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How Are the Toxics Release Inventory Data Used?

-- government, business, academic and citizen uses

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Foreword

The Toxics Release Inventory (TRI) data are used in myriad ways. There are many uses of the TRI data that the authors of the legislation (the Emergency Planning and Community Right-to Know Act) mandating the TRI envisioned and many that they did not foresee. The Pollution Prevention Act of 1990 increased the types of data required to be reported to the TRI, which expanded the potential uses of the TRI. The combination of the types of data collected under TRI and the fact that they are made available to the public under EPCRA 313 makes TRI a powerful tool for many environmental analyses and understanding the many factors that contribute to human health and environmental conditions.

The intent of this report is to provide the reader with an overview of the different ways in which the TRI data are used, and as such does not include a description of all programs, activities, and analyses that use the TRI data. The case studies that are presented in this report were gathered through literature searches and phone interviews. EPA does not support or condone any of the uses of the TRI data presented here; nor does it endorse any of the organizations that are discussed in the case studies. To learn more about TRI data and about EPA's annual Toxics Release Inventory Public Data Release (PDR), consult EPA's TRI website at www.epa.gov/tri.

EPA is interested in learning of new uses of the TRI data. If you know of uses of the TRI data, particularly types of uses not covered in this document, and wish to share them, please send them to:

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Introduction

A chemical accident killed more than 2,000 people and injured hundreds of thousands of others in Bhopal, India, in December 1984. Coupled with similar, though less devastating, chemical accidents in the United States, the Bhopal incident greatly increased the public's awareness of and concern about the dangers of chemicals used and released into communities. Consequently, in 1986, Congress passed the Emergency Planning and Community Right-to-Know Act (EPCRA) as a part of the Superfund reauthorization. EPCRA's mandate is twofold:

- promote contingency planning for chemical emergencies, and
- provide the public with previously unavailable information about toxic and hazardous chemicals in their communities.

Section 313 of EPCRA created the Toxics Release Inventory (TRI), which requires companies within the manufacturing sector and federal facilities to report specified quantities of certain chemicals released from their facilities. In 1990, Congress passed the Pollution Prevention Act (PPA), which requires that facilities report to the TRI the quantities of toxic chemicals that they manage in waste and the types of pollution prevention (source reduction) activities they undertake. In 1998, the public gained access to data from additional industrial sectors. The other industries now required to report under EPCRA and the PPA include metal mining, coal mining, coal and oil burning electrical utilities, hazardous waste treatment and disposal facilities, chemicals distributors, petroleum bulk plants terminals, and solvent recycling operations.

Under Section 313(h) of EPCRA, Congress clearly provides for the wide distribution of the industry information gathered:

"The release forms required under this section are intended to provide information to the federal, state, and local governments and the public, including citizens of communities surrounding covered facilities. The release form shall inform persons about releases of toxic chemicals to the environment; to assist governmental agencies, researchers, and other persons in the conduct of research and data gathering; to aid in the development of appropriate regulations, guidelines, and standards; and for other similar purposes." Through their availability, TRI data have become a useful resource for many different organizations:

- Communities use TRI data to begin dialogues with local facilities and to encourage them to reduce their emissions, develop pollution prevention (P2) plans, and improve safety measures.
- Public interest groups, government, academicians, and others use TRI data to educate the public about toxic chemical emissions and potential risk.
- Industry uses TRI data to identify P2 opportunities, set goals for toxic chemical release reductions, and demonstrate its commitment to and progress in reducing emissions.

- Federal, state, and local governments use TRI data to set priorities and allocate environmental protection resources to the most pressing problems.
- Regulators use TRI data to set permit limits, measure compliance with those limits, and target facilities for enforcement activities.
- Public interest groups use TRI data to demonstrate the need for new environmental regulations or improved implementation and enforcement of existing regulations.
- Investment analysts use TRI data to provide recommendations to clients seeking to make environmentally sound investments.
- Insurance companies use TRI data as one indication of potential environmental liabilities.
- Governments use TRI data to assess or modify taxes and fees based on toxic emissions or overall environmental performance.
- Consultants and others use TRI data to identify business opportunities, such as marketing P2 and control technologies to TRI reporting facilities.¹

This document presents uses of TRI data in the following categories: public, industry, government, international, investment, and academic. Case studies were found primarily by consulting with EPA/TRI program representatives in the state and EPA regional offices, researching numerous literature sources, conducting internet searches and following up leads with phone interviews, mail and email correspondences with TRI data users. This document does not describe all of the many people, programs, and activities that use TRI data, but instead presents examples in each category. Appendix A provides additional examples. More case studies were found of TRI data use by individuals, community groups and environmental organizations than by private industries.

Public Use

Each year, the EPA makes TRI data available to the public on two Internet sites: TRI Explorer <www.epa.gov/triexplorer> and Envirofacts <www.epa.gov/enviro>. The EPA also provides summary national and state data in the annual publications *Toxics Release Inventory: Public Data Release* and *Toxics Release Inventory: Public Data Release: State Fact Sheets*. States also release their own reports. Community organizations, universities, local public interest organizations, national non-governmental organizations (NGOs), and workers and labor unions also conduct analyses and risk assessments based on TRI data. Some of these organizations also make data and analyses available to the public.

The public can use TRI data to:

- *learn about their local environment and potential exposures to toxic chemicals*
- *participate in environmental decision-making*
- *learn more about the environmental behavior of companies in communities to which they might consider moving.*

Citizens and Community Organizations

Citizen activists and community organizations educate their citizens or residents about toxic chemical releases using TRI data, often combining education with a call to action. Some community organizations have used TRI data to initiate discussions with local industries or to call on local and public interest organizations to lobby for their causes. Local public interest organizations improve citizen environmental awareness, encouraging them to become involved in the environmental health of their communities. Members of a local public interest organization can be of technical and legal help to citizens in the field of environmental negotiation. Examples of citizen activists and community interest organizations and the ways in which they use TRI data follow:

- The Eugene Toxics Right-to-Know program, a local grassroots organization in Eugene, Oregon, used TRI as a model to develop the first city right-to-know program. This program gives citizens information about toxic material use and materials accounting information to the kilogram level. Voters adopted the program in 1996 as an amendment to the Eugene City Charter. A citizen initiative placed the amendment on the ballot. Previously, information concerning the use of hazardous substances in the community, and the releases of those substances into the local environment in particular, was not readily accessible to citizens under existing reporting regulations. Unlike other hazardous substance reporting programs, the Eugene charter amendment requires affected businesses to provide materials balance accounting. In other words, inputs and outputs of hazardous substances must be reported and must balance. These reports, required annually, are available in an accessible format at the Eugene Public Library. For more information, or to view the database, go to www.ci.eugene.or.us/firedept/Toxics/toxicsb.htm.²
- South Carolina Environmental Watch is an environmental organization that educates communities about toxic chemicals and their possible health effects. The organization presents TRI data to communities and discusses the potential effects of toxic chemical releases.³
- The Louisiana Environmental Action Network (LEAN) was formed over a decade ago to educate and provide a voice for residents concerned about toxic chemical releases from local facilities. LEAN uses TRI data to help residents become aware of risks associated with toxic chemical releases and to facilitate discussions between communities and industries to evaluate the impact of those releases.⁴ LEAN “encourages community decision-making and legislative challenge in neighborhoods near toxic chemical sites. The organization locates waste disposal sites, dumps and industrial facilities that could potentially affect communities, and compiles TRI, accident release data, and state groundwater data on these types of sites. The resulting data compilations are then used as the spearhead of strategic campaigns directed at making changes at the legislative level.” LEAN publicizes its information in the form of “briefing books,” which it

presents to members of the Louisiana House and Senate environmental committees. These reports “can be the starting points for change. The goal is to build a knowledge base for legislators and communities and to raise awareness of local environmental problems.... In one case, a briefing book was compiled for neighborhoods near a railroad switchyard, where leaking valves on the chemical transport cars stored there overnight were found to have contaminated groundwater. The chemicals included styrene, perchloroethylene, benzene, toluene, hexachlorobenzene, hexachlorobutadiene, and vinyl chloride.”⁵

- California facilities are required to develop and make public P2 plans under the state Hazardous Waste Source Reduction and Management Review. A community organization called “The Mothers of East Los Angeles of Santa Isabel” used TRI data to compare toxic chemical release estimates listed in P2 plans submitted by facilities to their actual estimated releases.⁶
- The Oneida Environmental Resources Board in Wisconsin used TRI data to convince leaders of the Oneida Tribe to organize a conference on cleaner ways to manufacture pulp and paper. The Board used TRI data to show that the pulp and paper industry was the largest industrial source of toxic chemical releases in Wisconsin, despite industry claims that significant release reductions in the past made further improvements unnecessary. The conference improved industry awareness of more environmentally friendly practices and procedures. The Board also used TRI data to alert a local labor union about possible worker health risks. The union included requests for reductions in toxic chemical releases in its contract renewal negotiations.⁷
- California’s Silicon Valley Toxics Coalition has used TRI data for over a decade. The *Silicon Valley Environmental Index (The Index)* <www.svep.org> shows “sustainability trends” in Santa Clara County, California. The *Index* provides information about, but not limited to, hazardous materials and air and water quality. At least five cities in Santa Clara County have referenced or relied on the *Index* as the basis for their "sustainable city" efforts or municipal environmental management system (EMS) initiatives. Private-sector companies, such as IBM and Philips Semiconductor, have also used the *Index* in evaluating their own EMS practices. Several universities have incorporated the *Index* into their environmental science course curricula. In addition, several states (Wisconsin, South Carolina, New Jersey) and countries (Germany and the Netherlands) have developed regional environmental indicators studies modeled after the *Index*.⁸
- Ms. Wilma Subra, a chemical research analyst in Louisiana, has been a vocal citizen leader and an active proponent of the TRI program for 20 years, working to change regulations and policies to improve public health and the environment at the local level.⁹ Ms. Subra has informed residents about the possible effects of toxic chemical releases and has aided their work to improve environmental conditions. The TRI data support

Ms. Subra's efforts to reduce toxic chemical releases from Louisiana's industrial facilities. Ms. Subra gathers and analyzes TRI data, distributes information to the public, participates in legal and regulatory processes against industrial facilities, and is a member of national and international advisory committees.

National Organizations

National organizations employ TRI data in many of the same ways as small community organizations, but on a larger scale. Such organizations analyze TRI data, use it to conduct risk screening and risk assessment, and often help the public interpret the data. National organizations often work with local public interest and community organizations to initiate discussions between citizens and industry. Some national organizations also use TRI data to help them lobby for changes in environmental policy. Examples of TRI data used by national organizations include the following:

- Environmental Defense (ED) launched its Scorecard web site in 1998 <www.scorecard.org/>. The site's "polluter locator" allows users to perform a search by ZIP code on a database containing information on more than 17,000 chemical-releasing facilities. The Scorecard also provides data on the health effects and regulatory status of different chemicals.¹⁰ The site correlates TRI chemical release data with U.S. Census demographic data. ED is currently linking TRI data with toxicological studies to create a Scorecard tool that compares the risks of different toxic chemical releases.¹¹ Logging 500,000 data requests on its first day of operation, the Scorecard web site has drawn significant public interest.
- The Right-to-Know Network (RTKNet) web site <www.rtknet.org>, launched in 1989 by the nonprofit organizations OMB Watch and the Unison Institute, also facilitates public access to TRI data. Users can search the TRI data by ZIP code, city, county, state, year, or chemical. The web site also includes links to additional information about chemicals and right-to-know issues. RTKNet estimates that about a quarter of a million searches are performed on the site annually.¹²
- The former Environmental Information Center conducted a study of the Great Lakes in 1997. Scientists used TRI data to examine endocrine disrupters released in states bordering the Great Lakes. The study ranked the largest emitters of various classes of toxic chemicals by region, and found the Great Lakes region to be the nation's top emitter of reportable endocrine disrupting chemicals.¹³
- In September 2000, Physicians for Social Responsibility, along with the National Environmental Trust and the Learning Disabilities Association of America, released the report, "Polluting Our Future: Chemical Pollution in the U.S. that Affects Child Development and Learning" <www.psr.org/trireport.pdf>. This report used TRI and

other data to present national information about releases of chemicals that present potential developmental and neurological risks. The report ranked states by their releases of these chemicals and included information about counties, industries, and facilities with the highest toxic chemical releases.¹⁴

- Labor unions also have used TRI data to support demands for safer working conditions for employees. Other than citizens who live near facilities, employees of TRI reporting facilities are most at risk from toxic chemical releases because they are most likely to come in regular contact with these chemicals. Beginning in 1990, the International Union, United Automobile, Aerospace & Agricultural Implement Workers of America (UAW) began training employees and managers of UAW companies to access, interpret, and utilize computer databases and programs in “critically assessing industrial emergency response activities at their facilities.” Workers were trained to download and interpret environmental compliance data. TRI data comprised one of the main sources of information for the program. Concerning TRI, the UAW stated, “knowing about maximum amounts on-site can help people prepare for a ‘worst-case scenario.’ It can help an emergency response planning group decide if there are enough response equipment and personnel to deal with an emergency involving the chemical(s) in question.”¹⁵ The UAW continues to provide potential risk information to workers regarding toxic chemical releases to the environment using TRI data. The UAW website provides links to EPA Envirofacts, and to the most recent TRI Data Release (<www.uaw.org/hs/at/index.html>).

Direct Negotiation

Through increasing their understanding of TRI data, members of the public can begin to understand potential risks associated with toxic chemical releases in their communities, and can work with facilities to reduce those risks. The nation’s first “right-to-act” law was enacted in September 1999 by the Passaic, N.J., Board of Chosen Freeholders, the county’s governing body. The law “allows neighbors and/or employees to petition the county health officer for creation of Neighborhood Hazard Prevention Advisory Committees (NHPACs) for specific facilities.”¹⁶ Even without the aid of this law, concerned citizens nationwide can take action in their own communities. Community organizations and citizen activists have used TRI data to negotiate with local facilities. Examples of direct negotiation agreements between citizens and facilities follow:

- In the city of Richmond, California, community members were concerned about toxic chemical releases from several oil refineries and other large industrial facilities. The West County Toxics Coalition, a local environmental organization, joined with Communities for a Better Environment, a statewide environmental organization, to investigate industrial polluters in Richmond. Using the TRI and other databases, they published the report, *Richmond at Risk*, which identified the area’s 20 largest industrial polluters and named the Chevron oil refinery the number one polluter. The report served

to initiate discussions among Chevron, the West County Toxics Coalition, and other community and environmental organizations. As a result of the meetings, the company agreed in 1994 to close down older portions of the plant and install P2 equipment to achieve zero net toxic chemical releases on its reformulated fuel project.¹⁷

- The Calhoun County Resource Watch (CCRW), founded by a Texas environmental activist and shrimper named Ms. Dianne Wilson, used TRI data to build community awareness about pollution of the rich shrimp and oyster breeding grounds of Lavaca Bay on the Gulf of Mexico¹⁸. Calhoun County was ranked first in the nation for toxic chemical disposal to the land, based on the 1987 TRI data. Lavaca Bay was designated as a Superfund site in 1993. CCRW brought suit against the Aluminum Company of America (Alcoa) related to this pollution. In 1995 Alcoa signed an agreement designed to protect the breeding grounds.¹⁹ Two Alcoa firms, a chemical plant and a bauxite refinery, committed to “fund independent review of zero discharge options and to adopt the technologies where technically, economically, and environmentally sound.”²⁰ In return, CCRW agreed to drop its legal challenges and suspend permit interventions against the companies. According to an Alcoa Operations Manager, as of March 2000 the company had made considerable progress toward the goals set in 1995, including compliance with a permit that sets the “allowed total annual maximum mass loading mercury limit” at 30 pounds, development and implementation of a Best Management Practices plan, and installation of an “evaporative spray and dust control system” near the refinery.²¹
- In 1998, Butler County, PA, warned pregnant women and infants against drinking water from Connoquenessing Creek due to high levels of nitrates in the water. In its report, the Pennsylvania Public Interest Research Group (PennPIRG) used TRI data to highlight the significant quantities of nitrate compounds being released into the creek.²² The report identified the major source of the nitrates as the AK Steel Corporation. TRI data showed that the company had discharged approximately 29 million pounds of nitrates into the creek in 1997 and 32 million pounds in 1998. This report and several newspaper articles about these toxic chemical releases prompted the state to commit to reduce the levels of nitrates that AK Steel is permitted to release into the creek.²³ Pennsylvania began developing a new water permit to reduce allowable nitrate releases to a level 90 percent lower than the previous level. In June 2000, EPA issued an emergency order requiring AK Steel to significantly reduce the nitrate compounds it discharges into Connoquenessing Creek. In addition, AK Steel was required to provide and pay for an alternative water source for the affected public on any day that the local water plant could not meet the federal maximum nitrate contaminant standard.
- Working with The Ecology Center, a public interest organization based in Ann Arbor, Michigan, residents of the town of Flat Rock used TRI data to obtain a commitment from Auto Alliance International to enact an aggressive solvent reduction program. TRI data

showed that the company's air releases of toluene had increased from 100,000 pounds in 1991 to 800,000 pounds in 1993, along with an increase in noxious odors in the community. A former Ecology Center staff member, Andrew Cormai, said, "[R]esidents who have put up with the smells since 1987 suddenly have a bone to pick with the company. The company is going to be saving some money by recapturing solvents, and they will be improving community air quality."²⁴

Environmental Justice

The goal of environmental justice is to ensure that all people, regardless of race, national origin, or income, are protected from disproportionate impacts and environmental hazards. "The concept [of environmental justice] addresses evidence [that] in some parts of the nation, poor and minority communities live closer to factories, highways and airports and are exposed to more pollution and noise and generally more environmental risks than the population at large."²⁵ TRI data have proved to be an important tool in environmental justice. Communities that were once uninformed about the toxic chemical releases in their area now have access to that information. Examples of TRI data use in environmental justice activities include:

- Two areas of Louisiana have become focal points for environmental justice efforts: the Mississippi River corridor, popularly known as "Cancer Alley," and the Lake Charles region. Local groups have used TRI data to illustrate the high toxic chemical release rates in these areas compared to those in other regions.²⁶ Several small communities have confronted industrial facilities about their toxic chemical releases and possibly related health effects. One illustrative dispute arose in Mossville, Calcasieu Parish, Louisiana, where some residents suspected that poor health in their community was due to the activities of 17 industrial facilities located within one half-mile of the community. Their concerns prompted numerous public interest organizations to collaborate on the report, *Breathing Poison: The Toxic Costs of Industries in Calcasieu Parish, Louisiana*. The 2000 report used TRI data and information from the Scorecard web site to convey the health risks to which the community might be exposed, and stated the need for "pollution reduction, environmental health services, and a fair and just relocation for consenting residents."²⁷
- The Asian Pacific Environmental Network (APEN) works with Asian and Pacific Islander communities in the San Francisco Bay Area, California. APEN created a series of maps that combined TRI and demographic data, to show that many poor Asian and Pacific Islanders live in "toxic hot spots." The maps increased awareness among community members about both their environment and environmental justice issues. APEN might add more environmental, health, and demographic information, and expand its mapping work to other nearby counties.²⁸
- The Los Angeles chapter of Communities for a Better Environment used TRI data to help

ensure that the communities it serves would not be exposed to higher environmental risks as a result of poverty or ethnicity. In one project, the organization combined 1996 TRI data with GIS mapping data to show that 80 to 100 percent of facilities that release toxic chemicals in Los Angeles County were located in areas where a large majority of the residents were people of color. These findings led to the report, *Holding Our Breath – the Struggle for Environmental Justice in Southeast Los Angeles*.²⁹

Industry Use

Although Congress intended the public to be the primary audience for TRI data, the TRI has also benefitted industries.

Cost Reduction

A primary goal of ISO 14000 (International Organization for Standardization's standards on environmental management) was to bring environmental issues to the attention of the highest levels of corporate management. Leaving decision-making to environmental managers alone might not produce the corporate commitment necessary to achieve the best success.³⁰ TRI data have been used as evidence to convince high-level management of the need for an Environmental Management System (EMS). In turn, the proactive environmental protection afforded by an EMS can reduce corporate costs.

For some industries, the creation of the TRI marked the first time that company managers and operators could look closely at the quantity of chemicals being released from their facilities. Initially, some companies expressed surprise at their own toxic chemical release amounts and set goals to improve their environmental performance. Some companies have reduced their toxic chemical releases and increased their efficiency at the same time, leading to an increased profit. Examples of ways that industry has used TRI data to reduce costs follow:

- At the 1997 EPA Toxics Release Inventory and Right-to-Know Conference, John Pine provided examples of how TRI information has helped companies develop waste reduction strategies. For example, Marathon Oil installed a thermal desorption unit to process oily waste and recovered over 120,000 barrels of oil and the Georgia Gulf Corporation relocated a methanol stripper purge line that resulted in the recovery of 9,300 gallons of

Industry can work with TRI data to:

- *improve internal auditing*
- *stimulate more efficient use of chemicals by identifying material losses*
- *provide a template for environmental reporting under ISO 14000.*

methanol that previously underwent biological waste treatment.³¹

- The Haartz Corporation, located in Acton, Massachusetts, makes coated fabrics used in automobiles. The firm once used 800,000 pounds per year of methyl ethyl ketone (MEK), a solvent that can cause dizziness, nausea, or unconsciousness when inhaled.³² In 1987, when Haartz was preparing its first TRI report, the company installed a new emissions control system to capture and recycle MEK. TRI data enabled Haartz Corp. to track the association between reduced toxic chemical releases and reduced costs. According to the Haartz environmental manager, the company's "emissions have stayed pretty flat" despite its "double-digit sales growth" between 1993 and 1998. In addition, reducing its MEK releases saved Haartz an estimated \$200,000 annually.³³

Public Relations Tools

Demonstrating environmental progress has become a selling point for industries, and many company web sites now include an environmental report. Examples of positive environmental marketing include:

- The Boeing Company posts TRI release data on its web site and uses the information to track the company's environmental progress. The web site noted that overall toxic chemical releases have decreased by more than 82 percent since 1991, and that "Boeing continues to invest and innovate in pollution prevention programs and find new ways to get greater leverage for current emission reduction programs."³⁴
- Monsanto's similar web site provides both current and past TRI information on consolidated chemical releases and transfers from Monsanto facilities. The web site also includes data about carbon dioxide releases, priority on-site toxic chemical releases, compliance penalties, chemical spills, Superfund sites, safety, and compliance.³⁵

Public Disclosure

Companies can use TRI data to "obtain an overview of the release and management of toxic chemicals, to identify P2 and release reduction targets, and to measure progress toward these goals. The publicity that has resulted from the availability of TRI data has prompted many facilities to pledge toxic chemical release reductions, and to work with communities to develop effective strategies for reducing environmental and human health risks."³⁶ For example, the Iowa Association of Business and Industry organized a community-wide pollution prevention initiative in the Des Moines-Polk County area. The organization adopted a goal of a 60 percent reduction of all TRI chemicals by 1992 and a 70 percent reduction by 1995.³⁷

Government Use

Environmental Solutions

Government agencies can take a variety of actions when TRI data reveal an environmental problem in a specific state or region. Some of these actions involve voluntary incentive programs for companies. Although these programs are not binding commitments, they offer good publicity for participating companies. Examples include:

- Governor Frank O'Bannon of Indiana announced the Indiana Governor's Toxics Reduction Challenge in 1998. The challenge pledged to "support the state's goal to reduce toxic chemical releases to the air and water from 1995 levels: 50% by December 31, 2000, in large urban areas for carcinogens and persistent bioaccumulative toxic chemicals; 60% by December 31, 2002 statewide for these chemicals; and, 50% by December 31, 2002, statewide for all toxic chemicals reported in the Toxics Release Inventory." The Challenge also pledged to "energetically help the state reach these goals through efforts emphasizing pollution prevention within your organization and/or in cooperation with other organizations." As of mid-April 2000, 67 companies in Indiana had committed to the Challenge. A list of the companies and an update on their progress is available on the Indiana state web site <www.in.gov/idem/oppta/p2/toxicchallenge/>.³⁸
- The EPA "33/50 Program" targeted 17 priority TRI chemicals for 33 percent and 50 percent reductions from 1988 release levels, to be attained by 1992 and 1995, respectively. More than 1,200 companies nationwide joined the Program, which provided several forms of recognition to participating companies. The Program reached both its interim 33 percent reduction goal and its final 50 percent reduction goal one year early.
- The P2 Program of the Colorado Department of Public Health and the Environment used TRI data, in combination with other data about hazardous waste and toxic chemical releases to air and water, to identify the ten industry organizations responsible for the largest quantities of hazardous waste generation or toxic chemical releases in the state. This research served as the basis for establishing priorities for P2 activities and for distribution of technical assistance grants. The report also aided in targeting large companies for participation in the "Governor's P2 Challenge Program" to reduce toxic chemical releases and hazardous waste generation.³⁹
- Due to the new TRI reporting requirements for dioxin, the Delaware Department of Natural Resources and Environmental Control became aware of dioxin-tainted waste at DuPont's Edge Moor, DE titanium dioxide (TiO₂) plant. Subsequently, DuPont agreed to pay an estimated \$15 million to remediate dioxin-tainted waste at this facility. DuPont discovered that the waste sludge was contaminated with dioxin while the company was

preparing to comply with EPA's requirement that dioxin releases be reported under TRI. In addition, DuPont agreed with the Delaware Department of Natural Resources and Environmental Control to spray a 23-acre stretch along the Delaware River with a starch-like coating to keep the dioxin from being stirred up by the wind or eroding into the river. DuPont used the site to store waste sludge from the Edge Moor plant. The company will also close four sludge lagoons near the plant and plans to cut dioxin formation in half by 2003 and by 90 percent by 2007.

Environmental Targeting

Budgets to fund environmental programs and measures often do not increase in proportion to the need for these activities. Environmental targeting initiatives, such as those listed below, help governments and communities prioritize their needs and ensure that their resources are used most efficiently.

- The P2 Division in Georgia's Department of Natural Resources used TRI data to identify the technical assistance needs of manufacturing sectors generating chemicals that pose the greatest relative risk to public health and the environment. The Division prioritized chemicals, examined manufacturing sectors releasing the highest priority chemicals, and identified particular subsectors for further assessment. The Division also conducted in-depth manufacturing sector assessments to determine which processes produce which wastes, what multi-media waste problems exist, what P2 activities were being undertaken, and what additional opportunities might exist.⁴⁰
- The Florida Waste Reduction Assistance Program provides assistance in source reduction and waste minimization to facilities handling TRI chemicals. The Program relies on TRI and other data to target facilities for the Program.⁴¹
- EPA's Office of Enforcement and Compliance Assurance uses TRI data within its Online Tracking Information System (OTIS) -- a collection of on-line search engines that enables EPA staff, state/local/tribal governments, and federal agencies to access a wide range of data relating to enforcement and compliance. Data on the OTIS site are from OECA's Integrated Data for Enforcement Analysis ([IDEA](#)) system, which extracts and integrates information from TRI as well as the following databases: AFS (Clean Air Act -- AIRS Facility Subsystem), PCS (Clean Water Act -- Permit Compliance System), RCRAInfo (Resource Conservation and Recovery Act Information System), the Federal Enforcement Docket, National Compliance Database (NCDB), and the 1990 U.S. Census. OTIS can be used for many functions, including program planning, enforcement targeting, sector and geographic analyses, data quality review, and pre-inspection review. As of March 2002, all states, all EPA Regional Offices, and another 90 local, state and federal governmental organizations are registered.

Legislation and Regulations

TRI data often provide the impetus for legislative action from federal, state, and local governments. For over a decade, TRI data has been used to influence and change environmental standards, regulations, and legislation, for example:

- In response to legislation passed in 1987 to address toxic chemical releases to the air, the Illinois EPA Bureau of Air used TRI data to determine quantities of stack and fugitive air emissions of reported substances to support continued development of regulatory proposals.⁴²

Risk Assessment

As the connection between toxic chemicals and human health becomes better known, public health officials are looking for ways to assess the levels of risk in their communities. TRI data have been a crucial component in creating tools to address these assessments. Examples follow:

- The New York State Department of Health developed a risk screening protocol using TRI air release data and toxicity potency data to produce relative risk scores and rankings for facilities and chemicals within the state. Results suggested the need for a more careful evaluation of health effects resulting from large releases of noncarcinogenic compounds.⁴³
- Researchers from EPA's Office of Health Research published a study of national and regional differences in county-level TRI chemical releases to air according to the ethnicity or race and household income of the populations. Using the "Population Emissions Index," a population-weighted average release for each county, the study found that all minority groups except Native Americans tend to live in counties where levels of TRI chemical releases to air are higher. The data also suggest that household incomes tend to be higher in counties with higher TRI chemical releases to air.⁴⁴
- The EPA Office of Pollution Prevention and Toxics's Risk-Screening Environmental Indicators Model provides year-to-year indicators of the potential impacts of TRI chemical releases on human health and the environment. The indicators consider TRI release and transfer volumes, chronic toxicity, exposure potential, and the size of receptor populations. Both generic and site-specific exposure characteristics can be incorporated. The model allows the targeting and prioritization of chemicals, industries and geographic areas. Facility scores can also be tracked from year to year to analyze trends.⁴⁵

Quality Assurance and Control

Some states, such as Massachusetts, that require separate reporting of toxic chemical releases for their facilities find TRI data to be a useful measure of quality assurance and control. The Air Pollution Control Program in the Missouri Department of Natural Resources also compares fugitive and stack emissions reported to the TRI with toxic chemical release data reported on the state's Emissions Inventory Questionnaire for quality control.⁴⁶

Other Government Uses

Additional governmental uses of TRI data can be found in agencies not immediately associated with environmental issues. The U.S. Internal Revenue Service used TRI data to identify companies releasing chlorofluorocarbons (CFCs) in order to enforce a tax imposed on releases of CFCs and thus facilitate the phase-out of these chemicals.⁴⁷

International Right-to-Know

The TRI has served as the model for many countries' Chemical Right-To-Know programs and laws. Within the next few years, more than 30 nations are expected to have a TRI-like system, known internationally as Pollutant Release and Transfer Registers (PRTRs). PRTRs allow the public to obtain toxic chemical release data over a large geographic area. Countries can compare their data and share ideas about improving environmental regulations. Examples of how PRTR information is being used include:

- The Commission for Environmental Cooperation (CEC), which was created by a side-agreement to the North American Free Trade Agreement (NAFTA), began its PRTR work by preparing a document that compares U.S. and Canadian PRTR systems. The CEC now develops an annual report, entitled "*Taking Stock*", that correlates data from the TRI and the Canadian National Pollutant Release Inventory to give an overall view of releases and transfers of toxic chemicals within and between countries. The CEC also has created an Internet search engine that allows the public to obtain continental PRTR data.⁴⁸
- In 2000, the Silicon Valley Toxics Coalition attended an international conference in Croatia on public participation and community right-to-know. Participants recognized the fundamental importance of Chemical Right-To-Know and are lobbying the United Nations to promote the program and persuade nations to support the passage of community right-to-know laws modeled after the TRI.⁴⁹

Investment

The public's increased awareness of environmental issues has made environmental performance an important factor in their investment decisions. Many investment companies have responded to this demand by providing socially responsible investment options. Examples of how TRI data have been used in investment decisions include:

- Green Century Funds, an investment organization that specializes in socially responsible mutual funds, offers two funds committed to promoting corporate environmental responsibility. The Green Century Balanced Fund invests in “performance-driven companies that are a part of the solution to environmental problems,” as well as in environmentally benign companies and “best of class” companies that are setting standards for environmental protection in their industries. The Green Century Equity Fund screens out companies with the worst environmental and social records. The funds are monitored for environmental performance using TRI data.⁵⁰
- Vanderbilt University's Owen Graduate School of Management found a correlation between a company's stock value and its P2 efforts, which were assessed using TRI data. A researcher from the University performed two separate studies comparing the progress of a company's P2 activities as reported on TRI forms to a company's stock market performance. The study reported that “companies that underperform expected pollution prevention goals are penalized in the stock market, and the stock of the companies that engage in pollution prevention activity tends to outperform the stock of companies that do not engage in pollution prevention.”⁵¹
- Using TRI data, the Investor Responsibility Research Center (IRRC) developed an Emissions Efficiency Index® that indicates which companies have a competitive edge in environmental performance. The Index is predicated on the idea that greater toxic chemical releases are associated with higher risks of negative publicity, more tort actions, and higher costs for pollution control and waste management. IRRC's constituency uses TRI-based information to identify companies with poor environmental records. Using the index, investors can either screen such companies out of their portfolios or purchase shares and use their ownership as leverage to improve environmental performance.⁵²

Academic Use

A variety of TRI data use applications occur in academia, in areas ranging from doctoral theses to journal publications to use in the classroom itself.

Research

Universities and research institutions are using TRI data as a means for “examining environmental policies and strategies, and clarifying risks associated with toxic chemicals at the state and local level.”⁵³ Students and faculty in the academic community also perform studies based on TRI data. Examples of academic research using TRI data include:

- In February 2000, the journal *Drug and Chemical Toxicology* published an article entitled, “Using GIS to Study the Health Impact of Air Emissions.” This article showed how public health professionals are able to use data (such as the TRI) on toxic chemical releases to air, air dispersion modeling, and GIS to identify and define a potentially exposed population. In addition, such data can be analyzed to estimate the health risk burden of that population and determine correlations between point-based health outcome results and estimated health risk.⁵⁴
- In the *Journal of Environmental Economics and Management* in 1999, researcher Mr. Madhu Khanna published results of research that examined the environmental, economic and investment effects of voluntary and mandatory toxic release reporting programs. One of the research studies focused on the EPA’s “33/50” Program during its first three years, 1991-1993, and its impact on the U.S. chemical industry. The paper concluded that Program participation led to a statistically significant decline in toxic releases over the time period, a statistically significant negative impact on current return on investment, but a positive and statistically significant impact on the expected long run profitability of firms.⁵⁵
- At Louisiana State University, environmental science professor Paul Templet developed a method, using TRI data, to evaluate the comparative effectiveness of pollution control strategies, policies, and programs, by calculating an “emissions to jobs ratio.” This ratio consists of the number of pounds of toxic chemical releases per job in a given industry and location, can be compared to a national or other average. The comparison is then used to assess the relative toxic air releases associated with a certain job. This ratio was used to modify tax exemptions granted to facilities to encourage and reward job creation.⁵⁶
- Professor Mark Stephan used TRI as the background for an academic paper focusing on the role of information disclosure programs in environmental policy. Professor Stephan used TRI as a prime example for the fundamental theories and concepts that underlie the empirical work on the comparison of basic theories arising from the knowledge of economics, psychology, and politics.⁵⁷
- Researchers Klassen and Whybark studied management of the natural environment in manufacturing firms, given increased public awareness and scrutiny as a result of

programs like the TRI. In one of their published studies, they concluded that an emphasis on pollution prevention instead of pollution control, improved delivery performance and firm competitiveness.⁵⁸

Classroom Use

High school and university instructors have incorporated the TRI into curricula involving subjects ranging from introductory chemistry to business.

- The JSI Center for Environmental Health Studies developed a field-based environmental education curriculum for high school students in Chelsea, Massachusetts, a low-income minority community near Boston. The goal was to encourage student participation in environmental assessment and protection. Students learned to inventory sources of contamination in a local creek and worked with community agencies on protecting a valuable environmental resource. TRI data were an integral part of the students' research.⁵⁹

Conclusions

A variety of stakeholders work with TRI data on a regular basis. Some data uses, such as risk screening, were recognized when the TRI was first implemented; other uses have developed as the program has matured and expanded. TRI data have been a key tool in the environmental justice movement and in the drive toward more environmentally responsible investment. The applications of TRI data will likely increase in number as environmental awareness grows and opportunities are identified for integrating TRI data with other types of information.



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