurs, the chemical becomes thousands of times more concentrated in the tissues of the large fish than in the plankton or the water. Usually occurs with fat-soluble compounds rather than water-soluble compounds.

biodegradation - the breaking down of an organic substance, resulting from the complex action of living organisms.

cancer - a group of diseases characterized by malignant, uncontrolled growth of cells of body tissue (tumors).

carcinogen - a term applied generally to any substance that is capable of producing cancer or increasing the growth and spreading of tumors in an organism.

chronic - occurring over a period of time. In toxicology refers to repeated exposure (chronic exposure) to a chemical for a relatively long period of time or persistence of symptoms or disease over a long period of time (chronic toxicity).

epidemiology - the study of the incidence, distribution and control of disease in human populations.

leaching - downward movement of a material in solution through soil.

Maximum Contaminant Level (MCL) - the maximum permissible level of a contaminant that is allowed in a public water supply system.

metabolism - the changes that a chemical undergoes in an organism. The products of metabolism may be more or less active in the organism than the original (parent) compound. In animals, many of these products find their way to body excretions, for example through lung exhalation, urine or feces. Tracing the pathways of metabolism is important to shed light on possible relationships between chemicals and particular health effects.

mg/m3 - means milligrams of a chemical in a cubic meter of air. It is a density measurement expressing the amount of air pollutant in a given volume of air.

mutagen - a substance that causes a change in the genetic material in a body cell, called a mutation. Mutations may lead to birth defects, miscarriages or cancer, or they may have no obvious effect, depending on what genetic material is damaged and on where the damage occurs.

persistent - existing for a long time in the environment or the body. For chemicals, this means not easily broken down; for the effects of the chemical, this means the effect remains or recurs long after exposure to the chemical.

pesticide - a general term used to describe a product designed to kill or control unwanted organisms; for example, herbicides are designed to control unwanted plants, insecticides are designed to control unwanted insects, fungicides are designed to control fungus, mold, etc.

ppb - an expression describing a small concentration, equal to an amount of one substance in a billion parts of another material; for example, one drop of alcohol in 16,000 gallons of water.

ppm - an expression describing a small concentration, equal to an amount of one substance in a million parts of another material; for example, one drop of alcohol in 16 gallons of water.

solvent - a liquid substance capable of dissolving or dispersing one or more other substances.

teratogen - a substance that causes stillbirths, birth defects, or malformations by affecting the growing fetus.

TLV - is the Threshold Limit Value for air. The TLV is a workplace exposure limit recommended by ACGIH and represents conditions under which it is believed that nearly all workers may be repeatedly exposed to a substance day after day without adverse effect.

toxicology - the study of the adverse effects of chemicals on living organisms.

volatile - readily vaporizable at a relatively low temperature.

*The following information is an **example** (revised October, 1995) of readily available data regarding the general nature and effects of methylene chloride (dichloromethane). The reader is encouraged to consult other sources or an appropriate professional if a more detailed explanation for specific concerns is desired.*

WHAT IS METHYLENE CHLORIDE (DICHLOROMETHANE)?

Methylene chloride (or dichloromethane) is a colorless liquid which evaporates easily and has a mild sweet odor. It is not flammable nor explosive at room temperature. Methylene chloride has been used as a solvent in paint and varnish thinners and removers, as a propellant in aerosols, as a solvent in metal cleaning and finishing, and as a blowing agent for urethane foams. Aerosol products in which methylene chloride may be found include paints, automotive products, and insect sprays. Methylene chloride is also used in the manufacture of synthetic fibers, photographic film, pharmaceuticals, printed circuit boards, inks, and certain plastics. Due to regulations and concerns over health and environmental issues, methylene chloride's use in consumer aerosol products and as a caffeine extractor for decaffeinated coffee have declined. In 1989, the Food and Drug Administration (FDA) banned the use of methylene chloride in hair sprays. Methylene chloride is still approved for use as an extraction solvent for spices and hops and as a grain fumigant.

Production of methylene chloride grew steadily through the 1970's and 1980's with a peak production of 620 million pounds in 1984. By 1988, the production of methylene chloride had dropped to 500 million pounds in response to a declining demand for the chemical.

HOW DOES METHYLENE CHLORIDE GET INTO THE ENVIRONMENT?

Methylene chloride has no known natural sources. Industrial and consumer uses contribute to the majority of the release of methylene chloride into the environment. Most environmental releases occur to the atmosphere through evaporation. However, its disposal in landfills and its dumping on the ground or into sewers are significant sources of methylene chloride contamination to soil, surface water, and groundwater.

Manufacturers, processors, and users of methylene chloride are required to report the quantities of methylene chloride released annually to air, land, and water. This reporting only applies to selected facilities producing and/or using certain quantities of methylene chloride. During 1993, 55 facilities in Illinois reported total releases of approximately 3.4 million pounds of methylene chloride.

Once released to the atmosphere or surface water, methylene chloride degrades readily with about half of the chemical disappearing within 53-127 days. Methylene chloride that is released to land will evaporate rapidly from near-surface soil but may also migrate through the soil into groundwater where it may remain for years. From groundwater, methylene chloride can be ingested in drinking water or inhaled as it volatilizes from the water during such activities as showering or bathing. Methylene chloride is not expected to accumulate in either plants or animals.

The general public may be exposed to methylene chloride in air, water, food, or from consumer products. The greatest exposures, however, are through contact with methylene chloride in the workplace. Methylene chloride can enter the body through inhalation, ingestion, or skin contact.

WHAT ARE THE HEALTH EFFECTS ASSOCIATED WITH EXPOSURE TO METHYLENE CHLORIDE?

Short-term exposure--Short-term exposure to methylene chloride most commonly affects the skin, respiratory system, and nervous system. Depending upon the length of the contact time, skin contact with methylene chloride can cause effects ranging from mild skin irritation to severe burns with repeated skin contact leading to dermatitis (rash). High levels of methylene chloride in the air may irritate the eyes, nose, or throat along with causing adverse effects on the nervous system. Nervous system effects noted include feeling sluggish, sleepy, irritable, light-headed, dizzy, and experiencing numbness and tingling in fingers and toes. Increasing levels cause headaches, nausea, flushing, confusion, slurred speech, loss of balance and coordination, and even death.

Once absorbed into the body, methylene chloride can be metabolized to carbon monoxide. This results in a decreased capacity for the blood to carry oxygen which deprives the tissues of oxygen. Persons with coronary artery disease or angina may not be able to tolerate the added cardiovascular stress brought on by the carbon monoxide that is generated. These individuals may experience such symptoms as headaches, weakness, dizziness, nausea and vomiting, and increased breathing and pulse rate.

Long-term exposure--Methylene chloride has not been shown to cause cancer in humans exposed to the chemical in the workplace. Breathing high concentrations of methylene chloride for long periods of time has been shown to increase the incidence of liver and lung cancer in mice and mammary and salivary gland tumors in rats. The USEPA considers the evidence provided by the animal studies sufficient to rank methylene chloride as a probable human carcinogen. No information is available to suggest that exposure to methylene chloride causes adverse effects on the reproductive system or the developing fetus. Carbon monoxide formed as a result of metabolism, however, could be potentially harmful to the developing fetus.

HOW IS METHYLENE CHLORIDE REGULATED?

Threshold Limit Values (TLVs) for methylene chloride have been established by the American Conference of Governmental Industrial Hygienists (ACGIH) and represent concentrations of methylene chloride under which it is believed that nearly all healthy workers may be repeatedly exposed day after day without adverse effects. The TLV for methylene chloride is 50 parts per million (ppm) or 174 milligrams per cubic meter (mg/m^3) as an average eight hour exposure limit for a 5-day workweek. The Occupational Safety and Health Administration (OSHA) has also established workplace levels for methylene chloride. The enforceable Permissible Exposure Limit (PEL) for methylene chloride is 500 ppm as an 8-hour average. OSHA proposes to reduce the current exposure limit from 500 ppm to 25 ppm.

A Maximum Contaminant Level (MCL) of 5 μg/l (micrograms per liter or ppb) methylene chloride has been established for drinking water under the federal Safe Drinking Water Act. Illinois has established maximum levels of chemical contamination for groundwaters of the state. Depending upon the designation of the groundwater, the standards for methylene chloride are 5 μg/l or 50 μg/l. Under the Clean Water Act, the USEPA has established Ambient Water Quality Criteria for methylene chloride. The criteria for methylene chloride are 4.7 μg/l for the ingestion of aquatic organisms and water and 1600 μg/l for the ingestion of aquatic organisms alone. The Illinois EPA General Use Water Quality Standards are established to protect aquatic animals and plants, wild and domestic animals, and humans who consume surface water and aquatic animals. This criterion for methylene chloride is 340 μg/l to protect humans from carcinogenic effects. USEPA requires industry to report discharges or spills of methylene chloride in an amount equal to or greater than 1000 pounds. The FDA has established limits on how much methylene chloride can remain in spices, hops, and decaffeinated coffee.

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APPENDIX D - CHEMICAL REFERENCES

The Condensed Chemical Dictionary, New York: Van Nostrand Reinhold Company, 1993.

Farm Chemicals Handbook, Willoughby, OH: Meister Publishing Co., 1997.

Fire Protection Guide on Hazardous Materials, National Fire Protection Association, NFPA #HAZ-91, 1991.

Sax, N. Irving, *Dangerous Properties of Industrial Materials*, New York: Van Nostrand Reinhold Co., 1984.

U.S. EPA Chemical Profiles

World Wide Web site **http://www.epa.gov/opptintr/tri/chemical.htm** (Toxic Release Inventory Chemicals)

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APPENDIX E - TOTAL RELEASES/NUMBER OF REPORTING FACILITIES FOR EACH COUNTY

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Total Releases/Number of Reporting Facilities
For Each County
(Release Amounts in Million Pounds)

County	Base Year 1988	Last Five Years 1993	1994	1995	1996	1997	Total 88-97
Cook	55.8 / 560	26.9 / 576	27.4 / 554	22.8 / 512	23.9 / 465	24.2 / 435	351.1
Whiteside	7.8 / 28	14.9 / 15	15.3 / 14	20.5 / 15	14.8 / 13	15.1 / 13	131.5
Madison	11.9 / 58	15.2 / 29	13.3 / 29	9.2 / 27	8.9 / 25	9.7 / 20	119.3
St. Clair	13.2 / 26	5.0 / 22	4.0 / 21	4.5 / 19	5.0 / 21	4.7 / 20	73.3
Peoria	6.6 / 29	6.7 / 19	7.4 / 16	7.5 / 16	8.0 / 15	6.7 / 15	64.4
Ogle	6.5 / 16	4.4 / 15	5.3 / 15	4.1 / 10	3.9 / 11	1.8 / 11	51.8
Will	7.3 / 42	4.2 / 41	2.9 / 43	2.4 / 39	4.2 / 45	5.5 / 46	49.6
Vermilion	3.6 / 12	4.6 / 17	5.2 / 17	4.5 / 17	4.4 / 17	4.3 / 15	44.2
LaSalle	5.0 / 34	3.5 / 27	3.4 / 27	3.0 / 25	2.6 / 23	2.7 / 18	34.8
Lake	4.9 / 55	2.4 / 49	2.0 / 47	2.2 / 42	1.7 / 43	2.0 / 38	30.8
Grundy	7.7 / 18	2.1 / 8	1.7 / 8	1.3 / 8	1.9 / 7	1.9 / 6	27.9
Winnebago	3.9 / 63	1.7 / 68	1.5 / 68	1.2 / 58	1.1 / 56	1.2 / 60	23.0
DuPage	2.9 / 33	1.2 / 61	1.5 / 65	1.5 / 60	1.5 / 61	1.3 / 60	21.1
Kankakee	0.8 / 22	1.2 / 21	1.3 / 21	1.1 / 15	1.0 / 17	6.2 / 16	17.0
Rock Island	1.7 / 19	1.8 / 17	1.9 / 17	1.5 / 17	1.4 / 15	1.4 / 17	15.3
Coles	2.6 / 10	0.9 / 9	0.9 / 9	0.8 / 9	0.3 / 9	1.0 / 10	14.8
Crawford	2.2 / 8	1.1 / 5	1.1 / 6	1.3 / 4	0.4 / 3	0.4 / 2	13.9
Marion	1.4 / 5	1.3 / 5	2.2 / 5	1.8 / 5	1.5 / 6	1.7 / 6	13.6
Kane	2.5 / 57	1.3 / 63	0.7 / 61	0.7 / 52	0.5 / 47	0.4 / 46	12.4
Macon	1.4 / 17	0.5 / 16	0.6 / 20	0.8 / 20	0.9 / 20	2.0 / 19	10.1
McHenry	1.2 / 39	0.8 / 38	0.8 / 37	1.1 / 36	0.9 / 37	1.5 / 36	9.8
Boone	2.5 / 12	0.3 / 7	0.5 / 10	0.4 / 10	0.3 / 9	0.2 / 8	9.7
Washington	0.7 / 1	0.8 / 2	0.9 / 2	0.9 / 2	0.5 / 1	0.6 / 1	8.1
Adams	0.2 / 15	0.3 / 12	0.3 / 13	0.3 / 15	0.3 / 13	0.3 / 13	6.3
Douglas	1.1 / 2	0.4 / 4	0.4 / 4	0.5 / 5	0.2 / 4	0.2 / 4	5.9
Kendall	1.6 / 6	0.3 / 5	0.4 / 5	0.4 / 5	0.3 / 4	0.4 / 4	5.8
Knox	0.3 / 9	0.5 / 7	0.6 / 6	0.6 / 6	0.5 / 6	0.2 / 6	5.1
Alexander	0.5 / 0	0.5 / 3	0.4 / 3	0.0 / 3	0.6 / 3	0.4 / 3	5.0
JoDaviess	0.4 / 3	0.3 / 5	0.3 / 4	0.4 / 3	0.5 / 4	0.5 / 4	4.4
McLean	0.5 / 5	0.5 / 7	0.5 / 7	0.5 / 6	0.4 / 6	0.5 / 5	4.3
Franklin	0.2 / 3	0.5 / 3	0.7 / 4	0.7 / 4	0.6 / 4	0.6 / 3	4.0
Stephenson	0.7 / 15	0.3 / 9	0.3 / 8	0.2 / 9	0.1 / 8	0.2 / 9	3.7
Jackson	0.8 / 5	0.0 / 2	0.3 / 4	0.2 / 4	0.1 / 2	0.1 / 1	3.6
DeKalb	0.8 / 4	0.2 / 13	0.3 / 10	0.2 / 9	0.2 / 10	0.2 / 11	3.6
Tazewell	0.8 / 15	0.3 / 7	0.3 / 7	0.2 / 6	0.3 / 7	0.2 / 6	3.5
Williamson	0.3 / 5	0.3 / 7	0.3 / 7	0.2 / 6	0.2 / 5	0.3 / 4	3.3
Moultrie	0.6 / 1	0.1 / 1	0.2 / 1	0.1 / 1	0.1 / 1	0.1 / 1	3.0
Bureau	0.5 / 2	0.1 / 6	0.2 / 7	0.1 / 4	0.1 / 3	0.1 / 4	2.8
Effingham	0.8 / 3	0.2 / 7	0.2 / 7	0.1 / 6	0.2 / 5	0.1 / 4	2.6
Marshall	0.1 / 5	0.2 / 3	0.2 / 3	0.4 / 3	0.5 / 3	0.5 / 3	2.3
Sangamon	0.2 / 6	0.2 / 6	0.2 / 6	0.3 / 5	0.2 / 3	0.2 / 3	1.9
Richland	0.2 / 2	0.2 / 1	0.2 / 1	0.2 / 1	0.1 / 1	0.0 / 1	1.8
Morgan	0.2 / 9	0.1 / 3	0.1 / 3	0.1 / 3	0.1 / 3	0.1 / 3	1.7

County	Base Year 1988		Last Five Years 1993		1994		1995		1996		1997		Total 88-97
Livingston	0.3 /	5	0.1 /	9	0.2 /	10	0.1 /	8	0.2 /	7	0.1 /	7	1.6
Champaign	0.4 /	4	0.0 /	9	0.0 /	9	0.1 /	6	0.1 /	6	0.0 /	7	1.5
DeWitt	0.1 /	1	0.1 /	3	0.0 /	2	0.0 /	1	0.0 /	1	0.0 /	1	1.5
Montgomery	0.1 /	3	0.1 /	2	0.1 /	3	0.1 /	2	0.1 /	2	0.5 /	2	1.3
Jefferson	0.1 /	5	0.0 /	3	0.3 /	3	0.1 /	5	0.0 /	5	0.1 /	4	1.3
Edgar	0.0 /	1	0.1 /	3	0.1 /	4	0.2 /	3	0.2 /	5	0.3 /	5	1.2
Lee	0.1 /	1	0.2 /	5	0.1 /	7	0.1 /	6	0.1 /	5	0.1 /	6	0.9
Lawrence	0.0 /	0	0.2 /	1	0.1 /	1	0.1 /	1	0.0 /	0	0.0 /	0	0.9
Clark	0.4 /	3	0.1 /	2	0.1 /	1	0.0 /	1	0.0 /	1	0.0 /	2	0.8
McDonough	0.1 /	6	0.1 /	5	0.1 /	6	0.1 /	4	0.1 /	4	0.1 /	4	0.8
Henry	0.0 /	3	0.0 /	4	0.0 /	6	0.0 /	4	0.0 /	3	0.0 /	3	0.8
Wayne	0.1 /	1	0.0 /	3	0.0 /	2	0.1 /	2	0.1 /	2	0.2 /	2	0.7
Iroquois	0.1 /	0	0.1 /	3	0.1 /	3	0.1 /	1	0.0 /	1	0.0 /	1	0.7
Putnam	0.2 /	1	0.0 /	1	0.0 /	1	0.0 /	1	0.0 /	1	0.0 /	1	0.7
Clay	0.1 /	3	0.0 /	2	0.0 /	2	0.1 /	2	0.0 /	2	0.1 /	2	0.6
Logan	0.1 /	5	0.0 /	3	0.0 /	4	0.0 /	1	0.0 /	0	0.1 /	1	0.4
White	0.1 /	0	0.0 /	2	0.0 /	2	0.0 /	2	0.0 /	2	0.0 /	2	0.3
Woodford	0.0 /	3	0.1 /	3	0.0 /	3	0.0 /	2	0.0 /	2	0.0 /	2	0.3
Piatt	0.1 /	0	0.1 /	2	0.0 /	2	0.0 /	2	0.0 /	2	0.0 /	2	0.3
Randolph	0.1 /	4	0.0 /	3	0.0 /	3	0.0 /	3	0.0 /	3	0.0 /	2	0.3
Cass	0.0 /	1	0.0 /	2	0.0 /	2	0.0 /	1	0.0 /	1	0.0 /	1	0.2
Clinton	0.1 /	2	0.0 /	1	0.0 /	1	0.0 /	0	0.0 /	0	0.0 /	0	0.2
Bond	0.0 /	2	0.0 /	2	0.0 /	2	0.0 /	2	0.0 /	2	0.0 /	2	0.2
Massac	0.0 /	3	0.0 /	3	0.0 /	3	0.0 /	3	0.0 /	3	0.0 /	3	0.2
Fayette	0.0 /	0	0.0 /	2	0.0 /	1	0.0 /	1	0.0 /	1	0.0 /	1	0.1
Perry	0.0 /	0	0.0 /	2	0.0 /	2	0.0 /	1	0.0 /	1	0.0/	1	0.1
Wabash	0.0 /	2	0.0 /	1	0.0 /	1	0.0 /	1	0.0 /	1	0.0 /	1	0.1
Christian	0.0 /	1	0.0 /	2	0.0 /	1	0.0 /	2	0.0 /	2	0.0 /	2	0.1
Macoupin	0.0 /	0	0.0 /	1	0.0 /	2	0.0 /	1	0.0 /	0	0.0 /	0	0.1
Hancock	0.0 /	0	0.0 /	2	0.0 /	2	0.0 /	1	0.0 /	1	0.0 /	1	0.1
Stark	0.0 /	2	0.0 /	1	0.0 /	1	0.0 /	1	0.0 /	1	0.0 /	1	0.1
Warren	0.0 /	2	0.0 /	3	0.0 /	3	0.0 /	3	0.0 /	2	0.0 /	2	0.1
Carroll	0.0 /	2	0.0 /	4	0.0 /	3	0.0 /	4	0.0 /	3	0.0 /	3	0.1
Pike	0.0 /	1	0.0 /	2	0.0 /	2	0.0 /	1	0.0 /	1	0.0 /	1	0.0
Cumberland	0.0 /	1	0.0 /	1	0.0 /	1	0.0 /	0	0.0 /	0	0.0 /	0	0.0
Ford	0.0 /	0	0.0 /	2	0.0 /	1	0.0 /	1	0.0 /	1	0.0 /	1	0.0
Fulton	0.0 /	0	0.0 /	0	0.0 /	0	0.0 /	0	0.0 /	0	0.0 /	0	0.0
Mercer	0.0 /	0	0.0 /	1	0.0 /	1	0.0 /	1	0.0 /	1	0.0 /	1	0.0
Union	0.0 /	0	0.0 /	1	0.0 /	1	0.0 /	1	0.0 /	1	0.0 /	1	0.0
Mason	0.0 /	0	0.0 /	1	0.0 /	1	0.0 /	1	0.0 /	1	0.0 /	1	0.0
Shelby	0.0 /	0	0.0 /	0	0.0 /	0	0.0 /	0	0.0 /	1	0.0 /	1	0.0
Jasper	0.0 /	0	0.0 /	1	0.0 /	1	0.0 /	1	0.0 /	1	0.0 /	1	0.0