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Toxics Release Inventory (TRI) Data Use Conference: Building TRI and Pollution Prevention Partnerships

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Sponsored by the
Northeast Waste Management Officials' Association (NEWMOA)

In conjunction with the
U.S. Environmental Protection Agency (EPA)

and
American Petroleum Institute (API)
Chemical Manufacturers Association (CMA)
INFORM, Inc.
National Association of State Title Three Program Officials (NASTTPO)
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New England Interstate Water Pollution Control Commission (NEIWPCC)
Northeast States for Coordinated Air Use Management (NESCAUM)
Toxics Use Reduction Institute, University of Massachusetts Lowell

Toxics Release Inventory (TRI)
Data Use Conference

1994 Proceedings

Maureen Hart, Editor

U.S. Environmental Protection Agency
Office of Pollution Prevention and Toxics (7407)
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Introduction

The 1994 Toxics Release Inventory (TRI) Data Use Conference brought together the members of the many different constituency groups using TRI under the theme of Building TRI and Pollution Prevention Partnerships. The sessions in the conference were organized into three different tracks: using TRI in pollution prevention efforts, partnerships using TRI, and innovative uses of TRI data. The conference was designed to support several important goals:

- strengthen the relationship between TRI users and managers, including members of all the different constituency groups;
- increase awareness of the diverse uses of TRI data;
- expand the network of TRI users;
- share information on how states and others are using the pollution prevention data elements in TRI; and
- provide a forum for discussing the future direction of TRI.

The fact that the conference had almost doubled in size from the 1993 conference shows that the goal of expanding the network of users was achieved. Not only were there more attendees than any prior year, there was also a greater number of representatives from industry and environmental and other nongovernmental organizations.

Conference Overview

The opening session included keynote addresses from Linda Murphy, the Director of the Air, Pesticides and Toxics Management Division, U.S. EPA New England and from Dr. Lynn Goldman, the Assistant Administrator for Prevention, Pesticides and Toxic Substances, U.S. EPA. This was followed by a plenary panel that discussed the expansion of the Right-to-Know concept in environmental programs.

Following the opening session, there was a reception sponsored by the Chemical Manufacturers Association, which allowed attendees to network as well as view demonstrations of TRI-related computer applications and environmental programs. Descriptions of the demonstrations are included at the end of these proceedings.

The breakout sessions were all related to one of three tracks: Pollution Prevention, Partnerships with TRI, or Innovative Uses of TRI. The Pollution Prevention Track was the most popular track in terms of attendance. The sessions included: an introduction to pollution prevention and TRI; discussions on how TRI can be used for pollution prevention planning from an industry viewpoint and for targeting technical assistance from an Agency viewpoint; how TRI can be used for measuring progress in pollution prevention; and what is being done with additional data collected by some states.

The Partnerships Track addressed the many different types of partnerships that exist between TRI and other programs. These sessions included how TRI can be and is used by local

emergency planning committees (LEPCs), other media programs, community groups, and for enforcement and compliance.

The Innovative Uses Track examined the many different ways that TRI is being used. These sessions included how TRI is useful in the environmental justice movement, uses of TRI by communities and workers, integration of TRI with other related data sources, and geographical information systems (GIS) and other tools for analyzing TRI.

Papers were prepared by most of the speakers. An index in the back of these proceedings shows where to locate papers submitted for inclusion in these proceedings.

For the first time since the annual TRI Data Use Conferences began, attendees were invited to present posters relating to TRI at two sessions on Tuesday, December 6th. Thirty-three abstracts were submitted and accepted. The poster sessions proved to be a valuable addition to the conference and allowed more information to be presented than was possible with a limited number of breakout sessions.

The closing plenary was a discussion of the future of TRI. Representatives from a national environmental organization, a state agency, and industry presented their views on how the TRI should or should not be expanded.

These proceedings include all the papers that were submitted by speakers and presenters. Immediately following this introduction are the presentations of the keynote speakers. Next are the papers submitted by the opening plenary speakers, with an introductory remarks by the moderator, Joseph Carra, Acting Director, Office of Pollution Prevention and Toxics, U.S. EPA. Following those papers are the papers submitted by speakers in the breakout sessions with an introduction describing each session. The sessions are grouped by tracks in the following order:

Track 1 - Pollution Prevention,
Track 2 - Partnerships
Track 3 - Innovative Uses

Papers for the closing plenary speakers are found after the breakout session papers with introductory remarks from the moderator, Susan Hazen, Acting Deputy Director, Office of Pollution Prevention and Toxics, U.S. EPA.

Following the closing plenary papers are brief descriptions of the computer demonstrations presented during the reception on Monday night. These are followed by abstracts for the posters presented Tuesday during the morning and afternoon poster sessions. An index of all presenters is provided to allow readers to easily locate a particular paper or poster abstract. Finally, after the index is a list of all those who registered for the conference.

Keynote Addresses

Speakers

Linda Murphy, *Director, Air, Pesticides and Toxics Management Division, U.S. EPA-New England*

Lynn R. Goldman, M.D, *Assistant Administrator, Office of Prevention, Pesticides and Toxic Substances, U.S. Environmental Protection Agency*

Linda Murphy, *Director, Air, Pesticides and Toxics Management Division, U.S. EPA-New England*

It is really a privilege for me to open this conference. There are so many distinguished members of business and industry in the audience, distinguished environmentalists, and members of state and local governments. And of course, I also want to extend a sincere welcome to Dr. Lynn Goldman, our Assistant Administrator in Washington. Among this esteemed group of people, I am truly honored to open this conference. I feel like it's really a celebration. A couple of years ago, I would not have envisioned that we would have over five hundred people registered for a conference like this. So, I am truly heartened by the response that we've had to the conference, and I do think it's a celebration that we all can take pride in. I do want to thank NEWMOA again, and members of the EPA headquarters staff and of course, my own staff in EPA-New England for all their hard work in putting on this conference. It's through their efforts that people like me get to trot around and open conferences with little to worry about, except opening remarks. So again, thank you very much.

We're here today to talk about change. Change in the way we do business and change in the way we think about the environment. There are many environmental reasons for this transformational change. But there are compelling social and economic reasons as well. These reasons are national, regional and local in scope. On the national front, thirty years after Silent Spring, we have doubled our use of pesticides in this country. Twenty-five years after the Cuyahaga River caught fire, forty percent of the rivers and lakes are still polluted -- too polluted for us to fish and swim in. Last year, as you probably heard on the talk shows, people in Milwaukee, New York City, and Washington, D.C., were ordered to boil their water before drinking it. Four-hundred thousand got sick in Milwaukee alone, and one hundred died. So you can see, the national picture still shows we have many environmental problems.

On the regional level, one billion pounds of the TRI chemicals in the waste stream were emitted from New England facilities. In the shell fishing industry alone, over 100,000 acres were closed -- more than three times what it was in 1970. There are 94 Superfund sites in this region and many more sites that are on the equivalent of state Superfund lists throughout the region. We, in EPA New England, are responsible for the six New England states and we have problems that are unique to each of these states as well.

In New Hampshire this summer, ozone exceedences occurred on eleven out of twenty-one days on the top of Mount Washington, which is the highest peak in New England. In Massachusetts, within five miles of this very hotel site, in Roxbury, which is an inner-city community, there are fifty-four hazardous waste sites in a single square mile area known as the Dudley neighborhood. In Maine, a land that prides itself on being "Vacationland," in fact, I think they have that written on their license plates, there were recent mercury warnings in fish that warned pregnant women and children to limit their intake drastically. In Vermont, for those of you who live in New England and are shopping for Christmas presents, there was a lead scare in Vermont maple syrup recently, that hit all the papers. Moving on to Rhode Island, Narragansett Bay, which is one of the premier bays in our region, the fecal-coliform bacteria level doubled within the past year. And in Connecticut, one billion tons of sewage flow into Long Island Sound daily. So, for those of you who are from outside our region, I've just tried to capture state specific problems to give you just a flavor of the kinds of environmental problems that we still face in our region.

These are tough problems and all the tougher, given the economic and social context. Our economy depends heavily upon natural resources. This is particularly so in New England. I'll give you just two examples, the fishing industry, for one. Currently, this is a half a billion dollar industry. It used to be four times that much, a two billion dollar industry, as short as fifteen years ago. You can see the effects of the down-turn in this industry in the fishing communities along the coast -- the people who are out of work and the people who have had to find other work because they no longer can sustain a living through fishing. Tourism is a $14 billion industry in this region; 4.5% of the gross regional product. Part of the reason that attracts tourists to our area is the clean and unique environment that we share. So, it is worth protecting.

EPA-New England is meeting these economic and social challenges. We are focusing our attention on four areas. With the new Regional Administrator, John DeVillers, we have tried to focus on limiting our attention to the most important problems. First of all, we're promoting environmental technology and with it, environmental industry. We are truly blessed in New England with a large variety of academic institutions, consulting businesses and environmental products that we feel could be used to improve the environment throughout not only New England, but the United States and the world as well. Our second priority is a strong, targeted enforcement effort. EPA is and always will be a regulatory agency and we certainly have not abandoned our attention and our priority towards a strong enforcement program. We want to be flexible, but we will use our enforcement authorities to ensure that federal laws are maintained and obeyed.

Our third priority is re-inventing the way EPA does business. This is really a cultural change that's going to occur over many years. It's been difficult for us in the regional office undergoing this cultural change, as I speak, and I think that we will be involved in it for many years to come. It's a cultural change not only in how EPA is organized (we're streamlining like the rest of the government and we're trying to reduce layers of management that we feel are unnecessary). But also, it's a cultural change in the way we do business with our customers. I hope that you have already seen the results of a more customer focused agency in New England, dealing with our customers, the states, the environmental community and the industrial and business community. And we intend to continue that effort to meet the needs of our customers.

Our final priority is environmental empowerment and education. I think this is probably the most important -- personally speaking -- of the four priorities. If we are to actually change behavior, we have to educate and empower people to take control of their own lives and to make changes for themselves. We also have to focus attention on the education of students, particularly students in the lower elementary grades. We have spent a lot of time on education in our regional office. A lot of people who work for EPA volunteer their time educating teachers in teach-the-teacher programs and educating and tutoring students. I think that obviously, as with any social change, the future is with the children and I think this is time well spent. But in the area of education, we don't always just focus on children. We obviously focus on the regulated community.

TRI is one of the central approaches we are using to address toxics issues and the toxic problem. Through efforts like the 33/50 program, we're empowering businesses to help themselves. Fundamentally, this is about people recognizing the importance of pollution prevention and the advantages that pollution prevention poses for both the environment and a company's bottom line: its profits. While saving money, companies are finding they can save the environment as well by reducing the use and emission of toxic chemicals. It goes to prove that a healthy environment is truly consistent with a healthy economy.

New England is proud to lead the nation in reducing toxic emissions. Our success is due to a new spirit of cooperation between industry and government, as evidenced by the results of voluntary programs like the 33/50 program, and progressive state toxic use reduction acts, such as the trendsetting law passed in Massachusetts in 1990. I think you'll be hearing about that later on in this conference. These reductions do not come from fewer business, but from fewer emissions from a comparable number of businesses. That's an important fact because, like all environmental improvements, we try to scientifically quantify whether the

improvements came from external forces, from down turns in business, or truly from the results of pollution prevention in environmental control. We think, in this case, it's from the latter.

I would like to give you a little TRI-specific information before I close. Since 1988, New England facilities have reduced environmental releases and emissions to the air, land, and water by forty-seven percent. I think that's a tremendous success. The national average was thirty-five percent, so we're better than the national average, but I think the national picture is a great success as well. The vast majority of environmental releases, eighty-six percent of them, are to the air, while water and land discharges equally account for the remaining twelve percent. Since 1988, New England facilities have reduced waste sent off-site for treatment or disposal by over sixty percent. And again, if you want to compare that to the national average, the national average was thirty-five percent.

We have achieved this terrific success rate, again, thanks to EPA-New England's and the states' emphasis on pollution prevention as a way of doing business, as a change in the behavior of how we do business. Again, there are many progressive state laws that have been passed and progressive state programs that are in place now to assist industry with their pollution prevention efforts. Since the Pollution Prevention Act of 1990, we have a more complete picture of the waste management practices through TRI. In New England, facilities recycled fifty-three percent of their total toxic chemicals that are in their waste streams. There are still currently one billion pounds of TRI chemicals in the waste streams of New England facilities. So, there is still obviously a lot of work to be done.

I've mentioned 33/50 several times in these remarks. For those of you who may not be familiar with the program, 33/50 is a voluntary program whereby companies reduce their emissions from a base line year of 1988. There are seventeen pollutants that are targeted. The name 33/50 comes from a target goal of reducing the emissions from the base line of 1988 by thirty-three percent in 1992, and fifty percent in 1995. So, 1992 has already passed. How did we do? In New England, 370 facilities and 193 parent companies are part of the 33/50 program. Participants in the 33/50 program ranged from small facilities to Fortune 100 corporations. By 1992, these New England facilities obtained a fifty-five percent reduction. That's well over the thirty-three percent target. So, we did great in New England. Half of the Region's TRI reductions are associated with facilities and parent companies that committed to the 33/50 program. So, 33/50 does work, education does work, and people do want to do the right thing. These New England facilities reduced their emissions and waste generated fifty percent faster than the national rate among 33/50 facilities. We don't have a scientific explanation of why this happened in New England, of why New England was a little bit ahead of the rest of the country. But, again, possibilities include the efforts of strong state and interstate programs that we have in New England and a high public concern for pollution prevention and the environment here.

Gillette -- and I hate to mention specific companies, because you always slight other companies that are just as good -- but Gillette is truly an exemplary company and it is a company that's based in Boston. Gillette has recently made an impressive commitment to go far beyond the 33/50 goals. Gillette has set a voluntary goal of a ninety-nine percent reduction in TRI emissions by moving away from their use of ozone depleting chemicals to de-grease razor blades. This commitment applies to all eleven world-wide facilities. Gillette obviously is a profitable company. They do national advertising and sponsor many programs on television. Gillette isn't reducing its emissions by ninety-nine percent solely to be a good corporate citizen. Obviously, pollution prevention is good business as well. Again, I would like to close by reiterating the fact that it's appropriate that we meet in Boston during the holiday season because this conference is a celebration. I'm very privileged to have opened this conference today.
□

Lynn R. Goldman, M.D., ***Assistant Administrator, Office of Prevention, Pesticides and Toxic Substances, U.S. Environmental Protection Agency***

Good afternoon. I am very pleased to be here to discuss the newly expanded Toxics Release Inventory and the opportunities for partnerships in pollution prevention. This conference is an important building block in the construction of one of the most vital and successful environmental programs in the United States -- ensuring the public's right to know about toxic chemical releases to their communities.

It is significant that you who are participating in this 1994 conference on TRI data are such a diverse group. You represent federal, state, and local agencies, the international community, environmental groups, academia, industry, labor, citizen organizations, and the news media. All of you play a role in the public's becoming aware of environmental releases and participating in avenues for response. With your involvement, I am confident this conference will lead to new relationships, new insights, and new possibilities for preventing the pollution reflected in the Toxics Release Inventory.

In 1986, when the Emergency Planning and Community Right-to-Know Act established a public process for identifying potential chemical hazards at the community level, few anticipated the dynamic events that would unfold in a very short time. This comprehensive national inventory of toxic chemical releases has developed into a valuable tool for identifying potential environmental problems and stimulating pollution prevention. In 1990, the Pollution Prevention Act added major new reporting elements to the Toxics Release Inventory or TRI form, which increased the ability of TRI to identify pollution prevention opportunities.

As you know, TRI gathers information on toxic chemical releases and other pollution prevention data from more than 23,000 manufacturing facilities on an annual basis. This information includes routine release data and not emergency response data.

Until recently, more than 300 chemicals have been subject to the reporting requirements. I am pleased to note that, last week, the Environmental Protection Agency added another 286 chemicals to the TRI, including several chemicals used in pesticide formulations. These are chemicals that have hazards in the same range of the existing TRI list and thus may pose similar risks to communities. Because of our action, more communities than ever before will be better equipped to identify and respond to the full range of potential environmental risks from chemical releases.

At the same time as we expanded TRI, we made reporting of low volumes of chemical releases easier and less time-consuming, saving limited resources while still protecting the public's right to know. Later in my talk, I will discuss these steps in more detail as well as our plans for future measures.

If past is prologue, last week's action to expand the Toxics Release Inventory to include 286 additional chemicals will help drive the pollution prevention movement. Consider what happened at the outset of the program. The first year's data were something of a revelation to government and industry. In 1988, the benchmark year for comparisons, nearly 4.8 billion pounds were reported. The eye-opening data have spurred a steady decline in releases. Since 1988, there has been a reduction of 1.6 billion pounds of toxic releases into the environment.

Our actions to strengthen the TRI are part of this administration's dedication to safeguarding the environmental health of all Americans. Information is fundamental to the functioning and well-being of a democracy. Informing communities about potential environmental risks empowers them to influence the environmental management decisions that will affect their lives and those of their children. It is vital that we do so for what we see with increasing clarity is the link between healthy environments and healthy communities -- safe food, safe water, and safe air.

The United States is at an important juncture in the history of environmental protection. In many ways, we have reached the limits of the tools we have traditionally used. Traditional approaches deal with pollution at the end of the pipeline, rather than before and during the manufacturing process, and they address effects on air, water, or land separately when, in fact, these different parts of the environment are interrelated.

Among the reasons for the shift toward pollution prevention is the expanding awareness both of environmental releases and of the environmental costs incurred over the life cycle of a product coupled with the opportunities for reducing them. Environmental managers today are beginning to look at the expense involved in the whole product cycle, from raw materials, manufacturing, and transportation through use and ultimate disposal, recycling, and/or reuse. There is growing recognition that life-cycle analysis can lead to economically wiser choices for reducing environmental exposure and future liabilities. In the United States, chief financial officers are becoming more involved in environmental management decisions and their effects on quality, productivity, and profits. Rightly so.

Command-and-control regulatory approaches are necessary to provide strong goals to achieve, but at the same time they leave little room for flexibility or innovation. By themselves, they are insufficient. In 1992, U.S. businesses spent close to $30 billion on environmental compliance. Yet the manufacturing and chemical sector alone released a total of 3.2 billion pounds of toxic pollutants. And too often our regulatory process is bogged down in litigation. Can't we do a better, more efficient and effective job of protecting public health and the environment? The answer is yes, by adding pollution prevention and community right-to-know to our tool box for environmental protection.

Today, everyone engaged in environmental management in the public and private sector is challenged to use the limited resources available to do a better, cheaper, smarter job of protecting the environment. Can we achieve the environmental protection we need in a more common sense way? Again, the answer is yes, and the Agency has launched a new program called the Common Sense Initiative to approach regulation on an industry-by-industry basis rather than pollutant-by-pollutant. Six major U.S. industries are participating in the pilot phase of the project -- auto manufacturing, computers and electronics, iron and steel, metal finishing and plating, petroleum refining, and printing. Together, they spent more than $8.2 billion in 1992 on compliance with environmental laws, according to the Department of Commerce, and their combined release of toxic pollutants into the environment totaled 395 million pounds that year, 12.4 percent of the reported emissions nationally. These six industries employ almost 4 million Americans.

Our Common Sense Initiative will bring together government officials at all levels, environmental leaders, industry executives, and others to create strategies that will work cleaner, cheaper, and smarter to protect the health of the people of this country and the natural resources we share. Pollution prevention will play a major part. The goal is a new generation of environmental protection -- a cleaner environment at less cost. In this way, we will be better able to achieve the interdependent goals of environmental protection and a sustainable economy.

Last year this administration took a significant step forward with its commitment to right-to-know and pollution prevention. In August 1993, President Clinton signed an Executive Order requiring federal facilities that manufacture, process, or use toxic chemicals to report them under the TRI. At the same time, he set a goal for all federal agencies to reduce toxic emissions by 50 percent by the year 1999. I am pleased to report that our federal agencies are stepping forward to lead the way. They are required to report TRI data by July 1995, and this information will become available to the public in the spring of 1996.

As I mentioned earlier, EPA last week greatly expanded the number of toxic chemicals subject to reporting requirements, bringing the total to more than 600. This expansion of TRI is a crucial step because the initial list, gathered from a variety of sources, represented less than 20 percent of the toxic chemicals in U.S. commerce today. Notably absent were toxic chemicals used in pesticide formulations. More than half of the 286 chemicals added to the TRI list were active ingredients in pesticides. To add chemicals, we conducted an

extensive search for chemicals of concern across the federal government. More than 1,000 chemicals were screened, and 383 underwent thorough toxicologic analysis to identify the 313 that we proposed for TRI listing, of which 286 were finalized last week. We are requiring that releases of the additional chemicals be reported for the 1995 calendar year, with the first reports submitted to EPA and state agencies by July 1, 1996.

We also made final a rule to streamline TRI reporting requirements for small quantities of emissions and waste. This should reduce the more than 80,000 reports currently received under the TRI each year by about 20,000, with considerable savings to industry and to government. Currently, whether a plant reports 10,000 pounds or 10 pounds, they have to use the same extensive reporting process. Now, a facility can take advantage of the streamlined and simplified reporting form -- often compared to the IRS's E-Z tax form -- if the total amount of the releases and waste required to be reported each year is below 500 pounds. This less detailed information will be available to the public in the TRI database.

These two rules strike a positive balance between enhancing the need for communities' right-to-know about toxic chemical releases and controlling regulatory costs. We estimate that the chemical expansion rule will increase the annual number of Form Rs by about 14,000 forms. This figure includes about 1,225 new data reporters. The total estimated annual cost to industry is $48.8 million, with the first year cost estimated at $99 million. But the alternate reporting threshold reduces the regulatory burden by a total estimated savings to industry of $21.5 million a year.

Completion of this first phase of TRI expansion will provide new opportunities for right to know and pollution prevention. High on our agenda at EPA is the need to address environmental justice concerns. Minorities and low-income groups who too often have borne a disproportionate share of potential environmental risk especially need access to toxic release data and to the environmental management process. More than $5 million is available in fiscal 1995 for our new Pollution Prevention for Environmental Justice Grants Program. These projects can range from using TRI data to bring about lower industrial emissions to encouraging resource efficiency in communities. Potential recipients include community groups, service providers, non-profit organizations, and academic institutions. This and other grant programs at EPA will help ensure that environmental justice groups are at the table when environmental management decisions are made.

An expanded TRI will also provide new opportunities for developing voluntary programs with industry. The Agency's 33/50 program targeting 17 high-priority toxic chemicals on the TRI helped accelerate the process. Approximately 1,300 companies, including a high percentage of the "top 600" largest firms, are voluntarily reducing the release or transfer of these chemicals. Companies voluntarily participating in the 33/50 program include AT&T, BF Goodrich, Dow, Du Pont, Lockheed, Martin Marietta, Republic Engineered Steels, FMC, and Shell Petroleum, among many others. Program goals call for reducing the release or transfer of these priority chemicals 33 percent by 1992 and 50 percent by 1995. The program brought about a 40 percent cut by 1992, which amounted to a total of nearly 600 million pounds. And it is on track for meeting the 1995 objective.

But with 1995 comes the program's completion. Any action to extend the program, in its current or a redesigned form, depends on the consensus and support of stakeholders like you. We are asking for your thoughts on whether there should be a next generation of the 33/50 program and, if so, what it should look like. The following are some of the questions we are trying to resolve and ask you to think about. What chemicals should be targeted in a next generation program? Who should be invited to participate? What measures should be included? Should it focus on source reduction or efficiency of use? Should it also embrace environmental improvements achieved through recycling, recovery, treatment, and remediation? Our plan is to make a formal announcement in the summer of 1995. Let us hear from you.

Now that we have expanded the Chemical Expansion Project, we are looking to increase the universe of facilities that are required to report beyond the current manufacturing sector. We call this "Phase II" of the TRI expansion project. Several major sectors of the economy have facilities that have significant releases of TRI

chemicals and are engaged in activities directly related to the manufacturing activities currently covered by TRI requirements. These are sectors that supply the raw materials or energy needed for manufacturing, distribute finished products as well as raw materials, and treat and dispose of wastes generated in the manufacturing process. The close alignment of activities guides our approach to facilities expansion.

We have been conducting a series of focus groups to encourage extensive public review and comment before we prepare a proposed rule. The first was held May 23, with a preliminary meeting for representatives of the utility industry. Additional focus group sessions have included mining, airports, publicly owned and commercially operated waste treatment facilities, oil and gas exploration and production, and freight and warehousing facilities. Another focus group was held with environmental organizations. The informal and substantive discussions have surfaced a number of issues that merit further discussion. One is the practical capacity of EPA and states to handle the increased data from new facilities. Another is whether the de-minimis exemption for the manufacturing sector is applicable to other types of facilities. We plan to propose a facilities expansion rule by mid-1995.

Phase III of TRI expansion is looking at the possibility of adding data elements that would give a more complete picture for pollution prevention. TRI data and the information added by the Pollution Prevention Act offer an important view of waste stream creation, waste management practices, and source reduction measures, if they exist. But there are still missing pieces.

A materials accounting approach would show how much of a toxic chemical is brought on site, how much is consumed, and how much is put into products, thus allowing measurement of efficiency of use, rather than just emissions and transfers. Consideration is also being given to requiring information on occupational demographics to better understand the potential for exposure. Together with the current TRI data, this information would allow better accountability of toxic releases and offer a better handle on pollution prevention opportunities. Not surprisingly, Phase III is controversial, and key decisions on whether to propose a national materials accounting strategy and if so, in what form, are still to be made. We will use an open and inclusive public process to shape this part of the TRI enhancement work. On September 28 we held the first public meeting on the issue. Approximately 125 people, representing state and federal agencies, trade associations, environmental and public interest groups, labor organizations, environmental justice groups, and law firms, were in attendance. Before the agency resolves the issues involved in Phase III, we will make sure that all parties work together to forge areas of consensus and develop mutually acceptable strategies.

So we are doing much to improve TRI now and in the future. But improvement of TRI won't be accomplished just by adding chemicals and consideration of additional facilities and data. We must all become much more sophisticated in how we use the data in TRI. It is because TRI is such a powerful tool that we must all take care to use it in as responsible a manner as possible, to drive the right kinds of actions for protection of public health and communities.

Let me give some examples of what I mean. One core communications issue is that the basis of TRI is hazard, not risk. What I mean by this is that TRI gives information about potential exposure but does not measure exposure. This can be useful but we need to guard against misinterpreting TRI numbers as actual exposure numbers.

A second issue is that although we are certain that all the chemicals on TRI are important environmental and/or health hazards, we are just as certain that they are not of equal toxicity. How can we do a better job taking that into account when we summarize and report TRI data on multiple chemicals?

Even more complex is that many of the chemicals on the TRI are important in some but not all media. For example, nitrates, which we just added last week, are of human health concern because of the potential for drinking water contamination. And they can also be of ecologic concern in certain nitrogen limited aquatic

ecosystems. But under appropriate conditions, they can actually be beneficial in other aquatic environments and when applied to land. How can we do a better job communicating about media-specific hazards on TRI?

And, not all activities reported under TRI confer equal risk. For example, proper recycling may be preferable to waste disposal which is in turn preferable to releases to the environment. Total data on emissions, disposal, and recycling may tend to mask these differences and inappropriately target our efforts for reductions.

Because our interpretations of TRI data change behavior and drive investments by communities, government and the private sector, we have the responsibility to develop more sophisticated ways of using the data than simply totalling up chemicals across media. EPA has already made a number of improvements in how we report data. And we are working to add toxicological information sheets to the TRI data base. But much more work will need to be done by all of us in order to maximize the benefits from TRI and maintain the effectiveness of TRI as a driving force for pollution prevention.

This administration's commitment to right-to-know and pollution prevention extends to the international level as well. For example, we at EPA are supporting an international effort to promote the concept of toxic chemical release inventories. At the Earth Summit in Rio de Janeiro in 1992, more than 150 countries agreed to an action plan called Agenda 21, which proposed, among other goals, the development of Pollutant Release and Transfer Registers, which is the international term for chemical inventory systems like TRI.

Today, in working to make the Earth Summit's goals a reality, EPA is helping to sponsor a toxic chemical inventory release effort through the OECD or Organization for Economic Cooperation and Development. In 1994, the Agency participated in an OECD effort to create a Guidance to Government document that will recommend right-to-know approaches to interested governments. The first of three work group conferences planned for 1995 is scheduled for January 24-26 in Basel. We firmly believe that publicly available chemical release inventories can have widespread international environmental and public health benefit.

Here at home, we are witnessing the rapid evolution of the TRI program and pollution prevention activities. Prevention is central to EPA's new Environmental Technology Initiative. The $60-million-plus program was launched in 1994 to identify and fund innovative technology development and pilot projects. We are also supporting state pollution prevention work directly and at a higher level than ever before. In 1994, EPA through its regional offices offered states $6 million in Pollution Prevention Incentive Grants. We have allocated another $6 million for 1995.

Pollution prevention is becoming a major factor in the Agency's media grants awarded in support of air, water, and solid waste programs delegated to states to operate. These program grants total approximately $628 million a year. EPA Administrator Carol Browner moved to ensure that these consider prevention as part of traditional inspection and compliance strategies.

The range of pollution prevention activities Agency-wide is without parallel. It speaks to our strong commitment to empowering communities with environmental data so they can more fully participate in shaping cheaper, cleaner, smarter strategies that reduce and prevent pollution.

In closing, let me say I believe your work here this week in Boston will be significant. It can lead to new and expanded partnerships to advance the public's right to know the environmental dangers it faces and to undertake measures to prevent potential risk from toxic chemicals. In the long run, the work done here can help safeguard the environmental health of this generation and the generations to come. Thanks to the organizers of the conference and thanks to all of you for attending the conference today.
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Opening Plenary

Moderator

Joseph Carra, *Acting Director, Office of Pollution Prevention and Toxics, U.S. Environmental Protection Agency*

Speakers

Stephen D. Hanna, Ph.D., *Assistant for Environmental Information, Cal/EPA*

John A. E. Hannum, *Head of Pollution Prevention and EPCRA Policy Section, Environmental Protection Safety and Occupational Health Division, Office of Chief of Naval Operations, Department of the Navy*

Nancy Ekart, *Advanced Environmental Representative, Eastman Chemical Company*

Gary Bass, *Executive Director, OMB Watch*

Joseph Carra, *Acting Director, Office of Pollution Prevention and Toxics, U.S. Environmental Protection Agency*

Good afternoon. In this opening session, we're going to be talking about expanding the right-to-know. We're fortunate to have several very knowledgeable speakers here with us. Before I introduce them, I would like to set the stage for the discussion and share with you some perspective from my office, the Office of Pollution Prevention and Toxics. As the office that runs the Toxics Release Inventory for EPA, we have been a leader in EPA on behalf of right-to-know. We pushed this movement within EPA because we are convinced that it can lead to real environmental results, especially pollution prevention, and that it can do it in a way that is cheaper and faster than the traditional approaches. Our attitude has been greatly influenced by a couple of factors.

First, there have been dramatic changes in public expectations about corporate environmental behavior. That in turn has resulted in changes in business attitudes toward environmental issues. The second factor is increasing demands on EPA, coupled with continually--and we expect it to get worse--shrinking resources. That has caused us to search for more effective ways to change corporate behavior. These factors can and do come together in a way that suggests a different model for government role in environmental protection. A model where government sets goals, enlists the participants in achieving those goals, provides help as need and as appropriate, measures progress, sets up systems to measure progress, and reports to the public on progress and recognizes success.

The TRI has relied on two of the elements of this model: measuring progress and reporting to the public. When the 33/50 Program was born, which you've heard about several times today already, we added the other elements into the TRI system. We set goals and hence the name, 33/50. We enlisted participants, as you heard today, about 1,300 of them. Then, we measured progress and continue to measure progress and report results using TRI systems. We will be recognizing final results but we've been already recognizing interim results. Just a few months ago, we had an awards program that we held in Williamsburg.

The 33/50 Program is a national program. But on any day, citizens and corporate officials can and do use the same approach at grass roots level. Using TRI data, citizens have increased their knowledge of toxics in their communities and have demanded and gotten improvements. Using TRI reporting systems, corporate officials have educated themselves about the environmental activities of their facilities. They, too, have demanded and gotten results. That's why we also refer to the Toxics Release Inventory as the CEO's right-to-know.

In this session, we'll be talking about expanding the right-to-know concept. You've heard us refer to Phase I, which we've just finalized, nearly doubling the number of chemical. We are working on Phase II, expansion of industries. Federal facilities are being added by executive order into TRI. And Phase III, exploring the idea of extending the data collection into chemical use reporting. The right-to-know concept can also be extended beyond the EPCRA mandated programs into giving greater access to other EPA databases -- and not just singularly, but in an integrated way, so that the public can, at some point, get a facility profile that has all of the environmental information in one place. That would truly make some common sense.
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Stephen D. Hanna, Ph.D., ***Assistant for Environmental Information, Cal/EPA***

Expanding TRI in Environmental Programs

Background

The Toxic Release Inventory program (TRI) of U.S. EPA was implemented in 1987, with the first reports due in July of 1988. To my knowledge, this was the first environmental reporting program developed with the primary purpose of collecting and distributing information on environmental releases. Given the prior history of many U.S. EPA environmental data systems, few observers felt that the TRI system would succeed. However, the TRI system was implemented on time and must be viewed as a success given the purpose and limits within which it was developed. In viewing the future of TRI, it is useful to examine the development of TRI and its relationship to U.S. EPA programs.

Reasons for TRI Success

One reason for the success of TRI is its development specifically for the purposes of information collection and dissemination. Most regulatory data systems are developed in support of specific regulatory programs and must compete with program activities for funding.

Some comments/observations on the success of TRI

- One important factor in the successful implementation of TRI was the adequate initial funding of the information management system.
- TRI has had widespread impact and use.
- Data quality of TRI is relatively high because its widespread use and dissemination has utilized the public sector as reviewers of data quality.
- States receive copies of the forms and have been included in policy discussions by OPPTS since the beginning of the program.
- TRI is one of the few existing systems that contain cross-media environmental release data.

Some comments/observations which have been critical of TRI

- TRI has no direct link to regulatory programs and data are not audited for accuracy.
- TRI is not comprehensive enough - not enough chemicals or facilities.
- Submittal of forms to both U.S. EPA and states creates some data system synchronization problems.

TRI and U.S. EPA Priority Issues

TRI has assumed a major role as a source of data in most U.S. EPA initiatives developed since TRI began. While most of these initiatives have probably not been established with TRI specifically in mind, many have a clear link to TRI. As a repository of quantitative chemical release data from 1987 to 1993, TRI has

become an increasingly important source of data for high-visibility U.S. EPA programs. Examples of such initiatives are:

- Pollution prevention - Pollution prevention measurements must be multi-media in nature to be effective. TRI remains the only national source for quantitative multi-media data.
- Multi-media regulatory perspective - As described for pollution prevention, TRI is the only national source for quantitative multi-media data.
- Environmental justice - TRI is one of the few sources of data available for spatial analyses of exposure to chemical releases.
- State partnerships - U.S. EPA has maintained an effective dialogue with states since the inception of TRI.
- Voluntary initiatives - A major factor in the success of the 33/50 program has been the availability of TRI data to measure the quantitative reductions in the releases of 33/50 chemicals.
- Environmental indicators - Any discussion of environmental goals and indicators by U.S. EPA or states includes TRI data as a source of chemical release volumes.

Future Directions

As mentioned previously, TRI is the only national source for quantitative multi-media chemical release data. Current efforts by U.S. EPA to increase both the number of chemicals and the size of the reporting universe will potentially enhance the utility of the data. However, there is currently no direct link to the traditional media program areas such as air, water, and hazardous waste. Development of these links could be one of the most productive future developments regarding the TRI program. The incorporation of TRI reporting into the regulatory activities of these programs could result in the creation of a comprehensive and integrated multi-media view of chemical releases to the environment. Accompanied by a reduction in the collection of other programmatic data, this effort could also result in a simplification and consolidation of reporting requirements which would increase data quality while reducing the industry reporting burden.
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John A. E. Hannum, ***Head of Pollution Prevention and EPCRA Policy Section, Environmental Protection Safety and Occupational Health Division, Office of Chief of Naval Operations, Department of the Navy***

I was asked at the last moment to speak at this conference, the original intent was to have Sherry Goodman up here. I admit to not being the absolute substitute for Sherry Goodman, but I will try. However, I would like to talk to you a little about what's happening in the Defense Department. I don't pretend to speak for all the federal agencies. That would be disingenuous on my part. Quite frankly, obviously, my piece of this is the Department of the Navy. But, in terms of expansion of TRI, an event took place in August of 1993 which significantly expanded TRI. The signing on the third of August of Executive Order 12856 brought us kicking and screaming into the whole realm of EPCRA and pollution prevention, somewhere we had never formally been before. Now, that isn't to say that we were not doing pollution prevention. We were certainly doing it in many cases at our facilities. This was the first time in which the Department of Defense had been formally tasked to do this. The key provisions are listed for you here. There are a number of other things ongoing, including things like environmental justice and public participation. But those are the principal ones which are causing a great deal of activity on our part. Some of the time lines that we're under are quite short. We had to begin with calendar year 1994; actually, some of our actions began before that in late 1993. The emergency planning notification part in March of this year, the emergency response plans in August, along with the MSDS's and the TRI finished by the end of this year. So, we're winding up our baseline year as I speak.

Our first TRI report, based on the '94 data is due in July of '95 and, as Lynn said earlier, will be reported out by EPA in the spring of '96. There are a number of things that we have done in order to make this work. For one thing, the Department of the Navy has put together a pollution prevention strategy that went up to the Secretary of Defense office in August and is being incorporated into the DOD Pollution Prevention Strategy, which will be issued in December. In fact, next week I understand, the plan is to sign the strategy but it may be a bit closer to the end of the year. We have Installation Pollution Prevention Plans, which are due by 31 December 95. Part of what we have done in that regard is put together a standard operating procedure for installation pollution prevention plans. That document has been completed. We developed a generic plan so that our facilities could have a framework in which to operate. The draft and generic plan will prototype in two sites; one in the east coast and one on the west coast. A final plan, a Standard Operating Procedure (SOP) was issued in June of 1994. So, all the Navy facilities now have a way of developing a standardized plan that will look, within the context of their business, more or less alike. It will have the same elements in it.

Under Standardized Document Review, which is a major problem for us, much of what we do is driven by standardized documents. Mil specs, mil standards, things of that kind. It makes it much more difficult. You can't go in and say, "Well, substitute A for B," because you may wind up killing somebody if you do that. The example that I have used before, if I take a recycled product and I put it onto a forklift and that forklift fails, I may lose the forklift, I might lose the material on the forklift, but I probably haven't done a whole lot of other damage. If I put that same recycled product in an F-14, I run the risk of not only losing the plane, several million dollars worth of aircraft, but worse, I risk losing the pilot and the ASO. Those are irreplaceable. We cannot afford to do that kind of thing.

The other misconception that I need to correct right here is, I heard recently again for the umpteenth time is, that commanders of military bases are worlds unto themselves. Yes, ladies and gentlemen, up to a point, they are. However, when it comes to controlling their resources, they are not. That is one of the problems that we're going to have to face, both collectively and separately, as far as meeting this challenge is concerned. Money is programmed two, three, four years ahead of time. We are working right now on the 1997 budget. That won't be completed until some time after the first of the year. The consequence of that is, when an executive order comes down in August of 1993, we have no money to work with. We took everything that's been done up to now, out of operating funds. That means that there was a ship, a tank, an aircraft or a troop somewhere that didn't get as much as they needed to do their job because we had to take it out of mission requirements. Obviously, that impacts our readiness and our operability as a military force and we can't afford to do very much of that. In 1995 we were able to reprogram some money into the '95 budget from other areas, principally from some compliance areas, where we had a little bit we could use. It gave us an edge and we're going full steam on this.

We are emphasizing the technologies for significant reduction. Many of these have been identified, a lot of them are currently available and being put into place. We're looking right now for short payback life, less than two years, and good return on investment. That ROI is important because the way you can sell these programs to people who have short budgets is to prove to them that they can save money. Our technology transfer program is being significantly strengthened. We've got about $50 to $60 million in off-the-shelf projects in the works right now. We are emphasizing principally off-the-shelf technology.

We still have a problem here, that is, defining what our role is. Keep in mind that when the Executive Order was written, it removed all the SIC code restraints from federal facilities. So, we don't have the same boundaries that industry does. In a sense, everything that we do is fair game. So, in order to put some boundaries on this, we are defining what we mean by primary mission. That's what the business of the Defense Department is and what the business of the individual facilities is. That's important because we want to equate this somewhat, to what industry does. Even though we don't have any SIC codes, we can put some finite boundaries on here to allow some relief for small and ancillary uses of chemicals, but also to be sure that we include any major uses which we have, which would support the mission of the Defense Department. We have

a working group , including all of the services and the Defense Logistics Agency, looking at defining what we mean by primary mission and a lot of this is being done by inclusion, by example of what we are actually doing.

We have another unique problem here and that is base realignment and closure (BRAC). This is not something that any other federal agency ever participates in. For those of you who are reading your newspapers regularly, you'll see BRAC coming up every couple of years, another BRAC Commission meets and it decides what bases to close down or realign. This has been a difficult problem. The question came up as to how do you justify spending the resources to do pollution prevention plans and do TRI reporting for a base that's going to close in a couple of years, and which has the bulk of its operating capability already removed from the facility? The answer is, that we negotiated an arrangement with EPA which allowed us to report in December of 1995. That gives us another six months for our closing bases, using an estimation technique based on work load, similar facilities and other available data. That is, we're not going to go out and dig up new data, we're going to use what's already available, and put our pollution prevention planning into the base closure plans.

We still have some issues remaining with EPA that have not been brought to closure. One is inclusion of releases from the remedial actions. Another is mobile sources. There is an on going discussion right now about whether mobile sources in fact are part of -- should be part of -- TRI reporting. Our reading of both CERCLA and EPCRA indicates not, but there are factions who see it otherwise. Stand-alone medical facilities are unresolved. Currently, hospitals in the civilian community do not report. We have an exemption for base medical facilities at the present time, but we're concerned about some of the stand-alone ones, such as Bethesda Naval Hospital, Walter Reed Army Hospital and so forth, and the lack of fit within the SIC codes because what we do does not fit. It's a square peg in a round hole.

Joe had asked me to talk a little bit about the data that we are gathering right now and which will be finished at the end of this year for the first year's data. Anybody in industry already knows what the first bullet is, it's difficult, it's costly. We estimated that for many of our industrial facilities, it would be approximately $1 million a year. Now, that's somewhat out of line with some of the EPA estimates, but I can tell you that one of the reasons is, that we do over two hundred processes a year at each of our major industrial facilities. Those two hundred processes are not done continuously. Most of the time, they're done intermittently. Sometimes, once a week, once a month, sometimes once a quarter, or once a year, even. It makes it very, very difficult to keep track of some of these materials when you're doing that.

We're on a learning curve. I will caution you that the data that's going to come out in 1995 will be like the data that came out the first year from industry. Use it judiciously. Don't take it entirely to heart because we are like everybody else, it's going to take us some time to get this thing spun up and final. It will cause some skew. We're reporting on materials and processes not currently included in SIC codes. So, there will be some skewing and there will be significant amounts of material such as MEK, methylene chloride, TCE, things like that which will rise significantly in the numbers when we start reporting.

As far as expanding -- by this, I'm not talking so much about right-to-know expansion, as the idea of chemical use inventory as opposed to TRI. We will have our use data once we complete the baseline. It's being used as we speak to prioritize our source reduction efforts. However at the moment, we've got several sensitive areas; chemical munitions, special weapons, and ordnance in general, all of which cause some difficulty as far as additional reporting is concerned. We've entered into the public participation effort in a fairly large way. Just recently, we've completed a two day meeting that was Keystone facilitated and included a whole range of people -- Physician's For Social Responsibility, Sierra Club, Greenpeace was supposed to be there but weren't -- but a large number of environmental organizations of various political views, which turned out to be, I think, a very, very good effort on both sides. There was a lot more understanding than I had gone into the meeting expecting to find.

We're developing public affairs guidance on TRI data reporting and we're encouraging our installation commanders and public affairs officers to go out and talk to the community. Many communities have no idea what the installations that are near them do, what kind of materials they use, why they use the materials and what they are actually doing. They may be repairing airplanes, but that doesn't mean anything to them. We're suggesting that they go out and actively talk to their communities and let them know what's going on. And address potential concerns about the DOD TRI versus industry TRI reports, because they're going to see different figures coming from us than they are used to seeing from industry.

Some things that have been driven by some of our efforts to date include the painting of ship parts using carbon dioxide, a marvelous technique. It allows us to do a certain kind of de-painting operation with an essentially benign agent and what you get is just the paint chips left over. IVD, which is Ion Vapor Deposition, is a method using what looks like a huge vacuum crucible in which you put everything up to wheels and landing gear and put ion bond aluminum onto the metal. It replaces a lot of hard chrome and cadmium plating. It's been very useful and it turns out to last seven times longer than hard chrome plating. We're using aqueous parts washers in a lot of places to replace TCE and methylene chloride and we are recycling a lot of grit from steel shot blasting of ships' hulls to get rid of some of the copper and problems that we've had with some of other materials that we were using.

One last one, which I am particularly pleased about is Consolidated Hazardous Material Reutilization Inventory Management Program (CHRIMP). It was based on an internally developed software, HMICS, which is Hazardous Materials Inventory Control System, which centralizes our hazardous material and hazardous waste for control and management. It's been prototyped now on sixty-three ships in the Pacific and Atlantic fleets. We are distributing a Navy-wide manual and lessons learned have been incorporated. We just put out Change One in November of this year, to bring those lessons learned into sync with reality. Just to give you an idea; on one typical carrier in one six month period, we reduced thirty-five to fifty percent of hazardous material and thirty-four to seventy percent of the waste, about $200,000 of disposal cost avoidance. That's for one single ship. Now unfortunately, you can't see that very well, but that's my final one and I should be playing "Anchors Away" here. But in point of fact, this is exactly how we see pollution prevention as the primary means of the Department of the Navy and the Department of Defense to meet compliance with the environmental requirements to preserve our access to sea and land. Thank you.
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Nancy Ekart, ***Advanced Environmental Representative, Eastman Chemical Company***

Expanding Right-to-Know in Environmental Programs

Introduction

The TRI, as originally enacted under the Emergency Planning and Community Right-to-Know Act of 1986, has been of benefit to both the public and industry. Information on releases and transfers of specific chemicals from manufacturing facilities is available to the public, with minimal effort. From an industry perspective, the TRI has been a stimulant for reduction projects involving TRI chemicals, and it is also a good measure of the chemical industry's success in carrying out its Responsible Care® program.

Under Responsible Care,® members of the Chemical Manufacturers Association are required to subscribe to three goals which require (1) ongoing reductions in **releases** of chemicals, (2) ongoing reductions in the amount of wastes **generated**, and (3) **managing** remaining wastes and releases in a manner that protects the environment and the health and safety of employees and the public. During the 1988 to 1992 period, the

chemical industry reduced releases of TRI chemicals by 34 percent. So the TRI has been, and continues to be, one good measure of whether, as an industry, we are succeeding in meeting the goals I've just outlined.

Direction and Focus of Current TRI Program

Before considering how right-to-know issues might be expanded into **other** environmental programs, we should reflect on the direction and focus of the existing TRI program, given recent and future expansions. We need to think about what is gained or lost from such expansions, how the public and industry will benefit from the expansions, and what right-to-know information is lacking in the EPCRA program that could more suitably be picked up by other programs.

Phase I

Phase I of EPA's planned expansion has just been enacted, with the promulgation a few days ago of a final rule which nearly doubles the list of chemicals for which manufacturing facilities must annually report. The addition of several other chemicals were deferred for listing, until the Agency has a chance to conduct further analysis. It's likely, then, that the list of chemicals will continue to grow. The chemical industry supports adding to the TRI those toxic chemicals that meet the statutory criteria for addition and that pose some reasonable expectation of exposure to the public. Industry takes exception, however, to some of the chemicals on the original TRI list as well as some that were added under Phase I, but this is not the forum to discuss that issue. Rather, I'd like to discuss some of the potential problems that may result from such a significant expansion of the chemical list, particularly from the addition of just a few specific chemicals.

As the TRI list of chemicals becomes increasingly long, the significance of the release numbers may be diluted. EPA estimated in its proposed rule that adding 313 chemicals to the list would expand the TRI database by 26,000 reports. [If and when] the criteria air pollutants, i.e., carbon monoxide, sulfur oxides and nitrogen oxides, are added, the total release numbers will be several orders of magnitude larger than in the past, significantly distorting the current baseline. One question then is whether the very size of the revised database will dilute the significance of the TRI.

Another question relates to whether the public will question the validity and relevance of the TRI database, once it's understood that manufacturing facilities are not the major emitters of some of the chemicals on the TRI. For example, based on 1991 data from EPA on the criteria air pollutants, if carbon monoxide is added to the TRI, industrial sectors will report about 5.9 million tons of emissions. Sulfur oxide industrial emissions will total about 5.6 million tons and nitrogen oxides, 4.3 million tons. Considering that the 1992 total air emissions from manufacturing sectors were only 0.9 million tons and total releases to all media (air, land and water) were 1.2 million tons, the emissions data relevant to just those few criteria air pollutants will dwarf current emissions data. Adding up the numbers, instead of about 0.9 million tons of air emissions, one can project about 17 million tons. What will the natural response from the public be, considering that the new emissions numbers will dwarf the old numbers? It likely won't be favorable to industry unless the public understands that industry's criteria air pollutant emissions account for only a small fraction of all such emissions.

Industry accounts for less than 9 percent of all carbon monoxide emissions. Seventy percent of all carbon monoxide emissions come from automobiles and other transportation vehicles. Even forest fires account for a greater level of carbon monoxide emissions than does industry. Whereas the 9 percent of carbon monoxide emissions from industry are dispersed well up into the atmosphere through tall stacks, the CO emissions from automobiles are dispersed at street level, with much greater exposure to the public. If the public knows that they are the major emitters of a TRI toxic chemical, if they don't think of CO from cars as a major problem, and if they aren't willing to pay higher costs for "cleaner" cars, then they might question why CO is on the TRI list in the first place, as well as question the relevance of other chemicals on the TRI. Electric utilities account for 68 percent of all sulfur oxide releases, compared to industry's 25 percent, and electric utilities and transportation vehicles account for nearly 75 percent of all nitrogen oxide emissions, compared to industry's 20 percent. Thus, we will need to educate the public so that they become aware that the manufacturing sectors which report TRI

data do not account for their true environmental exposure to these chemicals. A concern is that the public may simply question the overall validity and relevance of the expanded TRI database.

Phase II

How can these concerns be addressed? One way is to include all major sources of the new chemicals in the Phase II expansion, i.e., expand the list of sectors that must report TRI data to include all major emitters of the expanded chemical list. To do anything less is to mislead the public. Information I have seen indicates EPA is considering adding electric utilities, metal and coal mining facilities, materials distribution facilities, waste management facilities and elements of the transportation sector (primarily airports). While not wishing this costly reporting burden onto nonmanufacturing sectors, out of fairness to current reporting sectors and to comply with the public's right-to-know, the Phase II expansion is likely the right thing to do. However, if the Agency doesn't include readily available information on automobile emissions, the public will still be misled as to the major sources of several TRI chemicals, and EPA Administrator Carol Browner's goal to "provide citizens with a more complete picture of chemicals that impact their communities" will not be met. Further, if industry were to spend millions of dollars on economically infeasible technologies in order to reduce its emissions of carbon monoxide and the other criteria air pollutants, the overall effect on nationwide releases would be so insignificant that neither industry nor the public would be well-served.

Phase III

EPA's Phase III expansion would add new data elements to the Form R, the form on which TRI data are submitted. The new data being discussed are mass balance information (sometimes referred to as materials accounting data or throughput data) and worker exposure information. First, the EPCRA statute doesn't give EPA the authority to collect such data. Secondly, from industry's perspective, requiring mass balance information is treading into dangerous waters and is **not** an appropriate expansion of right-to-know. We have trade secrets to protect from our competitors, both at home and abroad, and if we were required to provide mass balance data, those secrets could be jeopardized. The "competitive intelligence" community is very active and very good. Through the use of reverse engineering, many secrets can be uncovered and unit efficiencies jeopardized.

For example, catalysts are used to "speed up" a process, to make it more efficient. Our competitors frequently know which catalyst is used in a given process. But the form of the catalyst used and how much is used is information we do our best to protect. If the catalyst we use makes us more efficient than our competition, then we can price the product lower and capture a greater portion of the market. If required to report mass balance information, key use data will no longer be protected, our competition can figure out what we're doing, and potentially serious economic impacts could follow. We would, in effect, be giving away our technology to other companies at home as well as to those in foreign countries. This would also provide a good incentive for U.S. companies to locate new facilities abroad, for the purpose of utilizing new technologies, rather than building them in the U.S. By choosing a country without such stringent reporting requirements, a company could recoup their research and development costs through protection of trade secrets.

It's unlikely that the general public has any real interest in knowing which process or processes account for each chemical use, how much is consumed in a process and similar mass balance information. Simply using and managing basic process chemicals in a responsible manner doesn't imply any significant element of risk to the public. The public is already receiving information on releases and transfers of the chemicals, and information is also available on which chemicals are stored on-site.

Having taken a snapshot view of the significant expansions of right-to-know under EPCRA, it's now appropriate to discuss whether a need exists to expand right-to-know into other programs. There are extensive reporting requirements under all the major statutes, e.g., the Clean Air Act, the Clean Water Act and RCRA. Much of that data is available to the public. Not all such information may be as easily attainable as TRI data, but it certainly can be obtained from a number of sources. Perhaps rather than looking at ways to collect more

data for right-to-know purposes, we should be looking at ways to make currently reported data more accessible to the public. This may be simply an educational process, in alerting the public to what information exists and how it can be accessed. Or it may mean that EPA needs to reformat currently collected data in a form more easily understood by the public.

It's important to keep in mind that industry is spending enormous sums of money to comply with existing regulations. We're all operating in a global economy, and it's not an even playing field out there, relevant to environmental expenditures. Many of our competitors are working under regulations less stringent than ours. So as we look for opportunities to expand the public's right-to-know, let's allow our industries to remain as competitive as possible by utilizing to the greatest extent that we can the data we already collect. Let's ensure that our trade secret information is not jeopardized, and let's ensure that the public wants and will benefit from any expansion. We need to be aware that while the public has a right-to-know, they don't have a right-to-know-all. We have to know where to draw the line so that the best interests of both industry and the public are served. □

Gary Bass, *Executive Director, OMB Watch*

I kiddingly said to Nancy beforehand that she was going to be night and I was going to be day. I didn't realize how stark the differences really are, until she completed her speech. I don't have any pretty charts. I'm just going to tell you, as I see it, the world in terms of expanding the right-to-know. Let me start from a view that says, access to government information is an essential citizen right. All the years in which we were missing data, people were dying. Such government information has an impact on knowing whether it was lack of OSHA regulation or whether it was due to lack of data, such as the TRI data. We are talking about human lives compared to the cost of product, as well as the cost to provide information and/or regulate chemicals.

The TRI is a major success story. I remember back when the law passed. Industry complained that it was going to be too burdensome, too much paperwork. The public would misunderstand the data. It was too technical. All of which proved to be false. The public interest community and the public at large has used the data effectively. Steve put up some slides on how it's used. Examples that weren't there are good neighbor agreements. Examples that aren't there are public education efforts. Examples that aren't there are toxic use reduction efforts. There were many successful stories. So I congratulate the EPA today on moving forward with Phase I, and I congratulate President Clinton on requiring federal facilities to report. And to tell you the truth, I'm looking forward to Phase II and Phase III.

Phase III, which adds the chemical use component, is going to be a royal battle with some industry sectors. It strikes me that we have to acknowledge the value of perusing the expansion of the TRI. You know, there is belief that when accurately reflected, that release reductions clearly do not equal source reductions. Lynn Goldman highlighted some of those very reasons for thinking about the expansion of the TRI regarding chemical use. When you have release data, you don't necessarily know if a result is something that happened in the product stage or in the planning or life cycle stages. You don't know where this has occurred. Paul Orum asked a question earlier – Paul is with the Working Group on Community Right-To-Know in Washington, D.C. The Working Group has identified three pathways in which chemicals can be released. One being consumed during the production, the other is in the waste stream, and the third is in the product itself. The TRI tells us the middle piece, the waste stream. We don't know the other components. If we are going to be responsible, if we are going to deal with accountability, then the TRI must be expanded. We should be working as a community to find ways to do it effectively, but to do it in a way that does not impose unnecessary burden on business.

Now, let me turn and point to a broader agenda. I think the TRI should be teaching us lessons about right-to-know in the broader sense. OMB Watch has promoted for a number of years, that access to government information is an essential quality. I think that the TRI can teach us how to do that within and throughout the EPA. We should begin perusing that, if not just for the reason to enhance democracy, if not just for the reason of creating greater public accountability, then for the very hardcore environmental reasons. We heard from Steve about using multi media analysis and cross media analysis. Enforcement analysis has been thwarted because we don't have the ability to cross link or find out information by cutting across different EPA regulatory programs. On top of that, industry has complained about burdens imposed on them. It is very difficult to begin even addressing innovative or clear ways for reducing burden unless you have access across the different regulatory programs to identify areas where reductions can occur. So, it's essential to move in that way. It will cost money initially, but when stacked up to the long term benefits that all of us as a community will incur, whether it's industry, whether it's public interest, or whether it's government, the costs are minimal.

I'm going to give you five ways in which EPA should pursue a broader right-to-know agenda. I use five because we can go one, two, three, four, five and still count on the desk. First of all, I think that they should adopt a general right-to-know principle. The Office of Management and Budget, about a year and a half ago, published something called "Circular A-130." It talks about management of information resources. It fundamentally shifted the policies of the past decade away from privatizing government information, away from the thrust of "don't collect information," away from the notion, "even if you collect, don't disseminate information," to, "encouraging agencies to actively disseminate information." EPA should embrace that in a very broad way by putting, as principle and objective, making the Freedom of Information Act a vehicle of last resort instead of first resort. We should be able to get information and EPA should have the responsibility to affirmatively put it out to us, and put it out in ways that makes sense. There was a comment earlier today about building the capacity of all of us to use this data. I think EPA has some responsibility to ensure there are ways of building that capacity. And, I think EPA has the responsibility to ensure that cost is not a barrier to the public getting access to the data. If not just because of the environmental justice issues, but because of the public's right-to-know.

The second point, just as Nancy said, "protect confidential business information(CBI)," I say, "revise CBI." There is a Hampshire Institute study just on the Toxic Substances Control Act (TSCA) showing that, depending on which part of TSCA you look at, twenty percent of health and safety reports that generated are exempt automatically as confidential business information. Ninety percent of pre-manufacturer notices from new chemicals are exempt under CBI. And how do you claim CBI? You check off a form for certain parts of TSCA. For a couple of bucks, you can check it off.

The right-to-know is meaningless if there are huge gaps of information. An empty box is not worth much. CBI needs to be revised, and I must say that EPA again deserves to be congratulated. On November 23rd, the EPA published a proposed revision to Freedom of Information requests related to confidential business information. One of the principles in there is up-front substantiation. That is, when the request for confidential business is made, it should be the industry's responsibility to identify why the request is being made. It should not be the EPA's responsibility to verify the request. It has worked extremely well under the TRI law. By the way, I think that there are other components under the CBI issue, but we'll hold on them.

The third point, besides incorporating the RTK concept and the CBI revisions; is to involve all of us in the design, implementation, and coordination of all parts with state and local governments. I am really tired of public access agendas not involving the public. The EPA has now done this for a number of years.

There is something called the "Solomon's Island Group." This group, which met in Solomon's Island, Maryland, met to discuss public access. Nobody from the public was invited. When we requested it, we were turned down. I'm tired of that! OMB is going to announce on Wednesday of this week, a new initiative called the Government Information Locator System, which is going to allow all of us access to an inventory of

government information. There are going to be Government Information Locator Systems (GILS). There is going to be a GILS Board. Well, in the draft of the notice, it wasn't going to involve the public. The GILS Board was going to evaluate public access. But the compromise is, to make the GILS Board recommendations subject to at least public notice and comment. Hooray! From now on, we must -- and EPA should -- incorporate all of our views. I don't say that just from an environmentalist's perspective. I say it from industry's perspective, and I say it from state and local government's perspective. One of the biggest problems is the coordination that Steve alluded to. Coordination must be ongoing with state and local governments and the federal government in data collection.

The fourth point is that the EPA has to adopt and encourage a variety of formats and access to government information. In other words, provide multiple pathways to the same information. Paper is good and paper is needed. CD-ROMs are happening as well as diskettes and on-line services. What we have is the "Information Superhighway." We have got to capitalize on the whole new information infrastructure. Internet in and of itself is not a solution. Internet may turn into the people's democracy, but today, it is costly, cumbersome, and difficult to use. When we have the adult's version of Internet, then we can have democracy. We don't have it today. EPA should make good use of intermediaries, whether they are the non-profit community, whether they are libraries, whether they are state and local governments. However, intermediaries should not become a substitute for the EPA **not** doing the activity. In other words, EPA, too, has responsibility.

The fifth point involves data linkage and integration. We at OMB Watch, along with the Unison Institute, run something called RTK Net, the Right-To-Know computer network. In fact, I think we're going to be doing a demonstration and training. We discovered when we put the TRI data up on RTK Net that users started saying, "MORE! It doesn't help to just have this. It's important to link it up with this." For example, we posted, after putting up the TRI data, census data so that the environmental justice community can begin looking at any potential disproportionate impact of toxic releases. People said we need water permit data. We need the civil suits. We need a number of other databases. EPA does have something called FINDS database, which is a facility index system. Just as Steve's humorous slide showed, we went and plotted some of FINDS longitude data and ended up also in the ocean. Data quality is **very** important.

The five points again are: right-to-know agenda; CBI revisions; public input and public involvement; variety of formats and pathways; and data linkage and integration. On that last point, EPA could easily take the lead and provide a real meaningful public access system.

I mentioned that OMB is going to be implementing its GILS on Wednesday. EPA can go well beyond the vision of GILS to provide access to information itself, instead of access to inventories about information.

Now, all of this is not going to be easy. I gave two other speeches this morning about the 104th Congress that's coming to Washington, D.C. I have an analysis called "Eye of the Newt." I probably don't need to say more, nonetheless, I will. We are talking about expansion of information. We heard at least one sector of the industry raise deep concerns about expansions and access issues. The House Republicans' Contract with America makes it very difficult to collect information. In fact, they require a five percent cut in information per year for four years. They make it very difficult for agencies to issue regulations. In fact, they make a requirement of 6-1/2% cut in regulations per year, which means changes in laws. They make no bones about it. They are going after things like Superfund, safe drinking water, clean water, the list goes on. Also included is another good sounding rhetoric-a balanced budget amendment. We're talking about resources that are required to do the things we saw today. A balanced budget amendment would be an across-the-board, twenty percent cut in all government programs. Trust me, it will not be across-the-board. The point is, it's going to be very difficult.

Let me conclude by telling a story. Maybe that's the best way of expressing my theory of what is likely to come with the new Congress and potentially trying to achieve this new found right-to-know agenda that many of us in this room care about. There is a story about a tiger and a Christian. The tiger was chasing the Christian.

The Christian got backed into a corner. The tiger is licking his chops and getting ready to pounce on the Christian. The Christian quickly says a prayer and says, "Lord, make that tiger a Christian. Let him understand the ways." Miraculously, as the tiger got ready to leap he falls to the ground and looks up and says, "Lord, thank you for the meal I'm about to eat!" In many respects, the Contract with America is licking its chops and saying, "Thank you, Lord. Look at the meal I'm going to eat." That's the environmental programs. Thanks.
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Session 1 - How TRI Can Drive Pollution Prevention

Session Leader
Kevin McDonald, *Coordinator, Pollution Prevention Program, Minnesota Office of Environmental Assistance*
Speakers
Michael Aucott, *Research Scientist, Office of Pollution Prevention, New Jersey Department of Environmental Protection*
Lisa Doerr, *Minnesota Program Director, Citizens for a Better Environment*
Ivan Kuzyk, *ConnTAP*
Tova Reinhorn, *Environmental Specialist, Occidental Chemical Corporation*

This session set the stage for the conference by providing the reasons for addressing pollution prevention in the context of TRI. The speakers discussed how state, industry, and communities are using TRI data to advance pollution prevention efforts. They also provided an overview of how TRI and Section 8 data help to target efforts and measure progress in preventing pollution.

Michael Aucott, *Research Scientist, NJ Department of Environmental Protection, Office of Pollution Prevention*

How TRI Can Drive Pollution Prevention

A discussion of how the TRI can drive pollution prevention requires, first, an agreement on what is meant by pollution prevention. In New Jersey's Pollution Prevention Act, pollution prevention is defined as: "..changes in production technologies, raw materials or products, that result in the reduction of the demand for hazardous substances per unit of product manufactured and the creation of hazardous products or nonproduct outputs..." The definition states further that pollution prevention includes, but is not limited to, raw material substitution, product reformulation, production process redesign or modification, in-process recycling, and improved operation and maintenance of production process equipment."

Under New Jersey's pollution prevention rules, TRI companies must prepare pollution prevention plans and submit summaries of these plans to the NJ DEP. These summaries must include five-year goals for the reduction of use and nonproduct output of TRI chemicals. The goals are determined by each facility, and can be zero. Implementation schedules also are determined by the facilities. Nonproduct output is, essentially, everything that leaves a process that is not product. Use is clarified in the rules as encompassing quantities (of TRI chemicals) produced on site and brought on site, adjusted for changes in inventory.

How can the TRI drive pollution prevention, as so defined?

Few would argue that, since the inception of the TRI, much attention has been focused on the quantities of TRI chemicals entering environmental media from TRI facilities. It also is apparent that, generally, such quantities have decreased since 1987, the year of the TRI's inception. It can be argued, however, that at least some of this decrease has been the result of changes in measuring these quantities, or to reductions in actual industrial production.

Pursuant to the federal Pollution Prevention Act of 1990, new data elements were added to the TRI Form R which make the TRI better able to measure actual reductions in nonproduct output, and to account for any

changes in TRI quantities which result from changes in production. These data elements appear in Section 8. They include, for each facility and each chemical above threshold quantities, the following data elements:

quantity released
quantity used for energy recovery on-site
quantity used for energy recovery off-site
quantity recycled on-site
quantity recycled off-site
quantity treated on-site
quantity treated off-site
production ratio or activity index
identification of source reduction activities

The first seven of these items, in total, can be considered to encompass nonproduct output (as long as the recycled on-site quantity does not include quantities recycled in-process). The production ratio can enable the adjustment for quantities to account for changes in production from one year to the next. Thus, the TRI is now capable of measuring, at a facility-wide level, at least the nonproduct output part of what is meant by pollution prevention, as defined above.

It seems evident that what is not measured is not as likely to be managed as what is measured. To the extent that the focusing of public attention on the nonproduct output quantity of a facility will encourage it to reduce that quantity, the present TRI will drive such reductions.

Often, however, the value of information depends as much on what it doesn't reveal as on what it does. By showing part of a pie, data can indicate that there is a part of the pie which is not visible. The TRI, when it first revealed quantities of toxics released to the environment, led to the realization that there could be large quantities of substances leaving industrial processes which were not products. It thus helped clarify that a focus on the improvement of industrial efficiency would necessitate the actual measurement of such quantities.

Now, the TRI does include a measure of nonproduct output. Does it therefore show a complete picture of reductions in actual quantities of toxic chemicals entering the environment? A look at other databases reveals that, for some chemicals, it may not.

As will be discussed in an upcoming article by this author in Pollution Prevention Review, the augmentation of the present TRI with chemical throughput information would greatly increase its ability to present an accurate picture of pollution prevention activities and the progress that facilities are making on pollution prevention. Methylene chloride (dichloromethane), provides a case in point. This example, and several others, are discussed in more detail in the upcoming article.

This chemical was, according to other data sources[1,2], produced in a quantity approximating 375 million pounds in 1992. Much of it was apparently incorporated into products such as paint strippers and aerosols, and thus could be expected to enter the environment at point of use of these products, with significant human exposure possible. The 1992 TRI Section 8 data indicates that approximately 287 million pounds of the chemical was managed as production-related wastes by TRI facilities. As is discussed in the article, this quantity may be inflated due to multiple-counting. However, it is clear that, assuming that most of the activity with the 375 million pounds produced is accounted for by TRI facilities, at least 375 - 287, or 88 million pounds of methylene chloride, is unaccounted for by the TRI.

The TRI, in conjunction with these other data sources, leads to questions about the fate of this 88 million pounds. How much of this quantity enters the environment? How quickly, or directly, does it do so? Are there significant human exposures or environmental risks associated with this quantity? And, are there pollution

prevention approaches such as raw material substitution or product reformulation which can be instituted, or are already underway, which can reduce concerns over methylene chloride exposures in a cost-effective manner?

Once again, the TRI, partly due to what it does not show as well as because of what it does, can help drive pollution prevention to a higher level, and can point out areas where additional information, such as industrial throughput, could be useful in encouraging pollution prevention.

End Notes

1. United States International Trade Commission, "Synthetic Organic Chemicals: U.S. Production and Sales, 1992," Publication 2720, USITC, Washington, DC, February, 1994.

2. Chemical Marketing Reporter, "Chemical Profile: Methylene Chloride," Volume 241, Number 8, March 2, 1992.

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Lisa Doerr, ***Minnesota Program Director, Citizens for a Better Environment***

How TRI Can Drive Pollution Prevention

Introduction

Citizens for a Better Environment (CBE) was founded in 1971. We are a midwestern environmental organization involved in local, state, and national policies. We have offices in three states -- Minnesota, Wisconsin, and Illinois -- and have more than 170,000 contributors around the region.

Unlike many environmental groups, CBE's program focuses on protecting the public health in urban industrial areas, not on preserving wilderness or building new parks. We believe that every place on this planet is sacred, not just those which have been set aside by Congress. For us, environmental issues are very much justice issues. Decisions made about where and how much to pollute impact families and workers, as well as the air, land, and water.

Pollution prevention has been a major focus of CBE's work for nearly a decade. In Minnesota, we helped author and lobby the 1990 Toxic Pollution Prevention Act (TPPA). We have also succeeded in amending it several times. These changes include:

- Expanding TPPA and the Community Right to Know Act to include non-manufacturers;
- Creating a Community Assistance Program that provides technical support to local communities on pollution prevention; and
- Removing a cap on the pollution prevention fee which unfairly rewarded large toxic polluters.

In addition to these successes, CBE has worked for five years to require that Minnesota toxic polluters report their use of toxic chemicals. This data is needed to provide public accountability that pollution prevention is happening.

CBE also serves on two national pollution prevention projects. These include the U.S. Environmental Protection Agency's (EPA) Common Sense Initiative and the Great Printers Project.

Minnesota Good Neighbor Project

I am here today, however, to talk about our work in Minnesota on the Good Neighbor Project. This project is designed to increase the effectiveness of Minnesota's Toxic Pollution Prevention Act (TPPA) and the federal Community Right to Know Act, specifically the Toxic Chemical Release Inventory (TRI). We begin by raising community awareness of local TRI facilities and stressing the importance of pollution prevention. From there we provide the technical assistance needed for local citizens to work positively and proactively with toxic polluters to maximize pollution prevention efforts. Our staff includes two seasoned community organizers and a chemical engineer.

The vehicle for this positive interaction is the Good Neighbor dialogue. The goal of these dialogues is to establish mutually agreed upon pollution reduction goals that go beyond the requirement of the law.

Like most state-level pollution prevention legislation, Minnesota's TPPA is based on TRI data. Under TPPA, more than 500 facilities required to report TRI data must develop toxic pollution prevention plans every three years and submit annual progress reports. Pollution prevention plans remain confidential. Annual progress reports, based on information in the plan, must be submitted to the Minnesota Pollution Control Agency (MPCA) and are available for public review.

While companies are not required at this time to include communities in the planning process, the law provides an excellent vehicle for focusing discussions between these parties. Bringing community pressure to bear in the planning process plays an important part in implementation of TPPA. The law provides for no enforcement of the goals set by a company in its plan. With no state authority to answer to, community involvement offers the only real leverage available for holding a company to its stated goals.

Get to Know Your Local Polluter: Profiles of Minnesota's Top 40 Toxic Polluters

To begin our work on the Good Neighbor Project, we published a report in 1993 called, Get to Know Your Local Polluter: Profiles of Minnesota's Top 40 Toxic Polluters. The Top 40 were chosen based on 1990 TRI emissions of the 17 chemicals targeted by the EPA's 33/50 program. This 300-page report filled several roles. First, the individual profiles supply communities with the basic information they need to begin positive discussions. While all of this data is available to the public, this is the first time it has been compiled in one accessible format. Second, CBE staff used this information to set our staffing priorities. Finally, in the process of developing these profiles, the state's first qualitative look at TRI reporters emerges. Information included for each of the 40 facilities includes:

1.) Maps of the major streets, schools, health care facilities and water bodies within a one and two mile radius of the facility;
2.) Business information, and company and labor contacts;
3.) History of a facility's compliance with environmental regulations;
4.) Community Right-To-Know data on the amount and types of chemicals stored on-site and released to the environment, and reported accidental releases;
5.) Known potential human and environmental effects of Toxic Release inventory (TRI) chemicals;
6.) Local climate information;
7.) Local population analysis based on 1990 census, including total population, sensitive populations, and people of color; and
8.) Community resources in the area, including health facilities, religious organizations, business associations, civic associations, schools, citizen organizations and Minnesota regional review Committees, and municipal government contacts.

Community Organizing

Since publishing Get To Know Your Local Polluter in January 1993, CBE staff have been active in communities surrounding 18 of the 40 facilities. These run the gamut from large multi-nationals such as 3M,

Ford, and ICI Fiberite, to family-owned outfits such as Superior Plating and Crystal Cabinets. They are also spread evenly between urban, suburban, and small town communities. See the Table 1 for a summary of the types of communities we have worked in and the response we have had as of November 15, 1994.

As the table below indicates, the response from communities to our project has been excellent. There have only been two places where we could not pull together a committee. Responses from facilities have come in many different forms. Several have simply refused to have any discussion at all, one company has published a brochure in response, five are meeting with us at this time. We plan to continue work on this project for one more year, at which time we will have a more thorough analysis.

Citizens for a Better Environment Summary of Minnesota Good Neighbor Project

Facility Name	Location	Community Type	Ownership	Response Community	Response Facility
3M	St. Paul	Urban	Multi	Yes	No
Alliant	Arden Hills	Suburban	Multi	Yes	In Progress
American Nat'l Can	Mpls.	Urban	Multi	Yes	No
Andersen Windows	Bayport	Suburban/rural	Family	Yes	In Progress
Ashland Oil	St. Paul Park	Suburban	Nat'l	Yes	In Progress
Boise Cascade	Int'l Falls	Rural	Nat'l	No	N/A
Crown Cork Seal	Faribault	Rural	Multi	Yes	Yes
Crystal Cabinets	Princeton	Rural	Family	Yes	Yes
3M-DFP	Stillwater	Suburban/rural	Multi	Yes	No
Federal Hoffman	Anoka	Suburban	Nat'l	Yes	In Progress
Ford	St. Paul	Urban	Multi	Yes	Yes
ICI	Winona	Rural	Multi	Yes	Yes
Mentor	Stewartville	Rural	Nat'l	In Progress	N/A
Onan	Fridley	Suburban	Nat'l	Yes	No
Superior	Mpls	Urban	Family	Yes	No
S.B. Foot	Red Wing	Rural	Local	No	N/A
Thermo King	Bloomington	Suburban	Multi	Yes	In Progress
Waldorf	St. Paul	Urban	Nat'l	Yes	Yes

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Ivan Kuzyk, *ConnTAP*

I work with the Connecticut Technical Assistance Program (ConnTAP) which is a non-regulatory, quasi-public organization that has been actively promoting multi-media waste minimization and pollution

prevention (P2) among Connecticut manufacturers since 1987. ConnTAP's efforts in Connecticut are currently mirrored, to a greater or lesser extent, in every other state.

In Connecticut, we have noticed interesting changes over the last seven years. One of the most remarkable and pleasant changes is the tremendous difference that P2 elicits from the business and manufacturing community. As recently as five years ago, P2 was often given short shrift by some manufacturers, who considered it to be basically unrealistic, and its exponents to be somewhat naive. Things have changed. Today, many of Connecticut's largest manufacturers have already dedicated resources to pollution prevention initiatives and many smaller companies are anxious to get on board. Enough case studies have been published in the past few years to convince even the greatest skeptics that reducing the volume and toxicity of waste not only makes good environmental sense, but good business sense as well.

Now that we find ourselves in agreement over the benefits that can be realized through P2, groups like ConnTAP often find themselves disagreeing with industry over what P2 actually is. Many generators, for example, consider recycling and P2 to be synonymous. They define pollution prevention broadly enough to include any activity that results in a reduction in the quantity of waste going to disposal. They consider more exclusive definitions of P2 to be nothing short of pedantic. A recent article by Karen H. Rasmussen in Pollution Prevention Review (Summer 1994) offers a good discussion of this issue.

At ConnTAP, we cannot afford to let definitions become obstacles to the work we do with industry. We do, however, adhere to a rather strict interpretation of what P2 is. We agree with the EPA's waste management hierarchy, which identifies source reduction as the most preferred method of waste management, followed by recycling, treatment, and disposal. In this hierarchy, P2 is defined as: *Practices that reduce, avoid or eliminate the generation of pollution which is released into the environment, prior to recycling, treatment, or disposal, so as to reduce risk to health and the environment.*

From this definition, it follows that P2 has only one component: source reduction. Accordingly, only closed-loop recycling falls within the bounds of this definition. *Source reduction is defined as any activity that reduces or eliminates the generation of hazardous waste at the source, usually within a process.* This might include: equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, the substitution of raw materials, or improvements in housekeeping, maintenance, training or inventory control.

At ConnTAP, we believe that by relying on a rather strict interpretation for what does and does not constitute P2, we have maintained a consistent approach as our programs and outreach have expanded. Over the last seven years, ConnTAP has grown and now offers a variety of programs that provide technical and financial assistance to companies interested in P2 opportunities in Connecticut.

In addition to its presentations and sponsorship of seminars and workshops, ConnTAP provides speakers to address P2 and environmental issues to business, industry and trade groups. From its Hartford office, ConnTAP operates a resource library, which is open to the public, where an extensive collection of pollution prevention and waste minimization materials are maintained. In addition, ConnTAP publishes a quarterly newsletter, with over 2,000 subscribers, dealing with P2 issues and case studies of local industry. ConnTAP also operates a technical assistance and referral telephone-hotline that handles up to 700 calls yearly. ConnTAP's technical staff is able to provide answers to a variety of questions relating to P2 as well as offer financial analysis to companies considering implementing pollution prevention projects. ConnTAP's financial assistance also comes in the forms of grants and low-interest loans to industries seeking to capitalize or test new technologies.

ConnTAP's most exciting project, the Site Visit Program, employs six retired engineers. They operate in two man teams, visiting plants and factories, offering on-site assessments of pollution prevention opportunities. The site-visit engineers have been well received at over 75 companies in the state over the last

three years. They have prepared reports on P2 opportunities to a variety of companies ranging from brass platers to chocolate makers.

ConnTAP's programs, while unique in Connecticut, are currently mirrored in a variety of other states. According to a compendium, recently published by the National Pollution Prevention Roundtable, there are currently about 130 organizations performing services similar to ConnTAP's at the state, county and municipal level across the country.

Returning to the topic of our session: How TRI can drive pollution prevention, it is difficult for us, and I think for groups doing the work we do, to imagine TRI driving P2 at all. From our perspective, a complex mix of economic and regulatory factors are what generally drive companies toward P2. This does not mean, however, that the TRI has no potential worth with respect to what P2 assistance groups do.

ConnTAP has used TRI data in the past, and we see two possible uses for it in the future. In the first instance, ConnTAP could use the TRI data as a tool that would allow us to target industries and companies for specific forms of P2 information or assistance. In the past, ConnTAP has used computerized data to target assistance to either specific industries or to generators of specific waste streams. Biennial hazardous waste report data, in particular, has been a rich source for this kind of information.

Secondly, ConnTAP would use TRI if we could use it to accurately measure the scope of source reduction and waste minimization activity currently taking place in Connecticut. As such a measure, TRI would be an invaluable asset by allowing us to evaluate our P2 successes and plan our future activities.
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Tova Reinhorn, ***Environmental Specialist, Occidental Chemical Corporation***

How TRI drives Pollution Prevention at OxyChem

The Toxic Release Inventory (TRI) - Releases and Transfers data, when first reported for 1987, alerted companies to the amount of toxic chemicals being lost from their facilities. Estimates, calculation and monitoring used for filing the Form R reports became more focused and successfully determined trouble spots, sources of high emissions, that subsequently were addressed by tight control or appropriate waste minimization methods.

The TRI provided direct public access to release data, which increased accountability of companies. Enhanced communication between companies and the public allowed for better understanding of issues of each side and raised the level of responsibility. The TRI provided a public baseline that allowed companies to demonstrate good faith efforts at reducing releases.

As a result of the TRI, the EPA, the states and companies initiated voluntary, publicly stated commitments to release reductions via programs such as:

- 33/50 - Industrial Toxics Program that has targeted seventeen high risk chemicals for 50% reduction by 1995, with an intermediate goal of 33% by 1993. This is one of the most reliable programs to measure progress because there were no changes in the list of chemicals or the data points included over the years. OxyChem achieved the intermediate goal of 33% reduction in 1992, and the 50 % reduction in 1993, two years ahead of the schedule.
- EPA/CEO Voluntary Emission Reduction Program - formerUS EPA Administrator, W. Reilly, personally asked the CEO's of nine chemical companies to participate and OxyChem was one of them.

The goal was to achieve 82% reductions of five TRI targeted chemicals between 1988 and 1992. The program has been completed; OxyChem has achieved the goal by initiating projects at seven of our facilities, at a total cost exceeding $10 MM.
Individual company goals. OxyMin is OxyChem's Pollution Prevention (P2) and waste minimization program that was initiated in 1984. The program has evolved during those years and gradually it has stressed more and more the TRI data as one of the major measurable parameters.

OxyChem publishes an annual corporate wide internal TRI status report, which highlights specific facilities contributions to reductions or increases in the TRI data. The report is distributed to all manufacturing management and is highlighted in numerous corporate and facility wide communications, such as the "Annual Environmental Report", departmental monthly reports, monthly environmental report "EnviroNews" etc.

Some of the problem areas that have not yet been solved are that there was minimal scientific study to select chemicals or data elements. This resulted in a dilution of our pollution prevention efforts since we targeted 300 chemicals and will be targeting 600 chemicals instead of concentrating on the high risk ones.

Companies, regulators and the public are still trying to determine how to accurately measure progress. The TRI database, including the baseline, is continually changing, and users have been attempting to adjust the data in order to account for all the regulatory, reporting and production changes.

The Pollution Prevention Act (PPA) of 1990 significantly expanded the reporting requirements with the newly required data (mostly included in the Sec 8 of the Form R), such as quantities of wastes on site and off-site for energy recovery and recycle and a comparison of four years of data, including estimates for two future years.

The PPA has encouraged the pollution prevention efforts by shifting the emphasis to reduction of all wastes not only those released to the environment. Releases of toxic chemicals into the environment are bad and should be reduced. Wastes must be reduced since they drain our resources. When waste creation can not be avoided it must be properly managed and should follow the hierarchy of recycling, energy recovery, treatment and disposal should be only as a last resort. Concentrating the efforts on the releases and waste reduction has the additional benefit that use of toxic material becomes more efficient.

CMA member companies PPA data (million lbs/year) for 1992 indicate that only 7% of all wastes have been released to the environment. OxyChem's 1993 data (million lbs/year) indicates that only 8% of all wastes have been released to the environment.

		CMA	OxyChem	
		1992	1992	1993
Releases to Environment		868	27.0	23.2
On Site	Recycle	6,293	61.3	29.5
	Energy Recovery	919	21.6	22.3
	Treated	3,844	179.7	181.6
Off Site	Recycle	640	0.7	0.9
	En Recovery	181	11.5	10.3
	Treated	209	9.5	14.5
Total wastes			311.3	282.2

As an example of how the PPA data requirements has effected OxyMin, our Pollution Prevention (P2) program, we revised the goal setting format to reflect the Form R, specifically the Section 8 data. We emphasize the multimedia aspect of P2 efforts, in addition to media specific goals that we had in prior years. OxyChem stresses the waste management hierarchy of recycling whenever possible with treatment and disposal being a last resort. We also requested additional information on how the goals will be achieved, such as specific project information, personnel involvement and costs analysis.

A major roadblock in our compliance with the PPA requirements, as well as P2 efforts, is the lack of definitions for data requirements such as wastes, recycling etc.,. This has caused variability in interpretation, which has taken a lot of effort to resolve before submission.

The PPA data is difficult to understand because of duplication of data. Same release data is reported in different sections of the same Form R, for example there are different quantities released: Quantity released (in Sec 8.1) include all Quantities released reported in (Sec 5) except for one time events (Sec. 8.8) but includes also Quantity transferred off-site for disposal (Sec 6). All the data reported as off-site transfers is potentially duplicated because the receiving facility is also reporting the same quantity as an on-site activity.

A final rule for implementation of the PPA of 1990 is still not available in spite of significant efforts from regulators, the public and the industry. The proposed rule issued in September 1991 was rejected by the OMB due to significant problems such as requiring data that was not based on the Act. The reporting package for 1991 was delayed creating confusion and significant unwarranted work in the regulated community. Significant work has been done in the EPA's TRI Data Reporting NACEPT subcommittee and in an EPA Internal Workgroup. Draft Guidance was expected in Nov. 30, 1994 with Final Guidance to be available in 1995 for 1995 Calendar Year, but there should also be a timetable for Final Rule for PPA of 1990.

In summary, the TRI data, including the PPA data, have a significant impact on industry's P2 efforts that is obvious in the continuous decrease in releases and transfers of toxic chemicals. The current reporting should be fine-tuned to provide a consistent and more accurate method to measure progress. Regarding the TRI expansion efforts by the EPA, I firmly believe that use of toxic material becomes more efficient when industry concentrates its efforts on reducing the releases and waste. Use should not be targeted for reduction in the same way as the TRI chemicals' releases have been targeted.
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Session 2: Using TRI Data for Pollution Prevention Planning

Session Leader
Tim Greiner, *Greiner Environmental*
Speakers
Eric Berliner, *Environmental Specialist, Martin Marietta Armament Systems*
Bob Lemcke, *Hazardous Substance Information Office, Washington State Department of Ecology*
Ron Robbins, *Environmental Compliance Coordinator, United States Postal Service, Northeast Area*
Brian Towns, *Facilitator, Environmental and Maintenance Services, Galileo Electro-Optic Corporation*

Tim Greiner, *Greiner Environmental*

Speakers in this session discussed how EPCRA data aids in pollution prevention planning. The speakers focused on the following topics: (1) motivating employees to aid in data collection efforts, (2) using data to introduce greener products and technologies, (3) working with data to set reduction priorities and measure success, and (4) the utility of TRI data from one state's perspective.

The first speaker, Brian Towns, outlined his firm's use of total quality management (TQM) tools to shape its pollution prevention program. Using TQM, Galileo brought environmental concerns into the company's profit making equation. Galileo followed the classic TQM strategy -- first organizing a task force of upper management to define global priorities and then setting up teams comprised of employees from all areas of the corporation. After performing a pareto analysis of pollution sources, the team set out the firm's three largest sources. The environmental manager played a key role in compiling team progress, securing needed resources for team activities, and shepherding team initiated policy changes through the task force. Moreover, the environmental manager kept employees actively interested in the process, ordering pizza for team meetings, broadcasting the success of team efforts, and seeking ways to make the pollution prevention planning efforts fun and rewarding.

Galileo's efforts paid off quickly. In six months, the company reduced methanol usage 40%, acetone 60% and eliminated Freon and trichloroethane while *increasing* production output. The task force estimates the changes have saved the company nearly $150,000 annually on production operation costs.

Building on Brian Towns' data collection talk, Ronald Robbins (second speaker) discussed the US Postal Services (USPS) comprehensive chemical inventory data base. In an effort to comply with Executive Order 12856: *Federal Compliance with Right-To-Know Laws and Pollution Prevention Requirements*, the Northeast Area Office complied chemical information on the products and substances stored or used at 65 major Postal Service facility sites throughout the Northeast Area. Using a contractor, USPS developed a database of all products used at the major sites. Chemical components, excerpted from material safety data sheets, were entered into the database.

USPS then targeted key chemicals for reduction and elimination from its operations. These chemicals include ozone depleting substances and the 17 chemicals targeted by the U.S. EPA in its 33/50 program. USPS used its EPCRA inventory database as a tool for pollution prevention by querying the database to identify those products containing the targeted chemicals. Of the approximately 6,000 products identified as part of this inventory roughly 263 were found to contain ozone depleting substances and roughly 1,122 contained at least one of the 17 U.S. EPA 33/50 chemicals. Using the database, USPS targeted products for reduction and replacement. To offer alternative products to its 65 sites, USPS tested replacement products and developed at least two alternative products for every product set for elimination.

After completing his presentation, a number of audience participants were interested in the transportability of the data base to other applications. Audience participants saw the database as a rich source of information on environmentally preferable products.

Next, Eric Berliner from Martin Marietta Armament Systems described his company's internal chemical tracking system. Built by in-house staff, the tracking system has the capability of monitoring the use of chemicals through out the plant. The system identifies where chemicals may be used, has a screening mechanism to prevent misuse, and enables the environmental manager to screen all incoming materials for hazards. Martin Marietta set up the tracking system as part of its efforts to establish waste reduction goals and measure progress against those goals. The company prepares an annual evaluation of waste generation data, TRI data, cost disposal data, and process knowledge. Since 1989, Martin Marietta has reduced its waste 62% (normalized for employee hours). The company has reduced its number of TRI-reportable chemicals from 5 to 1 over the same time period and hopes to eliminate the final chemical before the next reporting period.

The session's final speaker, Bob Lemcke, presented his state's research on measuring pollution prevention. The research focused on two objectives -- to evaluate the usefulness of several measurement methods and to examine and to compare TRI and non-TRI data sources. Washington selected nine volunteer facilities. For each facility, data sets were reviewed for completeness and then tested with alternative measurement methods. Washington's study found that using different normalization measures -- such as labor hours, sales, or employees -- yielded different results. The study concluded that absolute measures of pollution prevention make sense on a state-wide or industry scale whereas normalized measures make sense at the facility level. In evaluating different data sources, Washington found that indicators of pollution prevention such as TRI data, RCRA waste data, air pollution data, and the state's dangerous waste data, were often not in agreement. The over-riding lesson from a policy perspective was the need for chemical use data to facilitate more accurate measurement. From a practical standpoint, researchers found that looking at data alone gave a poor picture of facility pollution prevention progress. But by reviewing the TRI and other data sources before visiting a facility, the researchers were able to ask questions of facility managers that brought out and clarified reporting inconsistencies and errors.
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Eric Berliner, *Environmental Specialist, Martin Marietta Armament Systems*

Using TRI Data for Pollution Prevention

The objective of Martin Marietta Armament Systems is to strategically align the business for long term success. In developing a blueprint for longevity, Martin Marietta has established realistic pollution prevention and waste minimization goals. Indeed, Martin Marietta has taken an extremely aggressive approach to preventing pollution and reducing waste, accelerating the programs, in many cases, to achieve waste minimization mandates ahead of industry as a whole. Martin Marietta recognizes the necessity of 100% compliance with regulations and, more importantly, understands that the way to achieve compliance is to significantly reduce the potential for waste generation at the front end of the process. This makes sense from an environmental as well as a financial standpoint since Martin Marietta understands that to successfully compete within today's tough economic market, the customers are looking for, and demanding "green" product.

Martin Marietta defines pollution prevention as "... preventing or minimizing the generation or release of wastes and pollutants, to the extent technically and economically feasible, throughout the lifecycle of the product, including its design, production, packaging and ultimate fate in the environment." There are two important elements to Martin Marietta's definition -- the scope of the pollutants covered and the methodology which can be used to achieve the reductions.

Martin Marietta believes that goals for waste reduction should be established. Goals are important to:

1. Facilitate tracking and reporting;
2. Establish a target against which progress can be measured;
3. Demonstrate commitment and results to management, employees and the local community;
4. Provide the target necessary to motivate employees and maintain their interest.

Since Martin Marietta's ultimate goal is to eliminate wastes and releases to the maximum extent feasible, the goals reflect a strong commitment towards aggressive reductions. Goals are established in quantifiable terms (i.e. percent reduction in the production index) and include a time frame for implementation.

In order to facilitate the quantification of goals, each year an evaluation of waste generation data, TRI data, cost disposal data, and process knowledge is completed. Based on the analysis of the data, Martin Marietta is able to prioritize the sources/generators of waste for minimization. Since 1989, as shown in Table 1, Martin Marietta has been able to reduce its waste by 62% based on a production index. Furthermore, Martin Marietta had to report on eight chemicals under TRI in 1988. In 1993 only one chemical met the reporting requirements.

Year	Hazardous Waste Generation (lbs)	Total Std. Hours Worked	Year	Ratio (lb/200,000 hrs)
1989	1302374	2,678,158	1989	97264
1990	834785	2,112,216	1990	79051
1991	652604	1,922,219	1991	67908
1992	483000	1,700,000	1992	56890
1993	259226	1,410,460	1993	36757

Table 1: Hazardous Waste Reduction Since 1989

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Bob Lemcke, *Hazardous Substance Information Office, Washington State Department of Ecology*

Washington State is one of four states participating in the U.S. Environmental Protection Agency's (EPA) "Waste Minimization Measurement" project. The project is national in scope and, in addition to Washington, includes pilot projects in Alaska, Ohio, and Oregon. The purpose of the national project is to evaluate practical ways to measure pollution prevention (P2). Washington has two principal objectives in the study:

1) To evaluate several measurement methods for their usefulness in measuring P2; and
2) To evaluate the available data resources for their adequacy in measuring P2.

This study represents the third phase of measurement efforts in Washington state. Work has been in progress since 1990 to define principles applicable to quantifying P2 and to establish a computer system to manipulate existing data for the purpose of measuring P2 progress.

Washington selected nine volunteering facilities from standard industrial classification (SIC) codes 20, 24, 26, 28, 33, 36, 37, and 38 and reviewed a broad range of currently available data provided by these facilities per federal and state reporting requirements. The data sets were reviewed first for compatibility and then measurement methods were applied to each data set. The TRI data were selected for more comprehensive study.

Data trends were graphed and several measurement methodologies were applied to a combination of the various data sets. Washington considered direct measures, normalized measures, and measures of relative toxicity.

Washington Department of Ecology staff met with facility representatives and shared the graphs and analyses. The facility visit provided enhanced understanding of data trends and insight on the reliability of the numbers reported. The facility visit was also an opportunity to learn more about P2 activities at the facility and to gain industry perspectives on P2 measurement and data reporting.

A profile on each facility was compiled. Where available, the following information was included in the profile: the driver behind implementing P2 at the facility, the techniques which have proven to be most effective in achieving source reductions, the benefits realized from P2 activities, and the barriers encountered in pursuing P2 initiatives.

The findings of the study conclude that absolute measures are most appropriate for measuring progress towards state and national goals. Normalized measures may be very useful for measuring P2 progress and identifying successful P2 techniques within an industry. The most appropriate normalization factor varied between industries. It appears impractical to develop an index that could be used state-wide or nationally for all industries. If data are to be compared between facilities, or if data will be aggregated at the state or national level, then the normalization factor must be consistent within the industry and all facilities must calculate the activity index in the same way.

Ideally, a standardized activity index that could be applied to all facilities within an industry should be developed collaboratively by industry and government. The TRI activity index (or production index) is currently reported in a different way for each facility, eliminating the possibility of normalizing aggregate release data. The TRI activity index would be most useful for national comparisons if a standard method for calculating the activity index were determined for each four digit SIC code or smaller industry grouping.

Of the available data sources, the TRI and Washington state pollution prevention plans (plans) and annual progress reports (APRs) proved to be the most useful for this project. The least useful data sources were the Biennial Reporting System Form WM and Tier II reports.

One difficulty encountered in completing the project was the absence of available information on chemical use. State policy has established P2 goals in terms of chemical use reduction. Current literature suggests that chemical release cannot be considered an adequate surrogate for chemical use. Clarifying the relationship between chemical release and use at the nine facilities went beyond the scope of the current project, however, this is an issue that should be addressed further in Washington state. If the state determines that release is indeed inadequate in describing chemical use, then the data collected should include information on chemical use, or the state policy goal should be expressed in terms of chemical releases.

Facilities had several suggestions for improved data reporting, principally, that government make greater attempts to simplify the process of reporting. Forms should be more user-friendly and, to the greatest extent possible, the number of contacts at each level of government should be minimized. The burden of distributing information within each level of government should fall on government itself. Multi-media permitting efforts, EPA's Common Sense Initiative and integrated regulation by industry represent a more holistic approach to environmental management that is welcomed by industry. Industry also supports government efforts to prioritize chemicals of greatest concern and establish state and federal goals.
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Ronald Robbins, ***Environmental Compliance Coordinator, United States Postal Service, Northeast Area***
Beth Secor, ***Project Chemical Engineer, TURP, Rizzo Associates, Inc., Natick, MA***

Using Emergency Planning and Community Right-To-Know Act Inventories as a Tool for Pollution Prevention

Overview

In an effort to comply with the Emergency Planning and Community Right to Know Act (EPCRA) and Executive Order 12856; *Federal Compliance With Right-To-Know Laws and Pollution Prevention Requirements*, the United States Postal Service (USPS) Northeast Area Office has prepared comprehensive inventories of the chemicals used at its major mail processing and vehicle maintenance facilities. These inventories involve the compilation of chemical information on the products and substances stored or used at 65 major Postal Service facility sites throughout the Northeast Area. The USPS accomplished this initial draconian task by contracting the bulk of the work to an environmental consultant. Rizzo Associates, under contract to the USPS, performed product inventories using portable computers which support the database program created for this project. Once the product inventory was collected, the chemical composition for each product was entered into the database. Chemical compositions were determined from the Material Safety Data Sheets obtained for each product. A number of query options were built into the database to produce EPCRA inventory reports for each Postal Service site.

Concurrently, the USPS Northeast Area also has an aggressive pollution prevention program underway. For the past two years the USPS Northeast Area and the United States Environmental Protection Agency (U.S. EPA), Region 2, have been working together to implement the findings in two pollution prevention studies completed for vehicle maintenance and processing and distribution operations. These jointly sponsored studies were conducted in Buffalo, New York. As stated in the federal Pollution Prevention Act of 1990, "There are significant opportunities to reduce or prevent pollution at the source..... such changes offer industry substantial savings in reduced raw material, pollution control, and liability costs as well as help protect the environment and reduce risks to worker health and safety."

As part of the USPS Pollution Prevention Program, primary key **"chemicals"** have been targeted for reduction and elimination, wherever possible. The primary chemicals include ozone depleting substances (refer to Table 1) and the 17 chemicals targeted for reduction by the United States Environmental Protection Agency (refer to Table 2). The basis for this decision was taken from Title VI of the Clean Air Act Amendments which set into motion the phase out of the production of ozone depleting substances (ODSs). and U.S. EPA's national goals to reduce emissions of 17 targeted chemicals in its 33/50 Program. The 33/50 Program is a voluntary initiative which takes its name from EPA's national reduction goals of 33% by 1992 and 50% by the end of 1995. The EPA is using 1988 as the base year to record this reduction.

TABLE 1
OZONE DEPLETING SUBSTANCES

Class I Substances
Chlorofluorocarbons (various types)
Halons (various types)
111-trichloroethane (Methyl Chloroform)
Carbon tetrachloride

Class II Substances
Hydrochlorofluorocarbons (various types)

The USPS was able to use its EPCRA inventory database as a tool for pollution prevention by querying the database to identify those products containing the targeted chemicals noted. The tool has manifested itself in the form of a document made up of detailed lists which include those products used by the USPS that contain

ozone depleting substance (s) and/or one or more of the 17 U.S. EPA targeted chemicals. Products are listed by vendor name and include a list of the targeted chemical(s) identified in the product.

TABLE 2

1. Benzene	10. Methyl ethyl ketone
2. Cadmium & cadmium compounds	11. Methyl isobutyl ketone
3. Carbon tetrachloride	12. Nickel and nickel compounds
4. Chloroform (trichloromethane)	13. Tetrachloroethylene
5. Chromium & chromium compounds	14. Toluene
6. Cyanide compounds & hydrogen cyanide	15. 1,1,1-trichloroethane
7. Lead & lead compounds	16. Trichlorethylene
8. Mercury & mercury compounds	17. Xylenes (all xylenes)
9. Methylene chloride (dichloromethane)	

Of the approximately 6,000 products identified as part of this inventory, approximately 263 were found to contain ODSs and approximately 1,122 contained at least one of the 17 U.S. EPA targeted chemicals. By virtue of this database the USPS is now able to target **"products"** for reduction and replacement to achieve its pollution prevention goals.
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Brian D. Towns, ***Facilitator, Environmental and Maintenance Services, Galileo Electro-Optics Corporation***

Galileo in the last two years has transformed from a top down management format into a total quality team management style. During this transition, the activities to comply with pollution prevention goals were shaped by the TQM philosophy. The environmental manager was transformed into an environmental facilitator with a goal to incorporate environmental concerns into the profit making equation. Outside agencies such as DEP and EPA were viewed as customers with requests that could contributed to the profit making ability of the corporation. Pollution prevention through source reduction was recognized as a way to reduce operational costs and enhance Galileo's competitive edge.

The environmental facilitator, as all other facilitators within the corporation, is authorized to use any resource necessary to accomplish corporate goals. A task force of upper management (facilitators) was created to define global needs such as data collection, report formats and material tracking. The task force also defined the top three contributors to pollution and the potential savings associated with reductions in each.

The formation of teams, comprised of employees from all areas of the corporation, is encouraged under TQM guidelines. The teams set goals and short term objects then divide up tasks to achieve the objectives. From the analysis of the top three contributors of pollution, sub-teams were formed to address each of the three contributors. The sub-teams were comprised of employees whose working knowledge of specific processes or background would significantly contribute to the success of the team. Each team was given a general goal from the task force and a time frame to achieve the goal. Other goals and objectives were set by the teams with no interference from the task force.

To ensure communication between the task force and sub-teams, the environmental facilitator was responsible for compiling team progress reports and converting the information into dollars saved. The task force

would then be up-dated on the progress of each team and the over all cost reduction. Any resource needs or policy changes would be brought to the task force by the environmental facilitator.

Chemical usage reports were generated by the environmental facilitator and provided to each team. Through the reports, each team was able to target specific areas and concentrate on the most cost effective solutions in each target area. The reports also provided a running score card on the effectiveness of their activities. Within six months, each team had identified and implemented several simple solutions to reduce chemical usage while maintaining production levels and product quality.

The success of the team approach to accomplish environmental goals can be demonstrated by the large improvements in chemical use efficiency within a very short time frame. Methanol usage was down 40%, acetone use down 60%; Freon virtually eliminated from the production process and trichloroethylene usage was eliminated all together. The time span from the formation of the teams to implementation of reduction ideas was six months.

Galileo reported five chemicals on the annual TRI form R reports before pollution prevention activities were initiated In 1994, Galileo will report on two chemicals and in 1996 will not reach any TRI reporting thresholds. The cost of implementing changes and the labor hours at team meetings and action items was estimated at $15,000. The task force has estimated that the changes have saved nearly $150,000 annually on the operational cost of production.
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Session 3: Using TRI to Target Pollution Prevention Technical Assistance Opportunities

Session Leader
Dave Thomas, *Director, Hazardous Waste Research and Information Center, Illinois Department of Natural Resources*
Speakers
Bob Donaghue, *Assistant Director, Pollution Prevention Assistance Division, Georgia Department of Natural Resources*
Sharon Johnson, *North Carolina Pollution Prevention Program*
Chris Tirpak, *Acting Director, The 33/50 Program, U.S. Environmental Protection Agency*

In this session, panelists discussed how state and federal staff are using TRI to identify pollution prevention opportunities, including prioritizing chemicals and industrial sectors of concern. Speakers addressed using TRI in conjunction with other databases on industrial waste. Other issues addressed include identifying industrial processes of concern, research priorities, and impediments to implementing pollution prevention.

Bob Donaghue, *Assistant Director, Pollution Prevention Assistance Division, Georgia Department of Natural Resources*

Prioritizing Pollution Prevention Assistance Needs Using the 1992 Toxic Release Inventory

Phase 1 - Preliminary Manufacturing Sector Analysis

Core Strategies for Assistance

A core strategy of the Pollution Prevention Assistance Division (P^2AD) of the Georgia Department of Natural Resources (DNR) is to be responsive to requests for assistance by all manufacturing groups and the public. However, this approach will not ensure that needed information and support is available to manufacturers that may be the most significant waste generators. To reach this audience, another core strategy of P^2AD is to identify technical assistance needs of manufacturing sectors that generate chemicals posing the greatest relative risk to the public and the environment. P^2AD is seeking their voluntary involvement in its non-regulatory pollution prevention programs.

Prioritization Approach

This effort represents the first phase of an on-going approach which evaluates waste generation characteristics of Georgia manufacturers producing toxic and hazardous chemical wastes. A preliminary prioritization of the manufacturing sectors (Standard Industrial Classification Codes 20 through 39) was undertaken using a two-step process: prioritization of toxic chemicals generated and prioritization of manufacturing sectors that generated the highest priority chemicals.

Chemical Prioritization

The primary chemicals used to prioritize assistance efforts are those included on the Toxic Release Inventory (TRI), which is part of Section 313 of the Emergency Planning and Community Right-to-Know Act. In Georgia, there are 321 chemicals included on the TRI. Since all of the chemicals listed on the TRI do not pose the same degree of risk, the chemicals were placed into three groups based on various toxicological and regulatory factors. The highest priority chemicals were generally those exhibiting carcinogenic or ozone-depleting characteristics, or were released to the environment in large quantities. The high priority chemicals generated in 1992 and their environmental fate are shown in Figure 1.

Figure 1
High Priority Chemicals
Distribution and Environmental Fate

Total 1992 High Priority Chemical Generation Was 99 Million Pounds

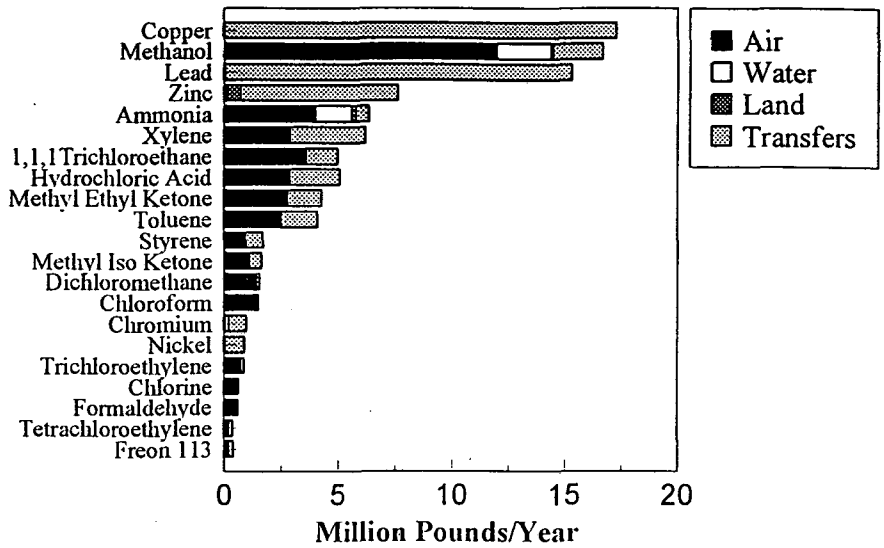
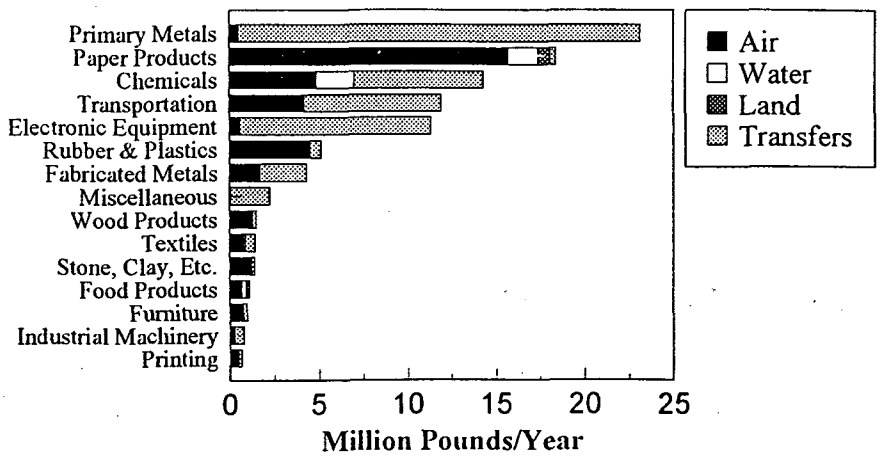


Figure 2
Georgia Manufacturers
High Priority Chemical Generation

Total 1992 High Priority Chemical Generation Was 99 Million Pounds



Prioritization of Manufacturing Sectors

Following the chemical prioritization step, manufacturing sectors were identified that generated and released the high priority chemicals. Each sector was examined in terms of their generation characteristics, the environmental fate of the chemicals, the number of companies reporting environmental releases, and the number of companies within the state with similar waste-generating processes. These manufacturing sectors were then prioritized from high to low. High priority chemical generation in 1992 by Georgia manufacturers and the environmental fate of the chemicals are shown in Figure 2.

High Priority Manufacturing Sectors

High priority manufacturing sectors were selected primarily due to environmental releases of high priority chemicals and include the following sectors:

- Paper and Paper Products (SIC 26)
- Chemical and Allied Products (SIC 28)
- Transportation Equipment (SIC 37)
- Rubber and Plastic Products (SIC 30)
- Fabricated Metal Products (SIC 34)
- Printing and Publishing (SIC 27)

The printing sector was included despite relatively low reported releases, because over 1,000 small printers fall below TRI reporting thresholds and are not required to report releases. Cumulatively, solvent releases from small printers are significant.

Medium Priority Manufacturing Sectors

Medium priority manufacturing sectors may generate significant levels of toxic chemicals; however, most are not released to the environment. Other medium priority manufacturing sectors may have only a few companies reporting TRI releases; however, many smaller companies that are below TRI reporting thresholds conduct business in Georgia within these SIC Codes. Sectors considered medium priority include:

- Primary Metals Industry (SIC 33)
- Electronic Equipment (SIC 36)
- Furniture and Fixtures (SIC 25)
- Stone, Clay and Glass Products (SIC 32)
- Industrial Machinery (SIC 35)

Low Priority Manufacturing Sectors

Finally, industries within low priority manufacturing sectors include those with either small toxic chemical wastestreams, or whose primary wastestreams consist of non-hazardous solid waste or wastewater. Manufacturing sectors considered low priority with respect to toxic chemical releases include:

- Food and Kindred Products (SIC 20)
- Textile Products (SIC 22)
- Apparel Products (SIC 23)
- Tobacco Products (SIC 21)
- Petroleum Refining (SIC 29)
- Leather Products (SIC 31)
- Measuring Equipment (SIC 38)

Subsector Analysis

After prioritizing the manufacturing sectors, a more in-depth analysis of each sector was undertaken. Each sector was examined to determine which subsectors reported high priority chemical generation and releases, and also the quantities and environmental fate of the chemicals generated. Figure 3 provides an example of a subsector analysis for the Transportation Equipment Sector (SIC 37). It indicates that the most significant generators of high priority chemicals within this sector are the aircraft and aircraft parts manufacturers (SIC 372) and the motor vehicle bodies and motor vehicle parts manufacturers (SIC 371). The sector was then assessed to see which high priority chemicals were generated and their environmental fate. Figure 4 provides an example of this analysis for the sector.

Figure 3
Transportation Equipment
Manufacturing Sector Analysis

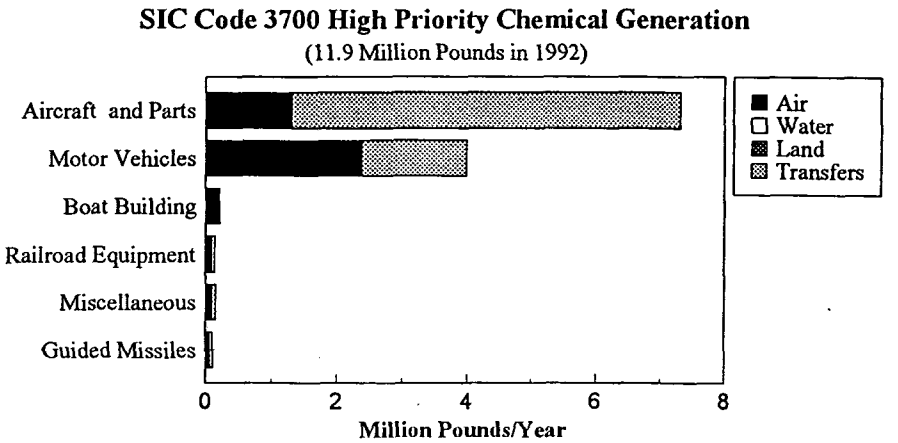
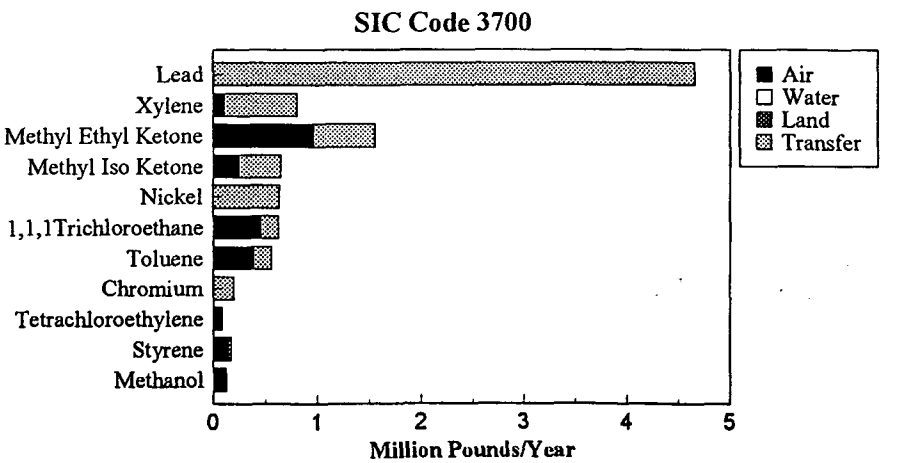


Figure 4
Transportation Equipment
Distribution of High Priority Chemicals



Phase 2 - In-depth Manufacturing Sector Assessments

The next phase of the needs identification program will consist of establishing manufacturing sector focus groups to identify key pollution prevention issues of the high priority sectors. In-depth assessments of manufacturing sectors will then be conducted to determine the processes producing the wastes, multi-media waste problems (e.g. solid waste, wastewater, excessive energy and water consumption, etc.), current pollution prevention activities, impediments to implementing pollution prevention measures, and opportunities for additional pollution prevention efforts by the sectors. On-site assessments will be undertaken at selected companies which volunteer to participate in the program. The research and assessments will be accomplished using staff engineers as the project managers working closely with industry experts, university personnel, and others with expertise in the manufacturing sectors.

This program is designed to better use P^2AD's resources to identify and reduce the most significant toxic waste generation in order to minimize potential public health and environmental risks while improving the efficiency of industrial operations. Although this program element focuses on hazardous and toxic wastes primarily from manufacturing sectors, other P2AD programs address areas such as agriculture, service industries, and non-toxic industrial solid waste and wastewater.

These planning efforts will establish a baseline of information on pollution prevention activities by Georgia industries. They will be used by P^2AD in developing its program, provide information needed to assess the progress of P^2AD's programs, and monitor environmental waste trends to improve the effectiveness and responsiveness of P^2AD to changing technological and environmental conditions.
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Sharon Johnson, ***North Carolina Pollution Prevention Program***

Using TRI as a Pollution Prevention Tool

The SARA 313 Form R reporting requirements of the Emergency Planning and Community Right to Know Act of 1986 have gone a long way towards increasing the awareness by industry, government, and the general public of the releases to the environment from the facilities that are required to report. For some facilities, this was the first time they had looked at waste generation from a multimedia perspective. As the only source of information on multimedia releases to the environment, the North Carolina Office of Waste Reduction (OWR) has found numerous ways to use this information to promote waste reduction efforts in our state.

In 1989, the N. C. Pollution Prevention Program (now a part of the OWR) received a grant from EPA to develop a Multimedia Waste Reduction Management System (WRMS). The goal of this project was to develop a multimedia waste reduction assessment database which would merge data from national and state databases that contained waste generation and reduction information. From this information, the Pollution Prevention Program (PPP) would be able to access multimedia releases and target waste reduction techniques to those releases. The targeting effort would include providing information on the services of PPP to specific facilities and developing specific materials for identified industry sectors.

Because the TRI was the only multimedia database available, it was chosen as the primary database to be used in the WRMS system. The TRI data were supplemented with data from the North Carolina State Annual Report on Hazardous Waste Generation, Airs Facility Subsystem Air Quality data, National Pollutant Discharge Elimination system data, and North Carolina Pretreatment data. The WRMS was developed as a relational database using dBASE IV. The combination of this information provides a broader picture on environmental chemical releases and waste generation than could be provided by the TRI data alone, although the TRI data comprise by far most of the data in the WRMS system.

While the WRMS system has proven to be a useful source of information, there have been several problems in utilizing the system. First, the large database requires an extended amount of processing time and, due to a lack of funding, the system is currently outdated. Since the data are being pulled from several different systems, it is time consuming to keep the system updated. The OWR does have plans, however, to evaluate and update the system soon. Other agencies within North Carolina's Department of Environment, Health, and Natural Resources have also expressed an interest in using the WRMS system to get an overall picture of the multimedia waste generation at a facility.

In spite of the current problems with the WRMS system, the Pollution Prevention staff has still been able to use this information as a pollution prevention tool. This information gives staff the ability to access more environmental parameters for a selected facility and provides a larger picture on chemical releases and waste generation as a whole. PPP also uses the data to make comparisons of industry releases between reporting years. This comparison includes analysis of trends at a specific facility, within an SIC code, within a geographic area, or on a statewide basis. The data are useful for looking at potential cross-media transfers of pollutants among reporting years at a facility. One of the most useful applications for the data is that the PPP staff can evaluate a facility's wastestreams prior to conducting a waste reduction opportunity assessment on site. This information can help staff be much better prepared for the visit.

In addition to its use in the WRMS system, the N. C. PPP staff also uses the TRI data in many of its efforts to target resources and as an information tool to give others a perspective of waste generation in N. C. An initial targeting effort involved a letter from the governor to the facilities in N. C. that reported releases on off-site transfers of the 17 chemicals identified for EPA's 33/50 Program. This letter encouraged these facilities to participate in the 33/50 Program and to use pollution prevention as the preferred method to reduce these releases. Information on the services available through the PPP to assist facilities was included, and the letter encouraged facilities to use these services. Within a few weeks, PPP was flooded with requests for on-site assistance, and, since that time, the Program has maintained about a six month backlog. We are not sure how much of this activity could be attributed to our targeting efforts, although they certainly were a factor. Because of the continued backlog since that effort, PPP has not been able to pursue many of the targeting efforts that were initially planned when the WRMS system was developed.

The TRI data have been a valuable source of information this past year as the OWR has worked with the Pollution Prevention Advisory Council. This Council was created in 1993 by the North Carolina General Assembly to look at the potential to promote greater waste reduction practices in the state, the regulation of hazardous waste generation and management in North Carolina, and the hazardous waste management capacity needs of North Carolina business and industry. In the Council's first meeting, the TRI data were used to present to the members an overall picture of multimedia waste generation in the State. Throughout the year, TRI data were referred to as the Council developed its recommendations on these issues.

One of the final Council recommendations is to set a state-wide goal of reducing releases and off-site transfers of TRI chemicals by 50 percent by the year 2005. The goal includes a challenge to reduce TRI chemicals requiring waste management by 25 percent by the year 2005 through source reduction and environmentally sound recycling. To determine this goal, TRI data were used to track reductions since 1988 and to make predictions on reductions for total releases as well as reductions through source reduction and environmentally sound recycling. If this recommendation is accepted by the General Assembly, statewide progress towards the goal would be tracked by the TRI data submitted by companies in SIC codes 20-39 for the 1992 list of reportable TRI chemicals. Achievement would be measured as percent reductions from a 1992 base year. The Council also recommended that OWR publish a biennial report that provides statistics on progress toward the goals and recognizes facilities with the highest reductions in waste generation.

TRI data have also been used in PPP's efforts to become more efficient in material and information development and dissemination. PPP has used the data to determine the SIC codes that have the greatest waste

generation and the chemicals they are generating. This information has resulted in the development of fact sheets for processes such as painting and coating operations. The data have also been used to identify potential sources of pollution problems in a geographical area.

OWR plans for using TRI data in the future include targeting a geographical area (probably a county) as a pilot project for providing intensive waste reduction information on reducing air emissions, wastewater pollutants, solid and hazardous waste. This project would involve coordination with the local POTW and solid waste managers as well as other local government authorities. The TRI data, along with solid waste annual report data would be the primary data analyzed to determine the targeted area. As the TRI data are expanded, there will be more opportunities to use them to promote waste reduction in North Carolina.
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Chris Tirpak, *Acting Director, The 33/50 Program, U.S. Environmental Protection Agency*

Using TRI's 33/50 Program to Target Industry P2 Technical Assistance Opportunities

What is the 33/50 Program?

A 5-year experiment in voluntary pollution reduction, the 33/50 program aims to cut 1.5 billion pounds of toxic waste across the nation by 33% in 1992 and 50% in 1995.

More than 1,300 companies currently participate in the 33/50 Program. Unlike most Federal Government programs, participation in 33/50 is simple and flexible. The only requirement is a letter to EPA. The 33/50 Commitment Tracking System (CTS) summarizes these letters in a repository of valuable information on pollution prevention and reduction -- available upon request.

The 33/50 Approach To TRI

The 33/50 Program sets national pollution priorities by targeting 17 chemicals (and categories) for reduction. The Toxics Release Inventory (TRI) is a chemical reporting -- not reduction -- requirement. The 17 priority pollutants were selected by the 33/50 Program on the basis of three criteria:

1. known environmental and health risks
2. high volume industrial use
3. potential for reduction through pollution prevention

The 33/50 Program measures progress against the 1988 TRI reports filed annually by American companies under the Emergency Planning and Community Right to Know Act (EPCRA) section 313.

TRI and 33/50 Timelines

As 1995 draws near, the 33/50 Program is entering its last TRI reporting year, just after the 1994 data have been received by EPA, but well before the 1993 TRI data are made available for public release in the Spring of 1995. Meanwhile, the 1995 TRI reports will come to EPA in the summer of 1996, for public release in the Spring of 1997.

There is a two year time-lag between TRI reporting and public disclosure of TRI data. When coupled with the use of the 1988 TRI reports as a baseline for calculating 33/50 chemical emission reductions, this time lag affects both ends of the 33/50 experiment. Thus the five year (1991-1995) 33/50 Program stretches to cover a 10-year (1988-1997) span in the public eye.

Preliminary 33/50 Results

The 1992 TRI reports already reveal a 600 million pound (40%) decline in toxic emissions from the levels reported in 1988. These results suggest that voluntary pollution reduction is, indeed, working -- faster

and cheaper than the standard legislation-regulation-litigation framework. The 50% goal appears to be well within reach of the 33/50 Program in 1995.

Technical Assistance - 33/50 Company Profiles

The 33/50 Program sets the stage for technical assistance upon request. Most recent among a series of reports available from 33/50 are Company Profiles. Fourteen 33/50 Company Profiles describe pollution prevention and reduction activities to date: Acme Metals, Aladin Industries, Aldan Rubber, Anchor Fence, Carpenter Technology, Dexter Shoe, Douglas & Lomason, Hadco Electronics, Johnson & Johnson, Olin, Parker Hannifin, Printed Circuit, Raytheon, and U.S. Steel. The profiles are drawn primarily from each company's communications with the 33/50 Program and the annual TRI reports submitted by their facilities.

A summary, as well as copies of the complete company profiles, can be obtained by contacting either EPA's Hotline at (202) 554-1404 or the 33/50 Program Staff at (202) 260-6907.

Technical Assistance in the 33/50 "Home Stretch"

The 33/50 Program actively challenges companies to think about technical assistance in new ways by focussing on goals. Building on the momentum established with the early achievement of the interim national 33% pollution reduction goal -- a year ahead of schedule -- nearly 1,300 companies are now being asked to boost their commitment to a cleaner environment in a healthy economy in a number of ways:

- pushing beyond the limits of initial goals for reducing toxic releases and off-site transfers;
- bringing more of their facilities into the 33/50 Program;
- expanding pollution reduction commitments to include chemicals other than 33/50's 17 target pollutants;
- reducing chemical emissions in international operations; and
- reducing toxic wastes at the source.

The 33/50 Program approach shifts from adversarial court-orders towards voluntary collaboration and partnerships -- stronger than either post-regulatory volunteerism or regulations alone.

33/50 Public Recognition

The 33/50 Program engages the power of public awareness and peer pressure to draw corporate America inexorably towards environmental stewardship. As a first step, company participation in the 33/50 Program is recognized officially in 33/50 Certificates of Appreciation. Then, as companies reach their pollution reduction goals, they receive 33/50 Certificates of Achievement. This creates a common ground for government-industry partnerships from which to develop a new way of doing business.

Right now, the 33/50 Program is working with EPA Regional Offices and other outside groups to identify specific categories and criteria for the final 33/50 Awards in the summer of 1996. US-EPA's 33/50 Certificates and Awards serve as powerful public symbols of doing more than just meeting the requirements of environmental regulations. Like good housekeeping seals of approval, 33/50 certificates are held by "cleaner companies."

33/50 Program Evaluations

Is the 33/50 Program working?

Evaluations are emerging from the US General Accounting Office (GAO), INFORM, the Manufacturer's Alliance, Citizen's Action and other organizations. Although these may be somewhat premature, they hold great potential for reshaping improved variations on the 33/50 program after 1995. Voluntary pollution reduction partnerships between government and industry, such as the 33/50 Program, hold real potential for faster and less expensive pollution reduction than the current conventional legislation-regulation-litigation cycles.

33/50 - The Next Generation

As general consensus on a clean environment in a sound economy emerges between government and industry, voluntary partnerships are cropping up throughout the country. The momentum for working collaboratively -- two way technical assistance -- is happening on a national scale.

EPA is asking environmental stakeholders from industry, trade associations, environmental groups, States -- critics and supporters alike -- to come together to frame the debate on the next generation of 33/50 by mid-1995. With minimal taxpayer investment, the 33/50 Program is working to reverse a growing trend toward spending more money on environmental lawsuits than cleanups. Court agendas are overcrowded. Clearly, the time has come to streamline expensive and time-consuming regulatory programs with more economic voluntary initiatives like 33/50.

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Session 4: Measuring Pollution Prevention Progress: Building a Better Yardstick

Session Leader
Kathryn Barwick, *Source Reduction Unit Chief, California Department of Toxic Substances Control*
Speakers
Craig Butler, *Environmental Specialist, Office of Pollution Prevention, Ohio EPA*
Elizabeth Harriman, *Research Associate, Massachusetts Toxics Use Reduction Institute, University of Massachusetts Lowell*
Robert T. (Tim) Hawes, *Corporate Environmental Manager, Polaroid Corporation*
Ed Hopkins, *Environmental Director, Citizen Action*

Kathryn Barwick, *Source Reduction Unit Chief, California Department of Toxic Substances Control*

This session focused on how to measure pollution prevention. The principal challenges of measuring pollution prevention include problems with data quality, establishing baselines, and normalization. The presentations and discussion led to the following observations:

- individual facilities can quantitatively measure the effects of the implementation of source reduction on the amounts/concentrations of hazardous pollutants produced (this is most effectively accomplished at the process level);

- data from individual facilities cannot be aggregated to give an overall indication (within a geographical area or political entity) of how industry as a whole is progressing toward pollution prevention; and

- existing data sets are inadequate for the purpose of measuring industry's progress toward pollution prevention (TRI data being the best and Biennial Generator Report the worst). Such data can be and are used at the facility level to assess progress, but normalization is still a problem.

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Craig Butler, *Environmental Specialist, Office of Pollution Prevention, Ohio EPA*

Ohio's Waste Minimization Measurement Pilot Project

As public and private organizations focus their attention and resources on pollution prevention, understanding the effectiveness of these efforts has become increasingly important. Indeed, it is generally accepted that pollution prevention is making a positive environmental impact. However, if environmental management strategies are to continue to shift toward pollution prevention, a reliable system of measurement is critical.

From a government perspective, measuring pollution prevention helps evaluate the success and impact of current policies, as well as direct new policy and allocate scarce public resources. Likewise, many businesses work to measure pollution prevention to document program success to internal and external customers and

document regulatory compliance. Others work to measure pollution prevention to increase public awareness and foster environmental accountability.

U.S. EPA has actively supported research in pollution prevention measurement and is currently sponsoring measurement projects by the states of Ohio, Washington, Oregon, and Alaska. Each state is completing pollution prevention measurement pilot projects based on a series of workshops and roundtable meetings which identified the measurement needs of various stakeholders (i.e., federal and state government, business, and public and research organizations). Each pilot project incorporated state-specific measurement research goals.

Background

In 1991 U.S. EPA Region 10 and Region 5 formed a workgroup on measurement to assist in the development of practical ways to measure progress in pollution prevention. Of specific interest to the workgroup was the utility of currently collected data in measuring pollution prevention. Based on the needs identified by the workgroup, U.S. EPA sponsored a roundtable titled "**Measuring Progress in Source Reduction, Recycling, and Waste Minimization**" in 1992. Roundtable discussions centered on the goals identified by the workgroup (U.S. EPA, 1992). Following the roundtable, state workgroup participants developed pollution prevention pilot project proposals which incorporated workgroup needs, roundtable findings and state measurement goals.

Goals and Objectives

The three specific objectives of the Ohio Waste Minimization Measurement Pilot Project (OWMMPP) are: 1) to assess the suitability of currently collected non-confidential data in measuring pollution prevention; 2) to assess the impact of complementing currently collected non-confidential data with additional facility data (i.e., construction of a facility profile); and 3) to compare and assess the suitability of currently collected non-confidential data with the data needs of materials accounting or throughput measures.

To complete the first objective, Ohio EPA selected seven facilities from the top toxic waste releasing and hazardous waste generating Standard Industrial Classifications (SIC) as hosts for data collection. Ohio EPA identified and collected the following from 1988 through 1992 for each facility: RCRA Generator Annual Hazardous Waste Report data, RCRA Facility Annual Hazardous Waste Report data, RCRA Hazardous Waste Minimization data, EPCRA Toxic Release Inventory data, EPCRA Emergency Hazardous and Chemical Inventory data, Clean Air Act Emission Inventory Statement data, and Clean Water Act data, National Pollutant Discharge Elimination System (NPDES) Discharge Monitoring Report data.

Ohio EPA also completed a review of measurement methods from current pollution prevention literature. Several different measurements were evaluated, however, only those measures that could be completed using the data selected for this study were used in the OWMMPP. Ohio EPA selected, and applied where applicable, actual and adjusted quantity measures in an attempt to measure pollution prevention.

To complete the second study objective, Ohio EPA worked closely with each of the seven facilities to collect additional information regarding facility pollution prevention efforts. Facility profiles were completed to 1) develop an overview of facility pollution prevention activity, and 2) see if additional facility data provided additional insight on pollution prevention efforts, or clarified results compiled from only evaluating currently collected non-confidential data.

To satisfy the final objective, Ohio EPA compared the data needs of a materials accounting methodology with Ohio's currently collected non-confidential data. This was done to evaluate the feasibility of applying currently collected non-confidential data to a materials account to measure pollution prevention.

Measurement Results

Actual Quantity Changes

Although the usefulness of actual quantity changes is limited, oftentimes it can provide quick results or spur additional measurement questions. The actual quantity change measure is the only measure available for data which do not include a method to normalize or adjust yearly data.

This measure was applied to RCRA Annual Generator and Facility Hazardous Waste reports, TRI releases to air, water, land, POTW, and deepwell injection, as well as off-site transfers for recycling, energy recovery, treatment and disposal. Off-site transfers for recycling and energy recovery were also measured for actual quantity changes, but are displayed separately to avoid skewing data analysis. Other data sources selected for this study were not subject to actual or adjusted quantity measures because of data incompatibility or other conditions related to data collection. However, this data was evaluated separately where appropriate.

Measuring actual quantity changes proved to be effective in identifying the types of wastes which are predominantly generated at each facility, as well as the amounts of those wastes and whether or not reductions have been achieved during the period of evaluation. However, since the data is not normalized for production or other activity, actual quantity changes do not provide information as to why reductions have occurred or whether waste generation or release decreases can be attributed to prevention.

One benefit of using the actual quantity change measure in this study was that it prompted the development of questions to be asked during facility profile interviews. Additional information from facility representatives often proved useful in linking yearly waste generation or release figures with pollution prevention activity. However, it is important to note that many changes were also attributed to other non-prevention activities.

Normalized and Adjusted Changes

Adjusted measures were reserved for Toxic Release Inventory (TRI) release and source reduction data because the TRI included an activity index after 1990. This index was important because it allowed for yearly adjustment of release figures. A drawback of the TRI index is that the method or process used by each facility to develop the index is not provided. Although the index is supposed to be calculated by using the activity which is most directly linked to each chemical release, there is no way for researchers to identify if activity calculations vary yearly.

Ohio EPA developed normalized and adjusted release information for each facility. Results provided yearly adjusted release totals. This enabled Ohio EPA to examine if releases were proportionately higher or lower than the 1990 base year. Some facilities experienced wide fluctuations, whereas others showed decreasing trends in adjusted releases. These results were more comprehensive than actual quantity measure results, but still did not provide sufficient information for Ohio EPA to measure pollution prevention.

Materials Accounting Research

Materials accounting is regarded as an effective tool to measure pollution prevention because it uses front-end data and quantitatively tracks materials as they flow through a facility. The State of New Jersey, through the Community and Worker Right to Know Act of 1983, has the authority to collect "... complete inventories of hazardous substances at the facility... [and] establish an annual environmental survey concerning the use and presence of hazardous substances throughout the state."

In 1987, and annually thereafter, specified manufacturing facilities and chemicals manufacturers were required to report the following: Starting Inventory; Quantity Produced On-site; Quantity Brought On-site; Quantity Consumed On-site; Quantity Shipped Off-site (as a substance or as a product); and Ending Inventory.

New Jersey uses this front-end information in conjunction with information collected under the federal TRI to establish a materials accounting measurement system. Analysis of the utility of this information in measuring pollution prevention activity was completed in 1993 (New Jersey Department of Environmental Protection and Energy, 1993).

Ohio EPA was interested in comparing currently collected non-confidential data with a materials accounting method of measurement. Ohio EPA examined two options. The first compared all study data with a facility-wide materials accounting model (i.e., material flow across facility boundaries) to identify if this data could be used to measure pollution prevention. The second option examined the feasibility of substituting EPCRA Emergency Hazardous and Chemical Inventory data for the additional data collected by New Jersey to complete a materials account.

In examining the first option, Ohio EPA compared the data sources used in this study with the data needs of a facility-wide materials account. Results of this comparison showed that Ohio EPA data sources are incomplete and could not be used to develop a facility-wide materials account. Data incompatibility also played a major role in this determination. Finally, since both the Office of Technology Assessment and the National Academy of Sciences concluded in separate studies that facility-wide materials accounts are not sufficient to measure pollution prevention, Ohio EPA did not continue to pursue this option.

In option two, Ohio EPA examined the possibility of supplanting facility input data collected by New Jersey with the data collected under the EPCRA Emergency Hazardous and Chemical Inventory Report to complete a materials account. Based on previous investigations, Ohio EPA determined that EPCRA Emergency Hazardous and Chemical Inventory data only provide maximum and average quantities of chemicals *stored on-site* throughout the year. When compared with the New Jersey data, it was determined that these data sources are not comparable. Therefore, Ohio EPA determined that this data cannot be used as a surrogate for data collected on facility inputs by New Jersey.

Facility Profiles

Facility profiles were derived from facility promotional materials, site visit information and correspondence. Facilities were asked to provide information regarding pollution prevention activities, including, but not limited to facility goal statements, descriptions of past and future pollution prevention projects, and other facility activities that had led to a greater concentration on pollution prevention.

The facility profile proved to be an invaluable resource. It was the critical link in explaining many of the trends identified in the data. Facility profiles provided expanded information in the form of narrative explanations of pollution prevention activities, waste generation trends, and other related pollution prevention activities. Without this data, Ohio EPA could only speculate on the origin of such data trends. Although the facility profile information cannot provide absolute conclusions on all data trends, it proved to be extremely beneficial in many cases. Ohio EPA believes that finding a way to collect this type of information from all facilities will be critical in accurately measuring pollution prevention. The challenge will be to do this without causing "data overload."

Conclusions

Overall, this study provided Ohio EPA with significant results on the utility of currently collected non-confidential data in measuring pollution prevention activity. Ohio EPA believes that the results will prove useful in guiding how data and information is collected to measure pollution prevention. In addition, it is hoped that this study will be of use to states that have a similar regulatory structure to Ohio.
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Elizabeth Harriman, ***Research Associate, Massachusetts Toxics Use Reduction Institute, University of Massachusetts Lowell***

Measuring Progress in Massachusetts

Introduction

In 1989, Massachusetts passed the Toxics Use Reduction Act (TURA), which is a toxics use reduction (TUR) planning and reporting law. The toxic chemical use and byproduct generation data collected under TURA supplements waste and release information submitted under the federal Toxics Release Inventory (TRI) program. Massachusetts has been collecting data under TURA since 1990. TURA has multiple goals, one of which is:

> "...to achieve by 1997, through toxics use reduction, a fifty percent (50%) reduction from 1987 quantities of toxic or hazardous byproducts generated by industry in the Commonwealth of Massachusetts." (MGL Ch.211 §13(A))

The Massachusetts TURA program, consisting of the Toxics Use Reduction Institute (TURI), the Office of Technical Assistance (OTA) and the Bureau of Waste Prevention at the Department of Environmental Protection (DEP), have embarked on a cooperative project to measure progress toward that goal. This project will be supported in part by a PPIS grant from EPA. In addition, TURI has recently performed some analysis of industry's experience with TURA as part of a chemical restrictions policy report to TURA's Administrative Council.

Challenges

There are four principal challenges to measuring progress in Massachusetts. The first hurdle to overcome is data quality. We have, at this point, only examined five Standard Industrial Classification (SIC) codes in detail. During that examination, many obvious data errors were discovered. They included errors made by facilities in reporting, errors made during input of the data into DEP's Facility Master File (FMF) database, and errors introduced during the extraction of the data from FMF to our PC-based system. In one instance, it was a combination of all three. A large quantity user had entered an outdated SIC code in their report. While DEP has done an admirable job of converting the old SIC's during data entry, this one was not corrected and, therefore, FMF left the field blank. During the downloading of the data (creating "extract files"), because this field was blank, the entire production unit was lost. As a result, reports run for that particular SIC code showed a total byproduct of approximately 4.3 million lbs, when the actual byproduct was approximately 22 million lbs!

The second challenge is to establish a 1987 baseline for measuring the state-wide goal. This will be a creative exercise at best. DEP will use TURA, TRI and other media-specific data in order to make an estimate of reductions from 1987 to 1990.

Normalization is always a challenge. However, because the goal is to reduce "through toxics use reduction" we must factor out use and byproduct quantity changes which resulted from changes in level of production. TURA requires facilities to report a byproduct reduction index (BRI) for each chemical at the production unit level. This is the percent change in byproduct generation per unit of product, and so is already normalized for production. However, there is no way to aggregate the BRI's, because quantity information is given at the facility level, not at the production unit level.

The last challenge is to determine if the reported data actually reflects what is really happening at facilities. The best data analysis in the world means nothing if the data does not accurately characterize what is happening in the real world. We need to get an idea about whether reductions that appear to be due to TUR or pollution prevention (P2), are actually due to those kinds of activities.

Project Status

We have now performed some preliminary analysis in an effort to describe the Massachusetts experience with toxics use reduction for the upcoming Chemical Restrictions report.(Shapiro, et al, 1994) Several possible metrics for measuring progress have been laid out, and have been tested on five SIC codes (2672, 2821, 3089, 3471, 3679) for 1990-1992. Absolute quantitative measures included quantity of chemical use and byproduct. Normalized measures were calculated using employment data as a proxy for level of production. In addition, qualitative analyses were performed using the BRI's, TUR technique codes, and other supplemental information which provides an indication of P2/TUR activity.

What We Have Learned

The preliminary analysis showed no clear trends in P2/TUR progress within or across the five SIC codes. Use and byproduct generation decreased in most cases over the 1990-1992 period, but not in a uniform manner. The 1991 quantities went against the overall trend in many cases. Qualitative measures (BRI's, TUR technique codes) many times supported the overall quantitative trends, but not the year to year trends. Normalization using employment rarely affected the trends in absolute quantities. One SIC (3089) showed dramatic increases in use and byproduct quantities, however, this trend is believed to be due to data errors.

We hypothesize that this "muddy" picture is due to three primary causes. The first of those is data quality. Numerous examples of errors in facility reporting, data input errors, and errors introduced during the downloading and transfer to PC-based systems, were discovered. In many cases, these errors were large enough to completely mask any TUR/P2 progress.

Secondly, there exist seemingly endless "anomalies" in the data. Some, such as the changing universe of reportable chemicals and SIC codes, can be corrected for by holding a constant list of chemicals and SIC codes for all years. But there are many others which cannot be accounted for; they are introduced by activities such as recycling, product changes, metals exemptions, varying product mix, changes in measurement or reporting methods, etc.

The third cause lies in the attempt to normalize quantities to account for level of production. I believe that this study showed the weakness of employment as a proxy for production. Its strength is in its availability. It is available frequently, in a timely manner, statewide and on a 4-digit SIC code basis. However, the many confounding factors, including lag time in hiring and firing, prior hiring of R&D, marketing and other personnel when there is a positive business forecast (without a simultaneous increase in production), and changes in the productivity of employees, all combine to make employment a poor indicator of year to year changes in level of production. In examining the complexity of the data, and the impact that large changes at just one facility can have on overall trends, it would seem that the best metric for level of production will be least facility specific, and preferably, process specific.

As a result of this, we have begun a normalization analysis using the TRI production ratio/activity index. A comparison for each of the five SIC's has been made between the percent change in total employment and the percent change in reported production ratio from 1990-1992. There was poor correlation between the two metrics. Only SIC 3089 showed a strong correlation (1% difference). Differences for other SIC's varied between 7% and 36%. While it would seem logical that a facility/chemical-level measure would be more accurate, there are many inconsistencies in reported production ratios. For example, zeros and N/A's are all listed as zeros, and companies are allowed wide latitude on the choice of production level indicator. One would assume, and some in industry have confirmed, that Massachusetts companies use their unit of product measurements to compute the production ratio. For smaller facilities with only one production unit per chemical reported, this value is, therefore, potentially very good. For large facilities, however, this is a very approximate number, based on a combination of operations in several different production units.

Where Do We Go From Here?

The year-long project for measuring progress in Massachusetts will focus initially on the following areas: data quality, normalization using TRI activity index, incorporating 1993 data, estimating a 1987 baseline, and the evaluation of the reality of what the data is showing. In addition to the above normalization effort, the possibility of collecting an additional TURA Form S data element will be investigated. This would essentially be a facility-wide BRI. This reporting of a facility "weighted average BRI" would allow the Commonwealth to aggregate all BRI's by performing a similar weighted average. While the limitations of the BRI are recognized, this would still be the most accurate way of obtaining a state-wide normalized measure of progress.

This paper is based on work done by the author and other project participants, including TURI members Maureen Hart, Mark Rossi and Tellus Institute (under contract to TURI), and DEP members Suzie Peck and Walter Hope. The opinions and observations given are the author's, and do not necessarily represent those of other project members.

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Robert T. (Tim) Hawes, ***Corporate Environmental Manager, Polaroid Corporation***

Polaroid's Toxic Use and Waste Reduction Program and its Applicability to Toxics Release Initiatives

Pollution Prevention is certainly not a new concept. I can recall some of Polaroid's early Toxic Use and Waste Reduction (TUWR) efforts as far back as the mid-70's. My old division, the Chemical Operations group, began working with people in the process development laboratories to prioritize and work on key candidate waste streams for recycling and waste reduction efforts. The problem was that this was an adjunct to the primary job of developing chemical synthesis processes which made better and cheaper film products rather than better waste streams.

Waste minimization didn't become an important concept until the mid '80's nationally with efforts such as a study by the Office of Technology Assessment in Washington, a project Polaroid participated in. Using the OTA. work as a model, we began coalescing our program in early 1987. I was fortunate to participate as a member of the team which developed the framework for the TUWR Program, working with our CEO Mac Booth towards the planned announcement of the program at the 1987 Annual Meeting.

We developed an early version of the reporting format based upon the following concepts:

1. The reporting system should serve as an overall chemical material balance around the reporting unit.
2. It should include all chemicals, regardless of toxicity or their inclusion on any Federal or State lists (remember this predated SARA Title III).
3. It should track all waste streams in extreme detail (drum versus bulk, physical state, TSDF destination and ultimate treatment technique).

The team then began the task of setting appropriate goals and began addressing such questions as:

1. Should we aim for reductions of 10% per year or 50% over 5 years? More? Less?
2. Do we reduce usage or wastes?

These and other questions resulted in compromise whereby chemicals would be slotted into four categories by a team of experts and recycle/reuse counted as waste reduction depending upon category. It was easy to agree that the reduction index be calculated on a per unit basis to account for changes in production schedule.

Finally, it was decided that the reduction goal would be corporate-wide and the accounting system developed to afford tracking of progress at all levels of the corporation.

The accounting system dubbed EARS (Environmental Accounting and Reporting System), was developed for reporting quarterly via the corporate-wide VAX system already in place to allow data entry at the divisions and data base administration at the corporate level.

Chemical categories were assigned initially to ~1300 chemicals and a few hundred more have been assigned since. Those chemicals having the highest environmental risk were placed into Category 1 and include substances such as acrylonitrile and Freon 11. Category 2 contains dichloromethane, ammonia and silver nitrate among others while Category 3 contains such materials as toluene, ethylene glycol and hydrochloric acid. Category 4 includes most alcohols, ketones and zinc dust and is the largest chemical category. A Category 5 was later added to track solid, non-chemical wastes such as paper, plastics and molded metal products.

The final product, announced in 1987, set a 5 year goal of 10% reduction per year in usage of Category 1 and 2 Chemicals and 10% per year reduction of waste by-products of Category 3,4 and 5 materials. The Category 3 reduction allows credit for on-site recycle (off-site for Categories 4 and 5) providing the generating division actually reuses the recycled materials. The program also established a waste management hierarchy with preference shown to recycle over disposal and internal disposition over external handling. At the bottom of the hierarchy are emissions and land disposal.

The final goal established was a "virtual" elimination of emissions of Category 1 chemicals at the end of 5 years.

The program was initiated with 1988 as the baseline year and was to be voluntary in nature with corporate-wide (international) scope and local autonomy over accountability. I was among the early skeptics and there did not seem to be much going on well into 1989 in many areas until a Polaroid "Earth Day" was established in the Fall of 1989. It was hosted by Polaroid's Vice President of Worldwide Manufacturing and attended by the CEO and ~200 officers and other operations, research, engineering and environmental types. Plant Managers had to present their TUWR progress reports to this corporate-wide forum. In my opinion, this was the first time many of them thought much about their waste minimization efforts. I think we turned the corner that day.

Polaroid has made an annual event of this "Earth Day" process and has instituted several other waste reduction forums such as "Waste Reduction University" (an all day exchange of ideas held at Bentley College), a waste reduction newsletter issued periodically to all employees, a grassroots "Waste Reduction Now" program and an annual awards program where ~20 employees are awarded plaques by a senior Officer at a luncheon he or she hosts.

In order to achieve successful waste reduction, a cooperative effort was needed involving operations, R&D and engineering representatives. The company is now committing significant capital spending to the program, encouraging toxic use reduction via process changes and funding installation of solvent recovery systems. It has been recognized that different TUR techniques are required in the varied divisions with such diverse products as chemicals (dyes and polymers), photographic negative, cameras, film (assembly), coated sheet and the film pack battery. Thus, each division is encouraged to manage its own program while drawing on the resources of the corporation as needed.

Polaroid is prioritizing SARA TRI reductions via our EARS reports and has modified the data base to allow us to cull the SARA Form R reports directly out of EARS. In addition, we "signed up" for EPA's voluntary Industrial Toxics Program (33/50), recommending to the EPA that we use our existing program to generate the data. Of course, the EPA's program is emissions reduction oriented while ours measures reductions in total "toxics" used or generated as wastes, depending upon the category.

When the 5 year program ended 12/31/93, a cross-sectional group had Redesigned TUWR for the next several years. We have broadened the program to include such areas as energy usage and have decided to give selected additional "credits" for recycling Category 5 solid wastes. The concept of "one set of books" was incorporated into the TUWR Redesign so as to assure all reported data (TUWR, SARA TRI, MA TURA, 33/50 etc.) are consistent and drawn from the same data base.

We have achieved approximately 6% reduction per year per unit of product corporate-wide during the original TUWR Program and have set an annual goal of 7% for the next phase. This puts the company in a position to deliver performance comparable with the statewide MA TURA goals and, in turn, is used as the driver to continued reducing SARA TRI releases.
□

Ed Hopkins, *Environmental Director, Citizen Action*

Using the Toxics Release Inventory (TRI) to measure pollution prevention is a little like trying to analyze the efficiency of your car's engine without knowing how much gas is in the tank. In both cases, critical pieces of information are missing. I hope to suggest why the TRI is deficient for tracking pollution prevention and recommend what additional information would be needed to enable the public to know when facilities are preventing their pollution.

We know that, according to the TRI, many facilities have made significant reductions in their reported releases and transfers. While the TRI is the best available mechanism for tracking manufacturing facilities' toxic waste, it is incapable of answering the most important question: *how* are facilities reducing their releases and waste?

A few examples from previous studies Citizen Action has done illustrate how little TRI can inform us about pollution prevention. All of these examples, which are quite typical of year-to-year changes facilities report to the TRI, come from the 1992 TRI reports.

- Magnesium Corp, Rowley UT - Cut chlorine air emissions by 27 million pounds.
- Inland Steel, East Chicago, IN - Cut its magnesium transfers by 11 million pounds.

- American Cyanamid, Westwego, LA - Cut its underground injection of sulfuric acid by 10 million pounds.

These examples suggest that these three facilities are doing a great job preventing their pollution. But we talked to representatives of these facilities and learned that the numbers don't tell the entire story.

- The Magnesium Corporation facility did not prevent pollution; it installed a chlorine burner. While an improvement over releasing chlorine to the environment, this is pollution control, not prevention.
- Inland Steel didn't prevent pollution, it sold the waste as structural fill material rather than landfilling it.
- American Cyanamid didn't cut pollution, it changed the way the it calculated the sulfuric acid in its wastestream.

None of this information is available from the TRI alone. Citizen Action discovered the causes of the changes reported to the TRI only by contacting the facility representatives.

In theory, a reduction in reported production-related waste may suggest source reduction when the level of production stayed the same, but one cannot make that assumption from the TRI data alone.

For a variety of reasons, the TRI is inadequate to measure pollution prevention:

- Just as knowing how much gasoline is in your car's tank is critical to computing your car's efficiency, tracking the amount of chemicals used in a production process is key to determining progress toward preventing pollution. Information the TRI provides on chemical storage at a facility is expressed in such broad ranges that it is of no value for tracking pollution prevention. Knowing that a facility had on-site somewhere between 50,000 pounds and 99,000 pounds of a chemical does not provide useful information.

- It's impossible to determine by examining its TRI forms if a facility changed its method of calculating its waste and to what extent the changes in the amount of the facility's production-related waste were due to different estimation methods. Some of the facilities reporting the largest amounts of waste entering on-site recycling processes in 1991 subsequently revised their estimating technique. Instead of reporting billions of pounds of chemicals being recycled on site, the facilities now consider the chemical to be entering a process which is integral to the manufacturing system. They are no longer reporting any chemical as being recycled on-site, thereby appearing to achieve a reduction in waste of billions of pounds when, in reality, nothing has changed.

- Thanks to the Pollution Prevention Act, facilities now report whether they have taken any new steps to reduce a chemical at the source. But one cannot determine how many pounds of waste have been reduced by the source reduction activity a facility undertook. There is no opportunity for facilities to report the results of their pollution prevention efforts. That information would enable one to understand how much of the change for the chemical could be accounted for by an active prevention measure.

- While useful at the aggregate level, the TRI production index is inadequate to normalize production levels because individual facilities may have many production processes and products and the production index covers the entire facility. Large chemical manufacturing

plants may use common chemicals such as chlorine or toluene in a dozen different production processes.

- The measure of pollution prevention is not limited to what takes place at the production facility itself; it also includes, or should include, the products the company makes. Products containing volatile organic compounds, for example, contribute to pollution when consumers use them and dispose of them. Companies have prevented pollution by removing toxic chemicals from their products, as Gillette did when it reformulated its White Out correction fluid to eliminate trichloroethylene. The TRI collects no information about toxic chemicals in products, so one cannot determine if a facility is making progress toward pollution prevention.

- Facilities which eliminate the use of a listed toxic chemical are not required to report information on a substitute chemical which is not on the TRI list. With the recent addition of almost 300 chemicals, the TRI list will be a lot larger in the future, but thousands of chemicals which are in use do not have to be reported. One cannot assume that these unlisted substitutes are benign.

If preventing pollution at the source is the nation's top environmental policy priority, as it should be, we must have a mechanism to track pollution prevention. We agree with the CMA slogan: 'don't trust us, track us.' EPA should collect the following information to enable the public, regulators and companies themselves to track pollution prevention:

- any change in methods for calculating waste;
- how many pounds of waste were prevented by a source reduction activity, and;
- process-specific materials accounting data -- chemical use, chemicals consumed in the manufacturing process, and chemicals in products -- in addition to TRI data;

EPA should also provide better guidance on estimating methodologies, particularly regarding the calculation of on-site recycling waste.

Until we develop methods of tracking pollution, it will be impossible to give public recognition to those facilities which are making progress in preventing their use of toxic materials and generation of waste. By adding the data requirements I've suggested, everyone will be better able to determine whether we're making progress toward national pollution prevention goals, and at the local level, the public will be able to know which facilities are doing the most to reduce their pollution.
□

Session 5: Beyond TRI: How Additional State Data is Used

Session Leader

Natalie Roy, *Executive Director, National Pollution Prevention Roundtable*

Speakers

Ken Geiser, *Director, Toxics Use Reduction Institute, University of Massachusetts Lowell*

Carolyn Nunley, *Research Associate, Chemical Hazards Prevention Program, INFORM, Inc.*

Susan Peck, *Director, TUR Reporting and Planning Program, Massachusetts Department of Environmental Protection*

Andrew J. Opperman, *Environmental Scientist, Bureau of Hazardous Substances Information, New Jersey Department of Environmental Protection*

Paul A. Wright, *Senior Attorney, The Dow Chemical Company*

Natalie Roy, *Executive Director, National Pollution Prevention Roundtable*

Because it covered a significant amount of new ground, this panel served as a fitting conclusion not just to the pollution prevention track of the TRI conference, but to the entire conference. Whereas risk targeting, emergency planning, and data integration were issues that arose frequently during many of the other sessions, the issue of materials accounting, and its significance to businesses, and the trade secret implications of reporting this data were almost the exclusive domain of this panel. The discussion was followed by a lively question and answer session.

Suzie Peck from the Massachusetts Department of Environmental Protection and Andy Opperman from the New Jersey Department of Environmental Protection were very thorough in discussing how Massachusetts and New Jersey use materials accounting data. Carolyn Nunley from INFORM, advocated the expansion of TRI to include chemical use. Paul Wright, a Senior Attorney with the Dow Chemical company and the panel's industry representative, rigorously defended a company's right to withhold data from the public in order to protect trade secrets. He noted several instances where a state regulatory agency's nature of storing industry data nearly led to serious information leakages. Ken Geiser, Director of the Massachusetts Toxics Use Reduction Institute refuted these arguments and suggested that businesses express concern about trade secret implications in order to avoid releasing data that Geiser said should be public.

The discussion became particularly spirited when industry representatives pointed out the irrelevancy of materials accounting data, while state regulatory proponents and nongovernmental advocates noted that materials accounting data is much more revealing than end-of-pipe measurements.
□

Ken Geiser, *Director, Toxics Use Reduction Institute, University of Massachusetts Lowell*

The Benefits of Chemical Use Data: Suggestions from Early Massachusetts Experience

The Massachusetts Toxics Use Reduction Act provides for a mandatory chemical use inventory reporting system. Each year, as firms prepare their "Form R" for the federal Toxics Release Inventory (TRI) they also prepare a "Form S" for the state Toxics Use Reduction program. A page from the state Form S is presented here as Exhibit A. In addition to the chemical release data required under the TRI, Massachusetts

Page ___ of ___

Massachusetts Department of Environmental Protection

TURA REPORT - FORM S

Toxic Use Reduction Act - Chemical Usage Facility-Wide & by Production Units

Section 1: Facility-Wide Usage of Listed Chemical

1.1 _____ _____

Chemical Abstract Service (CAS) Number (if applicable) Chemical Identification (from Form R)

1.2 Facility-Wide Usage of Chemical Identified in 1.1 above. Enter total amount (in POUNDS) for each applicable category.
NOTE: Byproduct (item 1.2d) generally means all wastes containing the listed chemical before the waste is treated or recycled. Read the instructions carefully, however, before completing this section.

1.2a Manufactured: _____ 1.2d Generated as Byproduct: _____

1.2b Processed: _____ 1.2e Shipped in or as Product: _____

1.2c Otherwise Used: _____

1.3 OPTIONAL QUESTION. When the amounts reported in 1.2a, 1.2b, and 1.2c are added together, the sum will – in many cases – equal the sum of 1.2d and 1.2e. In other words, the left and right columns will often form a "materials balance." If the two columns are not in approximate balance, you may use this block to explain why. Mark all the reasons that apply.

___ Chemical was recycled on site. ___ Chemical was consumed or transformed.

___ Chemical was held in inventory. ___ Chemical is a compound.

___ Other (explain): _____

1.4 OPTIONAL QUESTION: Did anything non-routine occur at your facility during the reporting year which affected the data reported?

___ YES ___ NO If YES, you may use this space to comment: _____

Section 2: Chemicals Used in Waste Treatment Units

2.1 Is this chemical used to treat waste or control pollution? ___ YES ___ NO

If YES, enter the quantity of chemical code for the amount used to treat waste or control pollution: :__:

OPTIONAL – You may enter the amount: _____

Section 3: TURA Report on Production Unit #: _____ (Enter # from the Form S Cover Sheet.)

3.1 Base Year: _____ 3.4 Byproduct Reduction Index: _____

3.2 Quantity of Chemical Code: :__: 3.5 Emissions Reduction Index: _____

3.3 Toxics Use Reduction Techniques Code: :__:__: :__:__: :__:__: :__:__: :__:__: :__:__: :__:__: :__:__:

If there has been a change from one reporting year to the current year in a (1) base year, and/or (2) estimation methods (that significantly alter previously reported data) for this PRODUCTION UNIT REPORT, describe the change:

Exhibit A

firms reporting on the Form S must report on each listed chemical over a threshold amount used at the facility during the previous year. For the facility as a whole, each firm must report the following for each chemical:

- amount manufactured,
- amount processed,
- amount otherwise used,
- amount generated as by-product (all non-product output),
- amount shipped in or as product.

As a means of verifying the numbers reported the state encourages firms to set up a materials accounting procedure in such a way that the total of the first three categories equals the total of the last two. Where this does not occur (e.g. the chemical was recycled on site, or the chemical was consumed in the production processes), the state provides for an optional explanation.

TOXIC CHEMICAL USE AND RELEASE IN MASSACHUSETTS, 1990-1992
(in thousands of pounds--chemicals and SIC Codes are held constant)

	1990	1991	1992
Toxics Release Inventory Data			
Released	20,819	17,065	14,359
Transfered	20,315	35,966	40,986
Releases and Transfers	41,134	53,023	55,346
Toxics Use Reduction Data			
Manufactured	25,586	10,672	11,004
Processed	739,756	748,388	677,264
Otherwise Used	113,101	112,927	111,564
Total Used	878,445	871,988	799,833
Byproduct	92,054	98,177	95,581
Shipped in/as Product	325,783	368,351	331,563

Exhibit B

This data was first gathered in 1991 for the year 1990, and it has been gathered for each subsequent year. Exhibit B provides a record of the aggregate data reported for the state during the first three years of reporting. This data indicates that in 1990, the Massachusetts firms reporting under the state Toxics Use Reduction program used 878 million pounds of reportable toxic chemicals. This compares to a release and transfer of 55 million pounds reported for the same year under the federal Toxics Release Inventory. If this is accurate, this comparison would mean that these firms used nearly 16 times more toxic chemicals than they released in 1990.

Comparable figures for more recent years are more difficult to assess because the list of chemicals and the list of firms required to report under the state law expanded over these years while the list for the TRI remained constant. The data presented in Exhibit B has been adjusted to include data only from comparable firms and comparable chemicals. Still in 1992 the TURA data report that these Massachusetts firms released nearly 800 million pounds of toxic chemicals. Of this 800 million pounds reported as used by these Massachusetts firms, 11 million pounds was manufactured in the state, 677 million pounds was processed into products, and 112 million pounds was otherwise used.

Aside from the value of chemical use data in better documenting the volume of toxic chemicals actually existing in a state like Massachusetts, there are several other important benefits of gathering use data. These include:

- Improved Targeting for Pollution Prevention Programs
- Indicators of Worker Exposure
- Assistance in Emergency Response Planning
- Validating (TRI) Release Data
- Improving Corporate Management of Chemicals
- Providing Common Basis for Firm-to-Firm Technology Transfer

These six points are discussed in the following sections.

1. Improved Targeting for Pollution Prevention Efforts

The TRI has served as an important data base for assisting state programs in setting priorities for state pollution prevention programs. As states try to assess their progress in these pollution prevention programs it is likely they will try to identify reductions in releases and transfers as indicators of success. Both priority setting and measuring progress could be better targeted if use data were employed rather than release data. As the Massachusetts data suggests, the release data will tend to reveal only a small fraction of chemical use in the state and measuring progress based on release data may not identify undesirable firm behavior such as increasing the amount of toxic chemical released in products, the amount converted in production processes, or the amount treated on-site in waste treatment operations.

In Massachusetts chemical use data has provided an important redirection in the state pollution prevention program. The largest TRI chemical reported as released in Massachusetts is toluene. This substance is used ubiquitously throughout several industry categories, but significantly in the electronics industry, for which the state is well known. While toluene emissions are of concern, the use data reveled another chemical worthy of concern. When the state chemical use data was released by the Toxics Use Reduction program, the staff of the Toxics Use Reduction program found that this data drew attention to an industry than that the TRI data had not drawn attention to. Exhibit C demonstrates that the largest chemical reported as used in Massachusetts is styrene. Styrene, a suspected carcinogen, is not used in the electronics industry, but rather in the plastics and polymer industries. With this new information, the staff at the Toxics Use Reduction Institute began to redirect some program focus to the plastics and polymer industries.

2. Indicators of Worker Exposure

Neither the federal Occupational Safety and Health Administration nor the Massachusetts Department of Labor and Industries requires firms to report annually on chemical use in such a way that government authorities might be able to predict potential worker exposure to chemicals of concern on a state-wide basis. In fact, most occupational risk mapping is based on after-the-fact worker illness data, and only indirectly provides a data source that could be used for risk prevention. The TRI release data has provided state agencies with some indicators of value in predicting potential exposure. But, release data does not accurately reflect the chemicals actually used or converted in a facility that can lead to substantial workplace exposure. While it is true that "fugitive emissions" can indicate potential worker exposure, such fugitive emissions often occur at roof level or

TOP 20 CHEMICALS USED IN MASSACHUSETTS, 1990

	Chemical Name	Total Use		Percent of Total Use	
1	STYRENE MONOMER	395,273,010		43.18	
2	COPPER	98,662,696		10.78	
3	SULFURIC ACID	41,872,305		4.57	
4	TOLUENE	40,948,447		4.47	
5	COPPER COMPOUNDS	35,430,681		3.87	
6	HYDROCHLORIC ACID	28,565,200		3.12	
7	METHANOL	22,804,516		2.49	
8	METHYL ETHYL KETONE	20,191,339		2.21	
9	1,1,1-TRICHLOROETHANE	15,865,068		1.73	
10	NICKEL	15,270,342		1.67	
	Total Top Ten		714,883,604		78.10
11	ACETONE	14,654,517		1.60	
12	ZINC AND COMPOUNDS	13,420,141		1.47	
13	CHROMIUM	12,968,445		1.42	
14	FORMALDEHYDE	9,230,184		1.01	
15	DIETHYLHEXYL PHTHALATE	8,586,024		0.94	
16	DICHLOROMETHANE	7,892,822		0.86	
17	XYLENE MIXED ISOMER	7,742,997		0.85	
18	AMMONIA	7,452,764		0.81	
19	GLYCOL ETHERS	6,481,661		0.71	
20	METHYLENEBISPHENYL	6,446,773		0.70	
	Total 11-20		94,876,328		10.37
	TOTAL TOP 20	809,759,932		88.46	
	TOTAL USE	915,347,795			
	Total Number of Chemicals Used	128			

Exhibit C

at the top of vents and stacks and fugitive emissions estimated from emission factors are not sensitive enough to capture the minuscule levels of release that may put workers at risk.

While use data can never be viewed as an accurate record of exposure (because it does not account for exposure control features in place at the facility) it does provide a better indicator than release data because it reflects the chemicals actually employed on the shop floor. The chemical use data collected under the Massachusetts program provides occupational health agencies the first state-wide data on chemical use that can assist in targeting preventive occupational health programs.

Returning to the case of styrene, much of this chemical used in Massachusetts is converted in process in chemical reactions to make polymers. While the controlled nature of these processes may not result in unusual risk levels for workers, the identification of styrene as a commonly used toxic chemical in Massachusetts has raised state interest in boat hull fabrication and in the manufacturers of plastic tanks and pipes where worker exposure may be much higher.

3. Assistance in Emergency Response Planning

Section 311 and 312 of the federal Emergency Response and Community Right to Know Act requires firms to report on chemicals stored on site at facilities. But, this data is reported to Local Emergency Planning Committees in the context of emergency response planning. There is no requirement that this data be tied to Section 313 release data or validated by material accounting procedures. Further, the data is not reported in a manner that can be easily aggregated for State Emergency Response Commission (SERC) program planning or targeting. While some state SERCs have effectively used the state-wide TRI release data to assist in program planning, release data does not provide an accurate inventory of chemicals used on-site that could be the source of a potential release of concern.

Following the identification of styrene as the largest volume chemical used in Massachusetts, the Toxics Use Reduction Institute conducted a study of styrene and discovered that since 1987 there have been 28 accidental releases of chemical mostly due to malfunctioning equipment or human error. The largest release occurred in 1987 when 2,500 gallons was spilled in a transportation accident. Again, the Massachusetts use data provides the state SERC with the first state-wide inventory of where hazardous chemicals are used, potentially stored ("held in inventory"), and potentially released under emergency conditions.

4. Validating (TRI) Release Data

Section 313 release reporting has certainly improved over the several years of program implementation. Firms today, are more conscientious and estimation techniques have been substantially improved. Yet, the validity of the data can only now be assessed by a sampled audit program. Reporting use data along with release data would provide both the firm and the government with an convenient data source for using materials accounting as a means of validating the reported releases and transfers.

When the first year of Massachusetts program data was compared with state TRI release figures there was a surprising level of incongruity. While much of the discrepancy may have resulted from problems Massachusetts firms had in learning how to report under the state program, the Massachusetts data today provides a means of checking on the accuracy of the TRI release data.

5. Improving Corporate Management of Chemicals

By now one of the most often touted benefits of the TRI reporting requirements has been the heightened attention corporate management has given to facility releases and to improving the management (and reduction) of facility releases. While there are hundreds of cases documenting how firms reduced their emissions by implementing true source reduction programs these illustrations are an indirect result of release reporting, however, measuring reductions in release tends to encourage firms to assess their performance by end-of-pipe accounting practices. The gathering of use data within the firm is likely to have the same positive effect of focusing management attention as was experienced under TRI reporting, but, in this case, the focus will be directly on chemical selection and materials use efficiencies. Measuring progress based on use data should encourage efficiencies in the use of materials which should ultimately benefit the financial health of the firm as well as its environmental performance.

The experience in Massachusetts is primarily anecdotal and case specific. Some firms have certainly reduced their hazardous waste streams by changing processes that use targeted chemicals, but others have done so by improving their waste management systems. A great deal of attention has been paid to changing the materials and processes of cleaning and degreasing parts. Many firms are actively exploring conversions from

chlorofluorocarbons and trichloroethane to alternatives such as aqueous and semi-aqueous cleaners. Determining the role use reporting plays as a motivating factor in such cases is confounded by the fact that these substances are targeted internationally for phase out.

6. Providing Common Basis for Firm-to-Firm Technology Transfer

The gathering of TRI release data has not been credited much with advancing production systems technology transfer among firms. This is not surprising as release data conveys little about production processes or performance, two fundamental conditions for encouraging technology transfer. Use data, on the other hand, provides firms and governments with a means of identifying common production units among firms and across industries and assessing performance in a manner that indicates comparative advantage among production and materials technologies. This is the heart of the concept of benchmarking, a recent development in technology assessment that permits firms to compare themselves to industry norms. Thus improvements in parts cleaning technologies that are identified in the electronics industry may provide models for improvements in the tool plating industries, in the painting and coatings industries, or in the cosmetic jewelry industries. The development of supercritical fluid cleaning chemistries in precision parts cleaning provides just such a possibility. A focus on release data would not necessarily encourage this type of cross sector diffusion, while a focus on use data would more directly highlight such possibilities.

The Massachusetts law will eventually require the state to identify common "user segments" among industries specifically in order to compare performance and encourage the transfer of the most effective technologies among similar firms or firms with similar production processes. Such a sectoral approach that aids in technology transfer would not be possible without the process specifics that use data provides.
□

Carolyn Nunley, ***Research Associate, Chemical Hazards Prevention Program, INFORM, Inc.***

The Value of Comprehensive Data For Measuring Industry Progress in Pollution Prevention

This presentation provided an overview of a recent INFORM analysis of the comprehensive data on toxic chemical use and waste (throughput data) that industries in New Jersey are required to report annually as compared to the much narrower waste generation and release data reported to the federal Toxics Release Inventory (TRI). INFORM's analysis highlights a single chemical at eight different facilities to show how relative quantities of a given chemical produced, used, released, and generated as waste vary significantly, making reporting of the full range of data essential to monitoring pollution prevention progress. The federal TRI data revealed that in 1992, New Jersey facilities generated more than 203 million pounds of the 300-plus reportable chemicals *as waste*. However, the throughput data reported to the New Jersey program show that these same facilities *used* a total of nearly 15.2 billion pounds of these same chemicals in their processes and products; chemical use may pose substantial risks of chemical release and exposure. INFORM's presentation included a discussion of the value of comprehensive data as a basis for assessing risks to workers, the community, and the environment; as a means for tracking regional and national trends that may reveal current or future damage to public health and the environment; as an aid to assessing problems related to the use of toxics in commercial products; and as a tool for monitoring progress on toxics use and source reduction.
□

Susan Peck, *Director TUR Reporting and Planning Program, Massachusetts Department of Environmental Protection*

Using Additional Pollution Prevention Data Elements to Measure Progress in Pollution Prevention: Massachusetts Toxics Use Reduction Program

The Massachusetts Toxics Use Reduction Act (MGL 21I) requires industrial firms that use certain toxic chemicals in excess of 10,000 pounds to report on their toxic chemical use and progress in pollution prevention. This information builds on the Federal EPCRA transfer and release reporting requirements.

What Additional Pollution Prevention Data Elements Are Reported

Specifically, Massachusetts Large Quantity Toxics Users (those facilities with more than 10 FTEs, in SIC codes 10-14, 20-39, 40, 44-51, 72,73, or 75, who manufacture or process more than 25,000 lbs or otherwise use more than 10,000 lbs of a listed chemical per year) must report the following information in addition to the information included on the Federal Form R:

Facility Wide Information:

- Quantity of the Chemical Used
- Quantity of the Chemical generated as "byproduct" (waste prior to treatment or recycling)
- Quantity of the chemical shipped as or in product from the facility
- The projected change in the quantity used 2 and 5 years in the future
- The projected change in the quantity generated as byproduct 2 and 5 years in the future
- If the materials balance Use = Byproduct + Shipped in Product does not balance, why not (optional)
- Why a chemical reported in a previous year is no longer being reported (optional)

For each Production Unit (Product/Process Combination) in which the chemical is used:

- Description of the Production Process (unit operations, SIC code, product description).
- Whether 0-5000, 5000-10,000 or >10,000 lbs are used in the production process.
- Current and projected "byproduct reduction index" (a measure of progress in pollution prevention -- the BRI is the percentage change in the amount of byproduct generated between 1990 and the present, normalized for production level).
- Current and projected "emissions reduction index" (a measure of progress in the reduction of transfers and releases from the facility – the ERI is the percentage change in the quantity of the chemical released directly into the environment or sent offsite for recycling, treatment, or disposal, between 1990 and the present, normalized for production level).
- TUR techniques that led to the current and projected "byproduct reduction index."

The projected items are based on Toxics Use Reduction Plans that the Large Quantity Toxics Users (LQTU) are required to prepare biannually. July 1994 was the first year in which the plans were required and the projections submitted to the department.

Using the Additional Data Elements

Ken Geiser of the Toxics Use Reduction Institute at University of Massachusetts at Lowell discusses several of the "other" uses of the "additional" data elements submitted to DEP in a companion presentation. This paper focusses on how they can be used to measure pollution prevention progress.

The first statistic is changes in use. LQTUs in the manufacturing SIC codes have had to report on Section 313 chemicals since 1990. Comparing the quantity of 313 chemicals used by this group between 1990 and 1993 reveals that use dropped by 19 % from 1.2 billion pounds to .9 billion pounds. The quantity of 313 chemicals used by LQTUs in the manufacturing SIC codes is projected to decrease by 7% between 1990 and

1998. (Absolute numbers are not provided because a small percentage of the LQTU's have not yet completed their TUR plans and submitted their projections. These facilities are under enforcement order.) The quantity of 313 chemicals projected to be generated as byproduct by the LQTUs in the manufacturing SIC codes dropped by 14% between 1990 and 1993, from 125 million pounds to 108 million pounds. The quantity of byproduct is projected to drop by 15% between 1990 and 1998.

Since these raw numbers can be affected by changes in production in addition to pollution prevention, it is important to look at measures that "normalize" for production level. For example, about half of the drop in use between 1990 and 1993 is attributable to the closure of two large facilities in the state.) Two such measures are possible with the TURA data: an efficiency measure and the BRIs.

The efficiency of chemical use can be evaluated by determining what percentage of the chemical does NOT end up as waste. That is, the percent incorporated into the product or consumed in production. In 1993, the efficiency of chemical use was 89%. This number is unchanged from 1990. By 1998, overall efficiency is projected to be 92%. This represents a significant increase, and is independent of production levels.

The other way to measure progress is to look at the BRI's. In 1993, 14% were negative, 29% were equal to zero, and 57% were positive. (Positive BRI's mean that a chemical is being used more efficiently in a production process. BRI's equal to zero mean that the efficiency is unchanged and negative BRI's indicate that a particular chemical is being used less efficiently in a production process.

In 1998, the distribution of negative, zero and positive BRI's is projected to be 14%, 20%, and 65%., respectively. Thus, by 1998, the number of chemical/production unit combinations that are expected to be less efficient is unchanged, fewer will have made no progress, and more production unit/chemical combinations will become more efficient than they are today.
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Andrew J. Opperman, ***Environmental Scientist, Bureau of Hazardous Substances Information, New Jersey Department of Environmental Protection***

New Jersey's Materials Accounting Approach to Environmental Release and Pollution Prevention Reporting

Introduction

New Jersey is a highly industrialized as well as a densely populated state. The proximity of industrial facilities, manufacturing, processing, and storing toxic chemicals, to population centers leads to concerns regarding potential toxic chemical exposures to human health and the environment. New Jersey's Industrial Survey Project (ISP), conducted by the DEP between 1979 and 1982, was considered to be one of the first and most successful attempts by any state [at the time] to use a cross-media approach to materials accounting for toxic chemicals.

The Project was designed to identify the types and quantities of toxic chemicals used by manufacturing industries in the state as well as to determine the fate and effects of those chemicals on human health and the environment. The ISP also laid the foundation for the development and implementation of the New Jersey Worker and Community Right to Know Act of 1983 which provides for the consistent performance of comprehensive toxic chemicals accounting in New Jersey. And it is generally well known that New Jersey's program, along with a program implemented in the state of Maryland, was recognized by the U.S. Congress as a model in the development of the federal Emergency Planning and Community Right to Know Act of 1986.

NJ's Materials Accounting Process

The State of New Jersey requires additional information from those facilities subject to the reporting requirements of Section 313 of the federal Emergency Planning and Community Right-to-know Act. The information is reported on the New Jersey Release and Pollution Prevention Report (RPPR). The same chemicals that are reported on Form R are reported on the RPPR.

Facilities are required to provide chemical throughput data, and environmental release and off-site transfer data, as well as information regarding pollution prevention activities. The RPPR, therefore, is the tool to identify the types and quantities of toxic chemicals used by manufacturing industries in the state. The throughput, release and transfer data are then analyzed as chemical "inputs" and "outputs" at the facility level. The input component includes: 1) the starting inventory of the chemical for the year; 2) the quantity produced on site; and 3) the quantity brought on site. The output component includes: 1) the quantity of the chemical consumed (chemically reacted) in process on site; 2) the quantity shipped off site as (or in) product; 3) the quantity destroyed through on-site treatment; 4) the quantity destroyed through on-site energy recovery; 5) the year end inventory; and 6) all environmental releases and off-site transfers for further management.

A quantitative materials accounting of the chemicals is established by conducting a simplified mass balance. The approach is considered simplified since the data are summarized at the facility level for the reporting year using the best estimates available. An assessment of the general data quality is then performed by calculating the difference between the input and the output for each chemical record. The difference provides an assessment of the balance, or closure, achieved in the materials accounting process. The resultant discrepancies are then addressed as a quantitative difference or a percent error.

Data Quality

Large quantitative discrepancies become the first priority in the review process. Large differences are observed for both excess inputs and excess outputs. However, for many chemical records, large percent errors are observed and can be just as significant as large quantitative errors. (In the early years, recognizing that large differences were being reported, a materials accounting worksheet was developed and included in the reporting package.) The variety of reasons for large discrepancies include:

- understanding and interpretation of the instructions
- lack of attention to reporting details
- lack of use of the materials accounting worksheet
- continued misunderstanding with respect to the reporting of metals, particularly the compound categories
- difficulty in quantifying throughput data (e.g. in the Petroleum Refining Industries)
- data entry errors (on the form and in the database)

Data Issues

As an integral component of the data quality analysis, there arise other issues relevant to mass balance data collection. The one that seems to be the most controversial is trade secret implications. New Jersey's program allows for confidentiality claims with respect to any data not in the public domain with the exception of environmental release and off-site transfer data. For the seven years that New Jersey has collected this type of data, there has been a regular core of facilities that have made trade secret claims (TSC). However, the requirements have not been demonstrated to present a hardship to industry and there has not been an exploitation of the provisions by industry to keep information from the public. Historically, less than two percent of the reporting facilities have submitted TSCs for less than one percent of the total chemical records reported by all NJ facilities.

Commencing with reporting year 1993, facilities are required to report "non-product output" (NPO). NPO is a pollution prevention concept defined as "all hazardous substances or hazardous wastes that are

generated prior to storage, out-of-process recycling, treatment, control, or disposal, and that are not intended for use as a product." At best, the value for this data field should be zero. Otherwise, it would be some positive value including all environmental releases and off-site transfers for further management. Interestingly, some facilities have reported negative values derived from the mass balance data.

Other data issues that come to the surface in the mass balance analyses, particularly when conducting data quality reviews, are:

- Throughput reporting of metals - Can they be produced and/or consumed (consider fume or dust forms)? Can they be destroyed through treatment? Do they have a BTU value, as many are reported under energy recovery?
- Double counting - Observations have shown that some facilities double count: 1) quantities "consumed" and quantities "shipped as (or in) product;" and 2) quantities released to POTWs and quantities "transferred to other off-site locations."

Data Applicability

Despite the appearance that there are too many limitations to the data for it to be of value, just the opposite is true. While limitations do exist, they are more of an artifact of the reporting requirements and do not apply to all records in the database. Actually, much of the data is of exceptional quality considering that facilities are not required to monitor or measure activities to any extent beyond that currently required by state or federal laws, permitting programs, etc.

There are many uses of and applications for the data that have been demonstrated to date:

- First and foremost, for public awareness as Community Right to Know information
- Provide an assessment of the environmental and commercial fate of the chemicals
- Assist facilities in assessing a "cradle-to-grave" concept of the chemical (not just the waste); and in evaluating quantities processed and otherwise used (facilities must have a knowledge of this information in determining if TRI thresholds are exceeded)
- Provide for Pollution Prevention analyses and trends (e.g. Is NPO decreasing as a percent of total use?)
- It may provide direction for a future federal chemical use inventory (e.g. TRI Phase III)
- Provides for a focus on specific chemical groups or types (e.g. carcinogens, metals, etc.)

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Paul A. Wright, ***Senior Attorney, The Dow Chemical Company***

Beyond TRI: Confidential Business Information

The Value of Confidential Business Information

The American Chemical Industry was built on innovation -- innovation which gave the American Chemical Industry the ability to become the global leader in a global chemical business. The American Chemical Industry has developed to become one of the very few industries with a positive balance of trade -- more chemicals are exported from the United States than are imported into the United States each year.

While U.S. patent laws give some protection to the innovation which has allowed this industry to develop, the protection is limited in scope and time. And the protection is limited to the United States. Other countries may not honor the patent. When the patent expires, anyone is permitted to exploit the innovation contained within the patent. Therefore, in order to fully realize the benefit from much of the technology developed by the chemical industry, the developer must maintain the technology as Confidential Business Information -- known to no one outside the company.

For many companies, the technology they develop is their very lifeblood. Without adequate protection for the confidential information, the companies will not be able to continue in business. If another person capable of manufacturing the same product were to learn of the new technology, the competitor would likely steal the entire market, or at least sufficient share of it to prevent the originator to compete. It is not an exaggeration to say the in many instances, the value of the confidential business information is the entire value of a business or company.

The Threat to Confidential Business Information

While this industrial development has progressed, so too has the development of environmental laws which require an ever increasing amount of disclosure by the U.S. chemical industry -- laws which apply only to the U.S. chemical industry and not to foreign competitors. Many of these environmental laws appear at first glance to require disclosure of only information necessary to inform a public about the environment in which they live. However, a study conducted by CMA showed that when taken together, the information disclosed under seemingly unrelated laws can be and are collected by industry intelligence groups in order to deduce the technology used by the submitter. The techniques used by the intelligence groups is not complicated. These firms conduct these investigations for various clients, including competitors in the industry -- foreign and domestic. Thus, one must view each requirement to disclose information in the context of all other requirements to disclose information in all jurisdictions.

As the requirements to disclose information continue to grow, so too does the ability of foreign and domestic competitors to discover the technology used in the U.S. chemical industry. This will inevitably erode the competitiveness of the U.S. chemical industry. Without a cooperative effort among the industry, government and the public, the growth of the U.S. chemical industry will be threatened.

The Need for Cooperation Among Industry, Government & The Public

The chemical industry recognizes the need for an informed public and the need to share information with the government in order that the public health and the environment can be preserved. However, the public and government must recognized that it is not necessary for the general public to know everything that the government knows in order that health and the environment is protected. The government must play an important role in collecting, digesting and analyzing information. Then, the government, under the appropriate statutory authority, can act as necessary to protect health and the environment. The public must rely upon the government to fulfill this role. The common goal can be achieved -- to protect health and the environment while allowing U.S. industry to compete in the global economy. It is important to recognize that the goal is NOT toxic use reduction. Industry does not, as a whole, support the concept of toxic use reduction. Rather, many, if not most, in industry believe that performance standards, rather than command and control standards, are the appropriate approach to risk management.

The industry is committed to providing government with the information necessary to carry out its role. It is important to keep in mind that disclosure to the government is not the key issue in maintaining Confidential Business Information. The key issue is disclosure to competitors. Generally, the government has demonstrated its ability to maintain the confidences entrusted to it. Even so, experience and study have shown that in some instances, state governments are not well equipped to protect the sensitive information required to be submitted under some state and federal laws. If the level of protection can be achieved at the state and local government level that is provided at the federal level, then the fears of inadvertent disclosure of the confidential information could be eased.

Industry also recognizes that the pressure is increasing on federal and state government agencies to disclose or to limit the ability of industry to make claims of confidentiality. The pressure comes from many different sources including health professionals and special interest groups. Because some of these entities have a special need for additional information, a solution must be found that will satisfy the need of the group while maintaining all aspects of the common goal.

An investigation by CMA indicated that the entities most likely to seek information from the governmental files are not the general public or even public interest groups. Rather, the most common entity seeking the information submitted by the chemical industry are foreign competitors, law firms representing industrial clients, and industrial intelligence firms working for domestic and foreign competitors. This tells the U.S. chemical industry that submission of information to the various governmental units can be very useful to competitors in their attempts to gain competitive advantages.

One should keep in mind that one easy method for avoiding CBI claims is for the government to avoid asking that confidential information be submitted in the first place. Government should evaluate carefully whether additional information will actually provide increased protection of the public's health or the environment. Alternatives to reporting information to the government should be explored.

Alternatives that work

One such alternative is the fostering of the relationship between a facility and its neighbors. Most responsible companies now have community out-reach programs in which they meet with local governmental officials and citizens to talk about the plant and the emergency planning. Some have chemical information available to the public at the local library or other facility. These programs can provide the level of comfort necessary for the local residence without jeopardizing the disclosure of confidential information to competitors. This fits well with the common goal I stated earlier -- to protect health and the environment while allowing U.S. industry to compete in the global economy. In this type of program, government can avoid the necessity of collecting and protecting confidential information, while still providing the protection to the public and the environment.

Other countries have addressed this concern differently than in the U.S. In Japan and in Western Europe, the governments recognize the value of the confidential information to their economies. Thus, those governments are more likely to resist the pressure to disclose the information, thus preserving the competitive position of their industry.

Conclusion

Reiterating, the industry believes that the common goal -- to protect health and the environment while allowing U.S. industry to compete in the global economy -- can be achieved. What the public and government must be willing to recognize is that confidential business information has high value to the industry and to the national economy. Protecting that information from competitors is, therefore, important to everyone.
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Session 1: Local Emergency Planning and TRI

Session Leader
Carol Macko, *Environmental Journalist, Bureau of National Affairs*
Speakers
John Ferris, *Chemical Emergency Preparedness and Prevention Office, U.S. Environmental Protection Agency*
Elizabeth Gonzalez, *Deputy Coordinator, Emergency Preparedness, City of Pasadena, Texas, LEPC Coordinator, Pasadena, Texas LEPC*
John Pine, *Associate Professor, Louisiana State University*
Jan R. Taylor, Ph.D., *National Institute for Chemical Studies, Charleston, WV*

Carol Macko, *Environmental Journalist, Bureau of National Affairs*

The Emergency Planning and Community Right-To-Know Act provides communities access to a wealth of information, including TRI data. But most local emergency planning committees (LEPC) do not make use of TRI data, according to panelists at the 1994 TRI Data Use Conference.

Some LEPCs report using TRI data to: identify facilities to be covered by the local emergency plan; make the data available to the public under EPCRA's right-to-know provisions; identify facilities that may not be reporting hazardous materials (for enforcement); include the data to construct hazards analyses for specific facilities; conduct risk assessments; assign priorities to facilities to be included in the emergency response planning process; initiate discussion with facilities about reducing the amount of hazardous materials they use; assist a city planning office in making zoning decisions; assist the fire department in fire inspections; prioritize response preparedness; update local emergency response plans; and supplement the fire department's computer dispatch.

The fact that a few LEPCs have found TRI reports useful in these ways suggests that others might want to explore ways to use them in their communities.

Some of the reasons given by LEPCs for not using the data include: Tier II data is more useful for emergency planning; TRI data underestimates risks; the data is too complicated to interpret; the delay in public distribution of the data to states and the public; not readily available to LEPCs; does not differentiate between uncontrolled releases and other types of releases; too much information to handle; and lack of resources to do anything with the data.

Several audience participants called on EPA to develop computer programs that would assist LEPCs in the manipulation of the TRI data. Others said EPA needed to do a better job of outreach to show LEPCs the potential of linking TRI data with chemical inventory information compiled under EPCRA Sections 302, 311 and 312.
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John Ferris, ***Chemical Emergency Preparedness and Prevention Office, U.S. Environmental Protection Agency***

EPCRA provides local communities with the authority to receive almost any information they want. TRI gives communities the amount of toxic chemicals that is being released; Section 311 and 312 provide an inventory of all the chemicals at a facility; section 304 provides the amount released and possible harm caused by releases of hazardous substances; and, section 302 provides the community with the means to receive any information regarding hazards from facilities that EPA or the state dictate.

During the Spring and Summer of 1993, torrential rains throughout the Midwest caused the largest flood disaster in United States history. Over 500 counties in nine states were affected by flood waters. The damages were estimated at $12 million.

In the initial hours of the response, we sought out any information we could get that showed where there could be the greatest risk of hazardous chemical releases. We pulled together the TRI reports, CENSUS Bureau reports, RCRA facility lists, and Superfund site lists. For states that had their hazardous chemical inventory (TIER II) reports computerized, the responders were able to use those reports as well.

Doing this, we realized that EPA has a wealth of information that could be useful to local emergency planning committees (LEPCs). This accelerated a program we were working on called LANDVIEW. Using this program, you can make maps. We are now finalizing ways to make this map making ability available to communities.

While doing this project, we learned an important lesson. The information in the database is close, but by no means perfect. For example, some Superfund sites were located by a zip code centroid. This may be close enough for some purposes, but a local community would want to know exactly where the site is.

All of this information can provide an awareness of the operations of facilities in the areas. Change comes facility by facility. If a community sees that a facility in their area is performing well, they should make an example of the facility for the other facilities. If they find a facility that is not performing well, they could make an example out of it as well. It all begins with awareness, and bringing that awareness to the right people. □

Elizabeth Gonzalez, ***Deputy Coordinator, Emergency Preparedness, City of Pasadena, Texas, LEPC Coordinator, Pasadena, Texas LEPC***

Use of TRI Data for Emergency Planning

By profession I am an Emergency Planner for the City of Pasadena, Texas. By virtue of that responsibility, my office has maintained an active role in the Local Emergency Planning Committee for Pasadena. I am addressing you today as a representative of the ten (10) LEPCs that surround the Houston Ship Channel and my counterparts in the same area in Emergency Management. We comprise the southeast portion of Harris County and are highly industrialized due to the proximity of the Houston Ship Channel. Our municipal boundaries are contiguous so that if one did not know where the boundaries were, one would not be aware of passing from one city into the next.

To understand how we have 10 LEPCs in that one section of Harris County, you must be made aware that Texans are different. While we have county government, that government has no jurisdiction within the boundaries of the cities and the cities do not answer to the county in any manner. A county, in Texas, has jurisdiction only over unincorporated areas unless it is specifically granted to them by local government. A

county has no emergency response capability beyond law enforcement. Being of an independent sort, each municipality in Harris County elected to form its own LEPC.

Being practical, those of us who do the work (and most times carry no lofty title) know that what we do affects one another. Our highest concern being the safety and lives of our citizens, we have elected to work together on many things that are common while maintaining our separate identities.

When I was approached to participate in this panel about the uses of TRI data in emergency plans and LEPCs, I talked to representatives of other ship channel LEPCs. You see, my LEPC does not use TRI data. While I knew that we did not find a value in the TRI data, I wanted to find out if we were missing the boat. Was there a use for this data that we had not seen? Would it improve our emergency planning? Perhaps we just didn't know how to read the data. The survey of the other LEPCs in our area told me that if my LEPC was missing out, then so were they. None of the LEPCs in our area have ever used the data submitted in the TRI reporting. The data is a year old when it's submitted and isn't released for a up to one and one-half years in addition to that. The data is subjective, cumulative, making no distinction in the areas in which it is important for emergency planners. The total numbers, as we understand them, includes amounts lost due to leaky valves, permitted releases, stack emissions, discharge into the waste stream, and other things that it is not important for an emergency planner to know along with the "unpermitted releases" that can be classified as emergencies. Emergencies are reported immediately and under other provisions of EPCRA. Quite often, an emergency response must be made immediately. The information on what chemicals are on site are reported on the chemical inventory reports. The vulnerability to our citizens from uncontrolled releases of these chemicals are determined through our vulnerability analysis. The information on total amounts released into the environment do not concern us from the emergency planning aspect.

Please don't misunderstand. We are concerned about the environment and about what is released into the environment. If it can affect our citizens who live and work in the area, we are concerned. We are also concerned because we, too, are citizens and we are concerned about our long term welfare and that of our families.

As an LEPC we can use the general information that comes from the cumulative reporting to convince the community that SARA Title III does work and is of benefit for us. Because of the reports we can point out that, in Region 6, the environment has sustained 41% reduction in chemical pollution since the beginning of the required TRI reporting because it pointed out to industry where they were losing a significant amount of their chemical inventory. While this is an excellent tool for community relations, it is the effect of the cumulative information released, not specific reports from specific industries.

The data accumulated from TRI submissions can be used by local governments, but it is in a regulatory area, not emergency planning. While some LEPCs may try to get into the regulatory area, most LEPCs have everything they can do to accomplish the tasks set out for them under EPCRA. One of the reasons the data is not used in our area has to do with the boundaries of our LEPCs and cities. I gave you a brief overview of the boundaries in the Ship Channel area. Most of our heavy industry - those who must file TRI release data, are along the ship channel. The "Port Authority" extends from a center line of the Houston Ship Channel 1/2 mile which includes the major portion of most of the industries. Technically, only parts of most of the industries reporting to our LEPCs are in our jurisdictions. As mentioned before, the county has no emergency response capability. The municipalities provide immediate emergency response to the industries, therefore, they (the industries) report to and participate in the LEPC that they would effect first in an incident, and who provides the response to their emergencies. The municipalities have no regulatory authority over the industries who file Form R. While our LEPCs may seem strange to people outside the state of Texas....they work!

We have coordinated our emergency planning between municipality and industry, industry and industry, and municipality and municipality. We have increased the training of municipal responders using industrial resources to increase their knowledge and capabilities. We exercise these plans - together.

We have improved the warning capability of the cities - with the help of our industry. To date, five cities have installed outdoor warning systems. Plans are in place to complete these systems in three more cities...with industries financial help. Telephone alerting systems are used in two cities, low band AM radio stations are in place in four cities.

We have increased the communities awareness of LEPCs through a Community Telephone System to give citizens a number to call to get information about incidents on-going along the channel. When there are no incidents, it gives them an avenue to gain information about the area LEPCs. The level of cooperation between industry and cities cannot be rivaled. But TRI data is still not utilized in any of these efforts.
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John Pine, ***Associate Professor, Louisiana State University***

Risk Assessment in High Hazard Areas

Introduction

Chemical processing is a major part of the Louisiana economy. The Transportation and Environmental Safety Section of the Department of Public Safety and Corrections (DPS) reports that approximately 25% of regulated hazardous materials in the United States are either produced, used, stored, or transported within the boundaries of the State of Louisiana. In addition, major transportation routes including rail lines, interstates, pipelines, waterways, and ports are located within the boundaries of the state. Because of the extensive volume and scope of chemicals processed within the state, Louisiana faces a significant need to enhance its state and local planning and response systems relating to hazardous chemical emergencies.

The Louisiana SERC with assistance from EPA identified high hazard areas in the state and assisted the LEPCs in these communities in improving hazardous materials emergency response plans. The high hazard parishes were identified by analyzing hazard indicators which reflected the extent of hazardous chemicals in the community. These hazards indicators formed the basis for ranking the parishes as to the relative risks associated with processing hazardous chemicals.

Hazards within the "High Hazard Parishes" were analyzed by teams composed of the LEPC members. The LEPC teams conducted a comprehensive analysis of Tier 2 inventories and identified those chemicals that pose the greatest risk to the community. After identifying and ranking the risks present in the parish, the teams determined the potential impact of an accidental release of the hazardous chemical. A vulnerability analysis was then conducted to determine who could be affected by the release.

With the results from the analysis of local hazards, the LEPCs could determine if the current emergency operations plan were focused on the greatest risks in the community. The LEPC could determine what changes must be made to the parish emergency operations plan and agency annexes to minimize the adverse impact of the hazards present in the parish.

Local Hazard Indicators

Hazard indicators are tools used to identify and measure the risk of emergencies associated with processing of hazardous chemicals. These indicators are specific, measurable, and enable planners to compare relative risks in the local community. The examination of risks were based on specific facility location in the parish. During this initial look at TRI data as an effective indicator of risk in the local community, an analysis

of the Tier 2 and TRI data by geographic classification system established by the U.S. Bureau of the Census was not used. Further analysis will be made to determine if analysis of TRI data by Census block group and postal service ZIP Codes are an effective means of identifying high risk in the local community. The location of Tier 2 and TRI facilities has been geocoded in two GIS mapping programs in this study. MapInfo and ArcView II are both being used to analyze relative risks in Louisiana communities. Block group boundaries were not available at the time the initial phase of this study was completed. Further analysis of facility incidents and transportation incidents will be completed using MapInfo and ArcView II.

Sources of information for hazards identification in this study included local Tier 2 records and Toxic Release Inventory Reports. These records were obtained from the Transportation and Environmental Safety Section of the Louisiana State Police and the Louisiana Dept. of Environmental Quality. The TIER 2 Report and Toxic Release Inventory provide an excellent basis for evaluating risks associated with processing hazardous chemicals.

Identification of High Hazard Areas

Hazard indicators drawn from Louisiana's Tier 2 reports and the Toxic Release Inventory were used to determine if the total amount of air emissions recorded in a facility's TRI report was a good predictor of relative risk in a local community when compared to high risk rankings determined by using Tier 2 EHS inventory records and EHS accidental release records.

The Tier 2 and TRI records used in this study were selected based on a statewide comparison of risks in each of Louisiana's 64 parishes. An analysis of all 64 parishes in Louisiana showed that parishes with highest number of Tier 2 facilities also had the greatest number of TRI facilities. The same relative ranking also occurred when the parishes were compared using the number of EHS and TRI chemicals. The parishes selected for this study to determine if the TRI data is an appropriate indicator of high risk at the local level were selected from the top ten high risk parishes in the state.

The following findings were drawn from an analysis of the relative risks associated with the 64 parishes in Louisiana. The ten high hazard parishes used in the present study have the following characteristics.

- The high hazard parishes tend to have the lowest unemployment rate.
- The high hazard parishes tend to be in the most industrialized urban and rural areas of the state.
- The high hazard parishes included all urban industrialized areas.
- The rural high hazard parishes are also on the Mississippi River (St. James, St. Johns, St. Charles, and Iberville Parishes). The population of these parishes range from 20, 000 to 45,000 residents.
- The urban industrialized areas have the highest average weekly wage of parishes in the state and are also on major transportation routes including rail, shipping, and highway.
- The unemployment rate is low in the urban industrialized centers (East Baton Rouge, Jefferson, and Orleans parishes).
- One rural industrialized parishes has an unemployment rates of less than 8% (St. Charles). High hazard rural industrialized parishes with an unemployment rate of 8% or greater include St. Johns, St. James, and Iberville).
- The TRI total emissions is the best indicator for high hazard parishes (Toxic Release Inventory Database).
- The parishes with high numbers of TRI facilities have a positive relationship when compared with parishes with high numbers of EHS chemicals and EHS facilities. The comparison of TRI facilities with EHS facilities and chemicals provide good indicators of high hazard parishes.
- The parishes with large inventories of Tier 2 chemicals and large numbers of Tier 2 facilities have a positive relationship with parishes with large numbers of EHS facilities and EHS chemicals. The comparison of parishes with Tier 2 chemicals and Tier 2 facilities with EHS facilities and chemicals are thus good indicators of high hazard parishes.

- The high hazard parishes included Ascension, Caddo, Calcasieu, East Baton Rouge, Iberville, Jefferson, Orleans, St. Charles, St. James, St. John the Baptist parishes.

An initial assessment of risks using these indicators was used to identify high risk areas in Louisiana. The data presented a clear picture showing that the industrialized areas of the state had the most facilities, chemicals, and greatest volume of hazardous chemicals. The fifteen parishes with the greatest relative risk will be provided special assistance in hazards analysis with the intent of enhancing local emergency planning and response efforts.

Findings

An initial assessment of these indicators was used to identify high risk parishes in Louisiana. The data presents a clear picture that for communities with established industrialized economies, the TRI data is a useful indicator of risk. In Louisiana, the industrialized areas of the state also have the most chemical process operations, chemicals, and greatest volume of hazardous chemicals.

- TRI facilities with the greatest number of TRI chemicals recording air emissions were also the facilities with the greatest number of EHS chemicals
- TRI facilities with the largest volume of permitted and non-permitted air emissions also had the largest volume of EHS chemicals
- Some facilities with a large volume of Tier 2 reportable hazardous chemicals may not be included in the TRI list. Public funded operations or utilities were among the facilities reporting large volumes of extremely hazardous chemicals; these facilities are not included in the TRI program. Since these facilities are not a part of the TRI Program they would not be expected to be included in the TRI data. Water treatment plants, sewerage treatment facilities, pipelines, and electrical utilities (Louisiana Power and Light / Entergy) would be the type of high risk facility in a local community not reflected in the TRI Program.

  Wholesale trade operations such as Delta Distributors, Fuselier and Thompson Stores, Dowell Schlumberger Inc., and Diversified Foods, which distribute hazardous chemicals were in the Tier 2 high risk category of facilities at the local level but were not included in the TRI Program.

  Service industries that use hazardous chemicals would not be covered under the TRI Program and be reflected as a high risk facility in the TRI data. St. John Well Booster and Matheson Gas Products both are involved in providing industrial services to the chemical processing operations in Louisiana. These business may not be included in the TRI Program.

- Caution should be taken to use TRI facilities as indicators of high risk in local communities. It should be noted that the number of EHS chemicals identified by the U.S. Environmental Protection Agency (EPA) include 435 chemicals. A total of 436 chemicals are identified by the EPA in the TRI Program. The list of chemicals is not the same and include only 96 common chemicals. This means that only 96 chemicals are listed by EPA as both a TRI chemical and an EHS chemical.

The use of the TRI data as an indicator of relative risk in a local community is an appropriate tool for emergency planning. The user of the data, however, must realize that the absence of a reporting facility's name from the TRI list does not mean that the facility has an excellent record of safety nor that large amounts of hazardous chemicals are not present at the facility. The list of TRI facilities simply point the way to further analysis and provide a quick focus on selected facilities in the United States. Extreme care should be taken not to assume that the presence of a business on the TRI report is not a reflection of the effectiveness of management. The TRI data is simply a useful tool in focusing attention at the local level on chemical process or manufacturing operations.

Conclusions

A year long project has focused on helping state and local emergency planning and response agencies to develop and maintain information relating to hazardous chemical emergencies. Hazard indicators were used to identify high hazards parishes and were used to form a basis for analyzing risks in each of the high hazard parishes. LEPC members reviewed Tier 2 and TRI data. High hazard areas in the parishes were identified and comprehensive emergency plans for these high hazard areas were examined to ensure that the plans were an appropriate response to the identified risks.

The TRI Program includes manufacturing facilities with 10 or more full time employees. It also involves business operations with a Standard Industrial Classification Code from 20 through 39. This includes the manufacturing of durable and non-durable goods. The TRI Program also focuses on business operation that use 10,000 pounds or more of a reportable toxic chemical in a year. Louisiana's Tier 2 threshold reporting requirements are much lower that the TRI Program and lower than other state Tier 2 threshold reporting programs. Caution should be taken when comparing the results of this study to other states. High Tier 2 thresholds could result in different relative ranking of facilities.

Analyzing risks in high risk areas leads to more effective emergency planning at the local level. LEPCs may develop the capacity to use local data to assess local plans and focus on the development of emergency response plans in high hazard areas. Data relating to the social and economic characteristics of the local community may be used in analyzing the impact of hazards. Facilities in the high hazard areas may use local social and economic data to ensure that the facility emergency response plan is sensitive to the local population that could be affected by an accidental release of a hazardous chemical.

The high hazard project demonstrated that a SERC and LEPCs can use hazardous chemical emergency information to enhance emergency plans at the local (including facility) level. LEPC and facility plans may also be more sensitive to the impact of hazards on local population and accommodate the special needs of local residents.

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Toxic Release Inventory and Emergency Planning: Feasibility and Utility for LEPCs

Introduction

In 1985, the National Institute for Chemical Studies (NICS) began working with the chemical industry and the public to build credible information for environmental decision-making. Since the enactment of provisions set forth under the Emergency Planning and Community Right-to-Know Act (EPCRA), Local Emergency Planning Committees (LEPCs) have been formed and have utilized the information made available by EPCRA, in many cases, to write emergency plans, transfer technology, redirect financial resources, and set priorities. Likewise, states and the federal government have used the information to assess pollution trends, write regulations and lobby for funds. Citizens have become involved in plant-level decision-making and communities have been the benefactor. But not all areas have the access and the ability to take advantage of the broad array of information available.

There are a myriad of databases and sources of environmental, public safety and emergency response issues which could be investigated by LEPCs to form a more comprehensive view of environmental data. For the purposes of this pilot study, however, NICS is focusing on sections 311/312 and 313 for the inherent value of collectively assessing environmental issues. In other words, we are investigating not only the mechanism by which this information may be linked but also the questions of influence and impact. Does Toxic Release Inventory data collected under Section 313 help emergency planners with interpretation of Section 311/312

chemical storage data and emergency planning? Conversely does the chemical storage information provide added value when assessing toxic chemical releases and transfers? Interestingly, these data fall into an array of local, state and national repositories. Thus, one challenge in this assessment will be to identify channels for linkages such that public and private access to the information will be improved.

The Project

Linkages can be defined in two ways: access and relationship. First, how does one, especially in the public sector, readily access EPCRA information in an efficient fashion? And, how might this process be improved? Second, what is the relationship or link between the data sets: i.e. what does one tell us about the other and vice versa? Here lies the true potential for a comprehensive right-to-know package.

In order to identify access routes and complete an assessment of relationships and access, NICS has collected data from two geographic areas. NICS research is focusing on two LEPCs and two SERCs actually utilizing SARA Title III data. We are specifically focusing on industrial communities for this study. EPCRA data from reporting facilities in the jurisdictions of the Kanawha/Putnam LEPC and West Virginia SERC and the Cuyahoga County LEPC and Ohio SERC are being compiled for analysis. A dBase program has been written to link the data and extract reports containing data of interest to LEPCs. The years 1991 and 1992 were targeted for assessment since these are the most recent available for both Section 311/312 and Section 313 data sets.

Our Hypothesis

Linking the two data sets through common identifiers will allow identification of certain data elements that will assist LEPCs, SERCs, U.S. EPA and the public in identification of and response to chemical risks. This linkage of data will allow us to assess the utility of providing new data to these potential users as well as the form the data should take.

Questions

Through the analysis of the chemical storage and TRI data sets and through meeting with the LEPCs and SERCs, we are gathering information that addresses several questions that we seek to answer regarding TRI, chemical storage data and emergency planning. At this stage of the project, we have some preliminary answers to some of the questions posed in the pilot project. As we continue to analyze the data and consult with LEPCs, SERCs, federal agencies and the public, we will refine and finalize the project report and recommendations.

1) Does knowledge of chemical storage data improve utilization of TRI?

At the local level, chemical storage data can be paired with TRI to paint a fuller picture of risk to the public from industrial operations. Linking facility data through common identifiers can assist the public in interpreting the magnitude of risk posed by chemicals. However, looking at the large amounts of data received by LEPCs can be a daunting task. If LEPCs or SERCs utilize Tier II software or some other data management system, the chemical storage data can be sorted in a variety of ways. One way is to identify potential TRI reporters by chemical storage amounts with TRI thresholds and SIC codes. The LEPC and SERC can then match the potential filers with the list of facilities that have reported TRI. For instance, in Kanawha County (WV), our linking program identified 14 facilities currently filing Form Rs and 9 additional facilities within SIC codes 20-39 that filed Tier IIs but not Form Rs. Further inquiry could easily establish the TRI status of these facilities. Additionally, Tier II data can be used to identify facilities that may need to file Form Rs with the expansion of the TRI chemical and SIC lists.

Knowledge of the amount of a chemical stored on a site can add perspective to the releases reported by the facility. Although TRI reporting requires maximum storage codes for each chemical reported, the universe of TRI chemicals is smaller than those reported under Sections 311/312. Relying solely on TRI can underestimate potential risk to the community. LEPCs can assist the public in understanding risk and their responsibility in emergency response by providing the public with summary information about both aspects of hazardous chemicals in the community.

2) Does knowledge of Toxic Release Inventory data improve local emergency planning capabilities?

TRI in general provides a range of information useful to emergency response planners. Specific aspects of the Form R that can assist in emergency response planning for the community include maximum storage information, offsite transfer data and pollution prevention and source reduction elements. In our analysis of Tier II and TRI data from the pilot sites, we found several instances in each jurisdiction where storage codes for the same chemical differed on the two forms. Identifying discrepancies can be an important emergency planning tool. Contact with the facilities can clarify the discrepancies and initiate an LEPC contact and visit to the facility. We also found instances where facilities filed Form Rs, but had never filed a Tier II form with the LEPC.

Examination of offsite transfer information from the TRI database can assist LEPCs in beginning or reassessing hazardous materials transportation emergency plans for the community. The Form R provides total amounts of TRI chemicals shipped away from covered facilities within the LEPC jurisdiction. The Form also gives the name and location of the facility to which the chemical is shipped. Assessment of hazards posed by these shipments may encourage LEPCs to improve planning for hazardous materials incidents on highways, railways, and rivers.

The pollution prevention data found in Section 8 of the Form R presents an opportunity for better understanding of the management of hazardous chemicals and their potential hazards. Storage information alone may not present the entire magnitude of risk, e.g. companies may not store nearly as much as they process via "just in time" delivery of raw materials. Examination of these data can also give LEPCs a glimpse into future plans of the facility for handling the hazardous chemical since facilities must project releases and management into the next two years.

3) Do pollution prevention opportunities also represent emergency response and risk reduction opportunities? Conversely, do emergency response/planning opportunities also represent pollution prevention opportunities?

Pollution prevention opportunities can and have been identified by examination of TRI data. Many state pollution prevention programs have targeted industry sectors based on reported releases, treatment and transfers of toxic chemicals. Large releases of chemicals often imply large storage or large processing capacity. In either case, pollution prevention assistance can be piggybacked with risk reduction elements. Pollution prevention audits could include local emergency planners and responders so that they could learn more about the process units and their potential risk.

TRI data can also be used by LEPCs, SERCs and EPA to target and prepare for chemical safety audits. LEPCs will be receiving large amounts of information when the Risk Management Planning (RMP) rule under Section 112(r) of the Clean Air Act becomes effective. Even though finalization and implementation are several years in the future, it is not too soon for LEPCs to begin interacting with those facilities likely to fall under the requirements of RMP. These include not only the larger traditional facilities like chemical plants that report TRI, but also small businesses that may currently be exempt from many reporting requirements. NICS has also written a program to identify potential RMP filers. The program marks facilities that report Tier II storage of RMP chemicals in ranges of pounds that include or exceed RMP thresholds. These facilities can be targeted for outreach, education and pollution prevention prior to implementation of the RMP. A similar technique can be used to notify facilities that they may be subject to TRI reporting due to chemical expansion. LEPCs can take the opportunity to begin to understand the RMPs that will be submitted by learning more about covered facilities now.

4) What are the problems with access and availability? Is data volume a deterrent?

Although TRI data are available to those with the knowledge and/or equipment to obtain it, many citizens **and** LEPCs are lacking in these areas. Through risk communication research conducted at NICS, we know that availability does not always equal access. The sheer volume of data creates a barrier to access and understanding. This necessitates some outreach program to improve accessibility for the general public and LEPCs.

Both TRI and chemical storage data create problems in interpretation for both assessing risk and planning for emergency response. Groups involved in outreach activities must take care to provide an intelligible interpretation of the often complicated rules that govern reporting under these sections of EPCRA.

5) Would summaries expedite utilization of both data sets?

NICS believes that specifically crafted summaries can improve access and utility of both chemical storage and chemical release data. The NICS' *West Virginia Scorecard* © was developed prior to the implementation of Superfund Amendments and Reauthorization Act (SARA) Title III in response to citizen need for information about hazardous and toxic chemicals in their neighborhoods. With the passage of EPCRA, it became possible to fairly assess the progress in reducing releases of these chemicals. While a few large environmental organizations are interested in and peruse national TRI statistics, most US citizens identify with and more actively engage local data. *Scorecard* © has been organized to meet the needs of local communities in West Virginia.

A selective summary of selective TRI data elements linked with critical elements of Tier II data could provide a succinct tool for LEPCs to improve emergency planning. LEPCs have little need for release data, per se, in emergency planning activities. They have even less time to deal with information of little use to their primary responsibility. Summaries provided to LEPCs that distill both TRI and Tier II data to strictly those items that directly affect emergency planning could improve the breadth and increase the effectiveness of local planning efforts.

Summary

NICS believes there is inherent value in linking EPCRA Section 311/312 and 313 information for a variety of users. While Congress created separate reporting mechanisms, and thus disjunct sources of information, we are working to compare and contrast this information for possible values to local, state and federal programs. The important tasks and challenges of LEPCs cannot be overlooked, but by selectively providing linked Tier II and TRI data to these LEPCs, and to state and federal agencies on a pilot project basis, NICS is assessing the advantages and disadvantages of this approach. LEPCs and program managers at the state and federal level could benefit enormously from the increased depth and breadth of comprehensive information. □

Session 2: Crossmedia Use: TRI Partnerships Within Agencies

Session Leader
Dick Murdock, *Pollution Prevention Unit, New York State, Department of Environmental Conservation*
Speakers
Robert A. Boisselle, *Branch Chief, Information Group, Division of Air Quality Control, Massachusetts Department of Environmental Protection*
Joseph E. Kowalczyk, *Multimedia Enforcement Council, New York State Department of Environmental Conservation*
Paul Orum, *Coordinator, Working Group on Community Right-to-Know*
Wesley Taylor, *Waste Management Information Specialist, Wisconsin Department of Natural Resources*

Dick Murdock, *Pollution Prevention Unit, New York State, Department of Environmental Conservation*

The experience of three states provided the basis for a discussion on the broad range of uses of TRI within agencies. Wes Taylor and Tom Nowakowski of the State of Wisconsin Department of Natural Resources (DNR) highlighted the Southeast Wisconsin Toxics Reduction Project, a pilot cooperative effort among the Wisconsin DNR regulatory programs, the University of Wisconsin - Extension Solid and Hazardous Wastes Education Center (SHWEC) and private industries. The Project focused on 10 facilities and the development of a good description of possible pollution prevention tools for each, based upon existing data from regulatory programs that had been integrated into a common format. The project combined education and environmental regulations into an effective method of providing tools for industries to apply pollution prevention strategies to minimize waste and decrease environmental impacts.

Robert Boisselle, of the Massachusetts Department of Environmental Protection, then highlighted the problems encountered when comparing TRI data with AIRS data. There were significant differences demonstrated, often due to different individuals completing forms, misinterpretation of instruction, or timing in filling out forms. There were instances given where the data were widely disbursed for the same facility. Mr. Boiselle clearly outlined the need for a more uniform collection approach if data from different systems are to be compared.

Next, Paul Orum, of the Working Group on Community Right to Know discussed effective management of information resources across different media. As a member of the Environmental Information and Assessment subcommittee of the National Advisory Council for Environmental Policy and Technology, Mr. Orum gave suggestions for better design and flow of information resources. Significant barriers to progress in this area were identified (including parochial programmatic structures) and recommendations for bridging the barriers through organizational culture changes were offered.

Finally, Joe Kowalczyk, an Enforcement Attorney for the New York State Department of Environmental Conservation, provided insight into NYS efforts at multimedia enforcement efforts including using TRI data as a resource for baseline information. The topic included the departments approach towards multimedia enforcement, identified the need for local and state involvement, and the need for complete up-to-date information when looking at a facility's progress towards compliance.
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Robert A. Boisselle, ***Branch Chief, Information Group, Division of Air Quality Control, Massachusetts Department of Environmental Protection***

Comparing TRI Data With AIRS Data Within SIC Codes

Introduction

The Superfund Amendments and Reauthorization Act (SARA), Public Law 99-499 has required various industries to supply information on the releases to the environment including air since the calendar year 1987. The submission of EPA Form R, the Toxic Chemical Release Inventory (TRI) reporting form, assist in this requirement of section 313 of the Emergency Planning and Community Right-to-Know. These reports are required to provide the public with information on the releases of listed toxic chemicals in their communities and to provide EPA with release information to assist the Agency in determining the need for future regulations.

Massachusetts Air Quality Section in 1994 embarked upon the task of reviewing databases for toxic chemicals in Massachusetts. During this exercise a question was asked about the amount of toxic chemicals at a facility in one database versus the amount in a second database which should contain the same information. It was necessary to answer several questions in addressing this task:

- What type of facilities are in the databases?
- What pollutants are included?
- What databases exist that contain similar and recent information?
- What are the acceptable means of receiving the data into the databases?
- What coding method is used to identify processes within a facility using the toxic chemical ?

The Massachusetts Air Quality Section decided to review the Toxic Release Inventory (TRI), required annually by SARA 313, and the Aerometric Information Retrieval System (AIRS)-Air Facility System (AFS), required to be updated annually by the Clean Air Act (CAA).

Inventory Overview

Toxic Release Inventory (TRI)

The TRI was mandated by Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA), also known as Title III of the Superfund Amendments and Reauthorization Act of 1986, signed in October of that year. The Pollution Prevention Act, passed into law in October, 1990, added additional reporting requirements to Form R. This law has two main purposes: 1) to encourage community/facility planning for response to accidental chemical releases; and 2) to provide government agencies and the public with information about possible chemical hazard exposure in their community. The law requires the collection of specific information about the use of chemicals by industrial manufacturing facilities and the release of those chemicals to the environment.

Section 313 of EPCRA requires manufacturing facilities with 10 or more employees and having a primary Standard Industrial Classification (SIC) code between 20 and 39 to file an annual report. The facility must manufacture or process more than 25,000 pounds or otherwise use more than 10,000 pounds of any listed toxic chemical during a calendar year.

TRI contains information such as name, location, type of business, contact names, name of parent company, environmental permit numbers, information about the manufacture, processing, and use of the listed chemical and the maximum amount on site during the year, releases and transfer estimates. For this review, only air emissions (Form R, Section 5.2) were evaluated. Air emissions estimates for stack/point releases are made through engineering estimates, mass balance calculations using purchase records, inventories, engineering knowledge or process specifications.

Aerometric Information Retrieval System (AIRS)

Congress passed the Clean Air Act (CAA) of 1970 and for the first time air quality standards were set for the country. By the mid 1970s it became apparent that not all air quality standards would be attained. Many states remained out of compliance and air quality in some regions deteriorated. In 1977, Congress amended the Act. While basic programs were retained, sources in nonattainment areas were stringently regulated and requirements were put into place to prevent the deterioration of air quality in attainment areas.

Many inventory programs were established to track the regulated sources and quality of air. These programs lack sufficient funding and at times the data deteriorated. By the late 1980s, these inventory programs were done away with and AIRS was created. The Aerometric Information Retrieval System (AIRS) was developed to replace five (5) existing federal EPA systems. The submission of information to AIRS, which includes air quality, emissions, enforcement and related data, is required by the state and local Air Quality agencies under the Clean Air Act. The AIRS Facility System (AFS) is contain within the AIRS and this program is the warehouse of information about the facility. The AIRS-AFS contains a great deal of information, such as name, location, contact names, telephone numbers, environmental permit numbers, type of business, enforcement actions, emissions, combustion information, underground storage tanks, and process information, which contains throughputs, seasonal activity, chemical quantity and emission control equipment.

The 1977 Amendments were no more successful in attaining the goals of the Clean Air Act. It was not until October, 1990, however that a second set of amendments emerged from Congress and was signed into law on November 15, 1990 by then-President George Bush. Although the 1990 Amendments do not alter the basic regulatory structure of the Clean Air Act, they dramatically increase the number and types of businesses subject to its regulatory requirements.

Title I of the CAA covers emission reduction programs for volatile organic compounds (VOC) to meet ambient air quality standards. Chemicals (VOCs) that participate in the atmospheric photochemical reactions to produce ozone are coded into AIRS. Title III, section 112(b) of the CAA, lists hazardous air pollutants (specifically 189 hazardous air pollutants (HAPs). These pollutants are expected to be coded into AIRS at a later date.

Data Evaluation

The TRI and AIRS databases were evaluated by comparing the following criteria:

1. Pollutants
2. Type of facilities reporting
3. Reportable quantities
4. Estimation methods
5. Emission points

1. Pollutants

Toluene and acetone were selected as the pollutants for evaluation from the databases. These chemicals are coded in both databases. Toluene and acetone have many uses in the manufacturing of organic chemicals and as a solvent in paints, gums, resins, adhesives and printing inks. Reaction of these chemicals in the atmosphere contribute to the formation of ozone in the lower atmosphere.

2. Type of Facility

AIRS evaluates information from all facilities subject to the Clean Air Act which are regulated under state programs and file reports annually. The TRI requires manufacturing facilities with ten (10) or more employees and having a primary Standard Industrial Classification (SIC) code between 20 and 39 to file annual reports

3. Reportable Quantities

TRI requires only those facilities which manufacture or process more than 25,000 pounds or otherwise use more than 10,000 pounds of any listed toxic chemical during a year to file an annual report. AIRS has no cutoff limit on reportability but this may vary from state to state depending on attainment status.

4. Estimation Methods

TRI and AIRS suggest that monitoring data, engineering estimates, and mass balance calculations may be used to determine stack/point air emissions. AIRS has default calculations using emission factors that have been generated through research. These factors have been assigned to a Standard Classification Code (SCC) system. This coding mechanism will identify the Industry category, source category within the industry and a particular process within the category.

Example: Chemical Manufacturing 3-01
Explosives -010
Fume Recovery -11

SCC # = 3-01-010-11

5. Emission Points

Both AIRS and TRI agree that all emissions come from any stack, venting or ducting mechanism. TRI considers the air emission to be coming from a particular stack/vent when it is reported on Form R for a chemical. AIRS can identify each process line with air emissions coming from it and bubbling that number to the facility level. This identification is done through the SCC system.

Summary of AIRS/TRI Evaluation

A number of facilities were identified to contain acetone or toluene in their 1990 inventory. One facility (02164ICPCR156OA) indicated 20,000 pounds of acetone being emitted into the air. The AIRS facility (1190424) indicated 20,000 pounds of acetone being emitted from three (3) paper coating operations (40200902) using the acetone as a solvent thinner in the printing section of the process. The retrieval of other facilities (20) showed similar correlation but there were a large number (15) that the difference between reported air emission in TRI and AIRS varied from 1,000 pounds to 156,000 pounds for specific chemicals.

A facility (01220WRGRCCHARWO) in TRI indicated 100,000 pounds of toluene being emitted into the air and the AIRS (1170078) facility indicated 124,000 pounds of toluene being emitted from a coating operation. Another facility (02106THGLLGILLE) in TRI listed 126,000 pounds of a chemical being emitted but the AIRS (1190033) database indicated only 26,000 pounds being released into the air. Upon closer review of the AIRS data, I found the source was emitting 126,000 pounds before being controlled by an activated carbon adsorption unit with 80% efficiency on the air stream resulting in 26,000 lbs of the chemical being emitted. The use of control equipment in the air process stream seems to play a major difference in the air emission concentration but there were some facilities that AIRS had higher emissions than TRI. Upon reviewing the data, it seems that different people are filling out the forms, which could lead to possible errors in the interpretation of data into the forms. It was also noticed that chemicals in AIRS are being incorporated into "Miscellaneous VOC categories" which made it difficult to track a specific chemical in the facility.

Conclusion

Comparison of the AIRS and TRI database revealed a number of differences. The problem of combining chemicals has to be addressed by the AIRS user community so that specific chemicals are identified in the process stream. The control equipment in a facility has to be addressed by the TRI user community to give credit to the facility for the installation of the equipment and the reduction of emissions. The user community for both systems may need additional guidance to confirm emission numbers. The facilities selected were accounted for

in both databases with the chemicals but quantities varied in amounts. Facilities were identified with correct chemical amounts and it was possible to show how the chemical was being used in the facility.

These databases are only a starting point for industrial interaction for all concerned. TRI and AIRS should be looked at as a tool for learning about the contents of a facility. But there is a need for continuous improvement in coding information and streamline the reporting process.

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Using TRI and Other Department Data For Environmental Enforcement

Introduction

It is the policy of the State of New York to conserve, improve and protect its natural resources and control pollution and the responsibility of the Department to promote and coordinate management of natural resources, taking into account the cumulative impact upon all resources when making enforcement determinations. This comprehensive approach to enforcement is designed to advance the State's policy to enhance the health, safety and welfare of the people of the State by protecting its natural resources and the environment and controlling pollution. The enforcement process generally, and multimedia enforcement specifically, is utilized so that the State's policy and the Department's objectives and responsibilities are carried out to the fullest extent possible.

The primary goals of multimedia enforcement are to ensure full compliance at all facilities and advance pollution prevention and risk reduction at facilities that have the potential to significantly impact public health and the environment. It also addresses cross-media transfers of pollutants and significant compliance problems due to inadequate environmental management systems.

Multimedia enforcement not only enhances the Department's ability to produce significant orders but provides facilities with the flexibility and certainty needed for both long-term planning and successful operation. Prosecution of violations in multiple programs increases the likelihood that orders fully address the universe of violations, as well as significant public health and environmental issues at certain facilities. Multimedia orders also include integrated compliance schedules addressing appropriate sanctions and/or remedies. Significant multimedia enforcement orders should also produce significant publicity within the regulated community and a corresponding increase in deterrence.

Background

Successful implementation of multimedia enforcement is essential for the Department to carry out its responsibilities more effectively. Consequently, the Department has increasingly modified its approach to enforcement by supplementing its traditional single-medium method and continuing to build a multimedia perspective into its enforcement effort. The Department has brought a multimedia enforcement perspective to all appropriate facets of its enforcement process, from priority setting and inspection planning to case screening, prosecution and settlement.

Over the past several years, the Department has increasingly developed a more comprehensive, integrated approach to facility management and environmental protection. Organization and Delegation Memorandum #92-13 Policy: Pollution Reduction and Integrated Facility Management ("O&D Memo #92-13") calls for a coordinated development of regulatory programs to ensure that the regulations of the environmental quality programs are integrated to form a more coherent framework. Moreover, O&D Memo #92-13 further directs implementation of integrated facility enforcement, or in other words, multimedia enforcement. O&D memo #92-13 also acknowledges that it is the law of the State of New York and the policy of the Department to reduce the generation and release of hazardous substances to all environmental media.

Multimedia enforcement is the latest component of the Department's strategy to ensure that the enforcement program: (1) is implemented consistently across the State; (2) produces clear environmental gains; (3) punishes violators and deters future violations; (4) prevents egregious violators from operating in New York State; (5) ensures that environmental harm is remediated; and (6) creates a level playing field for companies that operate lawfully. Specifically, multimedia enforcement will be utilized to advance the State's environmental policy by: i) detecting violations and requiring their correction; and ii) deterring violations.

Multimedia enforcement actions normally include: 1) enforcement actions involving more than one program or one medium; 2) enforcement actions rising out of multimedia inspections; 3) enforcement actions which result in compliance activities (such as pollution prevention programs) that impact other media; and 4) enforcement actions which include progressive sanctions and remedies such as those discussed under "case resolution" below.

Implementation

Case Selection

Successful implementation of multimedia enforcement must effectively combine common sense, innovation and flexibility. Multi-program cases addressing all of a facility's outstanding violations will generally be utilized except when other strategies will more effectively advance the Department's objectives. Generally, the decision as to whether the Department's goals can best be accomplished through single program or multimedia enforcement activity will be made on a case-by-case basis, pursuant to regional docketing and screening procedures approved by the Commissioner. The docketing process includes a system for identifying violations in more than one program and for weighing the merits of consolidating cases into multi-program cases before a decision is made to pursue administrative or judicial enforcement in a single program. Identifying and pursuing multimedia enforcement requires effective case screening which integrates staff from different programs. Case screening is a component of docketing designed to evaluate potential cases for "strategic value" (extent to which the case, when resolved, reduces risk, protects the environment, prevents pollution or enhances deterrence) and to decide upon the most appropriate response.

The following factors are considered in determining when to utilize the multimedia approach to enforcement:

- Environmental and Public Health Issues: Facilities with the potential to impact natural resources, including but not limited to, particularly sensitive or important resources such as sole source aquifers and wetlands, or densely populated residential communities, should be subject to thorough multi-program review.

Multimedia enforcement is also well-suited to implementing pollutant-specific, geographic, or other risk-based targeting strategies.

• Appropriateness of progressive sanctions, remedies and compliance tools: The desirability and/or potential for committing facilities to certain progressive sanctions, remedies and compliance tools often indicates that multimedia enforcement is appropriate.

• Significant toxic loading: Integrated facility management (including enforcement) is primarily utilized to regulate the State's largest polluters. Many significant contributors of toxics to New York State Environment can be identified by reviewing Toxic Release Inventory information submitted pursuant to SARA Title III and Hazardous waste generation data submitted pursuant to Article 27 of the ECL.

• Compliance history: Potential facilities are subject to a comprehensive review regarding compliance history, including electronic databases such as the Environmental Enforcement Data System (EEDS). A poor record of compliance regarding a company or facility is often indicative of more significant problems than those identified and suggests that coordinated enforcement activity is appropriate.

• Multimedia impacts of proposed order conditions: Violations may involve only one program, but the sanctions and remedies may trigger cross-media transfers or impact other media. Inter-program coordination is essential in such circumstances.

• Selection of the best statutory authority: Some environmental problems, such as groundwater contamination, may be best addressed by using statutory provisions other than those available within the program which identified a violation or problem;

• Opportunity to increase deterrence: High profile cases present the potential for widely influencing the regulated community and deterring future violations. Deterrence is particularly important when addressing violations that are difficult for the Department to detect;

• Access: Multimedia inspections are encouraged when performing investigations under administrative search warrants; and

• Multimedia Inspections: Facilities such as those which present either significant risk or the potential for violations in multiple programs, or result in significant releases of pollutants or significant generation of hazardous waste, are selected for planned multimedia inspections.

Case Resolution

Administrative orders are effective in advancing the Department's policy to encourage pollution prevention and risk reduction when actionable violations exist. Traditional enforcement orders are principally aimed at gaining compliance and deterring and punishing violators. In addition to the foregoing, multimedia orders will continue to be used to advance important Department objectives. Specifically, multimedia enforcement has been utilized to achieve results including i) significant operational improvements resulting in compliance with all applicable environmental laws; ii) pollution prevention or risk reduction measures; and iii) equitable penalties. Consequently, all multimedia enforcement orders in significant actions include integrated compliance schedules and pollution prevention and/or risk reduction programs as appropriate.

The Department has also successfully used the enforcement process to advance the following preferred environmental management hierarchy: 1) source reduction; 2) reuse/recycling; 3) treatment; and 4) disposal or release. Reasonable and appropriate pollution prevention conditions are generally appropriate and should be included in administrative orders where (1) elimination or substitution of chemicals may end recurring violations

or reduce the potential for adverse impacts; (2) there would be no unacceptable cross-media impacts; and (3) there are known technically feasible and economically practicable pollution prevention options available.

The Department will continue to take swift and appropriate action against violators, as well as demonstrate that environmental protection and economic success are complementary objectives. The Department will continue to use the enforcement process to address underlying problems leading to poor compliance records and to commit respondents to improving operations resulting in environmental compliance through the use of progressive sanctions, remedies and compliance tools. Examples of such progressive sanctions and remedies include independent environmental audits, risk management programs, accident prevention/response plans, comprehensive best management practices, toxic chemical reduction plans, fugitive emissions reduction plans, energy audits, community awareness programs or other pollution prevention or risk reduction measures. In appropriate circumstances, independent audits are used to evaluate compliance, environmental management effectiveness, toxic loading and pollution prevention options.

The Department's Civil Penalty Policy provides that adjustments to the gravity portion of penalties will provide the flexibility and equity needed in the Department's penalty system. Specific factors that are identified for penalty adjustments include culpability, violator cooperation, history of non-compliance, ability to pay, and other "unique factors." It is the Department's policy to strongly encourage the use of progressive sanctions and remedies which advance the State's environmental policy. Therefore, such sanctions and remedies may be viewed as unique factors and examples of violator cooperation and staff is expressly authorized to exercise its discretion to adjust the gravity portion of penalties downward. The Department will continue to ensure that any economic benefit that violators gain is addressed and that resolution of enforcement actions sufficiently deters both the respondent at issue and the larger regulated community from committing future violations.

In conclusion, effective multimedia enforcement enhances the Department's ability to induce violators to operate in compliance with environmental requirements and commit to pollution prevention and risk reduction. The resulting improvement in the operation of facilities will maximize both competitiveness and environmental benefits. Consequently, multimedia enforcement actions will often demonstrate that environmental protection and economic competitiveness are compatible.
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Paul Orum, ***Coordinator, Working Group on Community Right-to-Know***

Information Resources Management: Building on the Lessons of TRI

Introduction

The Toxics Release Inventory (TRI) has taught us an important "lesson" for improving information resources management (IRM): organizing dispersed information around natural data integration points makes it much more accessible.

The Environmental Protection Agency (EPA) is beginning a project to organize data around one such natural data integration point: facility identification. Under the project, facilities will report basic identifying information (such as name, address, and location) just once to the agency across all programs. The initiative takes a successful "lesson" of TRI and writes it large across all EPA programs.

The "Lessons" of TRI

TRI is what I call the first "prevention era" environmental law. TRI established the first on-line, publicly accessible data base of environmental information required under Federal law. Consequently, the data are "designed for data management." TRI data are:

- facility specific;
- chemical specific;
- multimedia; and
- publicly accessible.

In other words, the TRI data are organized around several natural data integration points, or "key data identifiers." This design has resulted in basically successful management and dissemination of information.

The data are of course subject to limitations. The TRI:

- doesn't measure source reduction;
- doesn't address chemicals in products (for life cycle assessment);
- doesn't include opportunities to participate in decisions to reduce risks; and
- is less direct than options such as labelling (active dissemination frequently requires interpreters such as advocacy groups or reporters).

But, there is a basic level of success in the TRI program, based on its design (for data management). This is the most overlooked "lesson" of TRI.

By comparison, the Clean Air Act's chemical accident prevention provisions (§112(r)) will require over 100,000 facilities to publicly disclose their worst-case chemical accident scenarios as part of a broad accident prevention program. Such disclosure may have an impact comparable to TRI. But, data collection plans may not include:

- computerization of registrations;
- Dun & Bradstreet number (to link facilities across organizations);
- permit numbers from other programs (for pollution prevention); and
- common order and units of measure.
- But probably will include latitude and longitude (it's EPA policy).

Key Data Identifiers

Dispersed data sources are functionally inaccessible. By organizing information around key data identifiers, one makes it accessible (at least to those with the resources and knowledge to use it).

During 1994, a Task Force established under the National Advisory Council for Environmental Policy and Technology's Environmental Information and Assessment Committee was formed by EPA to provide recommendations on the agency's IRM strategic plan. (This was not the full committee as indicated in the conference brochure, rather it was a Task Force during 1994.)

The Task Force's report, *Using Information Strategically to Protect Human Health and the Environment*, makes recommendations for information management, partnerships, infrastructure, and organization. Its overall message is that EPA must change its information resources management or fail in transition from single media programs to a cross media, comprehensive focus.

The report explains that EPA's existing infrastructure was designed to support a series of "stovepipe," specific-media programs and not to exchange or link information across programs.

> "[F]or example, EPA's information does not allow EPA to combine data on ecosystems, industrial sectors, chemicals, and facilities across programs." (page 5)

Further, current data systems were not designed to serve secondary users (other program offices and agencies, states researchers, the general public, industry, and others).

The Task Force recommended using "key data identifiers" to link information a across EPA programs, and lists six (on page 8):

- facilities/sites (a facility ID);
- spatial coordinates (latitude and longitude);
- regulated substances;
- industrial sectors (Standard Industrial Codes, SIC);
- chemicals (CAS number and name); and
- organizations (Dun and Bradstreet).

The Task Force urged EPA to develop integration policies and tools that would organize information around these natural data integration points to create what I would call a modern map of environmental information.

EPA's Information Integration Initiative

The U.S. EPA has dedicated $1 million in fiscal 1995 (and an additional amount the following year) to a systems redesign initiative for facility ID (among other reforms). The initiative will allow facilities to report basic identification information just once (just as people don't put their entire address on each tax schedule attached to their 1040 form). The project starts with a new regulation that will consolidate all facility reporting under one central authority. This will go through a proposed and final rule in the Federal Register.

This is an important initiative that has mutual benefits for all stakeholders:

- the public gets better access to information and government;
- industry gets reduced reporting burden through consolidated reporting and electronic reporting methods; and
- regulators get a more effective mission.

To succeed, the project must be designed with secondary users in mind. Of course, success will make apparent a more fundamental problem: currently collected data do not add up to a cohesive whole. And, there is no natural constituency or specific mandate for the initiative. So it will need support to be realized.

References

Using Information Strategically to Protect Human Health and the Environment [EPA 270-K-94-002], August 1994, is available through EPA's Public Information Center at (202) 260-2080 or the Agency's Morris Altschuler at (202) 260-9752 (no cost).

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Wesley Taylor, ***Waste Management Information Specialist, Wisconsin Department of Natural Resources***
Tom Nowakowski, ***Air Management Specialist, Wisconsin Department of Natural Resources***

Developing Pollution Prevention Tools from Wisconsin's Integrated Toxics Data System

Southeast Wisconsin Toxics Reduction Project: A PPIS Grant

More than twenty years of pollution control regulations in all environmental media have shown that while these traditional measures have made a significant impact, continued progress in protecting and preserving the environment will require a preventative approach. The southeast region of Wisconsin maintains a significant manufacturing base and is currently designated non-attainment for the ozone standard under the reauthorized Clean Air Act and subject to numerous air and water toxics regulations. The Southeast Wisconsin Toxics Reduction Project (The Project), a pilot cooperative effort among the Wisconsin Department of Natural Resources' (DNR) regulatory programs, the University of Wisconsin - Extension Solid and Hazardous Wastes

Education Center (SHWEC) and private industries, developed tools and strategies which will result in positive impacts on the environment and promote inter-agency and inter-industry working relationships.

A significant portion of The Project was dependent upon selecting ten facilities, representing a portion of southeast Wisconsin's industrial base, with significant cross-media environmental impacts from their waste streams. Selected facilities were evaluated from a whole facility regulatory perspective. In order to complete a whole facility description, data from individual regulatory programs were integrated into one common format. These facility descriptions were used in conjunction with on-site pollution prevention assessments completed by SHWEC to identify site-specific pollution prevention opportunities.

Data gaps (either missing or incorrect information) were the most common impediment to creating an accurate facility description and suggesting specific pollution prevention activities. In all cases, these gaps were addressed to complete the most comprehensive facility description possible and yield the most appropriate pollution prevention strategies.

All ten participating facilities were generous with their time and comments regarding this pilot project. A major emphasis of The Project was placed on providing individual facilities with tools to assess the costs of creating and disposing of waste products and evaluating potential pollution prevention strategies. As a follow-up to this project, a return visit to the participating facilities in the future would provide valuable information needed to evaluate the effectiveness of the tools and suggest pollution prevention strategies developed over the course of The Project.

Setting

The Project targets the southeast region of Wisconsin and includes industrial facilities in the following counties: Milwaukee, Waukesha, Racine, Kenosha, Walworth, Sheboygan and Manitowoc. This region maintains a manufacturing base of approximately 2,200 facilities covering a wide spectrum of industrial categories. In addition to the current ozone non-attainment designation under the reauthorized Clean Air Act, industries within this region are subject to numerous environmental requirements including new air and water rules for the control of toxic pollutants. Further, the State of Wisconsin must certify that it has the capacity to accommodate all the hazardous wastes generated over the next twenty years. Most regulations have focused on treatment and disposal, but now strategies for developing a more sensible approach, assessing costs associated with waste treatment and disposal and preventing or limiting waste generation, are being evaluated -- shifting the focus of environmental protection strategies from treatment to prevention.

Pollution prevention information and education efforts, by themselves, often have limited effectiveness in changing behavior. The Project combines strengths of education and environmental regulations to encourage industries to consider tools and strategies which can be used to identify unnecessary wastes, avoid cross media shifts of pollutants and decrease environmental impacts.

Scope of Study

Ten facilities were used to represent a portion of the industrial base in southeast Wisconsin. Private sector participation was voluntary. Using the State of Wisconsin's Integrated Toxics Reporting System (ITRS) system, we selected potential facility candidates. A initial list of fifty-two candidates was screened from approximately 2,200 industrial facilities in southeast Wisconsin. After eliminating ineligible facilities, we separated this list into three categories: high, medium and low priority using SHWEC's Pollution Prevention Protocol. The eleven high priority and fourteen medium priority facilities were our initial targets during our outreach. Selected facilities were evaluated from a whole facility regulatory perspective. Regulatory documents from all major regulatory programs were examined and condensed to develop a whole facility "picture". A review of the facility's individual waste streams was completed in conjunction with representative raw materials formulate waste cost estimates to enhance the whole facility picture. In addition, on-site pollution prevention

assessments were conducted by SHWEC to provide participating facilities with useful suggestions pertaining to specific pollution prevention opportunities observed at each facility.

The DNR's ITRS is an independent stand-alone database comprised of data extracted from six DNR environmental program master databases. The ITRS combines selected data fields by facility from the Master Facility File, the Air Emissions Inventory file for air toxins, the Waste Water DMRS file for chemical pollutants, the Hazardous Waste Annual Report which lists the annual quantity of RCRA wastes generated, the Hazardous Waste Manifests, and the Toxic Release Inventory. The ITRS is an invaluable tool as it offers the side by side, multi-media display of a given facility's environmental releases off-site transfers of toxic chemicals and wastes.

Conclusion

The Wisconsin Department of Natural Resources plans to continue to use and refine the tools developed during The Project. The whole facility description template developed as part of this project will be a useful tool to identify potential cross-program overlaps to all environmental media permitting staff. The voluntary aspect of The Project and the one-on-one contacts with individual facilities provided a good opportunity to develop individualized pollution prevention strategies and fostered a personalized working relationship with project participants. As a separate project, SHWEC will be following up with site visits to each facility to measure the effectiveness of the pollution prevention information provided. We hope that making the tools we developed available will have a positive impact on the environment by promoting integration of pollution prevention concepts and strategies and existing pollutant databases.
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Session 3: Industry-Community Relationships

Session Leader
Hank Topper, *US EPA*
Speakers
Harold N. Hicks, Jr, *Plant Manager, Ashland Chemical Company*
Paul L. Hill, Ph.D, *President, National Institute for Chemical Studies, Charleston, WV*
Sanford Lewis, *Director, The Good Neighbor Project for Sustainable Industries, and Instructor in Environmental Law at Tufts University, Department of Urban and Environmental Policy*
Phillip Muessig, *Community Assistance Coordinator, Minnesota Office of Environmental Assistance (OEA)*
Ellie Skokan, *Assistant to Chair, Department of Biological Sciences, Wichita State University and Member Community Involvement Group, Vulcan Chemical Co.*

Hank Topper, *US EPA*

Local communities are more and more becoming a focus for the use of TRI information. Given limited national and state resources, the ability of local communities to turn TRI data into effective plans for action will, to a large extent, determine the success of the TRI program as a tool for promoting pollution prevention and risk management.

This is a time of learning and experimentation for community use of TRI data. The relationships that are developing between industry and their surrounding communities are at the center of this activity. Hundreds of communities have now established some form for regular dialogue between industry and the community. How these relationships develop will be key to progress in turning TRI into a tool for pollution prevention and risk reduction at the local level. The presentations of the panelists, based on their own direct experiences, provided the following important insights for building effective community/industry relations:

- Assistance to help communities turn TRI data into understandable information is needed. Programs such as the annual "Scorecard" produced by the National Institute for Chemical Studies, the Minnesota State program providing technical assistance to communities, and the programs using retired engineers as technical resources for communities provide an essential ingredient in the use of TRI data. Communities need to continue to find new ways to draw on all available resources to interpret and use TRI information.

- Forums for regular dialogue between industry and communities, such as the Community Advisory Panels organized by the Chemical Manufacturers Association, can be effective. Inclusion of participants in discussions about facility policy in the early stages before decisions are made and access to independent expertise for participants in technical discussions are essential. The uneven effectiveness of existing groups argues for more interaction between groups and for more widespread use of outside resources to assist groups to develop effective programs.

- Pre-dialogue agreements with companies on the provision of resources for independent technical expertise, on selection of participants, and on methods for setting agenda for discussions are key to successful dialogues.

- Special attention (training/coaching) paid to helping both industry and community representatives learn how to communicate with each other can be essential. Both sides in these dialogues have preconceived notions that can be barriers to effective communication.

- Industry openness in discussing all issues affecting the community is key to success of dialogue. Open discussion of worst case scenarios as required by the Clean Air Act, development and discussion of a third party risk assessment on facility releases, inclusion of community in development and review of pollution prevention planning, and developing forums for considering impacts of all facilities in an area are opportunities for developing meaningful dialogue.

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Harold N. Hicks, Jr, *Plant Manager, Ashland Chemical*

Building TRI and Pollution Prevention Partnerships

It's a pleasure to have this opportunity to review some of the ongoing industry/community partnerships in the Tri-State area of Kentucky, Ohio and West Virginia. My employer, the Ashland Chemical Company, strongly encourages facility managers to be involved in our respective communities. Ashland also is an enthusiastic supporter of the Chemical Manufacturer's Association Responsible Care[1] initiative. Today I am going to focus on our involvement with the Local Emergency Planning Committee and a Community Advisory Panel -- jointly sponsored by Ashland and Aristech.

Background

Historically a major center for refining and primary metals, the Tri-State area has suffered major economic decline due to the loss of industrial jobs. Many industries have closed their doors and others have undergone major force reductions. The population of West Virginia declined 10% between 1980 and 1990 and this same population and job decline is also characteristic of Southern Ohio and Eastern Kentucky. The population is aging as young adults are forced to leave the area to find work.

The area is now an attainment area for all priority pollutants except ozone which is moving through redesignation actions in West Virginia and Kentucky. The redesignation, when fully implemented, will put the area in an attainment status for ozone as well.

Environmental concern is focused on air quality issues. There are several large quantity dischargers with NPDES permits and several Superfund sites but because of good compliance history and/or low risks, water and solid waste issues don't get much attention in the print or broadcast media.

Community Advisory Panel

Aristech Chemical and Ashland Chemical organized a Community Advisory Panel or CAP early in 1992. Ann Green, who now facilitates 21 CAPS across the Eastern United States, worked with the two plant managers to develop a list of candidates and followed up with recruiting. The CAP started with 15 members and attendance at bimonthly meetings is typically 12-15. The two small plants have excellent safety and environmental compliance histories. SARA 313 emissions are down more than 90% from the 1987 base year. The CAP members live close to the plants except for a couple of emergency responders who live about five miles away. CAP members have been interested in learning about safety, emissions and noise but none have expressed great concern regarding the two specific plants.

CAP members have been on a couple of plant tours and each plant has held an open house since the CAP was formed. Plant Managers share SARA 313 data in July for the previous year -- the first public release.

Clearly were the CAP activities limited to tours and reviews, the members would lose interest and for that reason we have worked to identify CAP projects which would involve hands on activities. As of today, the Neal CAP has two important projects in progress with a third in the formative stages.

In the Spring of 1993, the CAP published a newsletter which was mailed to all households in the Kenova VFD District along with a VFD Newsletter and an emergency information questionnaire. The questionnaire included a diagram of a house and asked for the location of:

- Natural gas cut off valve
- Water cut off valve
- Incoming electrical switch box
- Likely location of invalids, if any, in the house

The mailing included a stamped return envelope which was to provide a means for returning the marked up diagram to the VFD. Response to the first mailing was about 15%. Obviously this needs to be repeated with some new wrinkle.

In the Fall of 1993, the CAP discussed the need for E-911 in Wayne County with County Commissioners eventually leading to a commitment from the commissioners to proceed with public meetings and a commitment from the CAP to assist in getting a representative sample of public opinion. Postal patron mailings to the 15,000 Wayne County households provided information about the public meetings, a map of the state highlighting the counties with E-911 service, a list of VFD chiefs (all) supporting E-911 and a questionnaire to be completed and dropped at the Water Company Office (or mailed to the commissioners) indicating support for or opposition to an E-911 system.

Public opinion with the questionnaire and at the public meetings was 95% favorable and the commissioners are proceeding with implementation of a system.

A third project, in formative stages, involves the communication of emergency information to the public. In the Tri-State area, hurricanes, tornados, tidal waves, earthquakes, civic unrest and even floods are low probability risks. Transportation accidents involving hazardous materials are more likely, however, there is almost no history of this kind of event. The same goes for major releases from refiners, chemical plants, terminals, and warehouses. The CAP will search for ways to communicate risk and training needs to the public which make sense.

In summary, we have an unusual situation with the Neal CAP-- no troublesome plant issues, no environmental justice issues but significant emergency response and public information needs. The CAP has been interested in helping to enhance emergency response and CAP involvement has made a big difference.

Local Emergency Planning Committee

Active committees are in place in Lawrence County, Ohio, Boyd County, Kentucky, and Cabell/Wayne County, West Virginia. These committees are seconded by KIMAC -- a three state mutual aid group of emergency responders and industry -- and by KEPRA -- a three state group formed by the U. S. Coast Guard to deal with marine emergencies on the Ohio River.

The Cabell/Wayne LEPC benefits from broad participation from print and broadcast media, area hospitals, full time and volunteer firefighters, Huntington Police, EMS, E-911, local industry, U. S. Coast Guard and citizen activists.

The LEPC has an emergency operations plan which is updated annually. During the past four years traffic diversion plans for both counties have been developed and tested. The LEPC has purchased Emergency Information System hardware and software for the E-911 Center in Huntington. The resource list and plume mapping features of this system are operational.

The LEPC is working on an emergency operations center and funding is in place. The center will be a combination employee lunch room/EOC in the Huntington City Hall Building near the E-911 Center.

Current efforts are focused on evaluating the two county early warning systems and developing a prioritized upgrading plan. The first step will be to negotiate an agreement with the National Weather Service to broadcast all risks over the weather frequency -- this process is ongoing. The next step will be to provide tone alert weather radios to day care centers, hospitals, schools, and nursing homes in the two counties. Longer term, the committee is looking at sirens positioned selectively along major highway and rail corridors.

The keys to an active LEPC program are having a plan with priorities and using positive reinforcement to solicit and maintain involvement of the public sector. Media coverage is a major asset in recognizing contributions of the various agencies.

Private sector support is needed for funding program initiatives -- again with media coverage to recognize the contributors. Private sector members need to be active in sub-committee "sweat equity" work -- providing a positive example to public sector sub-committee members.

The LEPC needs to be opportunistic. Funding and in kind "sweat equity" opportunities arrive at unexpected times. With a prioritized plan in place, it is much easier to achieve the rapid consensus needed to move quickly in capitalizing on opportunities.

The LEPC also needs to be pragmatic. Local officials can establish levels of preparedness which are appropriate and for which funding is available. Building a top notch response capability takes many years so patience is essential.

End Notes

1. Responsible Care is a registered servicemark of the Chemical Manufacturers Association.

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Paul L. Hill, Ph.D, ***National Institute for Chemical Studies, Charleston, WV***

Improving Community - Industry Relationships with TRI

Without question, the advent of Toxic Release Inventory (TRI) information has greatly enhanced the opportunities for industry/public dialogue. Key to these opportunities are (a) attitude and (b) a process to engage the information for mutual benefits.

The National Institute for Chemical Studies (NICS) has worked on both the reporting of better information and improving community relationships since 1985. With the multitude of commonalities between EPCRA and the NICS charter, we became a "Title III" agency. An array of data management, communication, planning, responder training, pollution prevention and risk assessment projects have been undertaken, both before and after the passage of EPCRA.

Today, the *Scorecard*© report on TRI and Community Safety Assessment (CSA) Committees are two tangible outgrowths of the combined NICS/EPCRA effort in West Virginia. First, *Scorecard*© is the statewide program for reporting TRI and increasing community access to the annual reports of emissions.

Making TRI more readily available and utilizing existing and creative outreach mechanisms have obvious benefits. Collective efforts and the effects of TRI availability have led to increased opportunities to work cooperatively on goals for increased environmental protection and risk reduction.

Scorecard© enjoys positive support from the State of West Virginia, U.S. EPA, industry and citizen/environmental groups. Contrary to reports from several states regarding the low to non-existent level of requests for TRI, NICS distributes in excess of 500 reports annually. All 52 LEPC's in the state receive copies.

Scorecard© provides hard data as well as various summaries, trends analyses and geographic groupings. Unique to the report, facility narrative statements cover ongoing pollution prevention initiatives, reduction goals and specific activities resulting in reduced waste discharges. While the report summarizes releases from all 151 TRI filers in the state, 26 narrative profiles from the largest emitter category (SIC 28 Chemical Manufacturing) are provided annually. Each facility receives a "Scorecard" charting its performance since 1987.

The development cycle for the report, however, is as important as the data itself. A public advisory panel of citizens, environmentalists, agency and industry representatives reviews the report and makes recommendations for public presentation of various trends and statistics. This group also helps to prioritize sub-groupings such as carcinogenic emissions and volatile air pollutants (VHAPS). In so doing, TRI facilities have reduced these categories accordingly with carcinogenic releases (a top priority) 83% lower than in 1987.

Additional outreach is carried out through direct contact with TRI filers, holding Pollution Prevention Roundtable meetings annually and issuing the Pollution Prevention Newsletter on a quarterly basis. NICS uses a variety of risk communication principles and techniques to enhance the broader public's ability to access the information.

A primary outlet for further presentation and discussion of annual reports is through various community groups including LEPCs, Citizen Advisory Panels (CAPs), religious and civic groups, as well as NICS' own CSA committees. This latter group functions much like a community advisory panel, is focused usually on a specific location (industrial site), and engages in open-ended debates of various environmental, safety and community issues. TRI information is anticipated annually and well received.

Community groups provide an ideal mechanism for discussing data implications in greater detail. These face-to-face discussions result in improved relationships, TRI prioritizing and coalitions to address data implications.
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Sanford Lewis, ***Director, The Good Neighbor Project for Sustainable Industries, and Instructor in Environmental Law at Tufts University, Department of Urban and Environmental Policy***

Independent Technical Resources Are Key to Community-Corporate Partnerships for Pollution Prevention

Models of Citizen Review for Pollution Prevention

A number of impressive examples of community-corporate partnerships for pollution prevention have emerged in recent years. To cite a few:

- Citizens for a Better Environment (CBE), a statewide organization in California, has helped citizens' groups in Contra Costa County to win three "Good Neighbor Agreements" with refineries, securing specific pollution prevention improvements such as the installation of leakless valves.

- After a serious 1992 chemical accident Rhone-Poulenc in Manchester, Texas entered a binding settlement agreement with concerned citizens. They allowed an independent review of their plant, by an expert selected and supervised by community residents and Texans United (a statewide organization). The firm has implemented housekeeping and safety recommendations from the audit.

- At the Ravenswood Aluminum plant in West Virginia, a labor-community-management committee which includes the plant's union, the United Steelworkers, is searching worldwide for the most advanced, environmentally sound technologies of the future for aluminum production and to avoid the use of chlorine compounds.

Independent Technical Resources as Key to Success

The key to success in community-corporate partnerships for pollution prevention is the availability of independent technical resources for the community. When local residents have their own experts, they can ask questions and make recommendations leading to action. Various technical assistance acquisition strategies are possible. In the Rhone Poulenc audit, the company paid for the work of the independent auditor. CBE's efforts were supported by a technical advisor from the *Environmental Careers Organization*, a national organization that has trained 17 retired engineers and chemists to assess toxics use reduction opportunities for environmental groups. The state of Minnesota has a program which has provided technical assistance grants to ten community pollution prevention efforts.

Other Features of Strong Partnerships

Other features of the stronger partnerships are exemplified in the agreements. In the R-P agreement, important procedural rights include: 1) disclosure of company environmental documents in a public library file, 2) a right of citizens to conduct plant inspections, and 3) the establishment of fenceline monitoring for air pollutants. An agreement negotiated with Chevron in Contra Costa County, California demonstrates another set of important commitments that can be addressed in the partnerships -- economic concerns. The firm committed to increasing its donations to nonprofit organizations benefiting near neighbors of the facility to $5 million, and to conduct job training and hiring from the community.

Labor Expands on Health and Safety Monitoring to Integrate Environmental Concerns

Labor unions have a vital role to play in partnerships for pollution prevention, based on their long history of tracking corporate performance on occupational safety and health issues. Unions' "safety stewards" are rank and file workers with the training to watchdog occupational health and safety issues that arise on the shop floor. Stewards are aided by professional industrial hygienists who work for the local or international unions. Union health and safety committees discuss any problems identified, and raise the issues in negotiations with management or in communications with appropriate government oversight bodies.

While organized labor has been involved in promoting environmental policies since the outset of the modern environmental movement, strides have been made in the last decade to expand workforce oversight to the environment beyond the plant gates. The use of toxics place both workforce and community at risk of ongoing or sudden emissions, thereby linking indoor and outdoor environments. So does a likely solution -- reducing the use and storage of those chemicals. Labor unions at a number of plants have begun to actively investigate, and to inform the public when management resists making necessary improvements.

One of the most advanced environmental precedents for organized labor occurred at Harvard Industries, in New Jersey. There, the United Auto Workers local negotiated the establishment of a "hazard prevention" committee in 1991 which examines HES issues. The union has a right to shut down any operation in the plant which presents a danger to worker health or safety *or to the outside environment.* Monitoring is ongoing.

At many nonunion plants, environmental committees have been established to solicit participation of workers on pollution prevention and chemical accident safety. However, the ability of these nonunion workers to truly "audit" and advocate for change at nonunion plants is more limited than at the unionized plants. While management may be willing to solicit the workers' money-saving ideas, workers who lack a bargaining unit to deal independently with the management or the community often risk management retaliation (firing or harassment) if they are vocal about the environmental shortcomings of a plant. While the federal Whistleblower Protection Act provides some protection, some states have also passed special whistleblower laws to give more

protection to such workers; the pending OSHA Reform Act would extend whistleblower rights and establish health and safety committees at all covered plants.

Rhone-Poulenc Agreement in Texas as National Model for Strong Process

The Rhone-Poulenc agreement in Manchester, Texas is a model for a strong process in regard to partnerships for pollution prevention. Manchester sits along the notorious Houston Ship Channel, home to the nation's largest concentration of petrochemical companies. Like so many communities under the stacks of major polluting industries, Manchester is a predominantly minority community (Hispanic). In June 1992, a serious accident occurred at the plant -- a release of sulfur dioxide. At least 27 people were sent to area hospitals. The Manchester community decided to take action. With the assistance of the environmental organization Texans United, the community confronted the company. After months of negotiations, they won an agreement which gave the community specific rights never before recognized in Texas.

The 1992 agreement reached by Texans United, local citizens groups, and Rhone Poulenc exemplifies the potential for more in-depth community review of a plant's HES performance. Rhone Poulenc agreed to pay for an independent environmental audit by an expert selected and supervised by a panel of community residents and a statewide organization, Texans United. Among the features of the agreement are:

- A broad audit which includes review of regulatory compliance, safety training, accident prevention, emergency response, waste analysis and information systems, monitoring programs, and waste minimization practices.

- Public disclosure of company documents, including hazard assessment and risk analysis, lists of accidents/upsets/near-misses/corrective actions, and waste minimization and reduction plans.

- Rhone-Poulenc committed to "negotiate in good faith" on the audit recommendations.

- Citizens are entitled to accompany the auditor and conduct other inspections by appointment.

- The agreement is legally binding because it is integrated to the firm's operating permit.

Even before the negotiations which led to this agreement began, the community had enlisted the support of a state legislator and a city council member who were present to voice support for the community's position. By the time the agreement was finally reached, there had been an intensive community campaign which included a public challenge to the firm's water pollution discharge permit. Numerous neighborhood plant inspections have occurred in other communities as a result of similar campaigns.

Weaker "Partnerships" Demonstrate the Dangers Where Rights and Commitments are Absent

The experience at the grassroots level is replete with innumerable instances of corporate public relations which are lacking in the kinds of rights and resources necessary for effective citizen and worker participation. A few examples of recent grassroots experiences should suffice to demonstrate why government must aid stakeholder participation to create a more fairly structured relationship.

- Firms are often willing to give local citizens sanitized summaries of plant evaluations, but refuse to share actual data and studies. Chemical companies willingly prepare and distribute vague self-evaluation "report cards" under the industry's so-called Responsible Care program. For example, Union Carbide asserted in a 1992 report that at 100% of its plants : "Senior management leads continuous improvement through policy, participation and resource commitments." But the same report noted that less than 10% of Union Carbide plants were sharing "safety information/lessons with industry, government, community." Instead of vague, undocumented characterizations of firm performance and safety,

stakeholders need real documentation on safety that they can scrutinize along with independent experts.

- Stakeholders have often been manipulated into believing they had won more than they had by nonbinding corporate "promises" to share information, which are later freely violated due to their unenforceable nature. At the DuPont plant in Montague, Michigan, corporate officials told the local organization, Citizens United for the Environment, that they would share worst case accident information and internal corporate safety audits. Instead of providing worst case information, they gave only their interpretation of likely "credible" accidents. They reneged entirely on their written commitment to provide internal safety audits.

- Firms often attempt to redefine the "public" by handpicking the membership of official "advisory committees," and asserting such committees as their principal mechanism for public interaction and accountability. Many of these community advisory panels are so heavily stacked with people friendly or even financially connected to the firm that they are not able to effectively watchdog the firm. On other panels, a single "bona fide" activist is allowed into such a grouping, where they have been outvoted and otherwise intimidated against raising their legitimate concerns and criticisms. Perhaps the ultimate demonstration of the skewing of this committee process is the CMA's own survey, which found that while most of the public remains seriously concerned about the industry, 86% of the panel members surveyed viewed the industry favorably.[1]

- Firms often attempt to dictate who citizens can use as experts, or refuse to provide the needed funding of experts. For instance, Union Carbide in Seadrift, Texas declined to allow the Calhoun County Resource Watch to bring any of a list of the citizens' chosen experts to the plant in meetings with the citizens group.

Government's Vital Role

These recent experiences with strong and weak participation models demonstrate that government can and must play a role in promoting community partnerships for pollution prevention. Government's role can include:

- Providing grants for independent technical assistance by staffers as is done in the Minnesota program.

- Setting groundrules for relationships such as document disclosure requirements and committee decisionmaking and participation rules.

- Providing direct technical assistance or facilitation of the local relationships.

- Providing citizens with leverage to convince companies to negotiate -- e.g. withholding permits and enforcement settlements until the relevant firm has negotiated an acceptable process or set of commitments with the local community.

Conclusion

Partnerships are in a period of experimentation, but the value of the stronger relationships is already clear. By establishing a strong and focused process to negotiate priorities for study and action, community and corporate partners can prevent pollution, protect health, bring diverse local interests and agendas into closer alignment, and save time and money that might otherwise be expended in conflict.

End Notes

1. CMA News, November 1992, page 4.

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Phillip Muessig, *Community Assistance Coordinator, Minnesota Office of Environmental Assistance*

Background

A 1992 amendment to Minnesota's facility planning statute expanded the provision of pollution prevention assistance to citizens and community groups. Minnesota Office of Environmental Assistance (OEA) new community assistance program provides information and education, referrals to and coordination of others, meeting facilitation and mediation, and matching grants. A fact sheet on the program is available today, and a full report on the program can be mailed to interested people.

I come from 8 years of economic development work with the Seward Neighborhood Group in Minneapolis, where I also staffed the local business association which had gone into dormancy and welcomed my offer of assistance. As staff to both groups, I was accepted as a mediator in dozens of business-citizen conflicts over pollution, noise, and trucks. Mostly the companies in question employed between 5 and 50 employees, though I did work with a few companies in the 100-300 employee range. My successful mediation of most conflicts informs many of the suggestions below.

At the OEA, part of my time is spent coaching citizens, citizen groups, and businesses to meet face to face to discuss pollution issues and to use pollution prevention as a tool in solving disputes. Though emergency planning and accident prevention are sometimes being sought by citizens, I strongly promote a more holistic pollution prevention focus in discussions.

Typical Business-Citizen Pattern

Business-citizen conflicts over hazardous and toxic chemical use and emissions often involve each side "demonizing" the other. This natural and understandable dynamic tends to play out in this sort of dialogue:

Citizen: "I can't believe you're doing this to me."
Business: "For the 10th time, I told you I'm not breaking any laws. The EPA says its safe."
Citizen: "I don't care what it takes, just stop."
Business: "What do you want me to do, go out of business?"

Over time, this dialogue will repeat itself over and over, or a citizen or citizen group will sue the company, or citizen action will try to obstruct a company's action by becoming involved in regulatory permit battles.

A More Productive Pattern

The case of Flour City Architectural Metals in the Seward neighborhood is instructive of this last course of action, which took an unexpected and favorable twist. Citizens had complained of MEK odor from Flour City for over a decade, with little change in emissions. When a company proposal to raise the height of the emissions stack reached the state's pollution control agency, a public hearing was held. Angry neighbors glared at the manager, one wore a gas mask, and one effectively challenged the company engineer's assumptions underlying air dispersion modeling. Productive discussion was nowhere in sight. But then a city council member, and the executive director of Citizens for a Better Environment (CBE: a state-wide environmental group) suggested to both the citizens and company officials that a small group of neighborhood members meet with company officials and CBE to discuss the issue in a more structured and rational manner. Seeing nothing but a permit battle ahead, the Flour City manager agreed, on the condition that the proposed "Good Neighbor Agreement" discussion take place formally with the official citizen participation organization for the neighborhood. Subsequent discussions focused on pollution prevention, with the company agreeing to phase out a vapor degreaser and beginning a plan for further reductions.

Another example of productive business-citizen interaction involves the owner and fleet manager of a trucking company, where fumes, noise, lights, and vibration had been a problem to neighbors for years. Around the time of an underground storage tank leak, the company invited neighbors for 3 blocks around to a beer and

bratwurst party on the boulevard outside the facility's front door. With both the owner and manager fully occupied at the barbecue, neighbors had a captive audience and spent the first half hour venting all their anger. The next half hour, however, was quite different. Real discussion about how to prevent some of the problems and how to keep the jobs at the company took place. The lasting impact of the barbecue was that neighbors had the direct dial number of the manager, who agreed to take all complaints and resolve them promptly.

How to Steer Conflicts Toward Productive Communication

Direct contact between affected citizens and top management is absolutely worth trying. The disputants must see each other as real people living in the same community. But for best results, I recommend two tactics: (1) that there be a mediator, or some third party neutral, to facilitate that most difficult hurdle of getting both sides to the table to talk in anything but hostile terms; and (2) that someone, and a mediator is trained in this, coach each party so that the meeting is focused and productive.

Tips for Businesses

In workshop training for businesses I elaborate upon six "tips," which take off from "The Seven Cardinal Rules of Risk Communication" by Vince Covello, writing in a 1988 EPA pamphlet for TRI reporters. The tips also rely heavily on "Getting to Yes" negotiation theory. The six tips are:

* Get to know your neighbors.
* Accept and involve your neighbors.
* Set the stage so everyone is listening.
* Be open, honest, frank, and compassionate.
* Connect with a local community group.
* Avoid arguing relative health risks.

Tips for Citizen Groups

Similarly, I do workshops with citizen groups and elaborate upon these tips:

* Partner with others.
* Know your role; keep your eyes on the prize.
* Know thy business; data is your resume.
* Set the stage so everyone is listening.
* Believe that "community" includes business.
* Be open, honest, frank, compassionate.
* Listen; meet people at their level of awareness.
* Exploit your common sense.
* Avoid quantitative health risk assessments.
* Focus on pollution prevention.
* Realize that public discussion of private technology is touchy.
* Push for action, and be patient.

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Ellie Skokan, ***Assistant to Chair, Department of Biological Sciences, Wichita State University and Member Community Involvement Group, Vulcan Chemical Co.***

The Community Involvement Group: An Opportunity for Citizen Participation in Industry Decision Making

The Community Involvement Group (CIG) was initially formed in 1988 in response to Vulcan Chemicals' plan to build a hazardous waste incinerator at their Wichita, Kansas facility. In response to suggestions from the local environmental community, the CIG was formed by a Steering Committee who worked

with industry representatives and a neutral facilitator to select the members of the group and to draft a set of ground rules under which the CIG would operate.

Within a few months, Vulcan withdrew their incinerator plans. However, six years later the group continues to meet. Contributing factors to the CIG's continuance include a history of environmental problems (including groundwater contamination) at the facility, the company's position as the only U.S. producer of pentachlorophenol (a wood preservative listed as extremely hazardous by the EPA), the release in early 1989 of the first Toxic Release Inventory (TRI) data which placed Sedgwick County, Kansas in the top fifteen counties in the USA in total amount of reportable emissions (largely due to deep well injection of hydrochloric acid at the Vulcan facility)[1], and impetus from the Chemical Manufacturers Association (CMA) Responsible Care ® program obligating member companies to make a public commitment "to improve performance in response to public concerns about the impact of chemicals on health, safety and environmental quality."[2] In addition, by the time the incinerator plans were withdrawn, all participants (both industry and community) felt that the dialogue initiated by the group had been beneficial and should be continued.

The members of the group represent academia, the environmental movement, public health and safety officials, the League of Women Voters, rural and suburban plant neighbors, other industries, and the metropolitan area at large. The meetings are facilitated by a neutral third-party and are open to the public with a period of time set aside at the end of each meeting for observer comments. The plant manager attends all meetings and acts as the corporate liaison. Other company employees attend meetings to present information as requested by the group. The company funds the meetings and the CIG has the right to negotiate with the company for additional funding to hire outside consultants. The primary topics of discussion during the past six years have been the proposed incinerator, waste minimization, underground injection of hazardous waste, RCRA facility investigation, a groundwater pumping program, TRI, two new production facilities, emergency response and notification systems, and meeting the standards of the 1990 Clean Air Act.

About one-half of the current members of the CIG were members of the original group. As one of those original members, it is interesting to reflect on why I became a member and why I continue to be involved. Originally I saw it as an opportunity to address environmental concerns in a new manner. Previous opportunities had often consisted of public forums at which little meaningful dialogue took place, regulatory agency hearings usually held after the decision making process was completed, media events which called attention to perceived problems but did little to alleviate them, and activities aimed at changing legislation or regulations. While I felt that each of these activities had a role to play in bringing about change, the idea of sitting down at the table with industry representatives seemed to fit my personal style. I felt that the chance to exchange information in a non-confrontational manner filled my need as a scientist to seek accurate information and a personal need to have my opinions heard and considered by others. Overall, the CIG process demands accountability on the part of all participants due to the long term relationship of the members. It also gives those of us in the environmental movement the opportunity to show that we can have our facts straight, can do our homework and that we can understand the science upon which environmental decisions are made.

Being an effective member of such a group is a demanding endeavor. It requires a commitment to the process, and of time to study the issues. It also requires an understanding of the concerns in the community and the ability to bring those concerns to the table for discussion. It requires a combination of inquiry and responsiveness. Members should be able to ask pertinent questions based on background information and must always be able to listen and respond to other points of view. Finally, membership requires the ability to evaluate information presented and the duty to disseminate that information to interested parties outside the CIG.

As with any process, this one is not perfect. The CIG, one of the first of CMA's Community Advisory Panels, has been criticized by some members of the community, particularly by some environmental activists, as one more attempt by industry to buy-out the public. To them, the process is perceived to be fraught with power imbalance, issue distortion, and the chance of co-optation. For the most part such critics have refused to

participate in the CIG and I believe the lack of their inclusion somewhat limits the CIG's perspective. The lack of representation of the extreme views on issues discussed makes for a good working relationship within the group, but in some cases prevents the group from adequately dealing with perceptions of the company which are prevalent in the community. In an attempt to address such criticism, the CIG does an annual self-evaluation, welcomes members representing all interested groups and citizens, and conducts its meetings in a formal, professional manner.

Other issues which impact the effectiveness of the CIG are the technical nature of the discussions and the hesitancy of the company to include the CIG early in decision making processes. Because we have dealt with many environmental and chemical process issues in our discussions, those members without a strong science background are sometimes at a disadvantage at the table. On two occasions the CIG has successfully negotiated with the company to finance consultants of the CIG's choosing for expert opinion, an option which tends to level the playing field, particularly for those members without scientific expertise. The inclusion of the CIG in the early stages of decision making has improved during the time of the CIG's existence. Whereas originally we were informed of decisions after the fact, more recently the company has asked for our input during the planning stages of most changes in operation. In recent years, we have reviewed plans for new process units, helped write informational brochures about changes in operation, participated in a process hazard analysis (HAZOP), reviewed options and made recommendations for meeting Clean Air Act regulations, toured process units under construction, and continuously monitored the company's TRI data and their commitment to toxic waste reduction.

I would foresee the most important upcoming roles of groups such as the CIG to be related to the ongoing implementation of the Clean Air Act and the Responsible Care program. One of the possible new roles of the CIG will be involvement in making worst case scenario information available to the public in accordance with the Clean Air Act. The question of what represents a worst case must be carefully determined and the CIG should be able to provide valuable input to the company as to what the community perceives that scenario to be. Another potential new role of the CIG will be in third party verification of Responsible Care. I would foresee the inclusion of CIG members in this process to be vital to the group's continued effectiveness. If the public is to "track us, don't trust us,"[3] groups like the CIG must be involved in the verification process if such groups are to maintain their credibility in the communities they represent. This inclusion will of course bring to the forefront the need to balance the community's right to know with the corporate right to proprietary information.

In the near future I would expect that groups like the CIG will face other issues, which are likely to be contentious. Such topics as the expansion of the list of chemicals reported in TRI and the growing evidence of the adverse environmental effects of organo-chlorines come to mind. Additionally, CMA members should be facing questions from their advisory panels regarding the perceived dichotomy between the Responsible Care initiative and other CMA activities such as lobbying. For example, it becomes difficult to accept Responsible Care's commitment to public disclosure when CMA is active in fighting proposed increased reporting requirements under Right-to-Know. If industry is serious about public disclosure and including the public in decision making, it must listen to what the public is saying and respond accordingly. To do otherwise, is to lose credibility with groups like the CIG, which at its best has accomplished much both for the public and the industry. It would be sad to see such groups lose effectiveness after we have come so far.

End Notes

1. Rae Tyson et al., "The Top 500 Counties: The Most Common Chemicals," *USA Today*, 1 August 1989, sec. A,6.

2. Chemical Manufacturers Association, ***Responsible Care: A Public Commitment***, (Washington, D.C.: Chemical Manufacturers Assoc., n.d.).

3. Peter M. Sandman, November 1990, as quoted in Karen Heller, "Listening to -and Taking on - the Skeptics," *Chemicalweek* 148 (26) (1991): 88.

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Session 4: International Partnerships with TRI

Session Leader
Fran Irwin, *World Wildlife Fund*
Speakers
Edan Dionne, *Corporate Environmental Systems, IBM*
Susan B. Hazen, *Acting Deputy Director, Office of Pollution Prevention and Toxics, U.S. EPA*
François Lavallée, *Head, National Pollutant Release Inventory, Pollution Data Analysis Division, Environment Canada*
Victor Hugo Páramo Figueroa, *Director, Administration and Environmental Quality, National Institute of Ecology, SEDESOL, Mexico*

Fran Irwin, *World Wildlife Fund*

Each country--and company--is taking a distinctive approach to reporting. At the same time, building reporting systems with a set of core data elements across national borders is a high priority. These two messages came out of the presentations by governmental leaders from Canada, Mexico, and the U.S. and a representative of the business reporting initiative known as the Public Environmental Reporting Initiative (PERI).

While the U.S. established the TRI through a legislative initiative based on the right-to-know, Canada's NPRI was developed through a stakeholder process. Existing legislation was used. Rather than requiring reporting from facilities within a particular set of SIC codes, Canada reverses the process and requires reporting from all facilities with some exceptions. In Mexico, 16 governmental, nongovernmental, business, and academic organizations are taking part in a coordinating group. A consultant's report reviewed existing databases and potential for a comprehensive approach as one early step toward a PRTR strategy.

When a questioner asked whether there will be a North American TRI, the Canadian and Mexican panelists stressed their distinctive approaches. At the same time, however, the Canadian director of NPRI pointed out that Canada's form requests reporting companies to use the U.S. as well as the Canadian codes for industrial sectors to ease cross-border comparisons. The Mexican program, the director noted, is being developed in close relationship with the UN Institute for Training and Research (UNITAR) and the series of international workshops on guidance for Pollutant Release and Transfer Registers (PRTRs) being sponsored by OECD. The Mexican proposal and the international guidance will both be completed in January 1996. Although PERI stresses that each company should decide how to report, the guidance encourages consistent reporting on environmental management among companies.

The U.S. panelist suggested that a step toward reporting of common core elements among countries would be to compare data from similar facilities in a particular sector or look at facilities in a border region. A California manager pointed out the difficulty California had in getting an accurate list of names and addresses of U.S. companies operating across the border in Mexico. The panel's business participant said she thought data would be available for facilities operated by American companies in other countries on a voluntary basis. She pointed out that detailed data may not be included in a company's environmental report because such reports serve broader purposes but that the data were likely to be available on request.

An NGO representative asked how PRTRs might be related to the Nordic proposals on persistent organic substances and to the action plan likely to come out of the Washington conference on land-based sources of marine pollution in November 1995. The Canadian panelist said that international agreements in the control of particular chemicals would have an important influence on which chemicals are added to the NPRI.

A consultant with UNITAR stressed the usefulness of PRTRs in providing baseline data on environmental releases.

Another questioner asked about the relationship of PRTRs to the environmental standards being developed under the International Standards Organizations (ISO). Panelists indicated they were keeping an eye on the relationship to the ISO standards on environmental performance.

In response to a question, the Canadian panelist said that as Canada deals with its first year of reported data, six staffers are working on the NPRI. Additional personnel are working at the regional office level. □

Edan Dionne, *Corporate Environmental Systems, IBM*

Guidelines For Effective Environmental Reporting: PERI Guidelines

An organization's environmental performance is increasingly viewed as an essential part of good citizenship. Consequently, environmental reporting continues to grow, as does its value as part of an organization's environmental management system.

Recognizing the growing importance of environmental reporting, several companies began exploring effective ways to publicly share information on programs and performance. The group produced a set of voluntary guidelines, first released in 1993 and updated in 1994, as a helpful tool for organizations to use is initiating or improving their environmental reporting. The document is called the Public Environmental Reporting Initiative (PERI) Guidelines.

The ten key environmental reporting areas covered by the PERI Guidelines are:

- Organizational Profile: Helps audiences interpret and understand the context of all information contained in the report.
- Statement of Policy: A statement of the organization's environmental policy, including overall goals to be achieved.
- Management System: Discussion of environmental management systems and how those programs are implemented.
- Environmental Releases: This covers information on air emissions, greenhouse gas emissions, ozone-depleting substances, water effluent, hazardous waste disposal and management, and company-wide reduction targets or goals.
- Resource Conservation: This category addresses materials, energy and water conservation, as well as forest, land and habitat conservation.
- Risk Management: This covers auditing programs, remediation programs, emergency response programs and work place hazards.
- Environmental Compliance: This category requests information on organization's record of compliance.
- Product Stewardship: This category covers a wide range of items, focusing on the degree to which a company evaluates the environmental impact of its products or processes; packaging reduction, reuse or recycling; use of recycled materials; energy efficiency; post-consumer materials management activities (product take back programs, etc.); supplier-based programs for reducing environmental impact; criteria for selecting environmentally responsible suppliers; any specific product stewardship targets, goals and performance against the goals.
- Employee Recognition: Particularly programs to encourage or reward environmental responsibility among employees.

- Stakeholder Involvement: This final category requests information on efforts to work with stakeholders, including efforts with research or academic institutions, policy groups, non-government organizations and industry associations.

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Susan B. Hazen, *Acting Deputy Director, Office of Pollution Prevention and Toxics, U.S. EPA*

It is a pleasure to be here today with representatives from our states, from industry, local community groups, academia, the environmental community and other Federal Government users.

TRI is a Program that tends to bring people together and this conference is one of the most successful examples of how bringing all users, or customers, together can help to enhance and build a product that meets as many customer needs as possible. After each of these conference , EPA has gone back and reassessed what we are providing in terms of information, how we are providing it and laid the course for changes and additions as appropriate and as possible.

Today I am here to talk about International TRI. Moving forward beyond our national program does not mean that we believe we are done here -- what it means is that we believe we have a tool that is essential in the development of good sound environmental management practices. It means we believe we have stepped out ahead and need to bring other nations along. It means that we believe our experiences -- yours, mine and all U.S. users are relevant and important to the rest of the environmental community.

At the Rio Summit, Agenda 21 was drafted and identified the collection and dissemination of information as one the highest priority activities for follow-up. Given the enormous number of issues that were raised at this Earth Summit, it seems surprising that information was identified as a priority. Why is that?

Information about the flow and movement of chemicals through the environment, the economy and the workplace is essential to understanding the potential dangers, the areas of greatest concern, the areas where special care needs to be applied and the areas where critical risk decisions need to made -- risks accepted or rejected as unreasonable. And these acceptances or rejections need to be made not just by the industry or the government but by the public -- the workers, the neighbors, the children. Those who often bear the risk with no financial benefit, those who often have been unaware that there is a risk to be evaluated. People for whom decisions have been made by federal and state agencies who don't live in their neighborhoods, or by plant managers who find a risk acceptable that you or I may not. The public lost trust in the decision makers long ago and information allows them to be part of today's decision making- and hopefully part of rebuilding the trust.

We all know about TRI and Right-to-Know in the United States - but why an International TRI? Well, just as we learned here in the U.S. -- pollution, chemical hazards and industrial diseases know no boundaries. We are at present trying to understand the contaminants that flow through the New River into the U.S. Trying to assist a population who is being adversely impacted by chemicals and wastes that they clearly did not generate, nor did they choose to accept.

We and they are hindered in our search for answer. We do not know and the Mexican government does not know what facilities in Mexico are releasing into the air and water that could be causing significant public health issues. Facilities in Mexico do not report on releases and transfers of chemicals into the environment. Even U.S. companies in Mexico do not provide that information. Yet pollution has moved across the border, people are getting ill, and information is not forthcoming.

When the catastrophe in Seveso, Italy occurred, the toxic chemicals released did not stay within a confined area. They moved and dispersed across borders. People many miles away had no idea what was stored, used or routinely released at Seveso. They had no choice, no right to accept or refuse the risk.

Until just recently, there was nothing to even restrict the purposeful movement of hazardous waste across borders from developed to developing countries.

Nations do not exist within bubbles, and as we become even more and more technologically advanced, the need to share critical health and environmental impact information across oceans and borders is essential.

So, what are we doing?

In February 1993, the U.S. EPA, under the auspices of the International Programme on Chemical Safety (IPCS), convened a workshop in Washington D.C. to explore issues relating to the implementation of Agenda 21 Chapter 19 recommendations concerning chemical release inventories. This was the first step in moving towards an international programme. As a follow-up, a small steering committee was formed to lay out what was needed and to find the means and the mechanisms for moving forward. This small group consisted of members from the IPCS, the WHO, UNEP, OECD, UNITAR, and U.S. EPA.

Much has grown from this small group.

The OECD took on responsibility for crafting a Guidance to Governments Document that would serve both developing and developed countries. This document would serve as a guide for creating small inventories and start up programmes. The document is being developed through a series of workshops. Two have been held already and the third will be held this January in Basel, Switzerland. The effort has been quite successful to date and we expect to have a completed document in 1995. This document is exploring such critical issues as Right-to-Know, pollutants to be covered, measurements data systems, facilities to be covered -- and so on.

The U.S and the IPCS drafted a "Benefits Document" as the starting point for "advertising" the benefits of an international TRI. The Project was called Pollutant Release and Transfer Registries.

UNITAR has taken on the sizeable task of developing and testing training materials for developing countries. Mexico, the Czech Republic and Egypt are pilot countries for this effort. All reports are that this exercise is progressing well. UNEP has been working with UNEP has been working to evaluate existing hardware and software at the IRPTC. The IRPTC is one possibility for a repository of international data.

And lastly, but certainly not least:

Many OECD member countries have forged forward aggressively and have developed their own inventories. Canada has completed their first year of data collection and is well on the way to year two. The United Kingdom published their first inventory results this year with much the same findings as the first U.S. inventory -- large releases that had not been expected.

The Dutch have had pollutant inventories for many years while the Japanese, the Australians and the E.G. are moving towards developing systems. Within the OECD we are at the early stages of sharing information across borders with the U.S., Canada and, if possible, Mexico.

Hopefully a similar effort will emerge in Europe.

The U.S. is strongly supporting all of these efforts through both in-kind services as well as financial support where possible. We believe that only when we can access information globally will we have a real sense of the chemicals in our environment.
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François Lavallée, ***Head, National Pollutant Release Inventory, Pollution Data Analysis Division, Environment Canada***

Canada's National Pollutant Release Inventory: An Overview of Its Development and Implementation

This presentation outlines the development of Canada's National Pollutant Release Inventory (NPRI) and highlights differences and similarities between the Canadian inventory and the United States Toxic Release Inventory (TRI). It closes with a brief review of progress to date and future direction for the National Pollutant Release Inventory.

Genesis

In the United States, the Emergency Planning and Community Right-to-Know Act provided the foundation of the Toxics Release Inventory, and later, other elements were added as a result of the Pollution Prevention Act. The TRI was, to a large extent, specified by these acts of Congress and was enacted as a result of the environmental incidents at Bhopal, India and, closer to home, in West Virginia.

The basis for Canada's NPRI is a strategic document, known as Canada's Green Plan, which is a framework for environmental remediation and sustainability. The Green Plan specifically refers to the need to improve our understanding of toxic substances and their health risks in Canada. In this way, the NPRI does not exist *per se* as part of a Community Right to Know initiative. It can be seen as a first step in that direction but it is foremost an essential part of overall toxics management in Canada. The need for Community Right to Know provisions in Canada, of which the NPRI is considered one important element, is part of the current review of the ***Canadian Environmental Protection Act (CEPA).***

It is important to note that no specific separate legislation was enacted to establish this new national database, the NPRI. Instead, the program was implemented using existing provisions of the ***Canadian Environmental Protection Act***, specifically subsection 16 (1) of the Act which allows the Minister of the Environment to request information by publishing a notice in the Part 1 of the Canada Gazette. CEPA applies to *all Canadians*, unless they are specifically exempted in a notice, and those subject to the notice are only required to provide information to which they have access or to which they can reasonably be expected to have access.

The NPRI Reporting Criteria

To assist in the development of the NPRI, Environment Canada established a multi-stakeholder advisory committee (MSAC) composed of representatives from governments - both federal and provincial, from a number of industry sectors, as well as representatives from environmental and labour organizations. The Committee worked for 18 months and consulted with other Canadians across the country to produce recommendations for baseline reporting criteria for the NPRI. These recommendations were submitted to the Minister of the Environment in December 1992. The program was officially launched in March 1993, with 1993 identified as the first reporting year for the NPRI.

The NPRI reporting criteria specify that anyone in Canada who manufactures, processes or otherwise uses 10,000 kgs (10 metric tonnes) per year of a listed NPRI substances, in concentrations of 1% or more, and who has 10 or more employees in a given year, must report releases or transfers of the listed substances unless an individual is specifically exempted in the Canada Gazette notice from reporting to the NPRI.

It will not be surprising if these criteria appear familiar to those who also know the U.S. TRI. In developing the baseline criteria for the NPRI, the members of the advisory committee turned to examples of existing programs, particularly the TRI, and the Canadian Chemical Producer's Association National Emissions Reduction Masterplan (NERM), a voluntary industry initiative.

The list of 178 NPRI chemicals also reflects the example of these programs. The list of substances in the NPRI was essentially derived from the 1990 TRI list of substances. Those substances already regulated in Canada and substances scheduled for bans or phaseout were eliminated from the potential NPRI list and, as a result, pesticides and Chlorofluorocarbons (CFCs) do not appear on the list. In addition, substances that were on our Domestic Substances List in quantities below 1 tonne were eliminated, since it was logical to assume that no reports would ever be filed for these substances under the current reporting criteria. The committee also reviewed 10 other major lists, from which it derived a list of 78 "candidate" substances which are expected to be reviewed in future years for possible addition to the NPRI list of substances.

Other Similarities and Differences

In addition to differences in underlying legislation and in the list of substances, it is important to note that the TRI reporting requirements apply only to industries within the Standard Industrial Codes (SIC) 20 to 39. As noted, in Canada, *anyone* who owns or operates a facility that meets the NPRI reporting criteria must report *except* if specifically exempted. The application to all Canadians is a basic underlying principle of the ***Canadian Environmental Protection Act*** and is not specific only to the NPRI. As a result, a specific list of exempted sectors needed to be developed for the NPRI. The current exemptions were recommended based on the expected level of releases, the undue reporting burden which might be imposed, and the availability of information from other sources. Federal and Provincial Government facilities are not exempted unless they fall under the specified exemptions, which include facilities used for:

- Education or training of students, such as universities, colleges, and schools;
- Research or testing;
- The maintenance and repair of transportation vehicles, such as automobiles, trucks, locomotives, ships or aircraft;
- The distribution, storage, or retail sale of fuels;
- The wholesale or retail sale of articles or products which contain listed substances, as long as the substances are not released to the environment during normal use at the facility;
- The retail sale of substances listed in Schedule I to this notice;
- Growing, harvesting, or management of renewable natural resources, such as fisheries, forestry or agriculture, as opposed to facilities which process or otherwise use their products;
- Mining of materials, but not those facilities engaged in further processing of these mined materials;
- Drilling or operating wells to obtain oil and gas products, but not those facilities engaged in further processing of these oil and gas products.

Other similarities between the NPRI and the TRI are apparent in the information being collected. As with the TRI, the NPRI requires that facilities report information identifying the facility and its location, the quantities of listed substances released to air, water, land or by underground injection or transferred off-site in waste. However, there are also important differences. Since "emergency preparedness" is not a stated purpose for the NPRI, information is not requested on the quantities of listed substances stored on site. In addition, because no agreed definition of "pollution prevention" could be developed for the NPRI by the advisory committee, no information related to pollution prevention, such as recycling on site, is being collected.

Electronic Reporting

Based on information provided by the EPA on the costs and time associated with the processing of TRI reports filed on paper, Environment Canada decided to encourage electronic reporting as much as possible. A "Clipper", user-friendly, reporting form was developed for the NPRI program by Environment Canada staff. The quality of this software was quite good and problems have been minor. Approximately 70 percent of respondents used the electronic form rather than paper. User feedback overall has been overwhelmingly positive. A number of changes are being made to the improve this product and increase its usefulness to users. Environment Canada found that the quality of the reports filed on disk was much higher than those filed on paper, primarily due to "error" checks built into the reporting software which required reporting facilities to correct reporting errors in order to complete their reports for Environment Canada. We have found that electronic reporting has greatly reduced the number of follow up calls required to complete missing or erroneous information on reports filed with the NPRI. Electronic reporting packages will automatically be sent for the next reporting cycle to anyone who has already filed with the NPRI and we will continue to work to increase the percentage of reports filed electronically.

Environment Canada has received over 1200 reports for 1993 and is in the process of reviewing the reports. The first annual NPRI report will be a summary of the information provided and will include Environment Canada estimates for mobile sources and fuel distribution. Estimates from other sources also will be included in future years. Because we intend to make the information reported to the NPRI publicly accessible through Internet, only a summary report will be published in paper format.

While the TRI has served as a useful model for the NPRI, we can expect that other differences between the programs will be introduced as the NPRI evolves in response to Canadian environmental priorities. Many changes have been made or proposed to the TRI and, as with the initial development of the NPRI, these changes will be evaluated for their applicability in Canada. Changes to the NPRI list of substances must also be considered in terms of outstanding issues identified by the Advisory Committee which included the need to consider high profile micro- (dioxins, furans) and macro- (CO_2) pollutants on the list of NPRI substances. These issues and the review of reporting thresholds which such changes would entail will form the basis of future work for the NPRI.

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Victor Hugo Páramo Figueroa, ***Director, Administration and Environmental Quality, National Institute of Ecology, SEDESOL, Mexico***

Development of a PRTR in Mexico

Mexico is considering a Pollutant Release and Transfer Register (PRTR) to achieve a range of goals. Some relate to developing a more integrated approach: provide comprehensive emission records for individual facilities; avoid duplication in reporting at the local and federal levels; provide basis for comprehensive inspection and enforcement; and provide information for future integrated regulations or rules.

In principle, Mexican industries agree that a PRTR can be a cost/efficient way to report emissions to authority. Industry also agrees that a PRTR offers the opportunity to identify unnecessary emissions to the environment. NGOs support a PRTR as public information to inform communities about risk and help the population protect itself. In addition, the PRTR is important in joining international agreements, in efforts to standardize environmental management tools, and in making national environmental reports.

The United Nations Institute for Training and Research (UNITAR) and the Mexican Government, through the National Institute of Ecology, initiated a Pilot Study on the establishment of a National PRTR in Mexico in 1994. In support of this pilot study UNITAR has developed a document entitled, "Guidelines for the

Implementation of PRTR Pilot Studies." In addition, consultancy support was provided by the National Institute of Ecology to assist in the preparation of a National PRTR Research Report entitled, "Assessment of the Mexican Legal, Institutional, and Administrative Infrastructure Related to PRTR: A First Report."

The first step was selecting a national focal point. The focal point is the Mexican National Institute of Ecology under the Secretary of Social Development. The Institute of Ecology develops and conducts Mexican environmental policy. It is responsible for developing federal regulations and rules. It is also responsible for integration of the air pollution emission inventories and hazardous waste management data files.

The second step was six informal meetings with representatives from government agencies, industry, academia, and non-governmental representatives. At these meetings, traditional objections such as how integration might occur, handling of confidential data, and legal changes were discussed. Agreement was reached to conduct the pilot study.

Sixteen groups participate in the monthly meetings of a national coordinator group, which was set up through a formal agreement. The members include the National Water Commission, Secretary of Commerce and Industry, Secretary of Foreign Affairs, Secretary of Health, Secretary of Social Development, National Institute of Ecology, Federal Attorney for Environmental Protection, National Autonomous University of Mexico, National Center for Disaster Prevention, the National Chamber for the Transformation of Industry, the National Association of the Chemical Industry, National Council of Environmental Industrialists, Ecological Liaison, Civic Committee on Ecological Disclosure, and the Border Environmental Education Project.

The next steps are a revision of the consultant's report, comments on the OECD's guidance, and UNITAR's Pilot Study Guidelines, exchange of information on PRTRs, and development of a PRTR Pilot Study Workplan for 1995.
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Session 5: Compliance Assistance, Enforcement and TRI

Session Leader

Maureen Lydon, *Deputy Director, Toxics and Pesticides Enforcement Division, Office of Regulatory Enforcement, Office of Enforcement and Compliance, U.S. Environmental Protection Agency*

Speakers

Jon Jacobs, *Office of Enforcement and Compliance Assurance, U.S. Environmental Protection Agency*

David Monsma, *Environmental Action Foundation*

Charlie Tebbutt, *Western Environmental Law Center*

Steve Tomlyanovich, *Minnesota Emergency Response Commission*

Philip Wong, *EPCRA 313 Regional Coordinator, U.S. Environmental Protection Agency, Region 10*

This section explored the different enforcement tools being used to increase compliance with EPCRA Section 313 TRI reporting requirements. U.S. Environmental Protection Agency representatives discussed the distinction between compliance and enforcement in the new Office of Enforcement and Compliance Assurance. U.S. EPA Regional representatives described how different kinds of Supplemental Environmental Projects are being used in EPCRA Section 313 settlements. The role of citizen groups and how citizen suits can help increase industry compliance with EPCRA reporting requirements was discussed by representatives from the Western Environmental Law Center and the Environmental Action Foundation. A state representative focused on how states can increase compliance with EPCRA without the threat of enforcement.

David Monsma, *Toxics Counsel, Environmental Action Foundation*

Beyond TRI

The Toxics Release Inventory (TRI) data, collected under Section 313 of the Emergency Planning and Community Right To Know Act or SARA Title III, continues to evolve in its public right-to-know and pollution prevention mission. Because of the Pollution Prevention Act of 1990, the TRI now logically collects information on recycling, energy recovery, treatment methods, and self-reported source reduction activity (Form R, Section 8). As EPA moves toward expanding the Inventory (Phase I - chemical expansion, Phase II - facility expansion, and Phase III - Chemical Use Inventory) and disseminating TRI data through new information technologies, new questions arise about the purposes TRI serves.

Data use for TRI has been successfully linked to pollution prevention goals, and to a lesser extent, the practice of source and use reduction. There have been appreciable reductions in TRI emissions, but this reduction does not represent a trend leading away from the heavy industrial use of TRI chemicals. In some cases, emissions have been cut but overall use remains steady or at slightly reduced levels. For many reporters, TRI still acts like an end-of-pipe control rather than a pollution prevention tool to reduce or eliminate the use of toxic TRI chemicals at the source. It is not clear whether the regulated community relies on TRI to achieve source reduction goals or not.

Toxics use reduction and its perception is reliant upon the accuracy of the reporting data. To get an idea of the accuracy of this data, Environmental Action conducted a case study on data submitted by a single industry. Surveying 873 Form Rs for the years 1991 and 1992 filed by 14 PVC feedstock manufacturers revealed average technical error rates for completing the forms accurately of 24% in 1991 and 26% in 1992. Moreover, our assessment indicated that technical accuracy does not in any way assure full compliance, that source reduction reports have no correlation to any reduction in waste, nor do they have any apparent accuracy, and the overall reductions in waste related by EPA in their TRI data reports were not borne out in this survey.

This data quality study is in no way definitive, but indicates a need to measure the accuracy of TRI data as reported to U.S. EPA. Environmental progress claims based on TRI should probably be avoided and any claims that are made by the U.S. EPA must be thoroughly evaluated and documented. Aggregating emissions data and charting presumable reductions is not the best use or purpose of TRI. Rather, environmental progress should be based on objective accounting criteria that measures real reductions in the use of chemicals of concern. This is the rational basis for collecting materials accounting information. In the absence of collecting materials use information, TRI will continue to be troubled with invalid environmental claims and the public will be less informed than it should be.

The Toxics Release Inventory must be put to work acting on known risks. Environmental protection programs such as TRI can ill-afforded to passively suggest environmental progress. The criteria for determining the status of a TRI listed chemical communicates some baseline level of risk. This determination should alert us to concerns about the continued use of particular TRI chemicals.

In this sense, TRI cuts across multi-media barriers without regard to specific control technologies or performance levels. TRI acts as an effective preliminary screening tool toward limiting the production or use of certain toxic substances that have been rationally determined to present environmental and health risks. The logical next step to take in this evaluation is to determine whether individual TRI chemicals or classes of chemicals present an unreasonable risk--unreasonable, not irrefutable. This is the articulated and legitimate role of the Toxics Substance Control Act (TSCA), which has been quelled by Agency neglect, the Asbestos court ruling, and unsuitable standards within the Act (e.g. "least burdensome alternative" & "substantial evidence" restraints).

The future of TRI is now being driven by information technologies that provide innovative retrieval and presentation tools. This creates new data users and broadens the public's right-to-know. The challenge for EPA now is to advance the purposes of the TRI program and pollution prevention. This will be accomplished by reconciling the Emergency Planning and Community Right-To-Know Act (EPCRA) with the Pollution Prevention Act and the Toxics Substance Control Act (TSCA). These Acts are unnecessarily segregated by purpose and operation.

The Pollution Prevention Act enunciates a principle that pollution ought to be reduced by avoiding its creation. EPCRA helps focus attention on what chemicals should be avoided. The Toxics Substance Control Act (although in need of correction) is the existing mechanism for ensuring that the production and use of the most dangerous substances is limited. The potential interactive relationship between these Acts, however, is thwarted by the absence of a commitment toward harmonizing their purposes and acting on known risks.

The Pollution Prevention Act supports but does not require pollution prevention, EPCRA documents releases but not use, and TSCA is impeded by a lack of regulatory will to limit the production of bad chemicals. Clearly, the Agency should seek to conciliate this process and drive toward a synthesis of regulatory purposes. Moreover, the Agency must adopt a mature attitude about the fact that some toxic chemicals ought not to be manufactured. Until source reduction and production limits are recognized as legitimate purposes of pollution prevention, the Agency will continue to communicate risk but fail to act on it.
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Charlie Tebbutt, *Western Environmental Law Center*

Introduction

The importance of the Emergency Planning and Community Right-to-Know Act cannot be easily exaggerated. For the first time ever, citizens and the government have an idea about the volume of toxic wastes that are constantly being dumped upon us all. Using the power of knowledge created by EPCRA, citizens have forced industries into reducing use of toxic substances, both by community pressure and litigation; industries have "voluntarily" reduced chemical use and/or releases into the environment out of fear of public outcry; and legislative and regulatory entities have reshaped their agendas.

A More Holistic Approach

EPCRA TRI reporting has, among other things, been the catalyst for the Clean Air Act Amendments of 1990, the Right-to-Know More activities in this country and numerous other national and international pollutant inventories. Canada is now implementing a similar TRI program.

EPCRA has begun to close the loop on chemical usage through its multi-media reporting requirements. For the first time, TRI analysis underscored the urgency of dealing with fugitive air emissions that have been directly affecting workers on the line. The past compartmentalization of pollution into air, water and solid waste is yielding to facility-wide focus. By viewing industrial polluters on a facility-wide basis, regulatory focus is slowly shifting towards source reduction and other pollution prevention measures and away from traditional end-of-the-pipe controls. Clearly, this more holistic focus is long overdue. Future regulatory emphasis must move towards redefining BACT/MACT as pollution prevention rather than bigger, more complex, and more capital intensive, end-of-the-pipe controls.

Citizen Action

Citizens have used the TRI and toxic substance storage information to leverage companies to become better corporate citizens through direct communications, "Good Neighbor" processes and enforcement of reporting violations. This discussion will focus on using citizen enforcement to achieve not only compliance, but also pollution prevention commitments by violating facilities.

Atlantic States Legal Foundation, a not-for-profit environmental organization for whom I have been counsel, has negotiated over twenty settlements with EPCRA violators which have included comprehensive, long-term pollution prevention programs as major settlement requirements. Atlantic States has identified facilities that have failed to report under sections 311, 312 and 313 of the Act and used the citizen suit provision of EPCRA to compel compliance and payment of civil penalties, in addition to pushing pollution prevention programs. In lieu of higher civil penalty payments, violators have made payments to EPCRA related projects. The project payments have, in large part, gone to Local Emergency Planning Committees, State Emergency Response Commissions and HAZMAT teams. Monies have also gone to other third party entities to promote local, regional and national right-to-know educational projects and campaigns.

Cooperation Among Citizens, States and EPA

Central to the effectiveness of EPCRA compliance tracking is the sharing of information between and among agencies and citizens. With agencies being undersourced, citizen enforcement adds a critical element to attainment of compliance both for non-reporters and inaccurate reporters. Citizens, however, generally do not have the same ready access to information as do the agencies. It is imperative for citizens to have access to Clean Air Act, Clean Water Act, RCRA and EPCRA information in order to ferret out non-reporters and be able to check the accuracy and completeness of facility reports. Agencies should work cooperatively with citizens to inform them of the availability of various databases and make those information sources readily available. While some antagonism naturally exists between agencies and citizens, achieving compliance is a shared goal that could bridge some of the differences.

Sharing information need not be a one way street. Citizens often discover problems that they either do not have the resources to tackle or cannot feasibly pursue because of limited rights to inspect facilities. Working from the citizen leads, agencies may be able to better document these leads and build stronger cases.

In certain cases, it may be advantageous for citizens and agencies to pursue joint enforcement actions. Citizens can, and often do, take tougher environmental stands than agencies. Citizens also have more flexibility in fashioning progressive settlement agreements. Agencies often feel constrained in their ability to go outside their statutory or regulatory obligations. By working together, agencies may be able to provide much-needed technical expertise while citizens can push for agreements with facilities that advance environmental protection beyond compliance.

Conclusion

Getting more information in the hands of citizens through an expanded right-to-know program along with more accessibility to the available databases will further the national movement towards the promotion of pollution prevention.
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Steve Tomlyanovich, *Minnesota Emergency Response Commission*

TRI Data Quality Assurance Project

Introduction

The office of the Minnesota Emergency Response Commission (MERC), as part of the Department of Public Safety, is responsible for implementing the Emergency Planning and Community Right-to-Know Act in the state. The Emergency Response Commission itself is made up of 22 members which include representatives of fire, law enforcement, medical services, business and industry, labor, community groups, and citizens. The Commission was established in Minnesota Statutes through enactment of the Minnesota Emergency Planning and Community Right-to-Know Act in July, 1989. This state statute also gave the MERC specific inspection and enforcement authority.

In 1991, the Minnesota Emergency Response Commission (MERC) received a grant from the U.S. EPA to conduct a TRI data quality assurance project. The grant focused primarily on identifying facilities which failed to report their toxic releases and transfers on EPA Form R, and on enhancing the quality of the data submitted. Both of these factors were critical to ongoing activities in the state. The project was developed to create a framework for future compliance with technical assistance efforts that will be components of information processing and pollution prevention programs within the MERC and other state agencies.

Databases/Other Source Review

MERC staff reviewed a number of possible databases and information sources to identify potential non-reporters. These included:

National Enforcement Information Services Center (NEISC)

The MERC contacted the U.S. EPA's NEISC and requested a data sort. The sort identified facilities in the state which had never reported under Section 313, had 10 or more full-time employees, were included in SIC Codes 20XX through 39XX, and had been assigned a Dun and Bradstreet Number. The NEISC provided the MERC with a computer printout listing approximately 3400 facilities which met all of the above criteria. Upon review of the printout, staff eliminated for consideration those facilities which it believed were not likely to meet the applicable usage thresholds. Examples of facilities deleted from the listing included small printing operations, machine shops, and metal fabricators. This source was used to identify 63 non-reporters.

Minnesota Directory of Manufacturers (MDOM)

The MDOM lists several thousand manufacturing facilities in the state. It identifies these facilities by location, SIC Code, and number of employees. Staff used the directory to compare current reporters with non-reporters in the same SIC Code. This source was used to identity 37 non-reporters.

Section 312 Reports

Facilities storing Extremely Hazardous Substances (EHS) at 500 pounds or the Threshold Planning Quantity, whichever is less, must file reports with the MERC and the local fire department. In addition, a facility must file if they store 10,000 pounds or more of a chemical for which they are required to have or prepare a Material Safety Data Sheet under the Hazard Communication Standard. Section 312 data assisted staff in identifying some Section 313 reporters, however, some commonly used chemicals are not found on the EHS list. For example, Xylene and Toluene are not on the EHS list and are not likely to be stored at the 10,000 pound threshold. Correlation between on-site storage and annual usage information can often be difficult. This source was used to identity 14 non-reporters.

Hazardous Waste Inventory

The Hazardous Waste Division of the Minnesota Pollution Control Agency (MPCA) maintains a computer database consisting of all licensed hazardous waste generators in the state. The MERC requested a printout of all generators included in SIC Codes 20XX through 39XX. This disclosure included facility identification information, along with the type and volume of waste generated per calendar year.

The amount of a Section 313 chemical reported by a facility as being transferred off-site is based only on the percentage of that chemical in the entire waste stream. In contrast, hazardous waste may include water, other chemicals, and impurities. Therefore, a direct correlation between the amount of a hazardous waste generated and Section 313 chemical usage cannot be made. For this reason, it was often difficult to determine whether a facility would be required to report under Section 313. Even though volumes cannot be compared, the generator list does give an indication of which Section 313 chemicals are being used at a facility. This source was used to identify 7 non-reporters.

Air Emission Inventory

The Air Quality Division of the Minnesota Pollution Control Agency maintains a database of all point source emitters in the state exceeding the threshold of twenty-five tons per year of Volatile Organic Compounds (VOC). Facilities exceeding this threshold must submit an annual criteria pollutants emission inventory to the MPCA Emission Inventory Point Source System. Using this system, the MPCA retrieved all facilities included in SIC Codes 20XX through 39XX, with VOC emissions at five tons or greater and not listed in the 1988 and 1989 state TRI annual reports. Since all VOC's are aggregated together for permitting, it is difficult to determine the actual emissions of a specific Section 313 chemical. This source was used to identify 6 non-reporters.

Miscellaneous

A small number of facilities were surveyed based on information received from other state and county agencies and the general public. These sources were used to identify 1 non-reporter.

Voluntary Submittals

During the course of the grant project, fourteen facilities which were not surveyed, reported for the first time. We believe that this was a direct result of our outreach efforts.

Survey Process

A brief cover letter, survey, and Section 313 Toxic Chemical List was sent to approximately 1500 facilities identified as being potential non-reporters. The survey asked the facility if they met the employee, SIC Code, and chemical usage criteria which may require them to file an EPA Form R.

Results

By the end of the grant project, 165 facilities indicated through the survey that they met all of the criteria for reporting. Through technical assistance provided by MERC staff, 142 of these facilities filed an EPA Form R during the period of the grant project. The remaining 23 came into compliance as a result of an EPA Enforcement Grant the MERC received from the U.S. EPA in 1992.

The 142 reporters represented 16 different SIC Codes. They submitted 268 Form R's covering 44 different chemicals and chemical categories. The total quantity of reported releases and transfers was 3.6 million pounds, 2.8 million of which was stack and fugitive air emissions.

Conclusions

The Data Quality Assurance Project allowed the MERC to identify and obtain compliance from facilities which had never reported in the state. Temporary staff hired during the grant period, allowed the MERC to contact a large number of facilities in a timely manner. Not only were these additional facilities brought into compliance, but through technical assistance, we were able to achieve good data quality.

A close working relationship with the regulated community can greatly enhance compliance rates and ensure data quality. This excellent rate of compliance continues today. For example, during the last three reporting years, the MERC has had a 100 percent response rate from known reporters. In other words, the facility has submitted a Form R or a letter indicating they are no longer subject to the reporting requirements. The MERC does have enforcement authority under the state Act. To date, we have not issued any civil penalties under Section 313 of the state Act.

State staff does cooperate with U.S. EPA in its compliance and enforcement efforts within the state. This includes providing facility specific information to U. S. EPA inspectors and accompanying them on data quality and compliance inspections.
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Philip Wong, ***TRI Coordinator, U.S. EPA Region 10***
James Pearson, ***Environmental Engineer, U.S. EPA, Region 10*** **and**
James Sekor, ***Pollution Prevention Technical Specialist, U.S. EPA, Region 10***

Review of Supplemental Environmental Projects

Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA), known as the Toxics Release Inventory (TRI), is a requirement for the reporting of chemical releases and transfers by certain facilities. The present regulations require that manufacturers with more than ten employees who manufacture, process or otherwise use more than threshold amounts of specified chemicals report their releases and transfers on EPA Form R. The list of chemicals subject to reporting and the types of facilities which must report are being revised and expanded to increase the level of information available to the public.

Failure to report as required may subject a noncomplying company to administrative actions including the payment of penalties. Typically, in settling penalties, Environmental Protection Agency (EPA) permits the penalties to be mitigated when a respondent agrees to perform an action which provides some tangible environmental benefit. Such actions are called Supplemental Environmental Projects (SEPs).

A project was undertaken in Region 10 to evaluate the SEP process. 55 TRI settlements with SEPs in Region 10 were reviewed during the summer of 1994. No comprehensive review or audit of SEPs had previously been conducted. The goal of the project was several-fold: to gather information as to the effectiveness of the SEP process; determine which types of SEPs were the most effective; review which industries and processes were

amenable to pollution prevention; examine the long term gains available through pollution prevention; and discover difficulties in implementing pollution prevention.

To the extent that pollution prevention is accomplished as a result of the implementation of SEPs, the process should be considered successful. Not surprisingly, all facilities visited agreed that the SEP process is a more equitable way of encouraging compliance with environmental regulations than simply to assess and collect a penalty.

More than half of the SEPs were deemed to have actually resulted in environmental benefits as measured by TRI releases and transfers. Other environmental benefits were accrued but are not discernable through TRI data. Some successful SEPs included process changes which also resulted in decreased use of and dependence on chemicals which would not be reflected in the Form R. Many SEPs have inherent value but simply cannot be quantified (i.e., environmental audit, chlorine alarm system, appointment of environmental coordinator).

A wide cross section of industries and SEPs were involved the project. The industries and processes most amenable to pollution prevention were those having a using coatings and solvents in their process. The key to success in this area is certainly the availability of suitable alternatives and widespread use.

Types of SEP's	No.
- Substitutions for Solvents	
- Aqueous (subst. for Trichloroethylene)	2
- Aqueous (subst. for Dichloromethane)	2
- non CFC Cleaners	2
- Dibasic ester (subst. for acetone)	1
- Mechanical cleaning	2
- Caustic tank (for TCE vapor degreasing)	1
- HVLP/ high efficiency sprayers for coating	11
- Powder coating bake oven and spray booth	3
- Water based coating systems	2
- Solvent recovery still	10
- Installed new bulk storage tank	2
- Installed sulfuric acid recovery system	5
- Mechanically cleaning foam machine	2
- Environmental Coordinator	4
- Installed recycling center for oil/metal chips	1
- Installed chlorine gas alarm system/auto shutoff	1
- Installed Dust Collection System	3
- Conducted Environmental Audit	1
- Nutrient chemical reduction	1
- Caustic wash recycle	1
- Cooling water recycle	1

There were many difficulties discovered in accomplishing pollution prevention through the SEP process. The types of problems encountered can include insufficient capital, lack of dependable information and experience with new products, an entrenched production culture, and inadequate training. The potential for successful pollution prevention within the groups varies by facility, and requires a flexible and supportive management which is receptive to the need for change.

* Complete text of this report will be available from the authors in March, 1995.

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Session 1: Risk Targeting and Screening Using TRI

Session Leader
Margaret Round, *Program Analyst, Northeast States for Coordinated Air Use Management*
Speakers
Michael J. DiBartolomeis, Ph.D., *Chief, Pesticide and Food Toxicology Unit Office of Environmental Health and Hazard Assessment, Cal/EPA*
Dr. Debra L. Forman, *Air, Radiation and Toxics Division, U.S. Environmental Protection Agency, Region III*
Gregg Recer, *Center for Environmental Health, New York State Department of Health*
Amit Sachdev, *Counsel, Chemical Manufacturers Association*

Margaret Round, *Program Analyst, Northeast States for Coordinated Air Use Management*

The focus of this session was to present a variety of innovative approaches used by state and federal agencies and private industry to analyze TRI data to determine potential public health impacts, and efficacy of existing methods for regulatory decision making.

Dr. Michael DiBartolomeis discussed the implication for environmental priority-setting using TRI data for identifying target populations at risk in California. An approach for using TRI data in the risk-ranking part of the California Comparative Risk Project, sponsored by the California Environmental Protection Agency, provided an innovative approach in formulating environmental policy and future strategies. Taking into account exposure of toxic discharges (specifically, air emissions from selected manufacturing facilities) to population subgroups within a defined geographical area, the project investigated whether exposure is unevenly distributed among racial and economic groups in California. Using an EPA derived measure, the project illustrated how per capita air pollutant loading varies across different subpopulations, defined in terms of their race or economic class. For a number of environmental threats defined in the project, potentially hazardous exposures to some pollutants were found to be concentrated in certain geographical areas in California. Noting the preliminary and uncertain nature of this analysis, the project found that groups with different income levels do not appear to experience substantially different TRI air pollutant loading, although there was a trend toward a decrease as annual incomes exceeded $75,000. In contrast, the data seem to indicate that African American and Hispanic subpopulations experience higher loading of TRI air pollutants than Caucasians, Asians, or American Indians. However, the statistical significance of these results cannot be ascertained. The challenge in using TRI data is to evolve and expand data collection to fill gaps in knowledge and collect data that are more applicable to risk assessment. Risk assessors must develop methods that incorporate geographical and population-specific data on toxic releases to define the distribution of risk across population subgroups.

Dr. Debra Forman presented an overview of the U.S. EPA Regional Approaches to Hazard Screening that are used in numerous applications including resource prioritization and pollution prevention targeting. This iterative process focuses on hazard identification and dose-response. The first phase of the screening process produces the Chronic Index which describes chemical releases in terms of relative toxicity using TRI data. The results of the Chronic Index are aggregated by facility, chemical and geographic grids. Phase II of the projects included development of the Vulnerability Index which describes the susceptibility of populations by scoring population demographics including age, economic status and minority status. With this information, a decision-maker may determine if additional information is warranted with regard to the exposure population, set of chemicals or industrial groups within the grid. In this way, opportunities for pollution prevention as well as resource intensive exposure and risk assessments may be pursued in sectors of greatest interest.

Greg Recer, from the New York State Department of Health, presented the findings of the state-wide screening study using TRI data to identify those facilities and chemicals most likely to have significant adverse public health impacts for priority setting. The risk screening protocol was developed as part of a project in which TRI data were combined with environmental, toxicological, geographic and demographic data to enable the DOH to better assess health risks and patterns of disease. The ranking of all NYS TRI facilities was done by deriving a risk-screening score for each facility based on both the quantity of air emissions reported and toxic potency of each chemical. The results found that inorganic chemical emissions, particularly chromium and arsenic compounds, predominated among those facilities ranked at the top of the carcinogen-based ranking. Conversely, respiratory irritants such as hydrochloric acid and chlorine dioxide were the predominant chemicals emitted by the highest ranking facilities in the non-cancer ranking. These results contrast strongly with the predominant chemical emissions among the highest-ranking facilities based solely on emissions quantity, which were primarily organic solvents. Again, DOH cautions on the interpretation of these results in light of the uncertainties in exposure estimates which assumes that exposure is directly related to emission quantity, accuracy of the data, and inability to distinguish between stack and fugitive emissions, since both are reported under the TRI. Uncertainties also arise from the chemical's toxicity assessment and gaps in the toxicology database. However, despite these limitations, risk-screening of TRI data allows new information to be extracted about TRI facilities and emissions which would not be allowed by considering total chemical emissions. The results also emphasize the need to carefully evaluate health effects from non-carcinogenic compounds such as respiratory irritants.

Amit Sachdev of the Chemical Manufacturers Association (CMA) discussed improving the use of TRI data for risk communication. CMA believes that TRI has gone a long way in meeting the statutory requirement to provide information about releases that could be useful in allowing the public to better understand and make decisions about the potential hazards that may be posed by those releases. However, only recently has EPA, the business community, and the public, begun to consider how to more effectively communicate this potential hazard based on the raw data. As a result the TRI program scores poorly as a risk communicator because it treats all listed chemicals as equally toxic, does not rank or prioritize decision-making based on risk, and does not provide information on toxicity or relative risks posed by the listed substances. In order to make TRI a more effective risk communicator, EPA could provide information in the database that the public can use for risk-based decision-making. This information could include, for example, relative risks posed by the listed chemicals, type of harm posed, routes of exposure and affected media and degree of certainty associated with this information. CMA recommended that EPA establish community advisory panels in order to better assess public data needs and aggressively explore new models for adapting TRI to provide the public with information not only about releases, but also risk.

The major issue raised during the question/answer period was how CMA reconciles the recommendation to expand the information available to the public to improve risk communication and the position presented the previous day regarding withholding of information to protect trade secrets.
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Michael J. DiBartolomeis, Ph.D., ***Chief, Pesticide and Food Toxicology Unit Office of Environmental Health and Hazard Assessment, Cal/EPA***

Using TRI Data for Identifying Target Populations at Risk: Implications for Environmental Priority-Setting

California recently completed a "comparative risk project" spanning two and one-half years that examined the State's environmental decision-making process and its environmental priorities.[1] This project, sponsored by the California Environmental Protection Agency, was intended to help the Agency shape its environmental protection strategies for the future. Although several states and the U.S. Environmental Protection

Agency (U.S. EPA) had found that ranking risks was useful for focussing on the most important environmental issues, the majority of participants in the California project were skeptical that environmental priorities should be set on the basis of risk alone. In part, this concern was driven by the realization that the current practice of risk assessment has several important methodological shortcomings.

As one of its objectives, the California Comparative Risk Project (CCRP) determined that some questions raised in California and nationally concerning the current practice of using comparative risk analysis (and risk assessment) for priority-setting should be addressed and evaluated. To manage this task, the CCRP was uniquely organized into three parts: 1) a ranking of environmental threats according to impact on (or risk to) human health, ecological health, and social welfare; 2) a critique of the risk-ranking model and an evaluation of other decision-making models; and 3) overall recommendations for environmental priority-setting by integrating the results of the first two components. Because the CCRP evolved this approach early on, several innovative ways to address priority-setting emerged at the completion of the project. A possible approach for using TRI data in risk-ranking is briefly described here.

One major shortcoming of comparative risk analysis is that the results of a ranking exercise are typically "total population-based." Previous comparative risk projects were grounded in the assumption that risks ought to be ranked unidimensionally in a way that reflects only the magnitude of their impacts on society as a whole.[2] That is, standard comparative risk methodology averages risk over an entire population, rather than focussing on individual or subpopulation risk. The use of aggregate statistics and a population burden of risk tends to erroneously characterize a population as homogeneous in ethnicity, age, gender, income, and health status, and ignores the significance of "toxic hot spots," or locations where multiple exposures and compounding risks occur. Furthermore, the use of only total population as a measure of risk masks high individual risks, and ignores how they are distributed. To complement the conventional emphasis on total population impacts in comparative risk projects (i.e., threats are ranked high only when a large number of people are exposed), the CCRP considered information about population distributions when identifying environmental hazards. Therefore, in the CCRP, environmental threats might also rank high when relatively few people are exposed to very high levels of toxicants.

To help address the issue of environmental protection inequities, the CCRP Human Health Committee (HHC) adopted a "distributional" approach to risk assessment which facilitates describing how risk levels vary across individuals in a population because of either exposure patterns or increased susceptibility to pollutant effects. The HHC, which was charged with ranking risks of environmental threats to human health, and the Environmental Justice Committee, which helped critique the risk-ranking process and explore other priority-setting models, worked cooperatively to describe the concept on which the methodology was based. That is, by relating total toxic discharges to population subgroups within a defined geographical area, an exposure map can be developed on which to assess and compare human health impact for each environmental threat. The concept of relating environmental exposure data to individuals in specific geographical areas may not be novel, but its application to environmental priority-setting has not yet been fully developed.

Population subgroups can be defined by any number of parameters as noted above. Environmental justice activists have identified race and income as two important markers for environmental inequities. Therefore, to examine whether the environmental loading of pollutants is unevenly distributed among subpopulations, the HHC conducted a statistical analysis of statewide TRI air emissions to characterize the average per capita air pollutant loading for different racial and economic groups in California. The analysis was limited because data were only available on air emissions from selected manufacturing sources, while it is clear that emissions from mobile sources would also likely to be inequitably distributed. Land and water releases of toxicants could also be used if data are available.

It is also important to emphasize that for some people, health effects might be experienced at lower doses than those causing responses in the general public. In an effort to evaluate potential impacts on such susceptible

subpopulations, the HHC identified groups known to be at heightened risk due to specific toxic substances and collected exposure information on these groups whenever possible (e.g., number of asthmatic children exposed to criteria air pollutants). However, relating geographical distribution of these susceptible subpopulations with manufacturing releases was presumed to be very difficult because of unavailability of data, and was not attempted during the CCRP. Nevertheless, the HHC did identify qualitatively two characteristics of more susceptible populations, that is, health status (e.g., preexisting disease) and exposure considerations (e.g., activity patterns).

The HHC used a measure developed by the U.S. EPA called the Population Emissions Index (PEI)[3] to illustrate how per capita air pollutant loadings vary across different subpopulations, defined in terms of their race or economic class. The PEI is the result of dividing the sum of the amount of toxicants released in a geographical area with members of a defined subgroup by the sum of the number of members in that population subgroup. If toxic releases (or put another way, enforcement of environmental protection) were equitable, all groups would have the same PEI regardless of the parameter in question (in this case race or income). General information about the age, race, and gender distribution of the California population was based on 1990 census data. When possible, census tract levels were used rather than zip code levels in order to obtain better geographical definition of pollutant loading.

The PEI should only be considered a surrogate measure for examining whether pollutant exposures or pollution-related health risks vary across population subgroups[3]. To interpret the PEI as a measure of potential health risk from exposure to air pollutants, it is necessary to make several simplifying assumptions: 1) concentrations of toxicants that people are exposed to are directly proportional to the amount reported released, and 2) all individuals in a given area will be exposed to the same concentration of an emitted toxicant, independent of the number of exposed individuals in an area or any differences in their activity patterns (e.g., sedentary versus exercising). Both of these assumptions can be challenged, but until air pollutant monitoring systems can provide spatially-refined ambient concentration data, analyses of distribution of risk across population subgroups must rely on pollutant loading data.

For a number of environmental threats defined by the CCRP, the HHC found that potentially hazardous exposures to some toxicants are concentrated in certain geographical areas of California[4]. Specifically for air pollutants, and selecting for individual race and economic status, the results of the preliminary HHC analysis indicate that groups with different income levels do not appear to experience substantially different TRI air pollutant loadings, although there was a trend toward a decrease in PEI as annual income levels exceeded $75,000. In contrast, the data seem to indicate that African American and Hispanic subpopulations experience higher loadings of TRI air pollutants than Caucasians, Asians, or Native Americans. However, the statistical significance of these results cannot be ascertained because of the high level of inherent uncertainty of the population and emission data.

Because of the preliminary and uncertain nature of this analysis, and the general unavailability of data for specific releases of toxicants in a given geographical area, these results were not included in the final risk-rankings of the CCRP. Nevertheless, several recommendations for improving the database and methodology, for enforcing environmental protection laws equitably, and for incorporating the concept of disproportionate burden of risk into environmental decision-making received consensus approval.

There are a number of important limitations to using TRI data alone to identify areas and populations that may be experiencing high pollutant exposures and resulting health risks: 1) the location of emissions and resultant exposures may not always correlate; 2) pollutant loading analyses do not take into account the toxicity of different compounds in the release; 3) occupational exposures would be ignored; and 4) TRI data are limited to the scope of its reporting requirements and the number of chemicals, although the impending expansion of TRI reporting will help to increase the usefulness of the data. Even acknowledging these limitations, the CCRP concluded that using TRI data and the distributional analysis approach to risk assessment, a number of interesting hypothesis about the distribution of health risks can be examined.[4]

The challenge for TRI practitioners is to evolve and expand data collection to fill gaps in knowledge, make data more readily accessible and user friendly, and most importantly, collect data that is directly applicable for risk assessment and priority-setting. Risk assessors must develop methods that incorporate geographical and population-specific data on toxic releases to define the distribution of risk across population subgroups. Identification of hot spots, or areas of cumulative risk, would be one benefit of this type of analysis which can ultimately lead to more equitable environmental decision-making and enforcement.

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U.S. EPA Regional Approach to Hazard Screening

The U.S. EPA Regions III, IV and VI are currently developing a universal process for Hazard Screening for use in numerous applications, including resource prioritization and pollution prevention targeting. The process is iterative, based on the first two steps of the National Academy of Sciences risk assessment paradigm: hazard identification and dose response. As a result, the process provides critical decision points for consideration by risk managers. The first phase of the screening process has been developed by Region III and produces the Chronic Index which describes chemical releases in terms of their relative toxicity. The Chronic Index is based on a combination of TRI emissions data and an estimate of relative dose, rather than an ordinal or categorical scoring system. This approach produces a continuous distribution of toxicity-weighted chemical releases and preserves the mathematical intervals within the original data sets.

The Chronic Index is based on the best available scientific information, thus, the selection of toxicity data is commensurate with the most rigorous level of peer review. The system primarily utilizes the EPA's Integrated Risk Information System (IRIS) and Health Effects Assessment Summary Tables (HEAST). Secondary sources of toxicity information include provisional factors derived by the EPA's Environmental Criteria and Assessment Office (ECAO) and studies performed by the National Toxicology Program. The results of the Chronic Index are aggregated by facility, by chemical and within 8 x 8 mile geographic grids. The geographic representation is independent of political boundaries and permits evaluation of cumulative hazard. Refinement of the grid to 1 x 1 mile may be performed for specific areas of concern. Details of the derivation of the Chronic Index are presented in Region III's Technical Guidance Manual.[1]

Phase II of the process includes the Vulnerability Index developed by Region VI, which describes the susceptibility of populations by scoring critical attributes. Population demographics are presented in terms of

age, economic status, and minority status. Areas of concern are delineated and, for each variable, an average value is calculated and compared to the state average.

With the information from Phase I and II, the decision maker may determine if additional investigation is warranted either in more narrowly defined geographic areas or with a more focused set of chemicals or industrial groups. In this way, opportunities for pollution prevention as well as resource intensive exposure assessments, risk assessments, and epidemiological studies may be pursued in sectors of greatest concern.

Region IV has emphasized the requirement for clear communication of the indexing process to diverse audiences, providing distinctions between the concepts of hazard and risk as well as indexing and assessment. In particular, community involvement is encouraged in an effort to foster cooperation in implementing specific strategies for targeted communities.

This iterative indexing process provides a standard method for screening TRI release information for relative hazard, permitting decision-makers to focus resources on the most toxic chemicals and most vulnerable populations. In addition, the regionally based GIS maps are used to explore opportunities for pollution prevention among the SIC codes governed by the Emergency Planning and Community Right to Know Act (EPCRA §313).

End Notes

1. U.S. EPA (1993) Chemical Indexing System for the Toxic Chemical Release Inventory, Part I: Chronic Index, Region III Technical Guidance Manual, Risk Assessment, EPA/903/R-93/002.

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Risk Screening In New York State Using Toxic Release Inventory Data

Introduction

There is a large variety of industrial chemical emissions from a large number of facilities which could have the potential to adversely impact public health in New York State (NYS). A statewide screening procedure to identify those facilities and chemicals most likely to have significant adverse public health effects would help avoid expending limited resources on relatively unimportant chemical emissions. The Toxic Release Inventory (TRI) database, although not a comprehensive compendium of all chemical-emissions data in the state, does identify emissions from most large manufacturing facilities to all media and provides a data set collected in a uniform manner across the state. Therefore, the TRI data appear well suited for use in the development of a statewide risk-based screening protocol.

We have developed such a risk-screening protocol, utilizing TRI air-release data, to produce relative public-health risk rankings for facilities and chemicals in New York State. This protocol was developed as part of a project in which TRI data were combined with environmental, toxicological, geographic and demographic data to enable us to better assess health risks and patterns of disease (NYSDOH, 1994). The screening procedure combines TRI air-emissions data with toxic potency data in a quantitative manner to produce risk-based rankings of industrial facilities in New York State which could be used to focus risk assessment and pollution prevention activities on the facilities and chemicals in the state with the greatest potential for adverse public-health impact.

Methods

NYS TRI air-emissions data reported to U.S. EPA for 1989 were used in the development of the risk-screening methodology. The ranking of all NYS TRI facilities was established by deriving a risk-screening score for each facility. The facilities were then ranked based on their screening scores. The score was developed to reflect both the quantity of chemical air emissions reported by each TRI facility and the toxic potency of each chemical. In particular, the score was derived to be directly proportional to both emission quantity and toxic potency, giving equal weight to these two measures.

A database of chemical toxic potency values was developed for use in the derivation of screening scores. One-hundred and fifty-eight chemicals or chemical classes were reported among 1989 NYS TRI air emissions. A toxicological potency assessment was developed for each TRI chemical based largely on previously developed health-based criterion values -- primarily Cancer Potency Factors and Reference Doses/Concentrations found in U.S. EPA's Integrated Risk Information System (IRIS; USEPA, 1992a). Values for cancer and non-cancer end points were obtained for each chemical. A brief list of health effects associated with exposure to each chemical was also developed.

TRI facilities were ranked in order of decreasing screening score. Rankings were produced for three different endpoint classes. One ranking was based only on carcinogen emissions reported in the database. The second ranking was based on all non-cancer endpoints. Facilities were also ranked using a hierarchical rule for combining both cancer and non-cancer endpoints.

This risk-screening process has features in common with the U.S. EPA Risk Screening Guidelines (USEPA, 1989). However, the risk-screening method developed for this project employs quantitative characterizations of chemical air emissions and toxicity while the U.S. EPA risk-screening process uses a qualitative approach to characterize these variables.

Results & Discussion

Some unexpected results were obtained when the risk rankings were examined. Inorganic chemical emissions, particularly chromium and arsenic compounds, predominated among those facilities ranked at the top of the carcinogen-based ranking. Emission quantities for these chemicals were generally quite low, with most below 1000 lbs./year, but the chemicals had very high cancer potencies. Conversely, respiratory irritants such as hydrochloric acid and chlorine dioxide were the predominant chemicals emitted by the highest ranking facilities in the noncancer ranking. These chemicals have relatively low noncancer toxicity but were often emitted in very large quantities. Chemicals from both of these classes appeared among the highest ranked facilities in the combined-endpoint ranking. These results contrast strongly with the predominant chemical emissions among the highest-ranking facilities based solely on emissions quantity, which were primarily organic solvents.

The public-health implications of these results should be interpreted with caution. It is easy to assume that the highest-scoring emissions have significant potential to affect public health. However this ranking method does not include an estimate of individual exposure. Instead, we have assumed that exposure is directly related to emission quantity. In fact, emissions from even the highest-scoring facilities may not be sufficiently large to result in significant exposure to nearby populations. Moreover, this analysis does not distinguish between fugitive and stack air emissions, both of which are reported under the TRI. Whether a particular chemical release is a fugitive or stack emission can strongly affect the degree of exposure nearby populations experience from that release. In principle, this analysis also does not differentiate between continuous or regular emissions and infrequent releases. However, the TRI is intended to provide information on routine or continuous chemical emissions rather than accidental releases, so these results speak more to the former situation.

The accuracy of the rankings is clearly dependent on the accuracy of the TRI emissions data and the toxicity information. The TRI program only requires emissions reporting from certain types of industrial facilities handling sufficiently large quantities of a limited number of chemicals (roughly 300). Therefore, any statewide

ranking of facilities or chemicals based only on TRI reporting will exclude consideration of some facilities and chemicals in the state. Much of the TRI air-emission data is based on engineering estimates which may vary considerably in quality among facilities and chemical processes. Stack-emission and fugitive-emission estimates may differ in reliability, and facilities differ in the proportion of their emissions which are fugitive. Data-entry errors were common in the geographic component of the TRI database (NYSPMRI, 1993) although the majority of these errors were transpositions of latitude and longitude and, therefore, an error type unique to this data field.

Uncertainties in a chemical's toxicity assessment result from gaps in the toxicology database and from assumptions made concerning dose-response, species and exposure-route extrapolations. The inherent uncertainty in the toxicology information has been characterized and is taken into consideration by U.S. EPA in their derivation of the toxicity values (i.e., CPF and RfD) which were emphasized in construction of the toxic potency database. For non-cancer effects, the comparisons of toxic potency based on RfDs or RfCs is strongly influenced by the wide range in uncertainty factors used to derive these criteria. The toxic potency assessment of chemicals with relatively sparse toxicology databases may be artificially inflated because such chemicals will generally have a 1000-fold or 10,000-fold uncertainty factor. Establishing non-cancer criterion values based either on no-observed-effect- or lowest-observed-effect-levels (NOEL or LOEL), combined with type and severity of effect (e.g., USEPA, 1992b) or on a benchmark-dose approach (e.g., Crump, 1984) might improve the comparability among chemicals in a non-cancer ranking.

Despite the limitations noted above, the risk-screening work described here has shown that including toxicity information along with the chemical air-emission data available in the TRI database allows new information to be extracted about TRI facilities and TRI chemicals which would not have been identified by simply considering total chemical emissions. In particular, our results suggest the need to more carefully evaluate the potential for health effects from both noncarcinogenic compounds such as respiratory irritants and from small emissions of very potent inorganic carcinogens such as chromium and arsenic compounds. Further refinements of the general approach used in this project, particularly developing rankings for more specific toxicological endpoints, should increase the usefulness of TRI risk-screening for directing more detailed investigations.

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The Right to Know about Risk: Improving the TRI

Introduction

The Toxic Release Inventory (TRI) was created by the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA). EPCRA Section 313 mandated EPA to create a public information database containing annual data on emissions of toxic chemicals which meet the appropriate criteria and are designated on the TRI list. Since its inception, the TRI program has been hailed as one of the most successful environmental regulations to date. Facilities subject to TRI reporting have accomplished dramatic reductions in listed emissions. Because of its past success, there has been added pressure and activity to expand the TRI program in various different directions, including increased chemical and facility coverage. This presentation briefly examines the TRI program and focuses on how it can be more effective as a tool for improving risk communication. In order for the TRI to be successful, it must offer concise, understandable data about the risks posed by "toxic" emissions.

The TRI Program

The TRI was established by EPCRA Section 313 in 1986 to inform the general public and communities surrounding covered facilities about releases of toxic chemicals. The TRI was not explicitly designed to communicate risk information. Rather, the database provides information about releases that could be useful in allowing the public to better understand and make decisions about the potential hazards that may be posed by those releases. In this manner, the TRI has gone a long way to satisfy a community's *right-to-know* about *releases*, but has yet to develop into an effective risk communication tool. While the existing TRI program provides the public with raw data about releases, only recently has EPA, the business community, and the public, begun to consider how to make the TRI a more effective risk communicator.

The TRI Program Presently Scores Poorly On Risk

Effective risk communication can help decision-makers to identify and assess potential hazards, to set priorities, and to take steps to manage and reduce the risks that may be associated with those hazards. Carol Browner recently stated that a goal of TRI expansion is to "provide citizens with more comprehensive information to better assess potential risks to health and the environment in their communities." (EPA Press Release, January 12, 1994.) With this goal in mind, the current TRI database, scores poorly as a risk communicator.

The TRI program scores poorly as a risk communicator because it:

- treats all listed chemicals as equally "toxic;"
- makes no attempt to rank chemicals or prioritize decision-making based on risk;
- does not provide available information about toxicity or exposure;
- provides no information about the relative risks posed by listed substances; and
- does not link existing information databases, such as the IRIS database, to assist public in understanding the hazards posed by releases.

Making the TRI A More Effective Risk Communicator

In order to make the TRI a more effective risk communicator, EPA could provide information in the database that the public can use for risk-based decision-making. This information could include information about the:

- relative risks posed by the listed chemicals;
- type of harm posed;
- routes of exposure and media affected;

- degree of certainty associated with listing; and
- seriousness of the identified effects.

EPA could also consider a chemical ranking system to rank chemicals on the TRI not only based on total pounds released, but also on toxicity and potential for exposure. The Agency could also use information management technology to link relevant EPA databases. EPA could establish TRI community advisory panels in order to better assess public data needs. Finally, EPA could aggressively explore new models for adapting the TRI to provide the public with information not only about releases, but also about risk. The Chemical Manufacturers Association is very interested in working with the Agency and other TRI users to explore options for making the TRI database a better risk communication tool.
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Session 2: Is TRI Useful in the Environmental Justice Movement?

Session Leader
Russ Lopez, *Environmental Diversity Forum*
Speakers
Linda M. Brown, *Louisiana Department of Environmental Quality*
Benjamin A. Goldman, Ph.D., *Research Director, Jobs and Environment Campaign*
Theodore S. Glickman, *Center for Risk Management, Resources for the Future*
Idell Hansen, *Washington Department of Ecology*

Environmental justice advocates are studying how environmental problems affect minorities and low income communities. TRI data was not designed to address these types of issues and there can be problems in interpreting TRI to render it useful. However, TRI can be a valuable source of information for researchers and individuals seeking insight into national and local problems. Panelists presented studies that have used TRI to identify environmental inequity and described community right-to-know outreach programs to low income communities and communities of color.

Linda M. Brown, *Louisiana Department of Environmental Quality*

TRI Outreach: A Role in Environmental Justice

The Louisiana Department of Environmental Quality began its Environmental Justice Program approximately two years ago. The program focuses on cooperation, communication, and issue resolution between the residents of industrial communities and representatives from the neighboring industrial facilities.

As part of the state program, Environmental Justice Panels are being created throughout industrial communities along the Lower Mississippi River Corridor between Baton Rouge and New Orleans. As part of TRI Outreach, these panels are being targeted for presentation of the TRI Program in Louisiana and how it can be utilized as a tool to assist them in their endeavors to build community/industrial relationships.

Our first workshop targeted an Environmental Justice Panel created in St. James Parish. The community representatives were residents of the Lyons, Mount Airy, and Garyville areas. The industrial representatives were Nalco Chemical Company, Marathon Oil Company, and Cargill Grain Elevator Company. These facilities are located in close proximity to the above mentioned communities. We met with the residents of these communities to introduce them to TRI and briefly explain what type of information is available. Several more workshops with the communities and industrial representatives are anticipated.

The goals and objectives of the workshops are to: provide the communities a historical perspective which will allow them to more fully understand why the Emergency Planning and Community Right-to-Know Law came into being; describe the facility reporting requirements; provide specific information on the facilities in close proximity to the communities, such as developing data trends; describe how the information can be used as a tool to promote discussion between community and industrial representatives; describe other available resources, such as the public health department and the public library that are easily accessible without cost; discuss the limitations of the data especially when considering risk; describe other data resources available such as TOXNET; and describe other available chemical information, such as Toxicological Profiles by the U.S. Department of Health and Human Resources.

The TRI outreach to the Environmental Justice Panels is only a portion of what the Environmental Justice Program is attempting to pursue. We plan to provide as much assistance as possible to facilitate the program.
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Benjamin A. Goldman, Ph.D., *Research Director, Jobs and Environment Campaign*

Is TRI Useful in the Environmental Justice Movement?

Is TRI useful in the environmental justice movement? Let me guess...I'll bet you want me to say:...YES. But let me instead play the loyal opposition. There's more than one "right" answer to this question. One thing the environmental justice movement stands for is its respect of diversity. I would venture that among people within the movement, there are as diverse opinions about this issue as about any other. So I'll try to present both sides of the debate based on a decade of my work in the fields of both right-to-know and environmental justice.

First, let's take the easier position and say: "sure it's useful."

Society generally doesn't address a problem until it can be measured. The revolution in information technologies that occurred during the 1980s helped bring the issue of environmental justice to national attention. Reductions in computer processing costs and increases in the availability of computerized data enabled researchers for the first time to quantify disparities in the nationwide distribution of environmental hazards. TRI is part of this trend.

About a dozen studies have crossed my desk in the past year or two that use TRI data to document environmental disparities by race or income. They examine various places across the country, including: Richmond, CA; Detroit; St. Louis; Los Angeles; Cleveland; all of Florida; the entire Southeast, and a couple national analyses. They use various methods and measures, including census tracts, ZIP codes, counties, and states. (See Table 1.)

Some are more complicated than others. Most find racial disparities in the release of toxic chemicals are more pronounced than income disparities, but some find greater income disparities. Others look more deeply into the relationships between these variables, finding, for example, that states with most toxic releases per job have the worst economic welfare, as measured by disposable incomes, unemployment, and poverty.

These findings clearly have significant implications for the environmental justice movement. And in some cases they have led to policy changes. A few factories, for example, have entered into "good neighbor" agreements with host communities after negative publicity over their toxic releases. At least one state has tried linking tax incentives to reduced toxic releases per job. Nationally, there have been legislative proposals to use this kind of information for identifying "high impact areas" in order to target remediation and prevention funds.

This all sounds great so far, but let's put a slightly more critical eye on these developments.

How significant has TRI really been in this trend of using information for environmental justice? First, I'd say that its data is less important than its public access mandate. There were plenty of data at EPA before TRI, and EPA's other major data systems continue to dwarf TRI in comparison. The most significant work in this field has used information collected under other sections of the Superfund law and under other environmental laws entirely. There are EVEN plenty of other data sources on toxic releases.

My book *The Truth About Where You Live*, for example, used EPA's other major data systems for air, water, hazardous waste, radiation, etc. to create national maps of a variety of industrial toxic releases, all of which were correlated significantly with people of color and elevated mortality rates across the country.

But TRI represents the first time such information was collected solely for the purpose of providing public access through state of the art communications systems. Given this fact, it's surprisingly how little environmental justice work has in fact been done with this database.

A few years ago, for example, I floated a proposal to look at which industries, companies, regions of the country, cities, and chemicals exhibit the greatest disparities in toxic releases by race and class. To date, no one has funded or undertaken this baseline work--or if they have, they've done so rather quietly.

Table 1 Listing of 11 Empirical Studies of Toxic Release Disparities by Income and Race in the United States

YEAR	AUTHOR	TYPE/ METHOD*	ENVIRONMENTAL CONCERN	GEOGRAPHIC SCOPE	– DISPARITY – INCOME	RACE
'89	Belliveau et al.	NP / CO	Toxic releases	Richmond, CA (tracts)	Yes	Yes
	Pfaff	JO / CO	Industrial air pollution; haz-waste disposal; toxic contamination	Detroit, MI (tracts)	Yes	
'91	Brown	LW / CO	Toxic releases	St. Louis, MO (tracts)		Yes
	Kay	JO / CO	Toxic releases	Los Angeles, CA (ZIPs)		Yes
'92	Attah	SO / CO	Toxic releases	Reg. IV (tracts, counties)		Yes
			haz-waste disposal (uncontrolled)			Yes
	Goldman	GE / CO HE	Toxic air & water pollution, haz-waste disposal & generation, occupational exposures, hazardous material fatalities	Nation (counties)	No	Yes+
	Nieves	GT / CO	Air emissions, hazardous waste, radiation, & other hazards	Nation (counties)	Yes	Yes+
'93	Burke**	GE / CO	Toxic releases (low-density tracts)	Los Angeles, CA (tracts)	Yes	Yes+
			Toxic releases (high-density tracts)		Yes+	Yes
'93	Bowen et al.**	GE / CO	Toxic releases	Cuyahoga, OH (tracts)	Yes+	No
				Ohio (counties)	No	Yes+
	Templet & Farber	EC / CO	Regulatory benefits (environmental conditions & policies, toxic releases/job)	Nation (states)	Yes	
'94	Vittes & Pollock	PS / CO	Toxic releases	Florida (ZIPs)	Yes	Yes+
			hazardous waste disposal		Yes	Yes+
			POTWs		Yes	Yes+

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11 Studies of toxic release disparities by income or race are reviewed.
Geographic unit of analysis: 5 (45%) used census tracts; 4 (36%) counties; 2 (18%) ZIPs; 1 (9%) states.
10 out of 11 tests (91%) found racial disparities.
8 out of 10 tests (80%) found income disparities.
5 out of 7 comparison tests (71%) found racial disparities independent of income disparities.

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* TYPE indicates the author's academic discipline or non-academic organizational affiliation. Econ = economics; Envi = environmental science; GE = geography; GT = government organization; LW = law; NP = non-profit organization; JO = journalism; PS = political science; SO = sociology. METHOD indicates the study's methodological approach: CO = correlation analysis; HE = health effects analysis.
\+ Income or race found to be independently or more significantly associated with environmental concern.
** Study included more than one test of income or racial disparity (8 studies with 15 additional tests).
DERIVED FROM: Benjamin A. Goldman, Not Just Prosperity (Washington, DC: National Wildlife Federation, 1994), plus two newer studies.

This leads to a fundamental point: as a regulatory approach, information strategies such as TRI are among the MOST REGRESSIVE that government can adopt.

There's a ton of research showing that new information systems and technologies tend to reinforce rather than redistribute power relationships. Individuals, communities, and organizations that are best equipped to act on technical information are most likely to benefit from this kind of policy. The biggest users of TRI by far are corporations seeking commercial intelligence about their competitors and their own operations.

People with lower incomes, less education, and poor mobility are at a tremendous disadvantage in acquiring, understanding, and acting on such information. It's not surprising that studies generally show white, well-educated, liberal males are the most informed about the environment. Just to illustrate: even looking at the

dozen studies I've seen that actually use TRI for environmental justice research, not one was done by a people of color or low income group.

If right-to-know laws provide equal access to toxics data, this information will likely be used more aggressively by better equipped and better educated communities and organizations. Hence, on their own, information systems such as TRI may actually EXACERBATE rather than diminish existing disparities in the distribution of toxic hazards.

So now let's get real depressing...

In the last few years there has been an explosion of information on environmental injustices, including HUNDREDS if not THOUSANDS of articles, studies, papers, conferences, media reports, etc. The latest study to receive front-page coverage around the country, was an update I prepared of the original *Toxic Wastes and Race* report. In this latest study, we found that despite the increased availability of information, people of color are today even MORE likely than whites to live in communities with commercial hazardous waste facilities than they were a decade ago.

In short, increased public knowledge of toxic hazards, combined with increased difficulties in siting new facilities, may contribute to even greater environmental disparities by race and class. As more communities try to block sites and prevent pollution in their backyards, those with the least political and economic power and with the least technical know-how will be left with an even greater share of the toxic residues from our modern society.

This is a sad conclusion indeed, given that demands for the right to know are rooted in a long history of labor and civil rights struggles

While the release of deadly gases at Union Carbide's Bhopal facility is credited with galvanizing support for the federal right to know law in the mid-1980s, labor and community activists had already been fighting for decades to get toxics data from the government and corporations. **Fifty years ago**, it was not only hard to come by information about the deadly chemicals that Carbide and other companies were handling, but it was often illegal to disclose such data--in fact, for certain toxins, such as fissionable materials, DISCLOSURE was punishable by DEATH under U.S. law.

Forty years ago, the United Steel Workers of America began making some of earliest demands for risk information on behalf uranium miners in Canada--many of whom, by the way, were Native Ojibwa people. **Just thirty years ago**, the U.S. Freedom of Information Act passed--but not because of grassroots struggle, rather, because the legislature wanted to constrain the executive branch. **Twenty years ago**, wildcat strikes at the uranium mines in Canada led to the first toxics right-to-know law in North America -- including a clause providing the right to refuse unsafe work, which remains a model for the continent. In the U.S., decades of civil rights battles led to passage of the Home Mortgage Disclosure Act, forcing banks to reveal information about discriminatory lending practices.

Now, its been about a decade since the first worker and community right-to-know laws appeared in the U.S., and what do we see?

- No right to refuse unsafe work like our neighbors in Canada, but instead a gutted OSHA bureaucracy, with little enforcement capabilities, despite continued hazards on the job.
- As much redlining and segregated housing as ever.
- A Freedom of Information service dominated by businesses requests.
- And as far as I know--though maybe I'll learn otherwise here--there's as much toxic pollution as ever, it's still distributed inequitably across the population, and it's likely in the future to become ever more concentrated in communities with people of color and lower incomes.

Meanwhile, Secretary of Labor Robert Reich can praise the emergence of a class of "symbolic analysts," like ourselves, who will use technical information such as TRI to rule the world, as the anxious middle and lower classes fall ever farther behind.

So where's the hope?

The need-to-know secrecy and nuclear production systems of the Cold War are rapidly collapsing. To end the toxic poisoning of communities across the country, the same kinds of massive changes that our military is now experiencing need to occur in our CIVILIAN methods of production as well.

What force will be powerful enough to cause the formidable changes we need to produce goods and services without relying on toxic chemicals, to rechannel the efforts of displaced workers, and to reduce the injustice to future generations left by decades of toxic production?

In just one little place in the forests across Lake Huron, for example, where those miners once breathed uranium deep under the bedrock of Northern Ontario, there are no workers anymore. The mine towns there have crumbled, and thousands whose livelihoods were the first step in the lifecycle of our nuclear technologies must seek other lines of work. Left behind are 300 billion pounds of toxic waste--50 times TRI's annual total for all U.S. industries. The uranium tailings fill ten lakes, covering 4 square miles, 4 stories high, exposing residents of the entire Northern Hemisphere to millions of increased cancer fatalities over thousands of years into the future.

So when we talk about TRI's usefulness to environmental justice, the tough question is...

How will information about toxic releases contribute to the broad social, economic, and political changes that are needed to end our country's dependency on toxic methods of production? My work suggests that right-to-know laws in and of themselves are unlikely to cause significant reductions in disproportionate exposures.

Good data didn't cause the momentous social change in Russia that ended the Cold War. But we can't just stand by and wait for the groundswell needed to eliminate environmental injustice. At least three conditions are needed for information tools such as TRI to be useful to the environmental justice movement:

- first, sufficient resources and training must be targeted to disproportionately affected communities to enable them to use such information effectively;
- second, research that uses TRI must be done under the direction of or in partnership with disproportionately affected communities; and
- third, right-to-know laws must be coupled with specific powers to act that end the release of toxic chemicals in the most disproportionately affected communities.

The bottom line, of course, isn't to report toxic releases or their disparities, but to stop them. Unless one act leads to the other, TRI won't be known for its contribution to environmental justice, but rather, for its ability to document the continued presence of the opposite.

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Theodore S. Glickman, ***Center for Risk Management, Resources for the Future***
Robert Hersh, ***Center for Risk Management, Resources for the Future***

A Case Study of Industrial Hazards and Environmental Justice

This case study deals with environmental equity related to industrial hazards in Allegheny County, Pennsylvania, where the city of Pittsburgh is located. The objective was to evaluate any inequities borne by minority, low-income, or elderly people due to the actual or potential impacts of facilities that emit toxic substances or store extremely hazardous substances. It was motivated by concerns raised by civil rights advocates and their supporters in the environmental community, and by the steps being taken by the federal government to respond to their concerns. The study's primary focus was on developing appropriate, readily transferable methods that can be used to identify and measure environmental inequities, especially in highly industrialized urban areas. Such information is essential for establishing priorities to correct existing environmental injustices and prevent future ones from arising.

The study analyzes census statistics and hazard data using a geographical information system (GIS), and evaluates inequities based on a subgroup's proximity to the facilities and the associated risks. The risk calculations take into account not only the distance between the subgroups and hazard sources, but also the probability of exposure and the associated consequences. Weather conditions, inhalation toxicities, and susceptibility to health effects are important factors in determining the level of risk. Because of the last factor,

and because Allegheny County has an unusually high proportion of elderly people, people over 65 were included among the subgroups of concern. The other four subgroups, all of which relate to race and poverty, were blacks (the census term for African Americans), people living below the poverty line ("the poor"), poor blacks, and poor whites. The last two were included to examine the influence of race on any income-related inequities, and vice versa.

Blacks are by far the largest minority in Allegheny County, accounting in 1990 for about 11% of its population and about 26% of the population of Pittsburgh, which is the only large city in the county. The poor and the elderly account for about 11% and 17% of the county population, respectively. The corresponding figures for Pittsburgh are 20% and 18%. The hazards are air emissions from TRI facilities and accidental toxic releases from "EHS facilities." The latter facilities are the ones which report the storage of extremely hazardous substances under EPCRA. There are 88 TRI facilities in the county and 62 (out of 128) EHS facilities that represent a significant hazard.

Proximity was evaluated by superimposing the facilities on census block groups using the GIS and calculating the incidence of each subgroup's population in one-half mile and one mile radius circles constructed around each facility. This was compared to the corresponding incidences outside the circles to determine whether inequities existed. Among the five most hazardous TRI facilities, the inequities were largest for the poor and the elderly in the case of one facility. For two other facilities the inequities were very large for blacks and the poor, and even larger for poor blacks in particular. And for the remaining two facilities, the only inequities were moderate ones for the elderly. Inequities were found for every subgroup when all TRI facilities were considered collectively. The inequities were all about the same at one-half mile, but the inequity for poor blacks jumped up as the radius increased, indicating that poor blacks tend to be concentrated between one-half mile and one mile from the facilities, whereas poor whites tend to be concentrated within one-half mile of the facilities' centers.

For the five most hazardous EHS facilities, the results were somewhat different. For four of these facilities the largest inequity was for poor whites, but for the fifth one the inequities were large for blacks and the poor, and larger still for poor blacks. For all 62 EHS facilities together, the burden of inequity was found to fall more on the poor than on blacks. At the smaller radius, the inequity was largest for poor whites but at the larger radius it was largest for poor blacks, reflecting the same tendencies observed for the TRI facilities.

Thus, from the viewpoint of proximity to hazardous facilities, inequities were found to vary substantially from one facility to another, depending primarily on the racial and class composition of the neighborhood. In general, it appears that environmental equity tends to be as much a problem for the poor as it is for blacks in Allegheny County, and at close proximity to the plants, it is more of a problem for poor whites than poor blacks.

To examine environmental equity from the viewpoint of risk, a risk model was formulated that contains a probability factor, a population impact factor, and a mortality rate. For both types of facilities, the model yielded estimates of the number of premature deaths in each subgroup, depending on the size and orientation of the impact areas and how they overlapped with the spatial distribution of the subgroup populations, adjusted for workday variations in population patterns. County-wide impact areas for the emissions from the largest TRI facilities and three other major sources of PM_{10} and SO_2 were estimated using standard air pollution models (ISCLT2 and COMPLEX1). Impact areas for the toxic plumes associated with accidental releases from EHS facilities were estimated using NOAA's ALOHA model.

For the TRI facilities, the average individual risk for each subgroup was calculated and compared to the average individual risk for the rest of the population. These comparisons revealed inequities for every subgroup. The inequities for blacks and the poor were similar to one another, but the inequities for poor blacks were larger than for poor whites. They were smallest for the elderly. For the EHS facilities, the only risk-based inequities found were for poor whites and the elderly, but in both cases they were small.

In summary, we found that risk-based and proximity-based equity evaluation can lead to different conclusions, indicating the importance of doing both. We also found that the chronic risks associated with the TRI facilities in Allegheny County were greater than the acute risks associated with EHS facilities, and that time-of-day population adjustments had a significant influence on the risk estimates.
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Idell Hansen, *Washington Department of Ecology*

Environmental Equity Study

The Washington State Department of Ecology (Ecology) is currently in the process of building a better understanding of environmental justice and equity issues. Agency attention to address this arena is being pursued through a variety of efforts, one of which is the completion of a statewide environmental equity study.

Ecology's focus on environmental justice issues is primarily due to proposed Senate Bill 6401 and Resolution 1994-8692, both presented during the 1994 legislative session. This joint legislation stated that Ecology and the Washington State Department of Health (DOH) would conduct a study relating to environmental equity. Even though neither the bill nor the resolution formally passed out of the legislature before the session ended, $29,000 of the Worker and Community Right-to-Know fund was appropriated to Ecology to provide solely for conducting an environmental equity study for fiscal year 1995. The Hazardous Substance Information Office (within Ecology's Hazardous Waste and Toxics Reduction Program) manages the Community Right-to-Know data and has taken the lead on the study.

As directed in the legislative appropriations for fiscal year 1995, the environmental equity (EE) study will be designed to include information on the distribution of environmental facilities and toxic chemical releases in relation to low-income and minority communities.

What The Study Will Try to Accomplish

Given a limited budget and time frame, the EE study will attempt to carry out the following:

1) use 1990 census data to identify census block groups according to A) percentage of people of color, and B) percentage of people below the poverty level;
2) to map the following six types of facilities and sites using the Geographic Information System (GIS): Toxic Release Inventory reporters (TRI); Hazardous Sites List; Treatment, Storage, & Disposal Facilities; Major Waste Water Discharges; Active Municipal Solid Waste Landfills & Incinerators; and Major Air Releases;
3) to assess the distribution of facilities and sites in relation to communities of color and low-income populations;
4) to identify the census block groups which appear to be exposed to the highest amounts of reported chemical wastes in the last five years (using TRI data); and
5) in conjunction with DOH, to develop recommendations for further studies or actions that could be taken by the legislature or the two agencies to address EE.

What The Study Will Not Try to Accomplish

The study will not attempt to determine:

- a comprehensive assessment of toxics in the localities;
- relative risk between the various types of facilities identified;
- a risk assessment for any of the localities identified; or
- reasons for possible disproportionate distributions of facilities relative to population groups.

Status of the Study and Milestones

1) A profile for each Block Group in Washington, regarding the population's race, ethnic, and poverty characteristics, has been established by inputing data from the 1990 U.S. Census Summary Tape Files into GIS. This provides a database map for each of the State's 39 counties. Communities of color have been identified as block groups that have A) a percentage of people of color higher than the county percentage and B) a percentage of people of color 20% higher than the county percentage. A Low-income community has been identified by block groups that have A) a percentage of people below the poverty level that is higher than the county percentage and B) a percentage of people below 200% of the poverty level that is higher than the county level. This step of the project has been completed.

2) Currently, Ecology staff is in the process of verifying the six site lists to be used for the EE project. Address matching software is being used to both generate and double-check latitude/longitude coordinates for most locations. When applicable, locations will also be compared with EPA and DOH information. Completion date: mid-December.

3) The next step will be to enter these sites into the GIS system and begin to count and compare the distribution of the various facilities over Washington communities as defined by block groups. Next, the relative distributions of the facilities and sites in relation to the various block group characteristics will be determined. This will be done primarily by ranking the block groups according to the number of facilities and sites within each area. Completion date: January, 1995.

4) In addition, block groups will be ranked by total pounds of waste released for each Toxic Release Inventory facility within a block group. Time permitting, block groups may also be ranked by other data that can be reasonably used to compare total wastes released (e.g. total volume of landfills). Totals should be based upon the accumulated releases during the previous five years (1989-'93). Completion date: February, 1995.

5) A map will be printed of each county, identifying the location and type of facilities and sites, and their respective communities. Completion date: February, 1995.

If possible, this study will also be mapped according to the State's drainage basins. This will assist Ecology, the legislature, and the public, in better understanding this data in relation to natural boundaries. However, it has not been determined whether the census data can be conveniently conveyed in a drainage basin format.

6) Once the comparison and ranking is done, Ecology will note the many strengths and limitations of the analysis and begin working with DOH and other interested parties (both Agency and Community groups) to jointly generate recommendations for follow-up studies and/or actions to be pursued. Completion date: May, 1995.

7) Reviewer's comments will be consolidated into the study's text during June, with the final study going to the legislature by June 30, 1995.

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Session 3: TRI and Data Integration

Session Leader
Gerry Brown, *Senior Analyst, Information Access Branch, U.S. Environmental Protection Agency*
Speakers
Gayle Alston, *Health Education Specialist, ATSDR*
John Chelen, *RTK Net*
Stephen D. Hanna, Ph.D., *Assistant for Environmental Information, Cal/EPA*

Gerry Brown, *Senior Analyst, Information Access Branch, U.S. Environmental Protection Agency*

TRI is a useful and valuable information tool--a potentially powerful and unique information source. It is a cornerstone for the Common Sense Initiative--a beginning for cross-media perspective--the experiences gained and lessons learned are the basis for common sense. But is only one piece of the information puzzle. As all have faced resource constraints, and will continue to do so in the coming years, we must actively work together to learn what other pieces of the information puzzle are available, bring them together , and create the tools to make it useful to stakeholders and constituents. Partnerships must be developed and fostered to learn and share--share knowledge, technology, and resources--to get the products of these tools to our publics. Alone we will be limited in our success; together we can succeed.

Gayle Alston, Agency for Toxic Substances Disease Registry (ATSDR), presented the use of TRI in health assessment and as one source for site assessment efforts of the ATSDR. Ms. Alston presented sources of health information and its pathways to the public through many sources and distribution channels

Steve Hanna, Cal/EPA, discussed California's lengthy data integration activities, multiple data collection efforts and sources. Dr. Hanna emphasized the need for data integration and regulatory change to work together to reduce burden on government and industry, and provide relevant and timely information to all constituents.

John Chelen, RTK-Net, stated that the technical challenges of data integration are clear and the real challenges are cooperation for mutual benefits. He presented three goals: integration critical to better public access; foster more efficient, effective government; reduce industry burdens and reporting requirements. Additionally, needs were presented to move towards these goals.
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Stephen D. Hanna, Ph.D., *Assistant for Environmental Information, Cal/EPA*

Use of the Cal/EPA Facility Inventory Database

Purpose

The Facility Inventory data base has been created within the California Environmental Protection Agency (Cal/EPA) to facilitate the identification of the complete environmental regulatory profile for a given facility. Currently, regulatory records on a given facility may exist in multiple data bases located within multiple regulatory agencies at federal, state, and local levels. These separate data bases do not typically communicate with each other, which complicates the development of a complete regulatory history on a facility.

Function

The Facility Inventory integrates data from many different sources by matching data records on the basis of facility location. When a facility record is loaded into the data base, the county, street name, and street number of the facility are compared to the same data elements of other facilities. Facilities sharing the same county, street name, and street number are then linked to one another. For each location, printouts from the Facility Inventory include entries for each regulatory data base, including the identification of the regulatory ID, SIC code, and contact person or comments. Further detail can be obtained by contacting the reference for each individual data base and referencing the appropriate regulatory ID.

Use

When searching for information at a particular address, the following steps are recommended:

1. Locate the appropriate street name, then the street number. The street number is listed in parenthesis immediately following the street name.
2. Check for duplicates. Due to some data anomalies, some street addresses are repeated. The data associated with these duplicates is not redundant, and should therefore be combined to obtain a more complete regulatory profile for the address in question.
3. Check for possible occurrences of the address when the street name is spelled differently. Examples are the substitution of a single letter such as "q" for "g" and "s" for "z", and elimination of spaces in a name (remember that these are computer-based matches: "Del Paso" and "DelPaso" are not the same to a computer).
4. Check for possible occurrences with no street number. These are typically listed at the beginning of a street name, with the street number written as "(NO STREET NBR)".
5. **PLEASE REMEMBER: Lack of an entry at a given location does NOT necessarily mean lack of contamination or regulatory activity at that location.**

A list of data bases currently integrated into the Facility Inventory follows.

Name	Number of Records	Source and Contact Information	Description
AREMS	19,242	US EPA, Office of Air, (415) 744-1182 Cal/EPA, Air Resources Board, (916) 322-5716	Stationary source facilities in the federal Aerometric Information Retrieval System (AIRS) Facility Subsystem with emissions activities.
ARCPL	2,335	US EPA, Office of Air, (415) 744-1182 Cal/EPA, Air Resources Board (916) 322-5716	Stationary source facilities in the federal AIRS Facility Subsystem with compliance and/or enforcement activities.
AG500	142	Cal/EPA, Air Resources Board (916) 322-6021	Facilities in the Emissions Data System (EDS) which release greater than 500 tons of criteria pollutants per year.
AGT25	1,736	Cal/EPA, Air Resources Board (916) 322-6021	Facilities in the Emissions Data System (EDS) which release greater than 25 tons of criteria pollutants/ year.
A1025	1,761	Cal/EPA, Air Resources Board (916) 322-6021	Facilities in the Emissions Data System (EDS) which release between 10 and 25 tons of criteria pollutants per year.
ATANK	1,902	Cal/EPA, Water Resources Control Board, (916) 227-4364	Facilities having above ground petroleum storage tanks.
ATEDS	3,650	Cal/EPA, Air Resources Board (916) 322-6021	Contains Sites specific air toxics emission data for facilities throughout California

Name	Number of Records	Source and Contact Information	Description
CALSI	8,032	Cal/EPA, Department of Toxic Substances Control, (916) 323-3378	Contaminated or potentially contaminated hazardous waste sites listed in the Calsites data base (formerly known as ASPIS).
CALNF	18,488	Cal/EPA, Department of Toxic Substances Control, (916) 323-3378	Sites in the Calsites data base which have been identified as needing no further action.
CERCL	738	US EPA, Office of Emergency and Remedial Response, (703) 908-2066	Known and potential hazardous waste sites in the federal Superfund data base (CERCLIS).
CERNF	2,374	US EPA, Office of Emergency and Remedial Response, (703) 908-2066	Sites in the federal Superfund data base which have been identified as needing no further action.
DTSCD	724	Cal/EPA, Department of Toxic Substances Control, (916) 324-2437	Enforcement docket records.
FDOCK	148	US EPA , Office of Enforcement (202) 260-2614	Federal enforcement docket records.
FINDS	61,755	US EPA , Freedom of Information Office, (202) 260-4048	Federally regulated facilities inventoried in the US EPA Facility Index Data System (FINDS).
HAZNT	265,099	Cal/EPA, Department of Toxic Substances Control, (916) 324-1781	Hazardous waste generators and treatment/storage/ disposal facilities and transporters listed in the Hazardous Waste Information System (HAZNET).
IUR	104	US EPA, Office of Prevention, Pesticides and Toxic Substances (202) 260-1536	Chemical manufacturers who submitted an Inventory Update Report to the OPPTS (required every four years).
LTNKA	18,155	Cal/EPA, Water Resources Control Board, (916) 227-4400	Active leaking underground storage tanks listed in the Leaking Underground Storage Tank Information System (LUSTIS).
LTNKI	4,927	Cal/EPA, Water Resources Control Board, (916) 227-4400	Inactive leaking underground storage tanks listed in the Leaking Underground Storage Tank Information System (LUSTIS).
M1984	8,938	Cal/EPA, Department ofToxic Substances Control, (916) 324-0658	Facilities which manifested hazardous waste offsite during 1984.
M1985	11,776	Cal/EPA, Department of Toxic Substances Control, (916) 324-0658	Facilities which manifested hazardous waste offsite during 1985.
M1986	14,743	Cal/EPA, Department of Toxic Substances Control, (916) 324-0658	Facilities which manifested hazardous waste offsite during 1986.
M1987	20,834	Cal/EPA, Department of Toxic Substances Control, (916) 324-0658	Facilities which manifested hazardous waste offsite during 1987.
M1988	24,359	Cal/EPA, Department of Toxic Substances Control, (916) 324-0658	Facilities which manifested hazardous waste offsite during 1988.
M1989	30,676	Cal/EPA, Department of Toxic Substances Control, (916) 324-0658	Facilities which manifested hazardous waste offsite during 1989.
M1990	34,236	Cal/EPA, Department of Toxic Substances Control, (916) 324-0658	Facilities which manifested hazardous waste offsite during 1990.
M1991	34,204	Cal/EPA, Department of Toxic Substances Control, (916) 324-0658	Facilities which manifested hazardous waste offsite during 1991.
M1992	36,386	Cal/EPA, Department of Toxic Substances Control, (916) 324-0658	Facilities which manifested hazardous waste offsite during 1992.

Name	Number of Records	Source and Contact Information	Description
PCS	193	US EPA, Office of Water (202) 260-8313	Facilities identified as major, which have had discharge monitoring reports filed with the Permit Compliance System.
RCRIE	2,840	Cal/EPA, Department of Toxic Substances Control, (916) 324-1809	Facilities within the Resource Conservation & Recovery Information System (RCRIS) which have an enforcement history. [RCRIS is maintained at both the state and federal level.]
RCRIP	505	Cal/EPA, Department of Toxic Substances Control, (916) 324-1809	Facilities within RCRIS that are subject to hazardous waste permitting requirements.
RCRIS	33,605	Cal/EPA, Department of Toxic Substances Control, (916) 324-1809	Federally regulated generators, transporters and treatment/storage/disposal facilities tracked by RCRIS.
SA302	859	CA Office of Emergency Services (916) 262-2868	Facilities which have reported the presence of extremely hazardous substances under SARA Title III Section 302.
SA304	461	CA Office of Emergency Services (916) 262-2868	Facilities which have reported releases of extremely hazardous substances under SARA Title III Section 302 or CERCLA.
STRMC	2,667	Cal/EPA, Water Resources Control Board, (916) 657-1395	Companies issued stormwater construction permits.
STRMI	8,361	Cal/EPA, Water Resources Control Board, (916) 657-1395	Companies issued stormwater industrial permits.
SWISE	56	Cal/EPA, Integrated Waste Management Board, (916) 255-2460	Exempt (from permit) sanitary landfills in the Solid Waste Information System.
SWISP	676	Cal/EPA, Integrated Waste Management Board, (916) 255-2460	Permitted sanitary landfills in the Solid Waste Information System.
SWISU	361	Cal/EPA, Integrated Waste Management Board, (916) 255-2460	Unpermitted sanitary landfills in the Solid Waste Information System.
SWRCB	6,714	Cal/EPA, Water Resources Control Board, (916) 657-1395	Facilities regulated for discharge to surface water, tracked by the Waste Discharger System (WDS).
S1987	1,873	Cal/EPA, Office of Environmental Health Hazard Assessment (916) 322-2793	Manufacturing facilities which filed the Toxic Release Inventory (TRI) under SARA Title III Section 313 in 1987. The TRI forms list quantitative chemical releases to air, water and land.
S1988	2,066	Cal/EPA, Office of Environmental Health Hazard Assessment (916) 322-2793	Manufacturing facilities which filed the TRI in 1988.
S1989	2,071	Cal/EPA, Office of Environmental Health Hazard Assessment (916) 322-2793	Manufacturing facilities which filed the TRI in 1989.
S1990	2,064	Cal/EPA, Office of Environmental Health Hazard Assessment (916) 322-2793	Manufacturing facilities which filed the TRI in 1990.
S1991	1,906	Cal/EPA, Office of Environmental Health Hazard Assessment (916) 322-2793	Manufacturing facilities which filed the TRI in 1991.

Name	Number of Records	Source and Contact Information	Description
S1992	1,609	Cal/EPA, Office of Environmental Health Hazard Assessment (916) 322-2793	Manufacturing facilities which filed the TRI in 1992.
TPPBR	357	Cal/EPA, Department of Toxic Substances Control, (916) 327-6110	Permit-by-rule facilities regulated under the tiered permitting program.
TPCA	515	Cal/EPA, Department of Toxic Substances Control, (916) 327-6110	Conditionally authorized facilities regulated under the tiered permitting program.
TPCE	1,896	Cal/EPA, Department of Toxic Substances Control, (916) 327-6110	Conditionally exempt facilities regulated under the tiered permitting program.
UTNKA	40,024	Cal/EPA, Water Resources Control Board, (916) 227-4400	Active underground storage tank locations.
UTNKI	11,245	Cal/EPA, Water Resources Control Board, (916) 227-4400	Inactive underground storage tank locations.
WB-LF	42	Cal/EPA, Integrated Waste Management Board, (916) 255-2460	Sanitary landfills which have evidence of groundwater contamination.
WDSE	630	Cal/EPA, Water Resources Control Board, (916) 657-1395	Facilities in the Waste Discharger System (WDS) with an enforcement history.

Session 4: Acting Locally: How Affected Communities and Workers Are Using TRI

Session Leader
Terry Greene, *JSI Research and Training Institute*
Speakers
R. H. (Bob) Eisengrein, *Technical Manager-ACES, Inc., Acton, MA*
Kathy Grandfield, *Spokesperson, Good Neighbors*
Michael K. Heiman, *Dickinson College*
Diane Heminway, *Western New York Director, Citizens' Environmental Coalition*

Terry Greene, *JSI Research and Training Institute*

The general public's active use of TRI data is necessary to achieve local pollution prevention goals, and lies at the heart of Congress' mandate to generate and widely disseminate the data. Whether we have successfully achieved this goal for broad scale use of the TRI arose as a key concern during this year's Conference, as requests by the general public for TRI data appear to be minimal.

Nancy Ekart, in her statement during the opening plenary, stressed the chemical industries' concern that the public is just not interested in this information. Panelists in this session, however, dispelled that notion. In communities they work with, affected workers and residents not only have been interested in the TRI, they have relied upon this data source as an essential tool for launching innovative efforts to protect their health and environment. The panelists presented case studies on how TRI data have been used to great effect, particularly when community/labor partnerships, working with industries and regulators, have been successfully forged.

It is true that many communities and workplaces, however, have not been fully using the data. Lack of interest is an unlikely cause. Panelist Michael Heiman pointed out that the broader public's interest in pollution prevention is clear, as evidenced through such prominent movements as that for environmental justice and the numerous health campaigns focussing on the role of a healthy environment. He observed that lack of general awareness of the existence of the TRI hampers its use for these efforts. Diane Heminway has found from her union trainings that even workers are largely unaware of TRI data for their own facilities. The general public may know even less about the existence of the TRI.

Citizens can do a great deal to increase awareness of the TRI as a resource, as demonstrated by the efforts of panelists Kathy Grandfield and Bob Eisengrein to share data with communities in their areas. Nonprofits and universities also have a significant role to play. Students of Professor Heiman, with EPA support, have set up TRI access centers and trainings in the heart of Philadelphia communities. The students target areas which have potentially significant opportunities for exposure and few resources of their own to devote to outreach. Unfortunately, resources for such efforts is limited. Industries and government (not just the Environmental Protection Agency, but all relevant levels of government) must do more to initiate and support outreach efforts, in partnership with community, health, and labor organizations.

Beyond needs for increasing public awareness and access to TRI data, the experience of the panelists also highlighted the need to support the public in interpreting and making use of the data once they have it. They laid out valuable suggestions, including technical assistance, trainings and materials, to help make the data understandable and provide a context for how the information can be used. Expanded efforts can ensure that **everyone** knows they have a right to know and **can use it** effectively.

The panelists also outlined ways the TRI data can be improved to help workers and citizens. Bob Eisengrein, for example, called for more detailed information such as the data on toxics use in production processes that are available in Massachusetts. This information provides an even better base of knowledge for informed public involvement. Toxics use data have allowed him, as a retired engineer, to facilitate dialogue between communities and facility managers on opportunities to reduce the use of toxic chemicals where reasonable alternatives exist. Panelists also highlighted the need for better, more accessible information on potential exposure scenarios and health effects of chemicals. Health effects information needs to be easy to understand and in formats which allow for simple presentation in combination with TRI data. More detailed health data from primary sources also need to be readily available in understandable form.

Finally, suggestions were made on how regulators can best work with affected workers and communities. Panelists urged officials to recognize the public as central to the success of the TRI. They asked that officials take the time to walk people through the data, lead them to further resources, and be sensitive to the fact that it is the health of their families and communities at risk. In an October 4, 1993 memorandum, President Clinton, while discussing the Freedom of Information Act, reminded agencies that "... our commitment to openness requires more than merely responding to requests from the public." To make the TRI a true success, panelists would like agencies to establish working partnerships, the theme of this year's conference, as an appropriate goal. They caution that "true" success cannot be measured solely by numerical trends in limited reported data; rather, it is actual improvements in the daily lives of workers and community residents which needs to be the central gauge of our progress.

Lively discussion followed the panel presentations. The issue was raised of the public's responsibility as consumers in reducing demand for products dependent on toxics. This was seen to indicate a need for more information about the toxic content in products. The impact of corporate advertising on demand was acknowledged as a complicating factor. Toxic use fees were suggested as a market-based mechanism to internalize the costs of toxic use in consumer products. At the same time it was recognized that consumer choice, at its best, is a limited tool which is unlikely to secure pollution prevention of adequate scope.
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R.H. (Bob) Eisengrein, ***Technical Manager-Acton Citizens for Environmental Safety (ACES), Inc., Acton, MA***

A Local Health Effects Study Using TRI plus MA TURA Data

Introduction

This report focuses on community and worker HEALTH and SAFETY as related to the use of toxic chemicals in the eight towns around Acton, Massachusetts. Three towns, Acton, Concord, and Westford had facilities using toxic chemicals.

EPA's Roadmaps database was a primary source of information relating toxic usage to adverse health effects. Roadmaps cited literature which confirmed the adverse health effects; abstracts of the literature are available from the National Library of Medicine's Toxicology of Information Program. New Jersey's Department of Public Health Facts was another source of information.

In these three towns toxic chemicals usage rose from about two million pounds in 1990 to about four million pounds in 1992. Exposure to certain of these chemicals contributes to serious health conditions such as cancer, birth defects, infertility, learning and developmental disorders, respiratory disorders, heart conditions, liver disease, immune system damage, and physical injuries through fire and explosions. The health hazards of toxic chemicals used by local manufacturing industries are found in products we use, and emissions released into the environment as waste.

Resources for Analysis

MA TURA data

Massachusetts' Toxic Use Reduction Act (TURA) requires public disclosure of toxic chemical use by industries with at least 10 employees who process or manufacture at least 25,000 pounds, or otherwise use at least 10,000 pounds a year of listed chemicals. Major details of the MA TURA legislation included:

-Amount of chemicals used by three categories
-Amount by chemical output in two categories, shipped in product, and byproduct
-Production Unit Description and Product Description
-Emissions as reported to EPA on Form R

The data is available to the public in a series of 14 files; over 600 MA facilities report this data.

EPA Roadmaps data

This data relates toxic chemicals to health literature citations according to a variety of adverse health effects. ACES interest was in four categories, carcinogenic, neurological, reproductive, and chronic. The Roadmaps System was version 2.2 dated 9/1/91.

EHS data

Extremely Hazardous Substances are classified as such by EPA due to their high toxicity and reactivity which can lead to dangerous fumes, explosions, or other accidental releases. A database of EHS chemicals was created from information in EPA'S publication "Technical Guidance for Hazard Analysis".

Methodology

Using a relational database system, it was possible to query these databases of information to create data subsets and graphs to provide insights as to potential adverse HEALTH and SAFETY effects in our community. The common database fields used most frequently in relating databases were facility ID, chemical CAS number, facility production unit number, and facility zip code. The following are typical examples of important relations:

-MA TURA zip codes were related to facility ID's in that zip code.
-Facility ID's were related to chemical CAS numbers to obtain chemical amounts used.
-CAS numbers were related to Roadmaps CAS numbers to find health cited literature.
-CAS numbers were related to EHS CAS numbers to find EHS chemicals used.
-MA TURA zip codes were related to TRI zip codes to obtain detailed Form R data on byproducts and recycling.

Results Achieved

Toxic Chemicals Used-How and Where

A check of both TRI and MA TURA files by zip code revealed for the years 1990, 1991, and 1992 that seven facilities in our three-town area reported toxic chemical usage; four facilities were in Acton, two in Westford, and one in Concord. Table 1 lists the facilities, towns, chemicals, amounts used, plus fugitive and point air emissions. Similar data was obtained for 1991 and 1990.

Figure 1 shows two graphs; the top one reveals the mass-balance of all chemicals in the three towns over a three year period. Total chemical input produced output distributed between emissions, shipped in product, and consumed. For example, consumed output might be chemicals transformed in a process, or incinerated in an energy waste program.

The bottom graph shows fugitive and point air emissions over the same three year period. The 1992 increase was caused by over 2.5 million pounds of calcium carbide reported for the first time by one facility in Acton.

Table 2 lists each facility's description of individual production units or processes within the plant. These data sets provide a clearer picture of chemicals used and what the processes do. The common production unit number in Tables 1 and 2 allow one to understand how chemicals are used in a process. For example, Airco in Acton uses production unit 2 to combine calcium carbide with water to create acetylene gas. In production unit 2, acetone is added to cylinders of acetylene gas. In contrast, Haartz Auto Fabrics in Acton has one production unit in which five different chemicals are used to extrude elastomer onto fabrics and gravure print the coated fabrics. These details provide valuable insights to aid in evaluating processes for health and safety risks for the community and the worker.

Health and Safety Issues

There were 11 different chemicals used in these three communities. They provide a means for comparing existing information from chemical use data with possibilities for exposure and information on the known health effects of these chemicals. The effects include cancer, reproductive, neurological and chronic health effects, and exposures associated with accidents and spills.

Relating the CAS numbers of the chemicals used with the Roadmaps and EHS databases produced Table 3. It lists for each of the five health categories those companies using the chemicals, and the literature citation found.

The rating codes for each of the health effects headings indicate the literature reference for a particular type of health effect. Reference sources include the following:

GENE--GENETOX on-line data base
IARC--International Agency for Research on Cancer
EPA--EPA Carcinogenic Classification
NTP--National Toxicology Program
ATSD--Agency for Toxic Substances and Disease Registry profile
HEEP--Health and Environmental Effects Profile
HSDB--Hazardous Substances Data Bank
HEA--Health Effects Assessment

Potential Health and Safety Problems

In addition to the general literature citations of health effects, the N.J. Department of Public Health is "quoted" when statements seem applicable.

General Comments

No facilities in the three towns use chemicals listed in the Roadmaps carcinogenic database. Although none of these chemicals have a rating, with over 70,000 chemicals in commercial use in the U.S. only 7,000 have ever been studied for carcinogenicity. However, chemicals were used in many facilities in all four other health categories- chronic, reproductive, neurologic, and extra hazardous chemicals. The symptoms of these effects are discussed in some detail; for workers, they might include problems from inhalation or dermal contact. For EHS chemicals, the problems could vary from high reactivity to water, sulfuric acid, or the caustic nature of ammonia. Problems might arise within a plant, or in a transportation accident when delivering the chemical.

Conclusions

It is encouraging to see that total usage of most chemicals used in Acton have decreased over the three year period 1990 through 1992. From past experience, ACES members have maintained a healthy dialogue with local facilities and been invited to visit these facilities. It is ACES plan to discuss the contents of our research with individual facilities; our goal is to work with them to implement TUR programs. There is too much at stake not to do this.

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Michael K. Heiman, ***Dickinson College***

Building Bridges Between the Campus and the Community: TRI Training Sessions for Local Residents in Impacted Neighborhoods Using the CD-ROM Format

Despite political rhetoric, we live in an era of limited state and federal commitment to environmental monitoring and enforcement. Fortunately, citizens can be trained to directly access, for themselves, the regulatory and reporting data required from hazardous chemical generators, handlers, and emitters. With further assistance and access to laboratory facilities of the type common on many college and university campuses, citizens can also assist in the detection and monitoring of contaminants in their local communities.

Congress specifically intended the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) to enable citizens to learn more about the hazardous chemicals stored, used, and released in their communities. The EPCRA (TRI) data base provides the major vehicle whereby thousands of citizen activists are finally gaining a handle on the chemical risks to which they are exposed. The result has been a flurry of local activity leading to support for toxic use reduction, more democratic participation in local planning and zoning decisions affecting facility location and expansion and, at the national level, political pressure necessary to strengthen federal environmental acts, as with list expansion for regulated chemicals under the Clean Air and Clean Water Acts.

The Environmental Studies Program at Dickinson College in Carlisle, Pennsylvania is committed to this goal of grassroots empowerment through faculty and student outreach to affected communities. This is demonstrated through our Community Toxic Waste Audit Program and the Alliance for Acid Rain Monitoring (ALLARM), both employing Dickinson students working with community volunteers to address requirements for hands-on training in data acquisition and environmental monitoring. The toxic waste audit process is initiated each spring as the 75 students in our introductory environmental science course prepare audits on communities or facilities of their choosing. As a result, we now run one of the largest campus-based toxic waste audit programs in the nation drawn from the TRI data base, and our activities have attracted regional and even national attention to the program and the college.

It has been our experience as community consultants, that rural and urban locales with high proportions of low-income residents and people of color, tend to be less active when accessing the TRI data base than have groups in more affluent suburbs. This is not due to any lack of concern over environmental pollution, for we have seen a powerful grassroots movement emerge in many such communities targeted for waste management facilities. Rather, knowledge about, and access to, the training and equipment necessary to use the TRI data base is limited in the impoverished communities where toxic release is often the greatest, while many national-based environmental advocacy groups with entree to the important data have tended to use the information to mobilize support for expansion of federal environmental legislation and for broader campaigns instead of for direct local training and assistance.

Fortunately, access to TRI data is now improved, with hundreds of county and federal depository libraries holding the CD-ROM format. Although somewhat dated, the CD-ROM data provides by far the best avenue both in terms of cost and ease of access for the general public. Following introduction to the CD-ROM format, interested citizens are often inspired to seek more current release data in hard-copy format from state reporting centers, or on-line via RTK-NET and the National Library of Medicine (NLM) systems.

Supported since June of this year through the EPA's Environmental Justice Grant program administered by EPA Region III, and working with student interns, I have conducted a series of TRI-access workshops in communities of color and low-income neighborhoods across Pennsylvania. To date we have held nine sessions in impacted urban areas such as Philadelphia, Pittsburgh, and Allentown/Bethlehem, as well as in more rural industrial districts as, for example, in Bedford, Union, and Beaver counties. In the coming months we will expand this series to impacted communities in West Virginia, Virginia, Maryland, and Delaware.

The workshops are held under the sponsorship of local grassroots environmental groups already involved with struggles to get a handle on the chemicals to which the residents are exposed. Here our two- to three-hour session centers on accessing the CD-ROM format of the TRI data base, together with the accompanying chemical fact sheets also available on the disks. Although most of the participants have little or no computer background skills, all receive sufficient training to go into their local depository library the next day ready to request and start using the data disks. Where possible, our workshops are held right in the county or local academic library where the data are stored, or at some other public place arranged for by the sponsoring local organizations. Where the library does not yet have a copy of the disks, we arrange for a free copy available for non-profit community outreach groups through the office of the EPA's TRI-US librarian. We bring with us the CD-ROM reader, supporting computer, overhead projector, and screen display monitor sufficient to project the computer screen for audiences ranging from 25 to 85 participants. Manuals providing line-by-line access information, depository library addresses, and other regional, state, and federal TRI-access resources, are also provided, as are contacts for good neighbor, toxic-use reduction, and union/labor-outreach programs.

Workshop participants include community environmental leaders; local librarians who may have the data base, or access to it, but often do not know how to load or use it; and members of the active public who, from our experience, are already very knowledgeable about local environmental conditions, yet are eager for documentation of the type available through the TRI data base and support materials. In addition, we strongly suggest that the local sponsors invite the environmental and health and safety managers from nearby industries represented on the data base. Most manufacturing concerns prefer to converse with a knowledgeable and informed public, and the dialogue is greatly enhanced when each side is apprised of the level of information already available to the other. This strategy of inviting all affected business and community members to the workshop has been very successful, with industry representatives present at most of our meetings.

Public response has been overwhelming, so much so that we are now in the process of producing a videotape to be sent out where our presence is no longer feasible. The data accessed is being put to good use. Already community participants in Southwest Philadelphia, working through Clean Water Action, our local sponsor there, have used the TRI data to begin a dialogue with the major oil refineries in the region on emissions reduction. Here the local library serves an ethnically mixed community downwind from the refineries. With our assistance it has installed the data disks so that the residents do not have to travel to Center City or beyond for access. Similar installation is now occurring in Northeast Philadelphia with assistance from the Clean Air Council in a community impacted by release from nearby chemical firms. In Bedford and Beaver counties, Pittsburgh, and the Allentown/Bethlehem areas, local TV and press coverage of our workshops led to greater public awareness of the data base, helping to empower resident groups in their dialogue with industry.

We are convinced that the TRI data base remains the most powerful, yet accessible, single source of information in the quest for environmental justice, toxic use reduction, and community environmental empowerment. Encouraging our students to work as multidisciplinary research teams in a real-world setting, helping them acquire both technical skills and social self confidence as they network with industry, citizen, and regulatory personnel, and building bridges between the campus and the wider community; are critical goals for our program. The skills acquired by the students in this project--both technical and social--are those often required for the professional work toward which many aspire. Indeed, it is no fluke that a number of our former students, already familiar with the TRI data base and its application in the waste audit process, now work at the EPA's own EPCRA hotline in Washington, DC, staffed by Booze Allan.

Our wish list for improved data access and availability includes the following:

1. The CD-ROM format should be made available on a more timely basis, as soon as possible after release of the data by the EPA. Why did it take more than two years to finally release the 1991 data in October of this year after it was reported in July of 1992 and nearly two years after the data was available on-line?

2. The EPA should endeavor to get the CD-ROM discs in as many libraries as possible, and not just those that are official federal depositories. Most county libraries still do not have the discs, even if they do have the computer/ROM capabilities to display them. The data must be publicized and available locally for the public to use it.

3. The EPA must continue to devote the requisite resources necessary to train local librarians in the availability and use of the data base, preferably in CD-ROM format. This effort seems under-funded at present, even in so-called 'test target' states, such as Pennsylvania.

4. We would like to see an EPA-sponsored or contracted manual for general public distribution on accessing the TRI data base. At present, we are forced to refer the participants at our workshops to the Form R reporting package itself, available through the EPCRA hotline, for the most thorough and useful text available. We supplement this manual with our own handouts. At a minimum and in the interim, the EPA Reporting Center should publicize availability of the reporting manual yet does not have to send out data entry disks for those inquiries only involving the manual itself. Other manuals, available from groups such as the Citizens Clearinghouse for Hazardous Waste, and INFORM, while useful, are either dated or do not devote sufficient attention to the TRI data base for our purpose here.

5. The EPA should sponsor a detailed hour-long TRI-access video, again focusing on the CD-ROM format, with line-by-line (or keystroke-by keystroke) instruction. This may suffice for wide distribution at depository libraries with the data base, and for interested citizen groups where workshops are not feasible or members of the public cannot attend a regularly scheduled workshop.

6. Additional workshops and videos addressing the needs of specific interests, as with labor representatives, emergency response personnel, and planning and zoning officials, can be adapted from the master format referred to above (item#5).

In conclusion, the Environmental Studies Program at Dickinson College is committed to **science by the people**, and not just for the people! We believe that environmental organizations and non-profit or service and response groups must not do for the public what the public can be empowered to do for itself. This idea forms the very base for our strong commitment to direct citizen access to the TRI data in the CD-ROM format. At Dickinson we are now moving from data retrieval to actual monitoring. This year we will use a new head space sampler for hydrocarbon detection, an atomic adsorption spectrometer for heavy metals, and other analytical equipment recently acquired through an NSF grant , to conduct rudimentary water and soil quality analysis for the presence of TRI chemicals. Samples will be gathered by the citizens themselves under quality-control supervision. This Toxic Fingerprints Project will be conducted in cooperation with the on-going Alliance for Acid Rain Monitoring (ALLARM), incorporating over 500 citizen volunteers across the State of Pennsylvania already engaged with stream monitoring for acid deposition.

As envisioned through EPCRA, knowledge leads to power and even furthers democracy, where democracy entails control over the forces, including environmental risks, affecting one's life. The Environmental Studies Program at Dickinson College is ready to assist with this effort. We welcome further inquiry.
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Diane Heminway, *Western New York Director, Citizens' Environmental Coalition*

Good afternoon. My name is Diane Heminway and I am the Western NY Director of Citizens' Environmental Coalition (CEC) and member of United Steelworkers of America. CEC is a coalition of 90 community, environmental and labor member groups and over 6,000 individual members. Established in 1983, CEC has been working primarily at a grassroots level to address and prevent pollution problems in New York State.

For the past six years, CEC has worked closely with a number of unions and other labor groups; three years ago, CEC staff organized with United Steelworkers of America. Before I go into detail about my work with labor, I'd like to give you a little background on myself.

My personal involvement began ten years ago on November 15, 1984. On that day, my five year old daughter and seven year old son were attending their elementary school in Middleport, NY when the FMC pesticide plant adjacent to their school had a 50 gallon accidental chemical release. The school was evacuated and nine children and two adults were sent to area hospitals and over 100 children were treated with oxygen and/or eye packs. When I phoned FMC to ask about the long and short term health effects associated with the chemical, I was told "there are none."

Eighteen days later, on the other side of the world, there was another accident involving this same chemical, methyl isocyanate. This time, in Bhopal, India, the chemical immediately killed thousands of people and left thousands more permanently injured. The Bhopal tragedy allowed me to learn more than I ever wanted to know about methyl isocyanate--a poison for which, in 1984, there was almost no toxicological data because, as was reported in TIME magazine, researchers stated that it was too dangerous to study in the laboratory.

Middleport was extremely fortunate on that 40 degree autumn day. An industrial toxicologist mathematically calculated that with a 20 degree increase in temperature, the school children would have easily received an exposure three times the life threatening level for an adult. Had the thermometer read 60 degrees, we would have undoubtedly been burying hundreds of dead children.

In 1984, there was no Emergency Planning and Community Right To Know Act and it was no easy task to learn that FMC had been inappropriately storing 140 tons of methyl isocyanate next to my children's school. And certainly, there was no data base to learn what poisons were being emitted into the air my children breathed daily. What I did learn was that at the time of the spill, the company sent workers out to "monitor" the area. They were given no personal protective equipment and were instructed to rely on their eyes and noses to detect the presence of methyl isocyanate--even though the manufacturer clearly warned that this should not be used as a detection method since lung damage can occur before the eyes and nose can sense its presence.

In 1984, workers were still being used as canaries in the coal mines--and they still are in 1994. That is why 100,000 workers die every year from occupational illness — that means that 11 workers die every hour as a result of workplace diseases. That is why we are so strongly committed to helping workers reduce their toxic assaults.

As I mentioned earlier, CEC staff are members of USWA. While unionized environmental groups are still somewhat unique, it is a natural and logical alliance--it is only good sense to join forces with those with whom we share common goals and visions. It is an alliance that for years, industry successfully prevented, by pitting workers against those who cared about safe and healthy communities. We have to stop allowing the issue to be framed in a jobs versus the environment context because the only way that we can ever hope to achieve a safe and healthy environment is by first having safe and healthy workplaces. The most logical way to accomplish that is through the reduction or elimination of poisons in the workplace. Obviously this won't

happen overnight, but we must continue to strive toward that end by working together and learning from one another.

For the past two years, in addition to my work as an environmental activist, I have had the honor of serving as a Health and Safety Trainer for workers through a training program sponsored by United Steelworkers of America. We teach workers about their various rights and about the inadequacies of worker protection laws and the uncertainties of science. They learn that there are about 70,000 chemicals used in commerce today and that about 35,000 of those chemicals are known to be associated with some type of hazard. Then they learn that OSHA regulates only 460 chemicals. They learn that permissible exposure limits are the legal exposure limits and not necessarily safe levels of exposure. In fact, for some chemicals, health damage has been documented well below the permissible exposure level. They learn that NIOSH, the research arm of OSHA, recognizes 150 carcinogens but that OSHA, their worker protection agency, recognizes only 21 chemicals as capable of causing cancer. They are taught about the inadequacies of Material Safety Data Sheets, which is the only source of chemical information that their employers are required to provide. And they begin to realize that just maybe they need to take on some of the responsibility for knowing what they are working with to protect themselves as well as their families.

In addition to providing various technical resource materials and instruction on their use, we also teach workers about available tools that can be used to make changes in their workplaces. One of these tools is the Toxic Release Inventory. Bear in mind that for the most part, workers are totally unaware that this law exists. After going over the basics of the Emergency Planning and Community Right-To- Know Act, I provide workers with their company's TRI data and Tier II forms. It's always interesting to hear the comments when they have the data in hand. They range from "Oh my God, I had no idea!" to "This is a lot of crap--I know we release a whole lot more than that!" I often spend a fair amount of time discussing "fugitive" releases which I refer to as "unpermitted releases." I point out that workers are usually the most exposed to these releases. Often, with volatile chemicals, the fugitive air releases are higher than the permitted stack releases.

In two instances over the past year, workers strongly questioned the data that had been reported. My suspicion had been triggered by the fact that the Tier II forms showed huge inventories of chemicals reportable under TRI but for which that had been no TRI reports. (Form Rs). I did followup work with them and learned that both companies were in violation of reporting requirements. While it is true that a lawsuit could have been initiated, it might not have in the long run, been the best approach. One company was suffering economically, and a financial burden just might have forced them to close down, putting a good number of workers out of jobs. Instead, we decided to use the information in another way. You see, the company was not only in violation of reporting requirements, they were also severely out of compliance in many ways, They had not been supplying proper personal protective equipment to their employees and they had been burning toxic wastes onsite without a permit. According to the worker, this is how the story played out: The union president presented the TRI data to the plant manager by tossing it on his desk, prompting the manager to ask "What's this?" "You tell me, I know it's a lie," replied the worker.

The next thing the plant manager said was "What do you want?" The worker was able to make several demands including getting personal protective equipment for workers, a promise that the company would stop the illegal burning as well as a promise that the company would look into replacing their chlorinated solvents for safer substitutes.

At the other plant, the worker presented plant officials with the data and told them he knew it was inaccurate but was willing to cut a deal with them. If they would agree to establishing a joint health and safety committee that truly stressed worker education and safety, he would not report them for their TRI violations. The company agreed and the safety committee has reportedly established a progressive safety program focusing on toxics use reduction.

I know of one other facility where workers took the initiative to investigate their own TRI releases. Although the company was thought to be honestly reporting, what startled workers were the huge quantities of chlorinated solvents reported as fugitive releases. Recognizing that this probably meant severe worker exposure, the workers took it upon themselves to find alternatives for most uses in the plant and convinced management that it would be in the company's best interest to make the changes.

Informed workers can and do force change. TRI data is one tool that belongs in their hands to help them shift away from toxics. This is public information - why aren't employers automatically giving this data to their workers when annual reports are submitted? All workers should have the courtesy of this data - these are the people who are frequently receiving the highest exposures!

The buzz words of the 90's seem to be "partnership" and "volunteerism." Employers should adopt these principles in-house by developing partnerships with their workers and voluntarily providing them with data.

I'd like to touch briefly on ways that I believe TRI can be improved. First, TRI must be expanded in a number of ways. Of course the list of reportable chemicals should be increased as should the types of facilities required to report. It is absurd that over 70,000 chemicals are commonly being used with 35,000 of them known to be associated with some type of hazard - yet the public is supposed to feel good about the fact that some industries are required to report on the released on some 600 chemicals!

Reporting of chemical use, or materials accounting is also needed.

Clearly the time is long overdue for such information to be shared with the public. As we all know, several states have taken the initiative to collect use data and EPA has the opportunity to gain from the experiences of the great programs in New Jersey and Massachusetts. What cannot happen, however, is for EPA to leave such reporting requirements up to the individual states to initiate. We need a federal program. Right now, for example, in New York, there is an ongoing effort to gut current environmental regulations under the guise of "making New York aggressively more hospitable for business." New York is just one of many states that would not initiate this much needed program unless federally required.

Having use data would give a much more accurate perspective of the "big picture." We could and should have a "cradle to grave" view of chemicals. This would help tremendously in assessing worker exposure.

Paul Orum, for who I have the utmost respect and admiration, was credited yesterday with identifying three possible paths for a chemical at a facility:

1) It can be consumed during production.
2) It can become part of the waste stream, or
3) It can become part of the product.

But there is a 4th path that is too often ignored -- chemicals find their way into the bodies of workers. Perhaps if use data reporting was required, we would not have to count quite so many dead worker bodies before learning about the hazards of a chemical. Had materials accounting been in place years ago, perhaps we would have known much sooner about the dangers of vinyl chloride, or carbon tetrachloride, or DBCP or aniline or glycol ethers or any of the other chemicals which have cost the lives and health of millions of workers.

I know that I'm about out of time, but while I have the opportunity, I'd like to leave you with one last thought to consider.

Yesterday, Lynn Goldman commended industry for their voluntary efforts in the 33/50 Program. I'm sorry, but I just can't get real excited about companies who voluntarily reduce 17 chemicals - not that these

reductions aren't commendable, but these are many of the same companies who REFUSE to clean up the hazardous wastes in their backyards and continue to release millions of pounds of toxics to the environment every year.

Dr. Goldman mentioned FMC as one of these voluntary companies. This is the same company that tried to litigate their way out of cleaning up over 75 Superfund sites - including their site in Middleport, NY where they dumped 16,000 tons of pesticides and pesticide wastes and 250 tons of arsenic next to my children's school. They have refused to clean it up even though the school yard is contaminated and the cancer risk is 900 additional cancers per million on the athletic field where children play. I'm sorry, but I can't sing the praises of a company like this. Please don't misunderstand, I'm willing to work cooperatively, but we need companies that are willing to be honest and ethical. We're at five to midnight--and we have to move much faster that reducing 17 chemicals at a time on a voluntary basis.
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Session 5: GIS and Other Tools for Analyzing TRI Data

Session Leader
Dave Wolf, *US EPA*
Speakers
Bowden Quinn, *Pollution Prevention Coordinator, Grand Cal Task Force*
Janet Vail, *Water Resources Institute, Grand Valley State University*
Len Wallace, *U.S. EPA-New England*

This session presented several applications of GIS using the TRI data. Len Wallace of the US EPA Regional Laboratory presented LANDVIEW. Bowden Quinn, of the Grand Calumet Task Force presented how TRI was being used with GIS on the small budget available to a grassroots organization. Finally, Janet Vail discussed the many different ways to get access to the TRI data.

Bowden Quinn, *Pollution Prevention Coordinator, Grand Cal Task Force*

GIS mapping offers exciting new avenues to promote pollution prevention in heavily industrialized communities and to help plan for sustainable redevelopment of these areas. Unfortunately, operating on the low budget of a grassroots environmental organization, I have found the start of this journey to be full of obstacles and bumps, but I have high hopes that GIS will eventually lead to communities that are healthier both for the people who live in them and for the environment around them.

The Grand Calumet Task Force works on environmental problems in the Grand Calumet River watershed in Northwestern Indiana, one of the most contaminated areas in the country. Discharges from industries along the river and adjoining canal and harbor have led to the creation of more than 20 feet of contaminated sediments that threaten Lake Michigan, a source of drinking water for millions of people. Steel mills, coke ovens and an oil refinery, along with many smaller plants, contribute to an air-quality region that is in non-attainment for several criteria pollutants. The loss of many of the region's industries has left a legacy of unused and contaminated land, the so-called "brownfields," which hamper attempts at economic renewal.

Most pollution prevention efforts by environmental groups have focused either on individual facilities or legislative campaigns at the state or federal level. Our project is exploring the potential of using local government initiatives to promote pollution prevention. These may include, among many other possibilities, new zoning ordinances, toxic chemical storage and handling fees, or increased penalties for industrial accidents requiring community emergency response.

The initial focus of our project is the City of East Chicago, a small, heavily industrialized city with a deteriorating infrastructure and economy. More than half of its area is zoned for industrial use, but this large tax base has not translated into benefits for the people who live in the city. The population and housing stock have shrunk for the past twenty or thirty years, and those who remain grow poorer. Next year the city will revamp its Master Plan to try to reverse this trend.

The Grand Cal Task Force will be part of that planning process. Using RTKNET and local sources, we are assembling a manual with profiles of TRI facilities in and around East Chicago along with discussions of various approaches to pollution prevention. We think that city officials will have a better idea of the impact of industrial pollution not only on human health but also on economic development if we can make it visual, so we

have contracted with the Metro Chicago Information Center, a not-for-profit research consultant, to do GIS mapping of the area to illustrate the pollution problems.

Unfortunately, the use of TRI data from RTKNET for the GIS map has not been as easy as we had expected. Even after several months of work, facility sites on the map do not correspond with their actual locations. However, we hope soon to have the TRI facilities for East Chicago manually located on our base map of the area. We will then proceed to locate sensitive population centers (schools, hospitals, churches, etc.) on the map and show demographic information (race, income, age).

Eventually we hope to use the map to plan for sustainable redevelopment of the community, adding layers on brownfields and critical habitats, as well as locating other businesses. Meanwhile, I hope to start using risk assessment software to analyze the impact of the TRI emissions on the community as the next step in this process.
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Janet Vail, ***Water Resources Institute, Grand Valley State University***

Accessing and Analyzing the Toxics Release Inventory (TRI)

Since the enactment of the Emergency Planning and Community Right-to-Know legislation (EPCRA or SARA Title III) in 1986, information on releases and transfers of toxic chemicals from manufacturing facilities to the air, water, underground injection, land, and off-site locations has become publicly available through the Toxics Release Inventory (TRI). This information source can be a powerful tool for revealing the magnitude of toxic chemical releases in a specific geographic area as well as a resource for tracking chemicals at an individual facility.

Access to TRI data

The Toxics Release Inventory data are available to the public in a number of formats. This information is widely distributed to libraries throughout the country and can be accessed by computer modem. Sources of information include:

- ***1987, 1988, 1989, 1990, 1991, and 1992 Toxics Release Inventory National Reports*** and ***Data Releases*** from the U.S. EPA,
- TRI User Support Service,
- Magnetic tape from NTIS, GPO, and TRI User Support Services
- Microfiche (for 1987-1990 data) available at major libraries
- Subsets of state data on diskettes
- CD-ROMS with search and retrieval software and chemical fact sheets
- Computer access through the National Library of Medicine's Toxicology Data Network (TOXNET) and through RTK-NET
- Individual state listings from the State Emergency Planning Coordinators
- Regional TRI Coordinators

Documents

U.S. EPA has made a concerted effort to provide TRI summary information to the public. Each year it has published TRI reports available to the public (***1987, 1988, and 1989 Toxics Release Inventory National Reports*** and ***1990, 1991 and 1992 Toxics Release Inventory Data Release***). In the ***National Reports*** and ***Data Release*** series, data on the amounts and the geographic, media, industry, and chemical distribution of TRI releases and transfers are summarized. The 1991 report has a special section on the prevention and management of toxic chemicals in wastes as well as a comparison of data with previous years and reporting profiles for the

33/50 Program chemicals. State Fact sheets for 1990, 1991, and 1992 have also been published which contain a brief profile of releases for each state.

A number of other TRI support documents can be obtained through the U.S. EPA hotline [Phone: (800) 535-0202, Fax: to request documents (703) 412-3333]. The publication "Public Access to the Toxics Release Inventory" is a comprehensive listing with ordering information for TRI products, services, and documents. Other sources of documents are:

1) National Technical Information Services (NTIS)
   [Phone: (703) 487-4650 or (800) 553-NTIS, Fax: (703) 321-8547]
2) U.S. Government Printing Office (GPO)
   Superintendent of Documents
   [Phone: (202) 512-2250, Fax: (202) 512-2250]

Actual photocopies or computer-generated facsimiles of Form R reports can be obtained through the TRI information branch [Phone: (202) 260-1609, Fax: (202) 260-4655].

Various Media

Raw data are available in spring for the previous reporting year (i.e. Spring of 1995 for the 1993 data submitted in July, 1994). Tapes, microfiche, CD-ROM, and diskettes are some ways that TRI information can be accessed. The U.S. Government Printing Office Electronic Products Sales Coordinator (GPO-E) should be contacted to order diskettes, magnetic tapes and for access to bulletin boards [Phone: (202) 512-1530, Fax: (202) 512-1262]. NTIS also has these media available but the cost tends to be higher than GPO-E.

Magnetic tape and Microfiche

Magnetic tapes containing the complete national data are available for all reporting years. Tapes are standard 1600 or 6250 bpi, 9-track, ASCII or EBCDIC and come with tape documentation. Microfiche contains the complete TRI data for the early reporting years along with indices to help locate specific facility reports. Microfiche will not be provided for the 1991 and subsequent reporting years. It has not been a popular TRI data format.

Diskettes

State-specific diskettes include only selected data from the Form Rs. They are available in high density 5.25 and 3.50 inch diskettes. There is a choice of data format: Lotus 1-2-3 (version 2.0), dBASE III Plus, and ASCII for DOS microcomputers and Excel (version 2.1) for Macintosh (for 1989 only). State diskettes may not be available from GPO-E or NTIS until Fall or later. Diskettes have the advantage of allowing the user to manipulate, sort, and group the data for analysis. Sometimes the state EPCRA Coordinators can assist in providing data on diskette.

NTIS has a "roadmap database" diskette that provides assistance to TRI users for identifying regulations and risk assessment information for TRI chemicals.

CD-ROM

Compact disc - read only memory (CD-ROM) is one of the least expensive and less time consuming ways to access the TRI data. The CD-ROM contains facility specific data, listings of Section 313 chemicals, indices, and information related to health, ecological effects, and safety of these chemicals (TRI-FACTS). The data base is easily searched and information can be retrieved rapidly for screen viewing, printing, or archiving to a file.

Online Computer Access

To access electronic databases, the user must have access to a computer with a modem. Files can be viewed on screen, printed, or downloaded to the computer. Online access can be expensive and a fast modem is recommended for downloading files.

TRI User Support Service (TRI-US)

Before an online search of TRI data is made, there is a source to contact regarding the best format for the search. Online access can be expensive and it is best to have a search strategy prior to going online. U.S. EPA has established a TRI User Support telephone number [(202) 260-1531] where requests for data can be made. The service provides a limited amount of online searches and comprehensive search assistance for the TRI online and CD-ROM applications at no charge. TRI-US also conducts training through individual sessions and workshops.

National Library of Medicine (NLM)

The Toxics Releases Inventory is one of a series of online databases on the National Library of Medicine's TOXNET system. Many libraries have access to the National Library of Medicine (NLM) and the individual user can set up an account with the NLM. A demonstration diskette showing the structure and the search strategies for TOXNET is available. On-line and off-line printing of entire or specific portions of records is possible. The data can be sorted and calculations performed before printing or downloading a file. The system has both a menu driven search package and a flexible command language.

The cost of using the NLM system is about $18 to $25 per hour depending on the time of day. The system is available 24 hours per day, 7 days per week. However, to comply with new federal regulations, there is toll-free access to NLM provided by CompuServe, Telenet (SprintNet), and Tymnet. Users receive the NLM Technical Bulletin which contains helpful hints about the system.

Right-to-Know Network (RTK-NET)

RTK-NET is a telecommunications computer service originally started by OMB watch in 1989 and now run by OMB Watch and Unison Institute [Phone: (202) 797-7200, Fax: (202) 234-8584]. The primary purpose of the service was to explore the use of online services to promote pollution prevention strategies. TRI data for 1987 through 1992 are available on RTK-NET along with other environmental data, all civil cases brought by the U.S. EPA, and a portion of the 1990 census. RTK-NET users can communicate with each other via "computer" conferences. There is not a public toll free number for RTK-NET. Unison Institute needs to be contacted for access information. A periodic newsletter keeps users informed of latest additions to the network.

State and Regional Resources

Each state has a designated Emergency Planning and Community Right-to-Know coordinator. Individual states can provide a hard copy listing of TRI reporters. Often states have TRI data available before EPA has compiled its data. Also, many states (i.e. Louisiana, Minnesota, New York, New Jersey) are producing state reports on the Toxics Release Inventory. There is a listing in the ***1992 Toxics Release Inventory Data Release - State Fact Sheets*** about individual state services. Each of the 10 U.S. EPA regional offices has a TRI coordinator. The TRI coordinators are knowledgeable about TRI and other EPCRA issues. The regions often sponsor TRI conferences to help businesses comply with EPCRA.

Analysis of TRI Data

Reports prepared by the Grand Valley State University Water Resources Institute (GVSU-WRI) have included compilations of TRI data by Standard Industrial Classification Code, county, chemical, and environmental media. State diskettes have been the easiest to use when raw data are needed. RTK-Net and TOXNET have provided summary data that can be quickly accessed. CD-ROM has been of use for quickly obtaining information on an individual facility. The hard copy reports have provided valuable background information on the Toxics Release Inventory.

Generally, a simple spreadsheet/database program like Microsoft Works has been adequate for analysis. However, data may have to be reformatted so that the program can accommodate it. Also, very large files are difficult to manage in Works. Graphics programs such as Harvard Graphics have been useful for data display. Combinations of pie charts, bar charts, and maps all contribute to an understanding of the data trends.

Specific locations of TRI facilities can be determined by the latitude and longitude coordinates reported on the Form Rs. Unfortunately, some of the facilities have reported incorrect locations (e.g., the middle of the Atlantic Ocean). The GVSU-WRI has used plat books to locate facilities on U.S. Geological Survey maps that are digitized. Alternatively, GVSU-WRI uses a Global Positioning System (GPS) for the most accurate characterization of a site.

Summary

Many types of media (hard copy, diskettes, CD-ROM, online databases) have been used by GVSU-WRI to produce its reports on the Toxics Release Inventory. Most of the TRI information is free and the computer software needed for analysis and display has been relatively simple.

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Closing Plenary: TRI--The Next Phase

Moderator
Susan B. Hazen, *Acting Deputy Director, Office of Pollution Prevention and Toxics, U.S. EPA*
Speakers
Jeanne Herb, *Director, Office of Pollution Prevention, New Jersey Department of Environmental Protection*
Edward S. Jamro, *Manager, Environmental Protection, Monsanto*
Hillel Gray, *National Environmental Law Center*
Linda A. Travers, *Director, Information Management Division, Office of Pollution Prevention and Toxics, U.S. EPA*

Susan B. Hazen, *Acting Deputy Director, Office of Pollution Prevention and Toxics, U.S. EPA*

I would like to welcome you to this final and closing session of the TRI Data Use Conference. I think this has been one of the most successful data use conferences that we've had, and it is mostly because of you, the folks who attended. Your attendance here is not only important for us to understand what the needs of our users are, but I think it's essential for us to hear from you and for us to have a forum so that this program can keep growing and can keep growing in the directions that are important to you, the users. We'll spend the next hour and a half discussing the future of TRI. Then at the end of that Linda Travers will close the session by telling us what the next steps in terms of this type of activity are and the major issues.

The agenda calls this session, TRI: The Next Phase. Quite frankly, TRI is being broken into so many phases right now, it's difficult to keep track. I'd prefer to think about TRI: How do we get there from here? We know where we are. I think our job is to define where the 'there' is. As Terri Goldberg said, I think this is going to be an interesting discussion. This issue, the next steps for TRI, is an issue that is very emotional for some folks, very important for others. I think we will hear some very different points of view.

In the past few years, in terms of the TRI program and in many ways as a result of conferences like this, we have expanded the data set of TRI with the pollution prevention information. We have expanded facility coverage by including federal facilities. And just recently, within the past two weeks, we have expanded the set of chemicals to be covered, almost doubling the initial set of chemicals that we were given. Today as a result of feedback from users like yourself we have a program that collects chemical release and transfer information from over 28,000 facilities, and starting next year, on 600 chemicals. We collect pollution prevention data as identified by the Pollution Prevention Act of 1990, and this year we will collect information on federal facilities.

As I've said at past data use conferences, we continually find ourselves at a crossroads with TRI, trying to make very strategic choices about what directions to follow next. This time we are looking at some very strategic choices for the next set of projects that will define the next directions for TRI. I think it's important to recognize that these choices need to be made with extreme care, that TRI is no longer a fledgling program. Changes that we make are extremely expensive. They're expensive in terms of government implementation. They're expensive in terms of the people who participate and devote their time to these efforts. And they can be expensive in terms of implementation from the industry side. We need to make sure that we collect what is useful to the majority of users. We need to make sure that there is a purpose and a clear direction that we are following. The issue before us today, and I'm sure the issue that will be before us for many months to come, is the issue of materials accounting information, worker exposure data and demographic information, and the role that TRI can play in the collection of that information on a national basis.

Mark Greenwood mentioned, or actually he stated quite clearly at an earlier meeting we had on the issue of materials accounting, that this issue is clearly going to redefine what we currently know as the outer edges of

the right-to-know program. Over the past few months as I have heard from people who have positions on many sides of this issue, I think that statement is truer than ever. This is truly one that is going to push and redefine those boundaries. From the perspective of somebody who has been with this program for many years, this is probably the most contentious issue that I have heard debated in terms of this program. That includes the original debate over the passage of this statute, the original implementation plans. The only thing that even comes close, in terms of the contentious nature of what we are moving towards here, is the debate over, what is a waste? We haven't come to closure on that. So that will tell you how contentious I think this one is going to be. I say contentious not because I'm trying to make this negative. I say contentious because it is an issue like this that can polarize people. It can polarize the different users of this data. It can polarize our constituents out there. I think it's important that we not let that happen. It's EPA's job to hear all sides of this issue and to try and prevent polarization from happening. It's our job to hear, to balance the needs of what we hear, and then to move forward and hopefully bring all the players along with us, not leaving folks out of the dialogue just because they don't happen to agree with the exact position that's been taken.

I mentioned Mark Greenwood's statement at a public meeting. Just to bring folks up to date a little bit on that, we did have a public meeting in Washington on the issue of materials accounting and TRI. I think we had more people at that public meeting than I have seen at any other public meeting in the toxics program. There was a great deal of information provided to the agency. We are still in the process of going through that information. We are going through an analytical exercise. There was a great deal more information presented in papers than actually got presented on the floor. I made a request at that meeting and I will make the same request at this meeting. That is the following: What was provided to us was a great deal of information about the potential uses of materials accounting data, how the information could be used, theoretically what the information can tell us, and even some good examples of what information that had been collected in Massachusetts and New Jersey did tell us. But what was not presented at that meeting, and what I have yet to see, and what I am asking for once again, are concrete examples of how materials accounting data that has been collected at a facility has been used by a worker, an individual, a state, anyone, to actually bring about a change. It is critical that if that information exists that we have it. So I raise that issue here one more time. It has been a number of months since that meeting, so perhaps some case studies have been done.

While EPA is very much in the listening mode on this issue, there is one thing which I believe EPA can and should add to this debate. That is that we do know from our experience with the Pollution Prevention Act data that we currently collect on TRI that we do not have the information which we, the federal government, need in order to actually track and measure pollution prevention progress at the facility level. For those of you who are familiar with the Form R, you know that we have the ability to ask facilities to tell us if source reduction played any part in any reductions that occurred at their facility, but the form does not collect quantitative information about what those source reductions activities were and how much of the reductions that show up on Form R were as a result of source reduction. Consequently, when companies in good faith make claims to have moved forward on pollution prevention, we have nothing to share with the public in terms of quantitative information about how that has happened. For those of you who have been involved in the 33/50 Program, you will know that one of the major criticisms of the program is that we cannot tell the public exactly how much of the reductions that have occurred at any facility have occurred because of source reduction. If we had the ability to measure that, we would be in a much better position to give credit to companies and to facilities who have moved actively forward. So what I'm saying to you is that if we are to measure and if we are to track and recognize source reduction, then we need something more than what we currently have. I don't know if materials accounting is it, but I can tell you that what we do have doesn't help us get to that answer.

We have three speakers with us today who have had experience in collecting and providing and looking at materials accounting information. I'm hopeful that they will shed some light on some of the issues which I've raised, but I'm sure this will not be the end of this debate. It will be a long one.
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Jeanne Herb, *Director, Office of Pollution Prevention, New Jersey Department of Environmental Protection*

The reason that I was asked to talk today was because in 1979 New Jersey did a one shot survey of manufacturers in the state that then became the model for the state's 1983 Worker and Community Right to Know law, which then became the model for TRI. So a lot of the issues that people are dealing with nationally regarding chemical use information we in New Jersey have been dealing with for a few more years. Now that certainly doesn't mean that I have any answers to give to you today. More I think what I can offer, based on a couple extra years of experience, is being able to ask some more questions. What I decided to do with this little talk was, instead of going into nitty gritty technical details about the whole issue of materials accounting, I'm going to sort of wax philosophic in terms of general directions on TRI, including materials accounting. Two of the folks from my agency, Andy Opperman and Mike Aucott, have given presentations over the last two days on more detailed issues related to materials accounting as collected by our state.

I think that it's real clear what some of the significant impacts of TRI have been. Those have been relatively well documented. First of all, it made the nation aware of the need to look at multimedia issues. Second, TRI also made the nation aware of the need to look at pollution prevention. You have to really start to look back and think about the world of environmental regulation prior to TRI and even prior to the New Jersey program, when there really wasn't even much of a bent at all towards multimedia. I would argue that we don't see much of that now, ten years after New Jersey started its program. But you certainly saw almost nothing prior to the New Jersey program and prior to TRI. Third, TRI certainly pointed the innovative approach of not using a traditional regulatory stick to bring about, not only compliance in terms of paperwork, but general innovation on the part of industry to look at ways to move forward in terms of reducing emissions and generation of hazardous substances. Please note that I make an intentional distinction between multimedia environmental efforts and pollution prevention. They are not necessarily the same thing. Pollution prevention is always multimedia; it cannot be medium specific. However, multimedia initiatives are not necessarily pollution prevention. I repeat, pollution prevention is always multimedia, but multimedia environmental protection is not necessarily pollution prevention.

The New Jersey definition of the term pollution prevention is consistent with the federal definition of pollution prevention which EPA interchanges with the term source reduction, in other words, reducing the use and generation of hazardous substances prior to recycling, treatment, controls, storage and disposal per unit of product.

The definition of the term pollution prevention must drive the future of TRI, including the question of whether TRI should collect materials accounting information. If the federal definition of pollution prevention or a state's definition of pollution prevention was essentially release reduction, (i.e., reductions post-treatment), then you could probably live with TRI the way it is today, and call it a tool for measuring pollution prevention. However, the federal definition of the term pollution prevention as well as that in many states, including New Jersey and Massachusetts, involves reducing the generation and the use of hazardous substances prior to treatment, prior to control, prior to storage, prior to recycling. That's the top of the hierarchy before recycling and treatment. So if you think about the future directions of TRI, then you need to look at your definition of pollution prevention, because you want TRI to be your tool for pollution prevention. Therefore, if, like New Jersey and Massachusetts, you are operating with a definition of pollution prevention that involves reductions of chemicals at industrial sources and if TRI is one of your tools for measuring pollution prevention, then it becomes necessary to use a measurement tool that accurately tracks reductions at the source, not at the end-of-pipe. We would argue that materials accounting is a critical tool for making TRI such a tool.

We've learned a lot from TRI, but there are a lot of places where TRI has not taken us. I guess that's where I want to focus right now. The first place is that we in New Jersey and, I think it's safe to say the folks in Massachusetts, argue that it's not a sufficient enough tool for measuring pollution prevention progress -

pollution prevention being defined the way I just went through it. In order to be able to call TRI the national measure of pollution prevention you need to be able to make some changes. Those changes are adding materials accounting.

In New Jersey and Massachusetts, materials accounting information contains four basic elements: the amount of the substance used, the amount of the substance consumed, the amount of the substance produced, and the amount of the substance shipped as (or in) product. In addition, New Jersey collects the beginning and ending inventory of the substance which, although not part of materials accounting, does contribute to a "whole facility" perspective.

EPA has been using the term "chemical use information" in its efforts to look at whether it should expand TRI in the direction of materials accounting information. As much as materials accounting information does include strict "use" data, I personally do not think of materials accounting data as a distinct measurement of chemical use. Rather, I see the materials accounting information as "whole facility" information. Materials accounting information collects critical data about the flow of a chemical through a production process or a facility, depending on the level at which it is collected. Coupled with release information already collected by TRI, materials accounting information provides a fuller picture of the trends of hazardous materials use and release at industrial facilities. Without materials accounting information, TRI only tells one side of the story, the release side. Again, depending on your definition of the term "pollution prevention," that one side of the story (e.g. release reductions) may be sufficient. However, if you are operating under a definition of pollution prevention that involves the top of the environmental management hierarchy, reductions at the source, then the TRI side of the story becomes clearly insufficient.

In New Jersey we see three elements as the core of our public pollution prevention information package. The first is certainly TRI. The second is the facility level materials accounting information that our state has been collecting for several years. In addition, the state's newer Pollution Prevention Law, for which we only have one year's reporting, collects pollution prevention related information at a production process level. By combining the facility-level materials accounting data with facility-level TRI data, we believe we have a facility-level aggregate of the process level information collected at a production precess level. We believe that these three elements are so linked that we do not conduct analysis of pollution prevention trends without analyzing all three sets of information because they are truly an integrated package. I believe that , regardless of the fact that EPA is not planning to collect process level pollution prevention data, one major future direction for TRI is to integrate facility-level materials accounting data with release data to become the national measure of pollution prevention trends.

The other direction I think TRI must head in is being the vehicle to make pollution prevention mainstream. I think there's a growing frustration with the lack of states integrating pollution prevention into the environmental regulation overall. I've been hearing this a lot from a lot of other states. State agencies have "air people" and "water people" and "waste people" and now there's a whole new set of "pollution prevention people." We have not been successful in terms of transforming environmental regulation, in general, towards a prevention ethic. I was trying to think, why is that the case? I think part of the reason is because regulatory agencies, and in my experience, facilities as well, really work based on what they measure, what numbers are in front of them. In a regulatory agency you've got a world of people who collect air data, you've got a world of people who collect water data and now you've got a world of people who are collecting pollution prevention data. Those folks really haven't seen the way to the long term approach to pulling it all together.

Now, I know that there was some discussion during the conference on data integration. I guess my take on it is a little bit different. I'm not talking about trying to have our computers talk to each other. Instead, I see TRI (if integrated with materials accounting information) as being a promising tool for pulling together disjointed, medium-specific efforts and giving it a prevention focus. The future of where pollution prevention in this country is going to go is directly linked to the kind of data that is reported. To date pollution prevention

in this country is going to go is directly linked to the kind of data that is reported. To date pollution prevention has been measured through TRI and various state pollution prevention requirements. The next wave is going to be integrating TRI and pollution prevention data with the mixing pot of data that companies are reporting for their air permit requirements, their water permit requirements, their hazardous waste requirements. One project that we're working on in New Jersey is we have a requirement to develop for a small set of companies a single permit. The single permit covers all their regulatory requirements including their pollution prevention requirements. We have learned that the data that the companies will report to the agency is going to be an incredible tool for prompting the companies to look at their whole facility and for looking at pollution prevention. So to that extent, we're attempting to develop a single spreadsheet that would cover all major reporting and monitoring regulatory requirements for a facility and also build in pollution prevention so that it has the pollution prevention basis. This also necessitates looking at how all those different data sets interact and interrelate. I am optimistic that, using TRI as the basis, we can start to look at the idea of trying to develop a single data set that crosses medium lines and that uses materials accounting to have a pollution prevention focus.

In closing, I think that TRI offers great promise for the future of pollution prevention in this country in three ways. First, I think that the addition of facility-level materials accounting will make TRI a good stand-alone measure of pollution prevention trends nationally. Second, with the addition of materials accounting, pollution prevention offers an effective complement to production process-level pollution prevention planning and reporting efforts underway in many states. Third, I think that TRI has the potential to be the best tool for making pollution prevention mainstream in environmental policy by linking disjointed reporting in medium-specific programs and by giving this integrated system a materials accounting, pollution prevention basis. The fundamental key as to the value of materials accounting in these efforts is the nature of the definition of pollution prevention. I think that we have had the "pollution prevention definition" debate for too long and that the National Pollution Prevention Act and subsequent EPA guidance on this subject has made the nation's policy clear. Pollution prevention is the top of the environmental management hierarchy and, in order to make it mainstream, we need to effectively measure it. Materials accounting will improve TRI's ability to measure pollution prevention as well as promote TRI's promise for making pollution prevention mainstream in environmental policy.
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Edward S. Jamro, ***Manager, Environmental Protection, Monsanto***

Chemical Use Data Is Not Needed to Track Pollution Prevention

Monsanto representatives helped negotiate the Toxics Use Reduction Act (TURA) in Massachusetts in 1989. We are still active in trying to keep TURA focused on by-product reduction. By-product reduction is still the only numerical goal contained in TURA. Massachusetts wants to achieve a 50% reduction in hazardous by-products (wastes) by 1997, using TUR methods. While we do report on usage in Massachusetts, this data is not needed to assess a production unit's, a facility's, nor the state's status in meeting by-product reduction goals. The same is true for assessing Pollution Prevention (P.P.) progress.

As defined in Massachusetts, TUR is NOT only input substitution. In fact, there are six methods (or techniques) which qualify as TUR in Massachusetts. These methods are: (1) input substitution, (2) product reformulation, (3) production unit modification, (4) production unit modernization, (5) improved operation and maintenance, and (6) recycling, reuse, or extended use integral to the generating production unit. It must be stressed that TUR methods 1 and 2 are "use related" while TUR methods 3, 4, 5 and 6 are "by-product (waste) related." Also, if a by-product becomes a raw material for another production unit without needing any additional processing, the material is not considered a by-product in Massachusetts. Note that Massachusetts TUR methods are really the same as EPA's Pollution Prevention (P.P.) methods.

In late 1988, the Associated Industries of Massachusetts (AIM) filed a Pollution Prevention bill which did not contain use reporting. While AIM - eventually after six months of negotiation - did agree to facility-wide use reporting in the final consensus TURA bill, AIM has never recommended use reporting as necessary for tracking Pollution Prevention, nor the Massachusetts By-product Reduction Index. AIM is still concerned with the issue of having confidential information in public files. To address this concern and to protect the competitiveness of Massachusetts business; recently (12/94), AIM helped to file a bill to change the use reporting requirements in Massachusetts from an actual number to a reporting range as used in SARA 312 - Tier II reporting.

Use information can be key business information for many companies (whether they realize it or not). To protect our confidential business information (CBI) Monsanto has asserted TURA CBI claims every year since 1990. To do this, we have had to submit duplicate copies of our Form R/S reports (250 plus pages) at considerable time, expense, and paperwork. Despite this effort to protect our CBI, some of our CBI was inappropriately sent outside of DEP. Unless State P.P. programs are already set to handle CBI, there will be considerable responsibility on them to develop systems to protect CBI. However, because this information is not needed to track pollution prevention, states should not be burdened with this data. It should also be noted that there is tremendous pressure on states to publish data as soon as possible. This pressure makes it more likely that CBI would be compromised at some point in time.

An additional point to make about CBI is that many business people are not sensitive to who can and does look at information in government files. If more business people were aware that their competitors or consultants working for their competitors can and do look at these files, there would be more CBI claims. This assumes, of course, that business people are appropriately trained and sensitized to these possibilities. Perhaps states and EPA should consider CBI sensitivity training as part of their pollution prevention efforts. This would help to alert the facility people responsible for reporting the data that their business leaders need to give input on CBI before the information is sent outside the company.

Many states (Minnesota in particular) have looked at use reporting. They rejected the concept partly because they did not need the data to show pollution prevention progress. The Minnesota Office of Waste Management held hearings and a forum in late 1992 to examine the use reporting issue - among others. They published their findings in January, 1993 and recommended against use reporting in Minnesota.

Many people are saying that current TRI reporting is inadequate to track pollution prevention. They say that use information is an absolute necessity for P.P. tracking. However, as facility people looked at Form R - Section 8 reporting, they realized that there is enough data there to adequately and appropriately track pollution prevention. It is as simple as comparing current year waste (CYW) (Column B) to prior year waste (PYW) (Column A) and using the Production Ratio (P.R.) to "normalize" the data. A Pollution Prevention Index (PPI) can be calculated by the equation: (Remember to add up the entire column in Section 8 on the Form R).

$$PPI = 100 - [(CYW/PYW)/P.R.] \times 100$$

This equation has been tested on several chemicals in several facilities and **IT WORKS** to show pollution prevention progress. A positive PPI when combined with the source reduction methods shown in Section 8.10 is useful in demonstrating pollution prevention.

Because use reporting is not needed to show pollution prevention, advocates of use reporting make other claims regarding its usefulness. Claims about enhanced worker safety and enhanced emergency response planning due to use reporting cannot be substantiated at the facility and local levels. Use reporting advocates also claim that use data can be utilized to validate current TRI reporting. Upon close inspection, even this claim is not true for most chemicals reported on Form R's.

In conclusion, it is obvious that use reporting is not and has never been needed to track pollution prevention. Even in Massachusetts, which has use reporting, that data is useless in tracking the state's status in meeting its 50% by-product goal. Advocates of use reporting ought to admit that the main reason they want the data reported is so they can track use reduction and use elimination. This is pure toxics use reduction; not pollution prevention.
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Hillel Gray, ***Policy Director, National Environmental Law Center***

Thank you very much. It's a great honor to be here today and to speak with three people who I have worked with for a number of years, and respect a great deal for the work that they have done. I also want to thank everybody here. Thank you for the work that you're doing. No matter what your perspective, or what kind of institution you are working for, we truly appreciate the work that you are doing.

Let me also mention at the outset that we actually do recommend toxics use reporting to other states, unlike the previous speaker, Mr. Jamro. I have been talking to activists around the country about toxics problems, pollution prevention and use data. In any other state, activists would be happy to have Ed Jamro as the representative of the chemical industry. Just the fact that Mr. Jamro and Monsanto believe that when they negotiate a program – such as the Massachusetts Toxics Use Reduction Act -- they stand by it (which is not how the chemical industry is acting in New Jersey) is greatly appreciated. Ed Jamro, while he recognizes that toxics use data is controversial at some level, has acted with integrity and helped us improve the TUR reporting in a number of significant ways.

You have been through a jam packed conference dealing with CD-ROMs, GIS, pilot projects, data evaluation and other practical matters. As the conference comes to a close, it makes sense to step back and acknowledge that the work you are doing is important beyond your day-to-day work and to look at how our varied efforts fit into a global challenge.

Our civilization, our species, is grappling with a very sobering public health and environmental problem because of the production, use and dispersion of toxic chemicals. We face a crisis that involves a persistent and pervasive contamination of our biosphere, our work places, our homes and our bodies. It is a crisis that involves the kind of toxic threats that scientists already recognize and that you can read about in the literature about toxic substances: higher cancer rates, depletion of the ozone layer, lead poisoning, and birth defects are among the problems that sound science already identifies as properties or potentialities of these chemicals. At the same time, we are learning about new threats associated with toxic chemicals. For example, there is considerable research now on estrogenic effects, infertility and reproductive system dysfunction, and neurological effects and disorders.

Again, thank you for doing the work to make information accessible on toxics. Why is this information so important? Because our society is running an uncontrolled experiment on us and on the biosphere by dispersing toxic chemicals with relatively little restraint. These chemicals, to a large degree, are fundamentally incompatible with biological systems and they are surely incompatible with biological systems at the rate that we produce and disperse them.

The conventional way that people looked at the burgeoning of the toxics crisis is represented in this New Yorker cartoon from the 1970's. The man is praying, "Grant that I may take into my system only acceptable levels of mercury, cadmium and lead." Of course, it is not possible. I would posit that it is impossible to somehow manage our toxic pollution in a way that will only give us acceptable levels. Let me cite two of the many reasons that we cannot manage toxic waste in this manner. First, waste management systems, treatment

systems, incinerators, and so on are intrinsically flawed and cannot entirely work. We have definitely seen that, for instance, in the dioxin debate. Secondly, we are learning that levels once thought acceptable by scientists are not acceptable. If people are familiar with childhood lead poisoning, they are probably familiar with this constraint on the efficacy of the risk assessment approach. Controlling pollution to a level justified as "acceptable" by risk assessments is the old mindset.

The TRI and the work that you are doing is already shifting the thinking in industry and government towards a different approach, a different mindset: a viewpoint that is more precautionary, more centered on prevention. Since Jean Herb described the prevention issue fairly well, I would want only to underscore an important point about a "multimedia" perspective.

There is a sense that TRI constitutes a major leap above the other environmental single-media programs because TRI is based on releases to multiple environmental media. That is very true and a key to the usefulness of TRI.

However, it is crucial to remember that the releases and exposures that people confront in our society are by no means fully documented by TRI releases. If the source is the industrial facility that uses or manufactures toxic chemicals, you can measure through TRI a number of routes of pollution, like air emissions, water discharges and POTW discharges. But there are a couple of main pollution routes that are never discussed in TRI, never shown in TRI. Notably, the use of toxic chemicals in consumer products, which are later disposed of and dispersed, are absent from TRI. The Inventory also fails to account for the feedstocks that are coming into facilities and occasionally causing accidental rail, truck or storage spills, fires, and explosions.

There are three compelling reasons why EPA is seeking to address TRI's gaps through a "chemical use" expansion. The first reason for toxics use information is that there are enormously high volumes of toxics in products that we cannot monitor through TRI. The second reason is that there are toxics used in the workplace, or brought into the workplace, that create an array of hazards and risks associated with chemical use and are not reflected by the TRI release data. The third reason for chemical use data is that TRI cannot measure pollution prevention, which several of the speakers have already mentioned.

When a company manufactures or brings onto its site a toxic chemical, there are three things that can happen. The business can either (1) "consume" the chemical (and thus convert it into another chemical or another type of pollutant), (2) put it into a product, or (3) put it into the waste stream. Today, TRI only gives us information about the waste stream.

Therefore, you see companies above the reporting thresholds for TRI that report zero or virtually zero in this area. So all the TRI data may be reported as zero. Yet in a state like Massachusetts or New Jersey, the public begins to see a very different picture. Here is an example of a company that reported all zeros in their TRI filing, but they reported in the state form that they put more than 100,000 pounds of the toxin into a product.

Let me give you another clear example of toxics in products. Universal Forest Products is a lumber products company in Massachusetts. As shown by the TRI filing, UFP's arsenic and chromium waste amounts to about eight pounds. Some people may think 8 pounds annually is not especially significant. But when you see the Massachusetts data, you will learn that UFP is making a arsenic-based registered pesticide treated onto the wood. What will eventually happen is that wood will either be burned or disposed of (and carpenters may be exposed to it through woodworking). Thus, the facility is actually the source of 300,000 pounds or more of toxic emissions and dispersion -- as well as upstream impacts.

Other examples include: lead in paints, solvent based inks, offgassing from carpets and building materials, cleaning products, automotive supplies, fuels, lubricants, spray paints, aerosols, household pesticides, adhesives, sealants, mercury in batteries, formaldehyde in cosmetics. How significant are toxic chemicals in

products? Just think of some of the major challenges in reducing toxic risks -- indoor air pollution, household hazardous waste, so-called "non-point source" pollution (where the "points" are the industrial makers of products), poison runoff, pesticide runoff. These are problems in environmental management where the source is the dispersion of a toxic product stream.

The second major area that is not covered entirely by TRI is the worker safety, as well as the community safety, associated with toxic chemical accidents. Yesterday, for instance, there was an accident at a PVC factory in Alabama; about 2,000 people were evacuated. The hazard from that facility was represented by the millions of pounds of vinyl chloride (VC) used or stored. By contrast, the routine emissions from that facility which might be measured by TRI in the thousands of pounds. TRI does not reflect the accident risk.

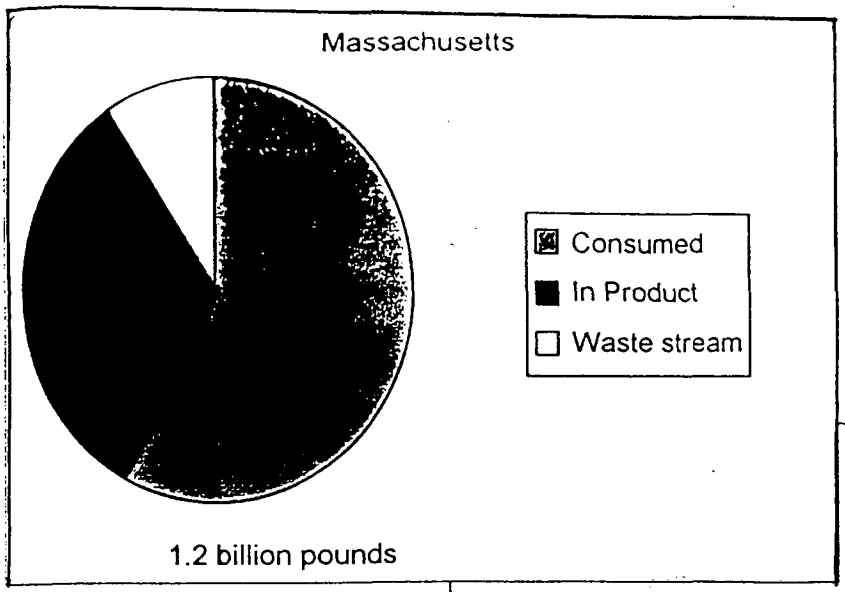
So, citizens and agencies in Massachusetts and New Jersey are provided information relevant to accident hazards. As shown in this chart, Eastman Gelatine reports about 1,700 pounds in their TRI, but report more than 100,000 pounds of toxic materials that they are processing through their facility. In the event of an accidental release, a spill or a fire (which could have generated dioxins at yesterday's PVC factory incident), it is the amounts stored and processed that represent the types of risks and hazards. Chemical use information at a facility is needed, therefore, to track and spur prevention of the risks associated with consuming, processing, or importing toxic materials.

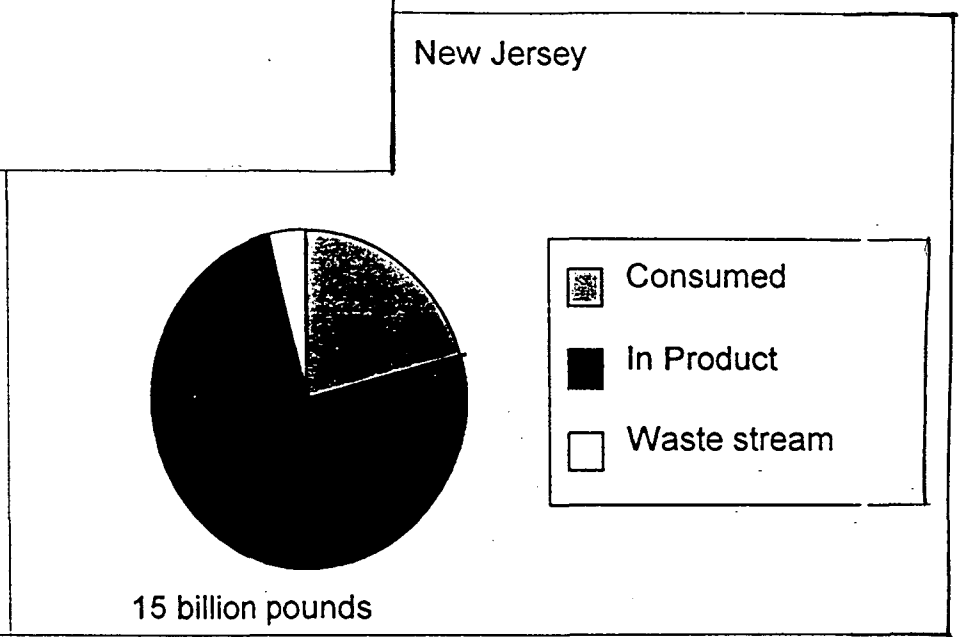
How significant is the missing data in TRI? Let me preface the answer by saying that the National Environmental Law Center has been deeply involved in Right-to-Know and share your belief that TRI is an important and valuable program. So I do not want to be discouraging in stating the cold truth that there are extremely crucial and sizable pieces of missing information. Massachusetts industries, for instance, use about 1.2 billion pounds of toxic chemicals, as shown in the pie chart. The amount in white on the chart is what the public can analyze through the TRI data. The shaded amount is the amount converted to other materials or pollutants; and the dark amount is actually put into products. In New Jersey, petrochemical firms and other industries use about 15 billion pounds of toxic substances each year. Note that New Jersey business has a very different proportion of quantity put into products vis a vis the quantity consumed.

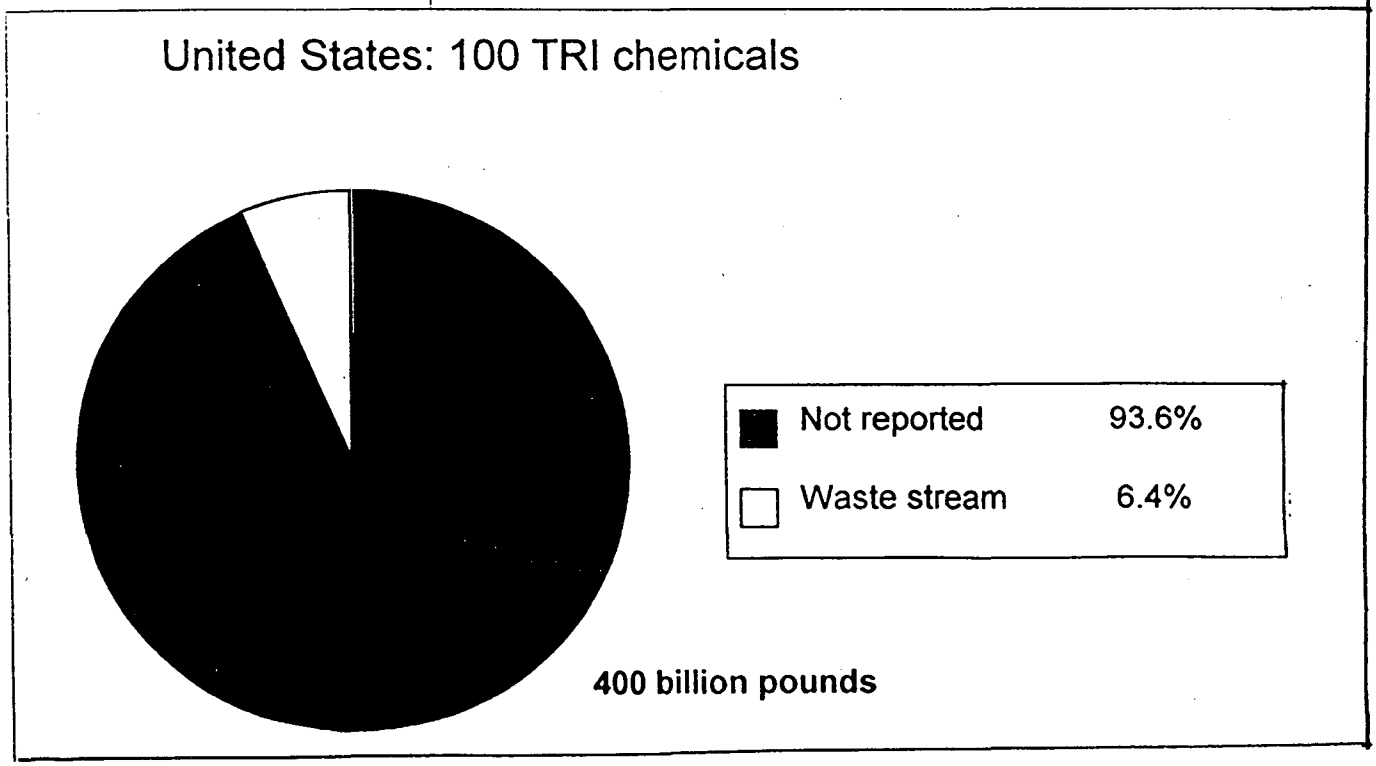
In the United States as a whole -- looking only at the top 100 TRI chemicals and not counting metals -- industrial throughput is about 400-500 billion pounds (assuming rough equivalency to production]. Unfortunately, TRI enlightens us about only a fraction of that. Maybe 6%, at best, of the country's toxics flow is captured by TRI. We do not have basic information on 94 percent of toxic chemical production and use. We do not even know where to gauge the relative amounts consumed or going into products. We do know from the Massachusetts and New Jersey data that the amount going into products, for instance, is many times the TRI waste data.

Besides giving us a more complete picture of toxics flow in society and in commerce, TRI could be doing a much better job of providing legitimate ways to measure pollution prevention.

Measurement is the key to accountability, to setting priorities and to stimulating change in industry. Many of you are working in very good faith on trying to shoehorn some kind of measurement of pollution prevention or source reduction into your programs based on the TRI information. This well-intentioned effort is not working very well from a technical or policy standpoint. I have seen some valiant efforts here at the conference and people are quite upfront about the struggles that they are having because they do not get the correct available information. We should be concerned that our scrambling to make TRI work in pollution prevention (P2) is creating a mythology that somehow TRI represents source reduction or helps measure P2 in a constructive way. To perpetuate such myths, there are some inaccurate and misleading representations of how TRI relates to source reduction.


Massachusetts
Consumed
In Product
Waste stream
1.2 billion pounds


New Jersey
Consumed
In Product
Waste stream
15 billion pounds


United States: 100 TRI chemicals
Not reported 93.6%
Waste stream 6.4%
400 billion pounds

To complement Jeanne Herb's remarks about the need for measurement and accountability, I would like to emphasize that there is a litmus test to know whether you are measuring pollution prevention in a technically sound way. This "litmus test" -- addressed at least ten years ago in the OTA report on Serious Reduction of Hazardous Waste -- is to measure reduction per unit of product. If you want to measure P2 adequately you need to be able to normalize or adjust the data for fluctuations in production level. As Jeanne Herb mentioned, the way to do this properly is with information disaggregated and analyzed at the process level.

An AT&T facility in Massachusetts is a good example of how process-level analysis works. AT&T divided up their facility into different product/process clusters, for which they then analyze for both their pollution prevention planning and some process level reporting under the Massachusetts Toxics Use Reduction Act. They do not disclose a process-level materials accounting, but they provide some process level reporting, including a production unit description and a measure of waste reduction change from a base year. AT&T, for instance, has a soldering unit that they measure in terms of the substrates that are processed. They also make foam, which they measure in terms of pounds of foam. Any facility, -- and there are many -- that has multiple product clusters, processes or toxic chemicals being used to make multiple products, would logically need to measure these production units differently.

A Raytheon facility that uses ammonia in three different product clusters is a example of why to start to study and measure source reduction by production operation. Raytheon makes circuit boards, blueprints and microwaves. The circuit board production unit had about a 26% achievement of source reduction. The blueprints unit was about even and the microwaves operation was less efficient (increased waste per unit of product). We also know from the Massachusetts TURA process level data that the circuit board operation accounts for the greatest amount of use of ammonia at the Raytheon facility. This suggests that the company targeted the right production process for reductions.

Raytheon's process level data gives us two other lessons. First, it allows us to track how the company is making P2 achievements suitable to different technologies. It gives Raytheon a level of accountability to the public. Even more important -- it allows the company and the public to analyze any significant component of the facility in a valid way, in this case on a per unit of product basis. There is no scientific way that Raytheon could add up circuit boards, blueprints and microwaves to derive some production index for their facility as a whole.

Again, credit should be given to people like Ed Jamro (and especially his predecessor) at Monsanto who negotiated this type of chemical use information with us in Massachusetts and New Jersey. We recognize that if we are talking about a future with materials accounting, and process level information and descriptions, there are many issues to consider thoroughly. What is the appropriate level of specificity? How many new data elements will there be, and how can we minimize the reporting burden? How will the agency administer the data? Agencies in both New Jersey and Massachusetts were very involved in trying to make this a manageable reporting program. We understand these considerations.

In fact, we also have had years of experience in understanding the confidentiality and trade secrets concerns with right-to-know. Business lobbies raised it in the mid-eighties over TRI expansion. It remains a constant issue. We understand that. There are legitimate trade secret concerns, but obviously you know that these issue are blown completely out of proportion. Sometimes trade secrets are used, as one of the speakers said, to polarize issues and sometimes as a red herring.

We are interested in negotiating at the national level -- or at any level, any facility, or any industry sector -- for the types of information that Jean and I discussed, while explicitly protecting trade secrets. Monsanto's staff helped us design the process level reporting so as to protect confidential business information in a manner that was acceptable to broad industry coalitions in two states.

To conclude with, there are three basic reasons for chemical use information: We envision a different future for TRI because toxics in products pose risks far above the releases and emissions that are now reported in the waste stream. We deserve to get a better picture of toxic chemicals that are consumed and brought into a facility because of upstream, lifecycle pollution and the concomitant worker exposure and chemical accident risks. And we need changes in TRI, particularly at the process level, so we can begin to measure source reductions in a valid way. Thank you very much.
□

Linda A. Travers, ***Director, Information Management Division, Office of Pollution Prevention and Toxics, U.S. Environmental Protection Agency***

One of the goals that we had when we began designing this conference nine months ago was to broaden the audience and bring in the pollution prevention community and the emergency planning community with the TRI community. The other goal was to move away from it being an EPA conference with EPA making most of the presentations and turning it into more of a participatory process where we had speakers that were not EPA speakers. I think you've experienced that over the last several days. I think we accomplished our goals as I've participated in the conference and attended various sessions.

One of our major accomplishments is that we've doubled the size of participation from the last conference. That is a major accomplishment. We feel very good about that. The other thing that I think is significant is the pollution prevention track was the track with the largest attendance. This may be an indication that TRI and pollution prevention are being seen as an integrated program.

As I said, in the past we asked EPA people to be the primary speakers. We have broadened the agenda and have asked NGO's, industry, state and local representatives to participate in many of the sessions. I think this approach has broadened our knowledge of TRI and its uses. I've seen new uses of the data that I had never imagined when I started working in this program seven or eight years ago. I'm sure there are going to be many more new uses. Thank you again for participating in the 1994 TRI Data Use Conference and I hope to see you at our next conference in the Spring of 1996.
□

Demonstrations

Demonstrations of the following TRI-related computer programs were given during the reception sponsored by the Chemical Manufacturers Association on the first night of the conference. These demonstrations were very helpful in showing attendees what software is available to work with TRI and TRI-related information.

CAMEO

Ken Ferber, *U.S. EPA*

CAMEO (Computer-Aided Management of Emergency Operations) is designed to provide Local Emergency Planning Committees (LEPCs) with a tool to manage information about hazardous substances in or near their communities, and to help emergency teams and first responders plan for the safe handling of chemical accidents. The program contains a chemical database of over 4,000 chemicals, 60,000 synonyms, identification numbers and labeling conventions, and emergency response information. MARPLOT maps contain latitude and longitude coordinates, roadways, waterways, railroads, shorelines and other features from U.S. Census Tiger/Line map files and 1990 demographic data.

Hazardous Substance Management System

Kim Hubby/Paul Clark, *Portsmouth Naval Shipyard*

HSMS (Hazardous Substance Management System) keeps track of each chemical part of mixtures, compounds and alloys, in storage, use, and release to the environment and tracks hazardous waste. HSMS identifies chemicals that exceed threshold values, calculates TRI release quantities, and provides important data in support of pollution prevention. This demonstration walked through the computer application of cradle-to-grave control of hazardous and toxic material. The demonstration showed how hazardous materials are ordered, received and converted within the computer to track chemical weight equivalents and product in parallel.

IDEA

Jerry Lappan, *OECA, U.S. EPA*

IDEA (Integrated Data for Enforcement Analysis) is an interactive, high speed data retrieval and integration system developed by EPA's Office of Enforcement and Compliance Assurance. Through IDEA, experienced enforcement personnel can retrieve data for performing multimedia analyses of regulated facilities for inspection targeting, facility or corporate screening, case development, litigation support, and settlement negotiations. IDEA overcomes the integration problem with EPA's media specific database management systems. While these systems frequently manage data on the same facilities, they are not easily integrated or relatable. IDEA acts as a universal interface for accessing and integrating data from several of these systems.

Internet Access to EPA Data

Geff King, *Labat Anderson*

Access to data through the Internet has increased markedly in the past year, with a wealth of information becoming available through a variety of sources. This demonstration showed some of the basic functions of Internet (telnet, ftp, gopher, e-mail, web, and WAIS) as well as how to access currently available EPA data sources.

JSI Community Outreach Project

Terry Greene, *JSI Center for Environmental Health Studies*

Staff from the John Snow Institute Center for Environmental Health Studies demonstrated their tutorial, "Environment and Health: How to Investigate Community Environmental Health Problems." The tutorial is used in community outreach efforts to introduce the TRI and other resources useful to identifying and addressing local pollution sources. It is being used in training programs for diverse audiences, including librarians, local officials, members of the media, environmental advocates, and members of the general public. It has also been disseminated by state and federal health and environmental agencies and used in high school to graduate-level classes.

LANDVIEW II

Len Wallace, *U.S. EPA*

LANDVIEW II is a CD-ROM system designed to integrate census data with demographic, economic, and environmental data organized in a geographic context. Information in the system includes digital map files of the U.S. and its territories; economic information at the block, place, county, Metropolitan Statistical Area (MSA) and state levels from the 1990 Census. Environmental data are taken from published and electronic EPA program offices. The system can pinpoint locations of CERCLA and RCRA sites, TRI facilities, drinking water facilities, areas of high or low income and more.

Population Estimation and Characterization Tool

Dave Wolf, *U.S. EPA*

The Population Estimation and Characterization Tool (PECT) provides desktop access to GIS and ready-to-use geo-demographic data for estimating and characterizing populations in buffered areas around locations, including hazardous waste sites, toxic release facilities and monitoring sites.

RTK Net

John Chelen, *Unison Institute/RTK Net*

The RTK Net is a free system that allows users to access TRI data as well as other databases, such as U.S. Census and EPA CERCLIS and Biennial Report data. The system also offers a conference facility and electronic bulletin board.

South Carolina 1992 TRI System

Michael Juras, *SC Dept. Health & Env. Control*

SC TRIS92 is a user-friendly TRI database system that performs a wide range of searches and reports. South Carolina's entire 1992 TRI data is featured. The data base files follow the EPA's GPO/NTIS structure and are searched by a Clipper program. Users can access the Ad Hoc Report and Label Writer for further combinations and report definitions.

TOXNET

Dr. Dorothy Stroup, *National Institutes of Health, National Library of Medicine*

The National Library of Medicine's TOXNET is a publicly available system that enables searching of TRI data from 1987 to 1992. Users can perform online calculations of release values, data sorting and ranging, as well as other data manipulation tasks. TOXNET has other online databases with toxicity and environmental fate information for the chemicals reported in TRI files.

TRI on CD-ROM

Michelle Cavanaugh, *Labat Anderson*

TRI on CD-ROM contains emission and transfer information for more than 300 chemicals and 20 chemical categories reported by manufacturers since 1987. Starting in 1991, pollution prevention information is included. The database has more than 80 searchable fields. The system provides sorting and calculating features, TRI chemical fact sheets, field descriptions, and 4-digit SIC code translations (for SIC codes 20-39). The data can be read by other computer software packages for additional analysis and reporting.

TRIPQUIC

Loren Hall, *U.S. EPA*

The TRIPQUIC system offers a number of analysis and display tools for TRI data, such as maps, charts, cross-tabulations, rankings, and simple statistics. This demonstration introduced the current features of this EPA mainframe system to help users explore TRI data in a variety of ways.

8(e) Triage Information Product

Richard Wormell, *U.S. EPA*

This PC-based information system provides a way to search indexed terms for health and safety studies submitted to the U.S. EPA under the Toxic Substances Control Act (TSCA). It also contains chemical substance fact sheets published by the U.S. EPA.

Poster Session

Posters presentations were included in the 1994 TRI Data Use Conference as a way to increase the exchange of information on the many different uses for TRI data. Posters were available for viewing during the second day of the conference. Two one-hour sessions, one in the morning and one in the afternoon, allowed conference attendees to discuss the posters with the presenters. The abstracts submitted by the poster presenters are presented below. An index at the end of the proceedings has an alphabetical list of all the presenters and the pages on which their abstracts can be found.

Michael Aucott, *Office of Pollution Prevention, New Jersey Department of Environmental Protection and* **Andrew J. Opperman,** *Bureau of Hazardous Substances Information, New Jersey Department of Environmental Protection*

New Jersey's Materials Accounting Approach to Environmental Release and Pollution Prevention Reporting

Statement of the problem

New Jersey is a highly industrialized as well as a densely populated state. The proximity of industrial facilities storing and utilizing toxic chemicals to population centers leads to concerns regarding potential exposures to human health and the environment.

Objective of the project

Identify the types and quantities of toxic chemicals used by manufacturing industries in the state. Establish a quantitative materials accounting of the chemicals by conducting a simplified mass balance. Assess the environmental and commercial fate of the chemicals.

Approach to solving the problem:

- NJ Legislature passed a law requiring certain facilities to report annual materials accounting on a select group of toxic chemicals
- NJ DEP prepared a reporting form and explicit instructions:
  1) defining the data elements to be reported
  2) providing a materials accounting worksheet for facility self-verification of chemical mass balance
- NJ DEP conducts annual employer outreach workshops
- NJ DEP established and maintains a database of facilities' annual reports
- NJ DEP conducts computer analyses of materials accounting on submitted data
- NJ DEP provides technical assistance via telephone or facility site visit when gross reporting errors are identified

Project results and outcomes

The development and implementation of an annual data collection process that includes toxic chemical materials accounting, that provides data on environmental and commercial fate of those chemicals, and that allows for the tracking of pollution prevention trends and analyses.
□

Janet Clark and **Jodie Siegel**, *Massachusetts Toxics Use Reduction Institute*

Moving from the TRI to Cleaner Alternatives: TURI's Technology Transfer Center is Your Gateway

Access to the Toxics Release Inventory is a great tool of empowerment for those who access and use the available data. The TRI provides information on the quantities of listed chemicals released by a facility in a certain SIC code. Often, however, this information is not sufficient to allow the receiver to apply and/or practice prevention and reduction techniques. Further information, about properties and toxicity of the chemical of concern, current process information, and alternative processes and chemicals, is often critical to pollution prevention success and progress.

The Technology Transfer Center (TTC) at the Massachusetts Toxics Use Reduction Institute (TURI), located at the University of Massachusetts Lowell, provides users with a wide variety of tools to access practical information on pollution prevention technologies. The research library was assembled through the acquisition of technical papers, case studies, reports from trade journals, conference proceedings, and newsletters. Papers and reports from state, national and international pollution prevention programs are also included in the TTC collection. This collection is constant and ongoing, maintaining an up-to-date source of information. Research reports by the Institute have reviewed various subjects, and fact sheets on subjects like alternatives to solvent-based paints and non-cyanide plating processes provide concise overviews as well as selected bibliographies on the subject.

The TTC provides access to its holdings through a searchable electronic database. External databases available include bibliographies, chemical toxicity data, the Solvent Alternatives Guide (SAGE), and vendor databases. Materials are organized to focus searches on a particular production process or use sector, on a specific chemical or chemical class, or on various methods for approaching pollution prevention. TTC staff are available to assist visitors in their searches and to respond to telephone inquiries.

Since its opening in 1990, the TTC has served over 1500 users. In October 1994, there were seventy visitors to the TTC, and the numbers are ever-increasing, as a result of consistent customer satisfaction. The TTC provides a lay or professional person with "one-stop-shopping" - one library that can take the user from raw data to applicable technologies.
□

Paul Clark, *Portsmouth Navel Shipyard*

Hazardous Substance Management System

SUMMARY: In October 1991 representatives of many Navy Commands participated in a Process Action Team (PAT) to develop the functional requirements for a computer based system that would assist our activities in meeting the hazardous communication requirements of OSHA, the chemical tracking and reporting requirements of EPA, and the pollution prevention and chemical reduction goals of the Department of Defense. Such a system would need to track and control products and materials containing hazardous and toxic substances from initial ordering through RCRA disposal of the waste generated. It would need to convert product chemical content into chemical weight at receipt, continuously track chemicals stored, and calculate each chemical release based on a computer model (algorithm) of the specific industrial process used. The Navy has identified more than 400 of these processes.

SYSTEM FEATURES:

* Maintains local MSDSs
* Lists product chemical hazards
* Process algorithm dictionary
* Lists chemical constituents
* Authorized use list
* Waste profiles

* Tracks product usage
* Generates waste manifests
* Tracks waste streams
* Calculates TRI chemical releases

* Tracks all chemicals ordered, received, stored, used, recycled, treated, including disposal through off-site recycling, reuse, or treatment

□

Ihab H. Farag, *Sc.D., P.E.*, **Carey Fillman, Jason Garland,** and **Anna Waller**, *Chemical Engineering Department, University of New Hampshire, Durham, NH*; **CWO Gerald A. Tipton**, *Environmental and Safety Manager, U.S. Coast Guard Base South Portland*; **Rachel Marino**, *Chief, Civil Engineering Unit (CEU)-Providence*; **Dwight Peavey**, *Ph.D., Environmental Scientist, Project Officer, U.S. EPA Region I*; and **Leonard B. Wallace**, *Environmental Scientist, EPA's Emergency Response Section, Lexington, MA.*

EPCRA & Pollution Prevention Project with U.S. Coast Guard

Statement of the Problem

On August 3, 1993, President Clinton signed Executive Order 12856, entitled "Federal Compliance with Right-To-Know Laws and Pollution Prevention Requirements." It requires all federal agencies to comply with the Emergency Planning and Community Right-to-Know Act and the Pollution Prevention Act (PPA). The President set a voluntary goal of 50% reduction in toxic releases and waste generation for federal facilities by 1999.

Objective of the project

The U.S. EPA - New England, through a Cooperative agreement, has entered into a collaborative partnership with the University of New Hampshire and the Coast Guard. The pilot project is focused at the Coast Guard Base located in South Portland, Maine. The goal is to share resources, training, and expertise in the development of a "model" facility pollution prevention (P2) plan. The implementation of the facility P2 plan will involve the use of the Computer Aided Management of Emergency Operations (CAMEO) software in chemical tracking and system audit. P2 training and specific source reduction projects will also be implemented. The project may provide a "model" for other federal facilities.

Approach to solving the problem

The specific tasks include an on-site environmental audit to assess P2 opportunities, compliance with all mandates of EO 12856, and all regulations under EPCRA and PPA.

Project results

To date, Phase one has been completed. It included initial communication, introductory meeting with Coast Guard personnel at the Base and at the Civil Engineering Unit (CEU), Providence, identifying opportunities, forming a team involving several UNH students, planning the CAMEO training, planning the chemical inventory, assembling a group of UNH students, Coast Guard personnel and reservists, and EPA personnel to execute the physical inventory and bar code every item, and developing instructions.

Outcomes and Conclusions

The outcome is to create a document which other Federal facilities can use as they implement their P2 plans.

□

Ihab H. Farag, *Sc.D., P.E.*, **Jason Garland,** and **Anna Waller**, *Chemical Engineering Department, University of New Hampshire, Durham, NH,* and **Vincent Perelli**, *Waste Management Specialist, N.H. Department of Environmental Service (DES).*

New Hampshire's Pollution Prevention Internship Program

Statement of the Problem

The Pollution Prevention (P2) Partnership between the N.H. Department of Environmental Services (DES) and the University of New Hampshire (UNH) was initiated by an EPA grant. An important goal of the Partnership was to establish an innovative internship program which combines its curriculum development efforts with a student training program focused on P2.

Objectives of the project

We defined the following primary objectives of the pollution prevention internship (P2I) program:

- To provide N.H. business with well-developed options for pollution prevention.
- To develop new information on pollution prevention that can be used to build educational modules and assist other businesses.
- To provide students with valuable opportunities to gain practical experience in industrial pollution prevention.
- To create educational materials on pollution prevention.

Approach to solving the problem

To effectively establish the P2I Program, generate interest in companies, and start the interns by 6/1/94, we identified the following tasks:

- Publicize/market the P2I program
- Generate interest in companies, and meet with interested ones
- Recruit qualified students
- Train the interns in P2

Industry sponsor guidelines were prepared and sent out to over forty interested companies. Student guidelines were also developed and distributed throughout the Chemical Engineering Department. We met with companies that expressed a high level of interest in the P2I program to answer questions and finalize the companies' commitment.

Project results

Eleven Chemical Engineering students took part in the Internship Project at nine NH facilities representing diverse industry types. Each intern was required to develop, in cooperation with his facility, a project proposal, emphasizing P2. To prepare the interns, a comprehensive four day training session was conducted to provide the students with an overview of federal and state regulations, pollution prevention definition, pollution prevention assessments, pollution prevention cost accounting, Toxic Release Inventory (TRI) database. It included a site visit at one of the participating companies.

Outcomes and Conclusions

The P2I was initiated. Industrial participants became college extensions for the interns. The program has been well received. The recommendation is to expand the scope of the program in future years.
□

Terri Goldberg, *Manager, Pollution Prevention Program, NEWMOA*

Northeast Waste Management Officials' Association Pollution Prevention Program

This poster provided an overview of the Northeast States Pollution Prevention Roundtable (NE Roundtable), a project of the Northeast Waste Management Officials' Association (NEWMOA). The NE Roundtable was established in 1989 by NEWMOA to enhance the ability of the Northeast states to implement source reduction programs. NEWMOA is a non-profit interstate governmental organization dedicated to coordinating activities among the six New England states, New York and New Jersey. NEWMOA has pollution prevention, hazardous and solid waste and waste site cleanup programs. NEWMOA organized the 1994 TRI Data Use Conference under a grant from the U.S.EPA as part of their pollution prevention program.

Currently the group is involved in a number of activities, including: organizing quarterly meetings to provide training to the states on pollution prevention (P2) and share information; publishing a quarterly newsletter that provides updates on state and EPA Regional activities; maintaining an information clearinghouse; publishing research reports and other materials; and organizing workshops and other training activities. In addition, the NE Roundtable has three committees: P2 Information Dissemination (ID) Committee, P2 Policy and Legislation Committee, and P2 Training Committee.

The P2 ID Committee is involved in developing a model regional information clearinghouse network in the Northeast in coordination with a group in the Great Lakes area. This project is exploring ways of reaching small and medium size business to address their environmental questions and concerns and methods of packaging P2 information in a useful format. The P2 Policy and Legislation Committee is pulling together information on P2 progress in the Northeast states as background and support for discussions with EPA on the future direction and funding of the state P2 programs. The P2 Training Committee has been focused on developing training sessions for state environmental regulators on P2.

NEWMOA's recent reports cover such topics as: measuring P2 progress at facilities; financial assessment of P2 projects; compendium of case studies; and pollution prevention planning. For more information on the NE Roundtable, call (617) 367-8558.
□

Robert Guillemin, *Coordinator, Pollution Prevention Consortium of New England Universities, NEWMOA*

Pollution Prevention Consortium of New England Universities

As pollution prevention (P2) emerges as a leading environmental management strategy, industry and government rely increasingly on institutions of higher education for technical guidance, basic research and pollution prevention training. Although New England universities have responded to this demand by developing innovative P2 programs, educators and government officials realized that a regional network would help to nurture individual P2 programs and guide broad based P2 initiatives. The idea to develop such a network was formalized in 1993 with a meeting of New England universities and colleges sponsored by the Environmental Protection Agency (EPA) and the Northeast Waste Management Officials' Association (NEWMOA).

By the Spring of 1993, the Pollution Prevention Consortium of New England Universities was founded with the mission to facilitate collaborative pollution prevention research and education/training projects among New England universities and colleges. More specifically, the P2 Consortium works:

1) To promote the incorporation of pollution prevention at all educational levels.
2) To identify pollution prevention opportunities and develop solutions through results-oriented research.

3) To collaborate with local, state, and regional pollution prevention programs in developing research and education programs.
4) To develop multidisciplinary ties among academic programs and professions involved in pollution prevention.
5) To promote networking, collaboration, referrals, and exchange programs among universities.

The Pollution Prevention Consortium of New England Universities is managed by NEWMOA and sponsored by the EPA and member colleges and universities. Recent Consortium projects include:

- The publication of a resource directory of member universities.
- The presentation of a two day, student-faculty conference on pollution prevention at the Massachusetts Institute of Technology.
- The acquisition of a P2 research and educational grant from the Department of Defense.

The P2 Consortium's twelve members include:

Brown University
Dartmouth College
Massachusetts Institute of Technology
Merrimack College
Roxbury Community College
Tufts University
University of Connecticut
University of Maine
University of Massachusetts Lowell
University of New Hampshire
University of Rhode Island
University of Vermont

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Hillel Gray, *National Environmental Law Center*

Pollution Prevention Network

What is the Pollution Prevention Network? We are organizing a national multi-constituency network on toxics pollution prevention. We are focusing on industrial sources of pollution in order to prevent further toxic contamination of workplaces, communities, products, and the environment.

State and local actions on toxics prevention have skyrocketed in the recent years -- and now EPA is making source reduction a top priority. But toxics prevention is innovative, untested, and faces tough opposition. We need to pursue common goals, and deal with potentially divisive issues, to ensure a transition to cleaner and safer industries.

Our constituencies include environmental, environmental justice, labor, consumer and occupational health activists. The draft goals of the Pollution Prevention Network are to:

Promote industrial toxics pollution prevention (source reduction and toxics use reduction) at the national, state, regional, and local level.
- Provide information, education and resources to activists.
- Strengthen local toxics prevention work and mutual support.
- Analyze policies and coordinate our responses.
- Facilitate networking and group building.
- Track federal toxics prevention activities and resources.

The activities of the Network include:

- **Information sharing and networking** through our newsletter At The Source and by disseminating concise information on model policies and campaign strategies. We also manage a clearinghouse and foster issue-specific working committees.
- **Policy analysis and input to government officials** on national pollution prevention decisions. A current focus is EPA's proposed expansion of the Toxics Release Inventory to provide public access to toxics use data.
- **Policy and strategy meetings** on cutting edge policies, emerging local or industry-sector strategies, and development of the Network. Recent topics included defense of New Jersey's Pollution Prevention Act, chemical accident prevention, and chlorine phase-out efforts.

Our work on TRI

Thirty public interest representatives from around the country testified on September 28th at EPA's public hearing on the toxics use expansion of the Toxics Release Inventory (TRI). Network participants generally believe that adding toxics use data to TRI would educate the public (and CEO's, media, government, etc.) with information to create the impetus for safer and cleaner products and processes. Toxic chemicals at a facility end up in three places - 1) in a product; 2) converted into another material; 3) in the waste stream. Currently, TRI only covers the waste stream, which is by far the smallest of the three. Therefore we need to focus on the problems associated with toxics use, not just wastes, mainly: product-related problems, accidents, occupational exposure, and gaps in waste data.
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Tim Greiner, *Greiner Environmental*

Normalizing P2 Data for TRI Reports: A Statistical Test for Choosing a Normalization Method That Accurately Reflects P2 Progress

Companies that file Toxic Release Inventory (TRI) reports are required to adjust their pollution prevention data for year-to-year changes in production. This adjustment, or "normalization," is required to be based on what is known as a "production ratio" or an "activity index." However, choosing the wrong normalization method can generate an inaccurate picture of a company's pollution prevention progress that either overestimates or underestimates the true results.

EPA provides scant guidance on how to select an appropriate ratio or index, leaving environmental managers to guess which measure of production best reflects changes in their firm's business activity. The Agency simply advises firms to use a variable that has the "primary influence on the quantities of the toxic chemical recycled, used for energy recovery, treated, or disposed."

This poster session describes a normalization method developed by the Massachusetts Office of Technical Assistance (OTA) that produces a more accurate picture of a firm's year-to-year pollution prevention progress. This technique uses regression analysis to determine the statistically significant normalization factors that best measure a facility's year-to-year pollution prevention progress. The poster reviews the complexity of normalizing P2 measurements and the corresponding issue of inaccurate progress reporting. It also presents a case study applying this technique to an automated spray paint line.
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Michael K. Heiman, *Environmental Studies, Dickinson College, Carlisle, PA*

Student Use of EPCRA (SARA Title III) Data To Conduct Community Toxic Waste Audits

Congress intended the Emergency Planning and Community Right-to-Know Act of 1986 to enable citizens to learn more about the hazardous chemicals stored, used, and released in their communities. The Environmental Studies Program at Dickinson College is committed to furthering this goal through instructional use of the data base generated through EPCRA. Each year 75 first-year students prepare toxic waste audits on communities or facilities of their choosing. As a result, we run one of the largest campus-based audit programs in the nation, and our activities have attracted wide interest.

Students work with reporting forms available on-line via RTK-Net and through the EPA's CD-ROM format. Using a wide variety of reference tools, they uncover reported epidemiological and environmental health effects, exposure standards, census data, and pertinent chemical profile information. Upper-division students in our policy class arrange plant tours focusing on toxic use reduction and 'good-neighbor' agreements. Additional interviews with residents, labor unions, and the Local Emergency Planning Committees profile incidents of high chemical exposure.

In an attempt to bring the program off-campus and directly to the impacted citizens, students and faculty are conducting toxic release inventory access workshops using the CD-ROM format in communities of color and low-income neighborhoods across EPA Region III (PA, MD, WV, VA, DE, and DC). This outreach is supported through a grant from the EPA's Environmental Equity Grant Program for the 1994-5 academic year.
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Maureen Heraty Wood, *Manager, Waste and Pollution Prevention Issues, Chemical Manufacturers' Association*

Pollution Prevention in the Chemical Industry

As manufacturers and distributors of chemical products, the chemical industry manages a large volume of TRI chemicals every year. The industry recognizes that pollution prevention is a core principle of responsible management. In 1992 CMA member companies managed over 12,000,000 pounds of TRI chemicals, but less than 7% of these chemicals were released to the environment. Industry implementation of sound pollution prevention practices helps to reduce the impact of industry on human health and the environment; serves to advance its own efforts, and those of others, to improve the environment; and reduces the potential for future degradation.

The poster describes the progress of the chemical industry in preventing pollution over the past five years. From 1988-1992 CMA member companies reduced releases of toxic chemicals to the environment by 35 percent. During the same time period, chemical industry production rose 8%. Examples of successful member company pollution prevention projects, featured in the poster, illustrate the many ways in which companies apply technological and human resources to reduce emissions to the environment.
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Maureen Heraty Wood, *Manager, Waste and Pollution Prevention Issues, Chemical Manufacturers' Association*

Through the Form R Process

Each TRI-eligible facility must submit a Form R for each TRI-listed chemical that it manufactures, processes or otherwise uses in excess of the statutory thresholds. In 1993 chemical manufacturers submitted over 10,000 Form Rs, representing emissions from approximately 1,400 different facilities. Facilities devote considerable time and resources to assuring that Form Rs are completed in an accurate and timely manner. This poster walks viewers through the process that facilities follow to prepare and submit a Form R. A flow chart, illustrated with pictures and text, shows the steps involved in determining TRI eligibility, types and volumes of chemical emissions and transfers, types and volumes of chemicals by pollution prevention activity, and other steps necessary for a facility to complete the Form R properly.
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Arpad Horvath, Chris Hendrickson, Lester Lave, Francis McMichael, and Tse-Sung Wu, *Engineering Design Research Center, Carnegie Mellon University*

Toxic Emissions Indices for Green Design and Inventories

The Toxics Release Inventory (TRI) summarizes plant, industry, county and state data by the total weight of toxic chemicals released to the environment, implicitly assuming that a discharge of substance A is equivalent to an equal weight discharge of substance B. However, the toxicity of the TRI chemicals vary tremendously. Different indices of the toxicity of the 370 TRI chemicals to humans indicate that the worst are more than 1,000,000 times more toxic than the most benign. The typical TRI rankings and time trends of facilities, industries, counties and states as sources of toxic releases measured only in pounds can be misleading because they have neglected relevant toxicological data. We contrast the ranking of the TRI data based on the weight of releases with a ranking based on the relative toxicity of the discharges, using ACGIH Threshold Limit Value (TLV) indices. We find that for the computer and office equipment industry, weighted discharges fall less than the number of pounds. We also show that Arizona, ranked 21st by weight of releases, has more toxic discharges per pound than Louisiana, ranked 1st. We discuss the limitations of our approach, and illustrate the use of toxicity weighted emissions indices in green engineering design and manufacturing changes.
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Sanford Lewis, *Director, The Good Neighbor Project For Sustainable Industries*

Rights and Resources for Public Participation in Pollution Prevention

PROBLEM: Much of the current policy discourse regarding pollution prevention related to the Toxic Release Inventory revolves around the need to provide firms with flexibility to achieve pollution prevention and chemical accident prevention. In the context of this flexibility, stakeholder involvement on a plant by plant basis is increasingly important as a means of advancing, watchdogging, and legitimizing the choices made. However, effective stakeholder involvement necessitates access to information, access to facilities and access to expertise. Lacking such rights and resources, dialogue with relevant companies is often a shallow public relations exercise, not an even-handed review.

SOLUTION: Locally negotiated Good Neighbor Agreements provide stakeholders with the needed rights to documents, expertise, and facility access. (e.g. Rhône-Poulenc agreement in Manchester, Texas, appended to hazardous waste facility permit). Other arrangements have granted access to expertise that was secured elsewhere (e.g., Environmental Careers Organization advisors, Minnesota Technical Assistance

Program). Citizens groups are also empowered by some citizens' lawsuit settlements, and have been working to encourage EPA to use its SEP program to empower citizen oversight.

CONCLUSION: Empowering nongovernmental organizations is an effective way to supplement existing regulatory approaches to pollution prevention. Government can play an important role in accomplishing this empowerment by using its roles of permitting, enforcement, technical assistance and industrial relations to facilitate the needed rights and resources for stakeholders.
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Ihab H. Farag, *Sc.D., P.E., Chemical Engineering Department, University of New Hampshire and* **Vincent Perelli**, *N.H. Department of Environmental Service (DES), Pollution Prevention Program*

DES-UNH Pollution Prevention Partnership (P3)

Problem Statement

Pollution prevention (P2) requires change in fundamental waste management/business practices. All sectors of society must reevaluate the current system and look towards a new approach to "business as usual." Learning institutions play a key role in this "change equation." It is imperative that the next generation of professionals emerge from the educational system properly trained in P2 concepts. Innovative partnerships can bring stakeholders (who have historically not worked cooperatively) together to establish common ground and enhance information exchange.

Objectives

Created through an EPA Grant, P3 goals include:

- supporting hands-on learning opportunities and classroom curricula in P2;
- promoting P2 and economic competitiveness through student internships at NH companies;
- fostering regional networking/information exchange.

Approach

To accomplish the above goals, we initiated:

- Student Internship Program
- P2 Curriculum Development
- P2 Advisory Committee
- P2 Case Studies
- Technology Transfer

Results

- Student Internship Program
- Developed 7 P2 case studies
- Organized Annual P2 Conference
- Compiled existing P2 curricula
- Established P3 Advisory Committee

Outcomes/Conclusions

- Learning institutions play a key role in P2
- Hands-on experience through internships is a valuable learning tool
- A viable economy cannot be gained at the expense of a healthy environment & vice-versa
- Collaborative efforts are important mechanisms for lasting change

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Natalie Roy and **Warren Weinstein**, *National Pollution Prevention Roundtable*

The National Pollution Prevention Roundtable

The National Pollution Prevention Roundtable (NPPR), formerly the National Roundtable of State Pollution Prevention Programs (NRSPPP) is the largest membership organization dedicated solely to pollution prevention. The Roundtable provides a national forum for promoting the development, implementation, and evaluation of efforts to avoid, eliminate, or reduce pollution at the source.

The Roundtable's voting membership is comprised of state and local government's pollution prevention programs. Affiliate members include federal agencies, non-profit groups and private sector interests. Public sector members located in 80 program offices and in nearly every state, operate programs that provide pollution prevention information and technical assistance to thousands of industrial, commercial, and agricultural facilities each year. The information provided helps many of these facilities reduce the cost of production and the cost of environmental compliance; this translates into improved competitiveness and jobs.

A small annual dues fee makes the non-profit Roundtable as inclusive as possible. The central office located in Washington D.C., provides members with access to pollution prevention information including state and local pollution programs. The Roundtable hosts two semi-annual conferences which provide members the opportunity to share pollution prevention information and expertise with each other. The organization is governed by a ten person board of directors from state and local pollution prevention programs. Each board member is situated in one of ten EPA regions and serves a three year term.

The Roundtable has just finished publishing a Pollution Prevention Yellow Pages and is working on the Clearinghouse Project to determine the pollution prevention information needs of selected industries. The RCRA National Waste Minimization Plan, the Common Sense Initiative (CSI), Toxic Release Inventory, and Toxic Use Reduction are among the many issues the Roundtable has extensively worked on over the past year. For more information about the Roundtable or to find out how to become a member call: (202) 543-P2P2; the fax number is: (202) 543-3844 or write to: NPPR, 218 D St. SE, Washington D.C. 20003.
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Jeff Scott, *Arizona Department of Environmental Quality*

Toxic Release Inventory (TRI) is an important part of the Arizona Department of Environmental Quality's (ADEQ) Pollution Prevention (P2) Program. The three components required by facilities that meet the reporting thresholds are a Pollution Prevention Plan, a Form R, and a Pollution Prevention Progress Report which updates the plan every year.

Arizona Revised Statutes bring facilities into the P2 program based on the amount of hazardous waste generation/shipment and toxic substance thresholds, creating many different filing categories. The categories used to define and track facilities will become more complicated with the new regulations (lowering toxic substance and waste generation thresholds) which become effective in the 1994 and 1995 reporting years.

The two primary uses of Arizona's TRI data consist of producing annual toxic data reports and as a database to anyone who requests toxic chemical, hazardous waste or facility information. Now that three years of data are in the database, more informative analyses into the influence of Pollution Prevention on changes in toxic chemical reductions can be investigated.
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Beth A. Secor, Janina J. Curtis, Alan D. Parr and Elizabeth C. Bunyon, *Rizzo Associates, Inc.*

Use of Chemical Inventory Databases as a Tool in Toxics Release Inventory Planning and Pollution Prevention

As a result of E.O. 12856, many federal facilities which have not previously been required to closely track their inventories and use of hazardous materials are facing the daunting task of having to quantify this information. Rizzo Associates, Inc. has developed a database program to collect product inventories on-site and subsequently identify chemicals targeted by various federal and state programs and their source products.

The USPS Northeast Region approached us to perform chemical inventories of 65 vehicle maintenance and mail processing facilities in New England and New York. The primary goal was to compile chemical inventory data to identify EPCRA compliance activities at each facility. Rizzo Associates conducted the inventories by entering product data directly into laptop computers. Product chemical composition information was obtained from MSDS sheets. Using this data, a report presenting EPCRA compliance activities and complete, current sets of MSDSs were prepared for each facility. The reports tabulated products observed on-site and detailed which products contained chemicals regulated under EPCRA or CERCLA.

The database can be customized to identify other sets of chemicals such as state listed hazardous substances or flammables. The USPS requested data on EPA's 33/50 Program target chemicals and ozone depleting substances to support their pollution prevention program. The use of the database provided information that would be difficult to acquire and manipulate using any other means. Specifically, it included the number of chemical products in use at each facility, which products contained targeted chemicals, and the aggregate quantities of each chemical at the facility. The surprising variety and number of products in use has given renewed impetus and direction to USPS's ongoing pollution prevention focus
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Karen Shapiro, *Tellus Institute*

Taking Stock: Measuring Pollution Prevention Progress

Four years after passage of the Federal Pollution Prevention Act and passage of similar legislation in many states, what progress is being made in preventing pollution? This question was examined in a recent Tellus Institute study examining toxics use reduction (TUR) progress by Massachusetts industries. Measuring progress presents several challenges -- are qualitative or quantitative indicators preferable? How can progress due to explicit prevention efforts be distinguished from other, unrelated factors such as changes in a company's product mix or changes in production levels.

Because methods for measuring TUR progress are in the nascent stage, Tellus developed and applied a methodology to 5 industry sectors using a combination of qualitative and quantitative measures available from the Toxics Release Inventory and additional facility data required by Massachusetts' Toxics Use Reduction Act. Tellus' assessment of TUR progress by five industrial sectors indicates limited and mixed progress to date -- while some sectors have decreased their generation of toxic byproducts over the two year period for which data are available, progress on a yearly basis is more mixed.

One interesting observation is that normalization appears to have little or no impact on measurement. Trends in manufacturing, processing, and otherwise using toxic chemicals, as well as generation of toxic byproducts, were typically not altered when these data were normalized by employment (an indicator of level of production). This result suggests that either: (1) measures of production have little or no effect on TUR measurement or (2) employment data are not well-correlated to chemical quantities. Since only five industry

categories were assessed in this study, further application of our normalization techniques are necessary before definitive conclusions are possible.

Measuring progress is an ongoing activity that should be repeated yearly. As more data become available, the methodology developed in this study will be increasingly useful for reliably taking stock of P2 and TUR progress.
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Tom Neltner and **Paula Smith**, *Indiana Department of Environmental Management (IDEM) Office of Pollution Prevention and Technical Assistance (OPPTA)*

Pollution Prevention Measurement Using the Toxic Chemical Source Reduction and Recycling Report (TCSRRR)

Unlike any other state, the Indiana Department of Environmental Management (IDEM) has a legislature's mandate to measure pollution prevention progress among all industries. To develop a quantitative assessment, the Indiana Department of Environmental Management determined that the purpose of this mandate is to measure industry's progress on pollution prevention rather than to measure the effectiveness of the state's pollution prevention program. The Indiana Department of Environmental Management evaluated the databases available for this type of assessment based on six selection criteria and chose the federal Toxic Chemical Source Reduction and Recycling Report (TCSRRR). This database goes beyond release information previously available from the Toxic Release Inventory (TRI). Progress on pollution prevention is measured as reductions in the total generation of toxic chemicals in environmental wastes. IDEM has also developed a weighted activity index for the agency to factor in changes in production rates when measuring pollution prevention progress. After an analysis of statewide data, the Form Rs for 1991 indicated that Indiana facilities generated 120 million pounds less toxic chemicals in their environmental waste from 1990 to 1991. This is a 8.5% reduction despite an 8% increase in production of products directly associated with the use of the toxic chemical. In addition, IDEM divided more than 300 toxic chemicals into three categories: metals, solvents, and other toxic chemicals and prepared analysis based on these categories. The comparison of 1992 data to the previous years is still in progress.
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Leslie Winik, *Manager, Product Stewardship, Chemical Manufacturers Association*

TRI Phase III: A Chemical Industry Perspective

Regulators, environmental groups, and industry continue to grapple with the question of how to measure pollution prevention progress accurately. In particular, various groups differ on whether the Toxics Release Inventory, as currently structured, provides an adequate measure of and incentive for pollution prevention. As a result, the US EPA has proposed expanding the Toxics Release Inventory (TRI) to require facilities to report chemical use information.

This poster discusses the proposal to collect data on chemical use from TRI-eligible facilities. The use and effectiveness of TRI data, the need for additional data, and the potential impact of the proposal on industry competitiveness serve as focal points for the discussion. The poster also describes how the industry is working to increase community involvement in pollution prevention planning and improve the credibility and accuracy of pollution prevention reporting under its Responsible Care® program.
□

Michael Ellenbecker, Karen Thomas, Mark Rossi, and **Arjan VanVeldhuizen,** *Toxics Use Reduction Institute University of Massachusetts, Lowell*

Clean Alternatives Project: The Use of TRI and TUR Data to Identify Industry Partners for Collaborative Research

I. THE CLEAN ALTERNATIVES PROJECT

The Clean Alternatives Project was funded by EPA's Risk Reduction Engineering Laboratory (RREL) in 1994 as part of its Pollution Prevention Strategy. The goal of the project is to perform technical, financial, and substitution analyses of alternatives to chlorinated hydrocarbon solvents used in metal degreasing.

The project is divided into six phases:

Phase 1: Uses and Users of the 33/50 Metal Degreasing Solvents
Phase 2: Identification of Participating Firms
Phase 3: Technical Evaluation
Phase 4: Total Cost Assessment
Phase 5: Substitution Analysis
Phase 6: Technology Transfer

The first two phases and the majority of the fourth phase have been completed. Current work is focusing on the third and fifth phase of the project. The sixth phase will be implemented after the first five phases have been completed.

II. THE USE OF TRI AND TUR DATA IN PHASES 1 AND 2

The research in the first phase involved identifying the key uses and Massachusetts users of metal degreasing solvents. This work was accomplished by assessing the 1991 Toxics Release Inventory data, Toxics Use Reduction Act data, and by conducting interviews.

From the companies identified in Phase 1, agreements to participate in the project were secured with three firms. One company manufactures lubricating oil pumps for aircraft engines . Another company manufactures cooking equipment for use in restaurants. The third company is a job shop electroplater. All three firms are located within the greater Boston metropolitan area.
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Theresa Hodges, *Office of Pollution Prevention, Kansas Department of Health and Environment*

Interaction Between State Regulatory Programs and University-Based Technical Assistance Programs

The Kansas Department of Health and Environment (KDHE) has designated an Office of Pollution Prevention to integrate and promote pollution prevention as the environmental ethic. Pollution prevention is being integrated into all areas of rulemaking, permitting, compliance, and enforcement in the regulatory programs.

A survey initiated by the KDHE and conducted by the Institute for Public Policy and Business Research at the University of Kansas revealed that there is a reluctance by industries to contact regulatory agencies for technical assistance. Technical assistance, including confidential on-site audits, is provided by contracts from KDHE with Kansas State University Engineering Extension Program. Pollution prevention workshops and seminars are provided by both Kansas State University and the University of Kansas Center for Environmental Education and Training. Additionally, the Small Business Assistance Program established in compliance with the Kansas Air Quality Act is provided through contractual arrangement with the University of Kansas with subcontracts with Kansas State University and Wichita State University. This arrangement for providing

technical assistance has proven very effective in Kansas and bridges the gap between the "regulators" and the "regulated community".
□

Theresa Hodges, *Office of Pollution Prevention, Kansas Department of Health and Environment*

Response of Kansas' Small Businesses to Environmental Regulation: Implications for Training

A survey of 506 small businesses in Kansas revealed that most firms rely heavily upon vendors, trade groups, and newsletters for information concerning environmental regulations. A telephone survey was conducted by the Institute for Public Policy and Business Research, University of Kansas under the direction of the University Center for Environmental Education and Training and the Office of Pollution Prevention, Kansas Department of Health and Environment.

The four objectives outlined for the project were to determine: 1) how Kansas firms are organized to deal with environmental regulation and compliance; 2) where firms currently obtain information regarding environmental regulations; 3) what issues and barriers are faced by firms in obtaining information regarding current and future environmental regulations; and 4) prioritize unmet needs for information and training related to environmental regulation and compliance.

Firms have trouble dealing with regulations due to lack of knowledge about where to obtain information, difficulty in understanding the regulations, and/or inconsistent or conflicting information. The biggest barriers to achieving and maintaining compliance are cost of compliance and difficulty with keeping up with changes.

Manufacturers indicating that they were impacted by reporting requirements of the Emergency Planning and Community Right-to-Know Act were equally divided in organizational structure between functional area and regulatory program focus. Approximately one-third indicated that additional information was needed regarding these regulations by ranking its importance as 1 or 2 on a 5 point scale, with 1 having highest priority.
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Nora Lopez, *U.S. EPA Region II and* **Blanche Krubner**, *NCSC*

Establishing a TRI Outreach Program for High Schools

Statement of the Problem

Information gathered under EPCRA is publicly available. However, the common citizen does not know this. Targeted audience has been highly educated citizens. The program has not succeeded in effectively in attracting the attention of the common citizen.

Approach to solving the problem

Refocus the targeted audience. High School students should be targeted as they are ready to go into the workforce. By alerting them concerning their rights under EPCRA, what information exists, and where they can obtain this information, we would be significantly enhancing public knowledge in this area.

The following steps need to be followed in order to have an effective program:

1. Gathering of educational materials.
2. Development of lesson plan or curriculum.
3. Develop a network list of contacts within the Educational Departments.

4. Conduct mailings to Superintendents of Schools of with materials developed providing importance to the issue of how EPCRA applies to the different school organizations.
5. Participate in teachers workshops, seminars and national or state meetings to provide the information.

Project Results

Region II is testing this approach in the State of New Jersey. Materials needed for an effective outreach have been drafted and will be provided to those interested for comment. Mailings to schools have been done. Invitation to conferences and seminars have been forthcoming.

Outcomes and Conclusions

Numerous requests have been received. Teachers are interested in having speakers address their classes and provide the information to the school library for the students to use.
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Betty Szudy and **Michele Gonzalez Arroyo,** *University of California at Berkeley, Labor Occupational Health Program*

The Right to Understand: Making Technical Materials Easier to Understand

How can we design materials that meet the needs of workers and communities with varying literacy levels? How can we make technical materials more understandable? UC Berkeley educators developed a manual that includes guidelines and practical tips for developing material and training activities with literacy in mind. The guidelines are based on the experiences of health and safety trainers and workers with limited reading and writing skills.

The authors reviewed a variety of health and safety educational materials and concluded that most were missing the mark. They interviewed over 25 workers and incorporated their ideas and suggestions for developing effective materials into the manual.

The 200 page manual includes over 60 illustrations. Chapters discuss how to learn more about the kind of material that will work with your target audience, how to develop visually appealing and easy-to-read materials, participatory training activities and alternative testing methods.
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Richard Wormell, *Analysis & Information Branch, Chemical Screening & Risk Assessment Division, Office of Pollution Prevention and Toxics (OPPT), U.S. EPA*

OPPT Fact Sheet Project

EPA's Office of Pollution Prevention and Toxics (OPPT) is currently developing information summaries (two page fact sheets) for TRI chemicals. The effort began in March of this year and to date has completed fact sheets for twenty chemicals. The plan is to complete fact sheets for approximately twenty additional TRI chemicals every three to four months during the 1995 calendar year. Information included in each fact sheet is obtained from secondary sources only, including those developed within OPPT under various sections of the Toxic Substances Control Act. Copies of drafts of existing OPPT fact sheets will be available for review. A sign-up sheet will be provided for those interested in receiving existing fact sheets as well as additional fact sheets as they are completed.

The benefits of the Fact Sheets are:

* Provides the reader with an overview of what is known about a chemical's production & use; its releases to the environment; its fate in the environment; and its health & environmental effects.
* Directs the reader looking for additional information to specific offices in EPA and to other federal departments/agencies that regulate or that are in some other way responsible for the chemical.

The benefits of the Supporting Documents are:

* Synthesizes information from a diverse set of secondary sources into understandable, comprehensive statements about a chemical.
* Provides a more detailed, more technical informationed discussion of what is known (and, in some cases, what can be reasonably inferred) about a chemical. It outlines the bases for statements included in the fact sheet.
* Points the reader, looking for additional information, to key technical documents in each area of interest.

Together the Fact Sheet and its Support Document:

* Provide a link, a point of reference, or, in some cases, a starting point for internal OPPT technical information needs.
* Provide a link to OPPT chemical specific information storage and retrieval.
* Provide a link to disseminate information about chemicals of interest to the public.

FACT SHEETS (HIGH RELEASE TRI CHEMICALS)

Group I. Completed By 1 October 1994

Chemical Name	CAS Number
Chlorine	7782-50-5
Methylene chloride	75-09-2
Methyl-tert-butyl ether	1634-04-4
Perchloroethylene	127-18-4
Toluene	108-88-3
Acetaldehyde	75-07-0
Carbon disulfide	75-15-0
Freon 113	76-13-1
Methanol	67-56-1
1,2,4-Trimethylbenzene	95-63-6
Acetonitrile	75-05-8
1-Butanol	71-36-3
Carbonyl sulfide	463-58-1
Methylchloroform	71-55-6
2-Methoxyethanol	109-86-4
Acrylamide	79-06-1
Acrylic acid	79-10-7
Cyclohexane	110-82-7
Methyl ethyl ketone	78-93-3
Methyl isobutyl ketone	108-10-1

Group II. To Be Completed Within Four Months

Chemical Name	CAS Number
Acrylonitrile	107-13-1
Aniline	62-53-3
Biphenyl	92-52-4
Bisphenol A (Isopropylidenediphenol)	80-05-7
Butyraldehyde	123-72-8
Cumene	98-82-8
Chlorine dioxide	10049-04-4
Chlorobenzene	108-90-7
Decabromodiphenyloxide	1163-19-5
1,4-Dioxane	123-91-1
Ethylene	74-85-1
Ethylene oxide	75-21-8
Formaldehyde	50-00-0
Methyl methacrylate	80-62-6
Nitrobenzene	98-95-3
Phthalic anhydride	85-44-9
Propylene	115-07-1
Propylene oxide	75-56-9
Styrene	100-42-5
1,2,4-Trichlorobenzene	120-82-1

The following hierarchy of information sources was used by the contractor in preparing the fact sheets:

HEALTH
* IRIS
* FACT SHEETS/ANALOGUE PROFILES PREVIOUSLY COMPLETED
* RMX/TRI ASSESSMENTS
* SECTION 4/8(e) INFORMATION/DATA REVIEWS
* EPA ASSESSMENTS
* ATSDR PROFILES
* NIOSH/OSHA PUBLICATIONS
* US AIR FORCE TOXICOLOGY GUIDE
* IPCS/IARC MONOGRAPHS
* NTP MONOGRAPHS
* PATTY'S
* ITC PROFILES
* GENETOX
* HSDB

ENVIRONMENTAL EFFECTS
* FACT SHEETS/ANALOGUE PROFILES PREVIOUSLY COMPLETED
* RMX/TRI ASSESSMENTS
* SECTION 4/8(e) INFORMATION/DATA REVIEWS
* EPA ASSESSMENTS
* IPCS DOCUMENTS
* ITC PROFILES
* AQUIRE
* HSDB

ENVIRONMENTAL FATE
* RMX ASSESSMENTS
* SECTION 4/8(e) INFORMATION/DATA REVIEWS
* EPA ASSESSMENTS
* CHEMFATE
* HSDB
□

Pat Ausman, Susan Kulstad, Janine Landroche, and **Deborah McKie,** *USEPA Region I and* **Deborah Cohen,** and **Ailing Hsu,** *R.O.W. Sciences, Inc.*

Integrating Environmental and Demographic Databases to Support Environmental Justice Consideration Across EPA Programs: A Demonstration Using TRI

Heightened consciousness at environmental management agencies of environmental justice is spawning government policies to address concerns about the equity of environmental protection where minority and low income communities exist. In order to ensure environmental justice, consideration of community impacts need to be built into ongoing practices and decision making throughout these organizations.

The U.S. Environmental Protection Agency (EPA) Region I office has developed maps and listings locating minority and/ or low income communities throughout the six New England states for ongoing program planning purposes. The New England office developed a database using 1990 U.S. census data. Employing

geographic information systems (GIS), this data was then used to depict and relatively rank communities within each state based upon socioeconomic factors.

Identifying where communities of potential interest exist, along with their relative ranking based on demographics, is an important first step in database development to support environmental justice goals. The next step was to integrate data on polluting sources with the socioeconomic database. The TRI database was selected based on a survey of existing Regional databases because it provides complete New England coverage, is in a ready state for integration with census data, and provides a fair risk surrogate.

New relative risk rankings were generated based on pollutant loadings, toxicity and population exposure, then combined with the demographic rankings to identify potential areas of concern. The next step is to determine whether a statistically significant difference exists in exposures to pollutants, as described in this study, between minority and/or low income communities and other New England communities.
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Terry Greene, Gretchen Latowsky, Bob Eisengrein, and **Carol Rougvie,** *JSI Center for Environmental Health Studies*

The Value of Toxics Use Data in Promoting Public Health in Massachusetts

In 1992, approximately 650 Massachusetts companies used more than 1 billion pounds of toxic chemicals in manufacturing. The industrial use of toxic chemicals introduces possibilities for potentially harmful exposures to workers, consumers, and the public at various points in the use cycle, including shipment, handling, storage, use, treatment, and disposal. Workers are exposed to toxic chemicals on the job, consumers use products that are toxic in homes and offices, and toxic chemicals end up in air, water, and land from both accidental and routine releases.

To raise public awareness of toxics use in Massachusetts and its potential to affect public health, we examined the possible health risks associated with exposure to toxic chemicals used in Massachusetts industry. Chemical use information was drawn from the data base of industrial toxic chemical use generated by the Massachusetts Toxics Use Reduction program, through which large-quantity industrial users of toxic chemicals report annually on their use of these chemicals and develop plans to achieve toxics use reduction.

While uncertainties about the health effects of chemical exposure preclude precise characterization of risks for Massachusetts workers and residents, our analysis underscores the importance of toxic chemical use reporting and provides sufficient information to justify a unified effort to reduce potential exposures by reducing toxic chemical use. Industry, government, and the public must work in partnership to promote broad scale toxics use reduction efforts to protect public health and the environment.

This work was done as part of the Toxics Use Reduction Implementation project. The project was funded with grants from the Jesse B. Cox Charitable Trust and the Charles Stewart Mott Foundation and is being conducted in collaboration with the Environmental League of Massachusetts and MassPIRG.
□

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U.S. Environmental Protection Agency's TRI Environmental Indicators Model

An environmental indicators model based on the Toxics Release Inventory (TRI) has been developed by the Office of Pollution Prevention and Toxics (OPPT) of EPA. The TRI Environmental Indicators utilize an algorithm that integrates weighted toxicity scores with a surrogate dose based upon TRI reporting of release and transfer data (including both generic and site-specific exposure characteristics). The output is a relative risk-based value which takes into account the potentially exposed population. OPPT is nearing completion of the development of this national risk-based indicator designed to track year-by-year changes in the multi-media impacts of TRI chemicals on chronic human health and ecological well being. A Microsoft Windows based computer application of the TRI Chronic Human Health Indicator is currently being evaluated by OPPT. The model's adaptable design lends itself to targeting and prioritization of chemicals by media, Standard Industrial Code (SIC) classification or geographic region; and may aid the investigation of environmental justice issues. □

John Shea, Louise Hamilton, Sylvia Hobbs, and **Ngozi Oleru**, *Office of Environmental Health, City of Boston, Massachusetts*

Database Methodology to Enhance Inner-City Hazardous Material Follow-up: An Innovative Multi-Agency Approach to Hazardous Materials Site and Receptor Mapping

Recent data have suggested an interrelationship between race, poverty, and exposure to environmental toxins. While these studies have gradually brought about increased recognition that minority and low-income areas are inordinately affected by environmental pollution, they have not led to the development of community models for systematic source and receptor identification. An active partnership between the **Dudley Street Neighborhood Initiative (DSNI)** (a grassroots neighborhood organization), and the **Office of Environmental Health (OEH)** (an agency of the Department of Health & Hospitals), along with federal, state, and other local groups initiated the **DSNI Hazardous Waste Work Group**. The goal of this partnership is to pool expertise and data sources to expedite identifying, prioritizing, and computerizing hazardous materials sites and receptors in a densely populated minority district plagued by environmental hazards. To improve identification, surveillance, and remediation of sites, a computer database was created by **OEH** with a mapping link to overlay hazardous sites and sensitive receptors for human exposure such as schools, elderly housing, day care centers, parks, development projects, and health care facilities. **Toxic Release Inventory (TRI)** data, and other data sources are used to prioritize, assess, and manage risk. Public meetings for residents are planned within the target area to provide feedback, focus site cleanup objectives, and facilitate community development goals. □

Steve Tomlyanovich, *Minnesota Emergency Response Commission*

Minnesota TRI Expansion

Minnesota recognized a need to provide even more TRI data. This resulted in an amendment to the Minnesota Emergency Planning and Community Right-to-Know Act to expand toxic chemical release reporting requirements. The facilities covered included those in one of 14 non-manufacturing SIC Codes which meet the employee and chemical usage criteria, as well as the exemptions available under the federal Act, must report chemical releases and transfers to the Minnesota Emergency Response Commission (MERC). The first reports for the expanded group of facilities were due on July 1, 1994, covering the 1993 reporting year.

There were problems because Section 313 was written for the manufacturing sector. In order to effectively implement the new legislation, the MERC had to make certain interpretations of the federal Act as it applied to the expansion. The legislation has some differences compared to the federal Act:

- Substances that are associated with or incidental to the combustion of fossil or other fuels for the generation of electricity or the production of steam are exempted.
- A person may petition the MERC to exempt a specific SIC Code from the reporting requirements.
- A facility meeting the reporting requirements under the expansion, but reporting no releases or transfers, may submit a written certification to the MERC exempting itself from the reporting requirements.

As a result of the expansion, the MERC received Form R submissions from 16 facilities resulting in over 17 million pounds of reported releases and transfers.

Data received under the expansion indicate that there is a substantial amount of releases and transfers of Section 313 chemicals from outside of the manufacturing sector. TRI expansion legislation should include reporting requirements written specifically for each of the non-manufacturing SIC Codes being considered. □

Dr. Warren Layne, *TRI Coordinator, U.S. EPA Region 6 (Dallas)*, **Loren Hall**, *Office of Pollution Prevention and Toxics, U.S. EPA*, and **Jay Jacob Wind**, *ViGYAN*

TRIPQUIC (Toxics Release Inventory Quick Response Tool Kit): An Innovative Way to Analyze TRI Data

Statement of the Problem

EPA Region 6 staff and State TRI Coordinators in Arkansas, Louisiana, New Mexico, Oklahoma, Texas needed to analyze TRI geographically, by chemical, by industry, and by medium.

Objective of the Project

We wanted quick, accurate profiles of TRI data nationwide and by Region, State, Geographic Initiative Area, county, ZIP, and facility. We wanted to enable Region 6 and State staff to use TRIPQUIC.

Approach to Solve the Problem

We used TRIPQUIC tools including tables, charts, and maps to develop State-specific profiles and to alert Region 6 and the States to possible misreporting. We provided TRIPQUIC training at Region 6 offices and on-site at all five State capitals to EPA staff and all Region 6 State TRI Program Coordinators.

Outcomes and Conclusions

Regional users found TRIPQUIC's maps and tables effective to analyze patterns of reporting. Some states plan to use TRIPQUIC to analyze their own state data. State TRI Coordinators are enthusiastic and prepared to use TRIPQUIC.

Examples to Be Included

o Maps
o Drill-downs by state, county, ZIP
o Data tables
o Calendar of completed and planned TRIPQUIC training

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Presenter Index

The following people participated in the conference either as speakers, session leaders, moderators, or poster presenters. Some people presented papers and posters. Below is listed the page on which a paper or a poster abstract begins. Not all speakers and session leaders submitted a paper for incluion in the proceedings, as indicated by (Not Submitted) following the name.

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