

# The National Pollutant Release Inventory & Materials Flow Data

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Dissatisfactions are often raised with the extent of data that is available through the National Pollutant Release Inventory (NPRI). Many of these concerns focus on items such as who reports, the substances reported, and the impacts of thresholds in exempting polluters from reporting. For example, recently the City of Toronto's health department reported that "only 3% of Toronto businesses report to the publicly-accessible National Pollutant Release Inventory (NPRI). It is estimated that more than 80 per cent of emissions to air for TPH's [Toronto Public Health] 25 priority substances are not reported to the NPRI."<sup>1</sup>

A different type of concern with the limitations of NPRI is the types of information that polluters are required to report about the substances they use and create. NPRI reports on releases, emissions and some transfers, but this is only a small part of the flow of materials into, through and out of a facility, and thus only a small part of the potential for negative health and environmental impacts. For example, the quantities of hazardous materials entering a facility, stored on site, used, and shipped off-site in product are not reported on under NPRI.

## Materials Flow Data

A materials accounting system requires facilities to track and report on all the fates of the substances they use, and to ensure that the total quantity of outputs matches the total inputs. Inputs include all materials brought on site and produced at the facility, as well as beginning inventory and wastes. The outputs include materials shipped off-site as product or waste, released to air, water or land, materials transferred or treated on site, and ending inventories.

Canada's NPRI provides data on only certain parts of the materials flow. It requires polluters to report the following items:

- On-site releases:
  - emissions to air (stack/point releases, storage/handling releases, fugitive releases, spills, other non-point releases)
  - emissions to surface water (direct discharges, spills, leaks)
  - emissions to land (landfill, land treatment, spills, leaks, other)
  - emissions to underground injection.
- Off-site transfers:
  - Transfers for disposal:

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<sup>1</sup> Medical Officer of Health, Toronto Public Health, *Strategy to Enhance Access to Environmental Information in Toronto*, June 22, 2007, p. 1.

- Physical treatment
- Chemical treatment
- Biological treatment
- Incineration or thermal treatment without energy recovery
- Containment (landfill, other storage)
- Municipal sewage treatment plant
- Underground injection at an off-site location
- Land treatment for the purpose of land application or land farming.
- Transfers for recycling:
  - Energy recovery
  - Recovery of solvents
  - Recovery of organic substances (not solvents)
  - Recovery of metals and metal compounds
  - Recovery of inorganic materials (not metals)
  - Recovery of acids or bases
  - Recovery of catalysts
  - Recovery of pollution-abatement residues
  - Refining or reuse of used oil
  - Other recovery, reuse and recycling activities.

Items **missing** in the NPRI from the materials flow include:

- Inputs:
  - Materials brought on-site
  - Starting inventory
  - Produced on-site
  - Recycled on-site
- Outputs:
  - Ending inventory
  - Consumed on-site
  - Shipped in product

The main distinctions are that the NPRI does not require reporting on materials used by the facility, transported into and out of the facility, and incorporated into products shipped out by the facility.

### **Benefits of Full Materials Flow Data**

The benefits of public and government access to full materials accounting include:

- a more complete understanding of the use and presence of toxic chemicals and of how they might affect workers and area residents and the environment;
- the basis to assess toxics use reduction - the premier pollution prevention strategy;
- the stimulation of toxics use reduction by users of substances; and
- the opportunity to identify cost savings.

The later discussion will give examples of the value of this additional information.

## Current Public Disclosure of Materials Flow Data

Three governments in the U.S. have made adjustments to reporting under the Toxics Release Inventory (TRI), the U.S. equivalent of the NPRI, to require complete materials flow data. In 1983, New Jersey passed the *Worker and Community Right-to-know Act*. In 1989, Massachusetts passed the *Toxics Use Reduction Act*. In 1996, the City of Eugene, Oregon, passed the *Toxics Right-to-Know Charter Amendment* to the Eugene City Charter. Each of these programs require those facilities that report releases and transfers under the U.S. TRI program to simultaneously submit materials accounting data to the state or municipality. New Jersey and Massachusetts also include requirements for the reporting facilities to develop toxics use reduction plans and update these periodically.

Others are now exploring the option of requiring more complete materials flow data. The City of Toronto has concluded: “It is important to collect data on both use and the emission of a substance to fully assess potential health hazard and inform pollution prevention opportunities.”<sup>2</sup> The City is developing a bylaw to require both use and release reporting of 25 hazardous materials. The Board of Health has already approved this bylaw in principle and will be considering the details of the bylaw in the spring of 2008.<sup>3</sup>

## The Benefits of Materials Flow Data

Before discussing the benefits of materials flow data, we will give one example of the data for a jurisdiction to help the reader better understand the nature of this data and how it differs from the NPRI. Since 1996, specified polluters in the City of Eugene, Oregon, must report on their inputs and outputs of approximately 1,300 hazardous materials if they have ten or more full-time employees and inputs of 2,640 pounds or more in total of the designated hazardous substances. In addition, reports must be provided for hazardous waste disposal incinerators or solid waste incinerators that receive infectious wastes.<sup>4</sup>

Fifty-four manufacturers had to report for 2004. The following chart shows the categories that each company has to report. The numbers given are for the total amount reported in 2004.<sup>5</sup>

Material Accounting Category	Millions of pounds in 2004
Jan. 1 inventory	1.2
Jan. 1 waste	0.029
Produced onsite	0.465
Brought onsite	16.7
<b>INPUT TOTAL</b>	<b>18.4</b>
Chemically altered	3.0
Shipped as product	8.7

<sup>2</sup> Ibid., p. 13.

<sup>3</sup> Ibid.

<sup>4</sup> City of Eugene, *2002 Hazardous Substance Tracking Instructions*.

<sup>5</sup> Table derived from [www.ci.eugene.or.us/toxics/](http://www.ci.eugene.or.us/toxics/).

Shipped as waste	0.619
Dec. 31 waste	0.03
Emitted to air	0.912
Discharge to Sewage Treatment Plant	0.672
Surface water release	0.000
Treated onsite	3.2
Recovered onsite	3.7
Disposed onsite	0.0
Dec 31 inventory	1.2
<b>OUTPUT TOTAL</b>	<b>18.4</b>
Environmental Releases	1.5
Transferred Away	9.3
Usage	19.6

As this table shows, the Eugene materials accounting system includes much more than the releases and transfers that would be reported under the NPRI system. The major additions in the Eugene system are the 16.7 million pounds of hazardous substances brought on site and the 8.7 million pounds shipped off-site as product.

In 2000, Oregon’s Department of Environmental Quality prepared a report that included an evaluation of Eugene’s right-to-know program. Among their findings were the following:

- The Eugene program captures data on eight to nine times as many hazardous substances as does the TRI.
- The TRI program captures 90 per cent of the releases reported under Eugene’s programs.
- When they separated out extremely hazardous substances from the rest of the materials reported, the evaluators found that 82 per cent of the substances reported on under the Eugene system were not captured under TRI.<sup>6</sup>

As can be seen from their analysis, while the Eugene system didn’t make much difference in terms of understanding about releases, it made the community and the government and polluters aware that there are other very significant ways in which the community is potentially being exposed to very hazardous materials. These are ways that the TRI or NPRI would do nothing to increase public awareness of.

**Stimulate Toxics Use Reduction & Pollution Prevention:**

Materials flow data makes the community, the governments, and those using hazardous materials aware of the extent of hazardous material use. This awareness can stimulate government programs to reduce toxics use and generation as well as to stimulate toxics users to reduce their use of these materials. This is critical because it is the most effective

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<sup>6</sup> Oregon Toxics Reporting Advisory Group, “City of Eugene Toxics Right-to-Know Program Evaluation, “*2000 Oregon Toxics Reporting Policy Evaluation Report*, December 2000, Appendix A.

way of reducing the potential for the release of those substances into the environment and into the workplace.

The evaluators of Eugene's program said that they could make only preliminary judgements because the program was only two years old when they evaluated it. Nevertheless, they found that there is anecdotal evidence that the Charter amendment has stimulated companies to reduce their use of certain hazardous substances. For example, Forrest Paints reduced its release of volatile organic chemicals by 61 per cent in part, according to the owner, so that it would no longer be highlighted as one of the town's largest users of toxic materials.<sup>7</sup>

As a result of its toxics use reduction planning program of which materials flow reporting is a core component, by 1998 Massachusetts was able to meet its goal of reducing toxic byproduct generation in the state by 50 per cent.<sup>8</sup> In its most recent annual report, *Toxics Use Reduction Act: Measuring Success*, the Massachusetts Department of Environment monitored data normalized for changes in production for a core group of industries that have reported to the program since 1990. In 2000, the core group comprised 340 facilities used 664.4 million pounds, or 57 per cent of the total toxic chemicals reported in 1990. From 1990 to 2000, these facilities reduced toxic byproducts by 58 per cent, toxic chemical use by 40 per cent, quantities shipped in product by 47 per cent, toxic releases to the environment by 90 per cent, and transfers off-site for further waste management by 36 per cent.

In 2004, the New Jersey government carried out an evaluation of trends based on the materials accounting data. They found that between 1994 and 2001, nonproduct output (NPO) decreased by 33 per cent or nearly 71.7 million pounds.<sup>9</sup> Nonproduct output measures the amount of toxics prior to treatment. It includes all toxic materials generated during the production process. This means that the nonproduct output numbers are higher than the amount of toxic chemicals released or transferred from a facility because some toxic chemicals are destroyed during pollution treatment processes. Therefore, it provides a better indication of the extent to which reductions in releases are the result of pollution prevention activities.

### **Stimulate Reduction of Transportation Hazards:**

Materials flow data makes the community aware of the hazardous materials going through their neighbourhoods because it requires reporting on the hazardous materials going onto and out of the facility.

The Eugene data for 2004 provided earlier in this report, showed that 16.7 million pounds of hazardous materials were shipped into facilities that year and 8.7 million were shipped off site in product and an additional .619 million pounds shipped off site in waste.

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<sup>7</sup> Ibid.

<sup>8</sup> This report is available at <http://www.mass.gov/dep/toxics/priorities/succes03.htm>

<sup>9</sup> New Jersey Department of Environmental Protection, *Industrial Pollution Prevention in New Jersey: A Trends Analysis of Materials Accounting Data From 1994 to 2001*, Spring 2004, p. 15.

The materials flow data showed that in 1994, 1.7 billion pounds of cancer-causing substances were shipped to and from New Jersey facilities. This was 219 times higher than the amount transferred off-site as waste.<sup>10</sup> The waste number is the only number that shows in NPRI data.

The data from the material accounting reports give residents a much better understanding of the possible hazards from transportation of materials through their neighbourhoods and is likely to stimulate action to make sure that risks from this transportation are reduced.

### **Stimulate Emergency Planning:**

Increased awareness of hazardous materials on sites in the community will stimulate communities to ensure that proper emergency preparedness programs are in place in the event of accidents or spills. Stimulating emergency planning was always a core reason behind the U.S. TRI. Canada's NPRI program has never had this as a guiding motivation. This is a serious flaw in the program.

An analysis of New Jersey data, for instance, showed how misleading simple TRI or NPRI data can be when considering the extent of hazards associated with a facility. INFORM, a research organization in the U.S., found that the TRI data for a vinyl manufacturing plant showed only 2,660 pounds released of DEHP while the materials flow data showed 25 million pounds of DEHP associated with the plants operations.<sup>11</sup> DEHP is a persistent, bioaccumulative toxin.

Some have raised concerns that increasing public awareness of hazardous materials in facilities will increase the risk of terrorist attacks on those facilities. That debate in the U.S. has led to conclusions that public knowledge of these materials stimulates toxics use reduction, which simultaneously reduces the risks of both terrorist attacks or sabotage and of chemical accidents.<sup>12</sup>

### **Stimulate Reduction in Hazardous Materials in Products:**

The NPRI data grossly understates the hazardous materials that a facility is responsible for generating and putting out into our communities. The Eugene data for 2004 showed that 8.7 million pounds of hazardous materials were in the products that were sold by plants in the community. The New Jersey data showed that 1.7 billion pounds of cancer-causing substances were shipped to and from New Jersey facilities in 1994.

Public knowledge of the massive quantities of hazardous materials being shipped out in product and awareness of which companies are doing so is essential to increase public awareness of the extent to which companies are responsible for putting these toxics into

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<sup>10</sup> Mark H. Dorfman and Marian Wise, "Tracking Toxic Chemicals: The Value of Materials Accounting Data", Inform, 1997.

<sup>11</sup> *Expanding the Public's Right to Know: Materials Accounting Data as a Tool for Promoting Environmental Justice and Pollution Prevention*, 2000, p. 32

<sup>12</sup> See Linda-Jo Schierow, Chemical Plant Security, Congressional Research Service Report for Congress, February 14, 2005. See also Paul Orum, Center for American Progress, *Preventing Toxic Terrorism*, 2006.

our homes. This will stimulate public and government pressure for reformulation of products.

This knowledge is as important to the public as is knowledge of hazardous materials directly released into the environment by these companies or shipped off-site in wastes because eventually almost all of these materials will be released to the environment. This may happen during use or after use when they are burnt or buried. INFORM says that this is “perhaps the most useful information available through New Jersey’s materials accounting program”.<sup>13</sup>

## **A Proposal**

The NPRI program should be adjusted to require full materials flow data, which would include materials used, generated, and shipped in product in addition to the releases and transfers now required by NPRI. This would make the NPRI program into a much more effective tool to stimulate toxics use reduction, the true goal of pollution prevention which government, industry and the public have all stated are the most effective means to protect the environment and human health from hazardous materials.

Expanding the NPRI in this way should not be a major burden for polluters because facilities reporting releases and transfers under the NPRI usually collect this data now and use it to calculate their releases and transfers. The only difference is that now they would make these data publicly available.

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<sup>13</sup> INFORM, , p. 23.