Airborne Toxic Pollution & Health

An Analysis of Toxic Chemicals Released to New Jersey's Air in 2005

NJPIRG Law & Policy Center

August 2007

Acknowledgements

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The author would like to thank John Rumpler, Alison Cassady and Allison Cairo for reviewing and commenting on this report. The author also acknowledges the importance of Alison Cassady's Toxic Pollution and Health report, March 2007, in creating the methodology for this one.

The author alone us responsible for any factual errors. The recommendations are those of the NJPIRG Law & Policy Center. The views expressed in this report are those of the author and do not necessarily reflect the views of our funders or those who provided editorial review.

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Executive Summary

Outsiders often mock New Jersey as a toxic state.[1] Unfortunately, our research has found that there is more than a little truth in this critique. Each year, New Jersey industries release millions of pounds of toxic chemicals into our air, water and soil. These chemicals cause cancer, developmental problems, and reproductive problems, and are suspected to cause a range of other health effects, such as neurological and respiratory problems. This report focuses on releases to New Jersey's air of carcinogens and developmental toxins.

In reviewing airborne releases of toxic pollution in New Jersey, we have reached three conclusions. First, industrial facilities continue to release enormous volumes of chemicals that cause cancer and developmental problems. For example, in 2005, New Jersey industrial facilities released 398,939 pounds of airborne carcinogens and 432,119 pounds of airborne developmental toxins.

Second, the airborne toxins are a problem statewide. The seven counties with the highest emissions of airborne carcinogens and airborne developmental toxins included counties from north, south and central New Jersey. The top three counties for carcinogens were Gloucester, Middlesex and Union. The top three for developmental toxins were Gloucester, Middlesex and Salem.

Third, safer alternatives exist for many of these chemicals. For example, safer alternatives are commercially available for dichloromethane, which accounted for 26% of all airborne carcinogen emissions in New Jersey in 2005, and toluene, which accounted for 72% of all airborne developmental toxin emissions.

Based on these findings, NJPIRG makes the following policy recommendations:

1. New Jersey should require mandatory toxics use reduction to reduce or even eliminate the health risks posed by toxic pollution.

2. New Jersey should invest in toxics use reduction by making grants available for smaller businesses to adopt toxics use reduction approaches and by considering making substantial funding available for toxics use reduction, along the lines of Massachusetts's Toxics Use Reduction Institute.

3. New Jersey should make its toxics use and release database available on the internet.

Introduction

Exposure To Toxic Chemicals Puts Human Health At Risk

Toxic chemicals are known to cause cancer, developmental problems, and reproductive problems and are suspected to cause a range of other health effects, such as neurological and respiratory problems.

In March 2007, NJPIRG Law and Policy Center released a report that looked at nationwide releases to air and water of all the chemicals known or suspected of causing these health problems. The study used 2004 data, the most recent available at the time. This report is a follow up to that study, focusing on New Jersey industries' air releases of chemicals known to cause cancer and developmental problems and highlighting the releases of two particularly well-known, potent toxins: lead and mercury.[2] Lead is known to cause cancer and developmental problems, and mercury is a powerful developmental toxin.

Cancer Incidence and Mortality is Unusually High in New Jersey

New Jersey consistently has higher rates of cancer incidence and mortality than the nation as a whole.[3] Cancer incidence and cancer mortality are not distributed evenly throughout New Jersey. From 2000-2004, the most recent data set available,[4] the top five counties for cancer incidence were Cape May, Ocean, Gloucester, Warren and Burlington. The top five for cancer mortality were Gloucester, Salem, Atlantic, Camden and Cumberland. As noted in Table 2 in the Findings section, four of these counties (Gloucester, Salem, Burlington and Warren) have relatively high air releases of carcinogens.

While New Jersey's toxic pollution likely contributes to our high cancer rate, many factors contribute to any individual's cancer risk. We cannot quantify the extent to which toxic pollution increases an individual's likelihood of getting cancer.[5]

Developmental Problems

Scientists have shown that exposure to some toxic chemicals can interfere with the proper physical and mental development of young children. Potential developmental health effects cover a wide range of conditions including fetal death, structural defects such as cleft lip/cleft palate and heart abnormalities, and functional defects such as neurological, hormonal or immune system problems. A developmental problem of particular concern in New Jersey is autism, because we have the highest autism rate in the nation. Some researchers have associated toxic exposure with autism; however, no conclusive link has been established.[6]

Methodology

The data in this report regarding the locations, sources and quantities of chemical releases, come from the U.S. Environmental Protection Agency (EPA), which makes available on the Worldwide Web all of the data industries are required to report under the Toxic Release Inventory (TRI) law.[7] The data are from 2005, the most recent year available. Recently, the EPA changed the TRI rules to reduce the information industries must report, making this 2005 data set the last complete one. Although New Jersey has a separate law that requires industries to report more information about toxic chemicals to our Department of Environmental Protection (DEP) than the revised TRI rules require,[8] the DEP does not make that information available on the web, which hinders New Jerseyans from using it.

The data on which chemicals cause cancer or developmental problems comes from a list maintained by the state of California. Because of a citizen initiative, "Proposition 65", California regularly reviews the available science to determine which chemicals are known to cause cancer, developmental problems and reproductive problems.[9] To date, California has identified almost 500 cancer causing chemicals, more than 250 developmental problem-causing chemicals, 40 chemicals that cause reproductive problems in women and 57 that cause reproductive problems for men.

Findings

I. Industry Is Still Releasing Huge Volumes Of Toxics Into New Jersey's Air

Almost twenty years since the passage of the New Jersey Pollution Prevention Act, New Jersey's industrial facilities continue to pour toxic chemicals into our air. In 2005 alone, 241 facilities reported that they put approximately 800,000 pounds of 59 chemicals known to cause cancer and/or developmental problems into our air. The vast majority of these toxic releases, by quantity, can be traced to a handful of large industrial facilities.

Facilities Releasing Large Quantities of Cancer-causing Toxins

In 2005, 196 plants reported releasing a total of 398,939 pounds of carcinogens to New Jersey's air; however, most of the total emissions were due to relatively few facilities. Nineteen (19) facilities released more than 5,000 pounds of carcinogens, and nine released more than 15,000 pounds.

Table 1: Largest Releasers of Carcinogens to New Jersey Air, 2005

Facility Name	Facility City	Facility County	Carcinogens Released (Lbs.)
Ferro Corp.	Bridgeport	Gloucester	51,490
Sunoco Inc.'s Eagle Point Facility	Westville	Gloucester	29,328
Mallinckrodt Baker Inc.	Phillipsburg	Warren	21,997
Polyone Corp.	Pedrickstown	Salem	19,077
Marisol Inc.	Middlesex	Middlesex	18,456
Colorite Specialty Resins	Burlington	Burlington	16,290
ConocoPhillips's Bayway Refinery	Linden	Union	15,965
Dupont Chambers Works	Deepwater	Salem	15,009
Merck & Co Inc.	Rahway	Union	15,006

As Table 1 shows, a single facility, the Ferro Corp. Delaware River Plant, released 13% of the total carcinogens released into New Jersey's air statewide. Looking at Table 2, that facility released more than half of all the carcinogens released in Gloucester County. The Ferro Corp. and Sunoco's Eagle Point Facility combined make Gloucester the county with the highest carcinogen releases, together accounting for 82% of the county's emissions.

Table 2: Counties With The Largest Amounts of Carcinogens Released to Air, 2005

County	Number of Facilities	Carcinogens Released (Lbs)
Gloucester	10	98,878
Middlesex	42	71,780
Union	16	48,660
Salem	9	42,844
Burlington	15	32,499
Warren	7	28,031
Morris	14	22,681

Similarly, Mallinckrodt Baker accounts for 78% of Warren County's carcinogenic emissions; Colorite Specialty Resins accounts for approximately half of Burlington County's carcinogenic emissions; Polyone Corp. and Dupont Chambers Works combined account for 80% of Salem's carcinogenic emissions; and the ConocoPhillips Bayway Refinery and Merck facility combined account for 64% of Union County's carcinogenic releases. At 14,412 pounds, WM Steinen Manufacturing Co. accounts for 64% of Morris County's carcinogenic emissions. In contrast, Marisol Inc., Middlesex County's largest air

carcinogen polluter and the fifth largest overall, only accounts for 26% of the county's emissions.

Just as a handful of facilities release the vast majority of carcinogenic emissions, only a handful of chemicals account for most of the releases.

Table 3: Carcinogens Most Released Statewide by Quantity

Carcinogen	# of Facilities Releasing It	Pounds Released Statewide
Dichloromethane	17	101,942
Chloroethane	3	56,648
Benzene	19	46,024

Together the three chemicals in Table 3 accounted for 51% of all releases of carcinogens.

Facilities Releasing Large Quantities of Developmental Problem-causing Toxins

In 2005, 177 plants reported releasing a total of 432,119 pounds of developmental toxins to New Jersey's air in 2005. As with carcinogens, most of these releases can be attributed to a handful of facilities; 16 plants released at least 5,000 pounds of developmental toxins, and eight plants released more than 20,000 pounds.

Looking at Tables 4 and 5, a pattern emerges of a handful of large emitters accounting for most of a county's releases, similar to that seen with carcinogens, although different facilities are often involved. For example, the four Gloucester facilities in Table 3 account for 98% of Gloucester's developmental toxin emissions; Dupont Chamber Works accounts for 94% of Salem's developmental toxin emissions; the two Union facilities combined represent 79% of Union's emissions; and Covalence Adhesives accounts for 57% of Middlesex County's emissions. Similarly, the Finite Industries facility, which released 11,200 pounds of developmental toxins, accounted for 51% of Bergen County's releases; two facilities combine for 91% of Camden's developmental toxin emissions; and two accounted for 48% of Burlington's releases.

Table 4: Largest Releasers of Developmental Toxins to New Jersey's Air, 2005

Facility Name	Facility City	Facility County	Developmental Toxins Released To Air (Lbs)
Covalence Adhesives	Middlesex	Middlesex	62,307
Dupont Chambers Works	Deepwater	Salem	49,117
Sunoco Inc.'s Eagle Point Facility	Westville	Gloucester	38,059
Ferro Corp. - Delaware River Plant	Bridgeport	Gloucester	26,000
Glacier Garlock Bearings	Thorofare	Gloucester	24,696
Valero Refining Co	Paulsboro	Gloucester	24,034
API Foils	Rahway	Union	21,081
ConocoPhillips' Bayway Refinery	Linden	Union	20,158

Table 5: Counties with the Largest Amounts of Developmental Toxins Released to Air, 2005

County	Number of Facilities	Developmental Toxins Released (Lbs)
Gloucester	9	114,743
Middlesex	35	108,644
Salem	4	52,256
Union	16	50,256
Bergen	14	21,848
Camden	6	16,650
Burlington	11	15,684

Table 6: Developmental Toxins Most Released Statewide by Quantity

Developmental Toxin	# of Facilities Releasing It	Pounds Released Statewide
Toluene	78	311,405
Benzene	19	46,024
Chloromethane	1	45,251

Again, just as a few facilities account for most of the developmental toxin releases, a few chemicals account for most of the releases.

The three developmental toxins in Table 6 together accounted for 93% of the developmental toxins released statewide.

II. Toxic In Any Amount And Commonly Released In New Jersey: PBTs

Not all chemicals are equally toxic; some are much more dangerous than others.[10] To address relative toxicity, EPA makes two basic distinctions—chemicals whose releases must be reported above a minimum threshold, currently 2,000 pounds,[11] and chemicals that must be reported regardless of the amount released. The latter type of chemical is very potent, and persists in the environment for so long that each can accumulate in the food chain and in our bodies.

The chemicals whose releases must be reported at any level are dioxins and a group known as PBTs—Persistent Bioaccumulative Toxic chemicals. For example, lead and mercury are both PBTs.[12]

Disturbingly, given their toxicity, the three of the five most commonly released carcinogens and developmental toxins are PBTs, as shown by Tables 7 and 8:

Table 7: Carcinogens Released by the Most Facilities Statewide

Carcinogen	# Facilities	Pounds Released Statewide
Lead/lead compounds	92	11,808
Ethyl Benzene	38	38,157
Polycyclic Aromatic Compounds	32	1,300

Two of these, lead/lead compounds and polycyclic aromatic compounds are PBTs.

Table 8: Developmental Toxins Released by the Most Facilities Statewide

Developmental Toxin	# Facilities	Pounds Released Statewide
Lead/Lead Compounds	92	11,808
Tolune	78	311,405
Mercury/Mercury compounds	21	1,211

Again, lead and mercury are PBTs.

According to the New Jersey DEP, from 2000 to 2004 air releases of all PBTs increased by 5% to 10,424 pounds. Given that the 2005 EPA data show air releases of one PBT—lead and lead compounds—to be greater than the DEP 2004 total, New Jersey industries appear to have continued increasing their releases of these potent toxins.[13]

III. New Jersey Industries Are Pumping Significant Quantities Of Lead And Mercury Into Our Air

Lead

Ever since the banning of leaded gasoline, most people don't think about airborne lead pollution when considering the risk of exposure to lead. Instead, they think lead paint, and lead in drinking water from old lead pipes. Nonetheless, a significant amount of lead is put into our air from industrial processes, and unlike lead paint or lead pipes, it's much harder for New Jerseyans to notice or avoid.

Lead, whether by itself or in compounds, is a carcinogen and a developmental toxin.

Table 9: Five Largest Releasers of Lead to New Jersey's Air, 2005

Facility Name	Facility City	Facility County	Lead Released To Air (Lbs)
Griffin Pipe Products	Florence	Burlington	3,819
Delphi Energy & Chassis Systems	New Brunswick	Middlesex	2,688
Atlantic States Cast Iron Pipe	Phillipsburg	Warren	992
U.S. Pipe & Foundry	Burlington	Burlington	804
U.S. Army Headquarters Fort Dix	Fort Dix	Burlington	607

Statewide, 92 plants released 11,808 pounds of lead to our air. As Table 9 shows, 2 plants accounted for more than half of the lead released.

Lead air emissions are an increasing health hazard in New Jersey. According to New Jersey Department of Environmental Protection, lead air emissions increased by over 41%, to 8,336 pounds from 2000 to 2004. Given that the EPA's data for 2005 show air lead releases of 11,808 pounds, it seems the troubling trend of increasing air lead emissions has continued.

Mercury

Mercury is a potent developmental toxin. One of the largest sources of airborne mercury pollution in New Jersey is Midwestern power plants. Nonetheless, New Jersey industrial facilities release a dangerous amount of mercury to our air.

If only 1 gram of mercury—1/70th of a teaspoon, 0.2% of a pound—falls out of the air into a twenty acre lake each year, it is enough to contaminate the fish in that lake and trigger warnings about eating the fish.[14] Mercury pollution in New Jersey is so great that New Jersey has issued a statewide advisory on eating fish caught in any of our rivers and lakes every year since 1995.[15]

Given this toxicity, New Jersey industry's mercury emissions have remained astonishingly high over time. From 2000-2004, New Jersey industry pumped anywhere from 757 pounds (in 2001) to 1,247 pounds (in 2003) of mercury into our air. [16]

In 2005, 21 New Jersey facilities released a total of 1,211 pounds of mercury to our air. One steel mill—Gerdau Ameristeel of Sayreville, Middlesex County—released 531 pounds of mercury, nearly half of the state's mercury air emissions.

Similar to lead emissions, New Jersey industry seems to be making little effort to reduce mercury emissions.

As with carcinogens and developmental toxins generally, most lead and mercury releases come from one or two large facilities in each of the top counties. Nonetheless, because of the nature of lead and mercury, much smaller emitters are also significant.

Table 10: Counties with the Largest Releases of Lead and Mercury to Air, 2005

County	# of lead Facilities	Lead Released (Lbs)	# of Mercury Facilities	Mercury Released (Lbs)	Lead and Mercury Combined (lbs)
Burlington	9	5417	2	111	5528
Middlesex	17	3819	6	614	4433
Warren	4	1002	1	80	1082
Hudson	10	489	2	136	625
Bergen	5	300	1	36	336
Cape May	1	238	1	75	313
Union	8	201	2	1	202

The Toxics Use Reduction Approach

Feasible Alternatives Exist For The Toxins In This Report

Toxic pollution and the health impacts it causes can be reduced most directly by reducing the use of toxic chemicals. Toxics use reduction can be achieved either by substituting less dangerous chemicals into an existing process, or redesigning the process to eliminate the need to transport or store toxins on site, usually by making limited quantities on site as production requires. Both of these approaches improve worker and community safety by minimizing the risk of accident, explosion, or routine exposure.

A number of facilities nationwide have made these kinds of improvements. The most recent New Jersey example is Shweitzer-Mauduit International, Inc., which just last month reported that it stopped transporting, storing and using large quantities of chlorine gas. Now the company reports using a different bleaching agent which it manufactures on site, as needed.

Dichloromethane and Toluene Substitutes

Although feasible, safer alternatives do not exist for every product, they do for many. For example, safer substitutes for dichloromethane, the carcinogen most released to New Jersey's air by volume, are commercially available.[17] Dichloromethane accounted for 26% of all airborne carcinogen emissions in New Jersey in 2005.

Similarly, the Toxics Use Reduction Institute (TURI) has identified 27 chemicals that are safer than toluene and can be effectively substituted for it in 60 different applications. Toluene is the developmental toxin most released to New Jersey air by quantity.[18] Toluene accounted for 72% of all airborne developmental toxin emissions.

Lead Substitution in the Electronics Industry

Lead, particularly lead solder, has traditionally been an integral ingredient in electronics. However, many electronics manufacturers have successfully redesigned their products to eliminate lead, including Intel, Microchip Technology, Nokia, Advance Circuits, Arizona Microtech and Tyco. [19] This industry overhaul was driven by government mandate; the European Union, China and other major international markets' decision to ban lead in these products.

Mercury Substitution in the Steel Industry

In 1998 three Indiana steel mills began to inventory mercury at their facilities and identify and implement ways to reduce their mercury use. According to a report they produced in 2001, significant reductions in mercury use were achievable. Of the two main sources of mercury they identified—equipment (including mercury on hand for servicing equipment), and waste—equipment was both the larger use and the easier use to eliminate. Most of the mercury containing equipment already has commercially available alternatives, and the three mills have committed to switching over all of that equipment.[20]

Given that New Jersey's single largest mercury emitter by far is a steel mill, the Indiana mills' example suggests that it could significantly reduce its mercury use and therefore emissions.

Current New Jersey Law On Toxics Use Reduction

New Jersey is one of three states that require industries to analyze their operations and create a plan for preventing toxic use and pollution at their facilities.[21] Currently, New Jersey facilities that report their toxic use and releases under the TRI must create a pollution prevention plan every five years, which is kept on site, and submit a summary of the plan to the DEP, along with periodic progress reports. While these plans have some merit in that they force a company to consider the goal of toxics use reduction, the current law is toothless; a facility may set a toxic use reduction goal of 0%, and when an actual goal has been set, the DEP has no power to enforce it. The same goal could be set, and not met, every five years without consequence. As a result, some industries make significant progress in reducing their toxics use and releases, while others make no headway at all, despite knowing precisely how gains could be achieved.[22]

Recommendations

1. New Jersey should move beyond voluntary planning, and require industrial facilities to move from toxic chemicals to feasible safer alternatives.

2. New Jersey should invest in toxics use reduction.
New Jersey should provide funding for small businesses to work with the Toxics Use Reduction Institute and facilitate the production line changes that are necessary. New Jersey should also consider creating its own version of the Toxics Use Reduction Institute to specifically focus on New Jersey industries' needs.

3. The New Jersey DEP should make its data sets available on the web with at least the user friendliness of the EPA TRI data.
It's not clear how the DEP and EPA data sets overlap; are they identical when it comes to releases, for example, or not? One way to tell would be to be able to directly compare the data, something that is not readily possible now. In addition, the DEP data seem to cover more aspects of toxics use, waste and releases than the EPA data. Having access to it in electronic fashion would greatly increase communities' ability to know about the toxics in their lives. Finally, it is possible that the DEP could release its data more rapidly than the EPA does—the EPA routinely lags 2 years behind—making the DEP data more valuable.

Endnotes

[1] E.g., the John Stewart Show did a 2006 segment on New Jersey's search for a slogan that in part ridiculed New Jersey about its toxic pollution.

[2] When reading this report, it's important to remember that a typical New Jerseyan faces a higher exposure risk than suggested by the numbers, because our data does not include out of state toxic pollution that blows into New Jersey, nor does our data reflect other routes of exposure.

[3] http://apps.nccd.cdc.gov/uscs/Table.aspx?Group=5f&Year=2003&Display=n (visited July 15, 2007)

[4] http://cancer-rates.info/nj/njmort.html (visited July 15, 2007)

[5] The DEP has similarly highlighted our toxic pollution and high cancer rates. New Jersey Department of Environmental Protection, "Industrial Pollution Prevention in New Jersey: A Trends Analysis of Materials Accounting Data 1994-2004", Spring 2007, 74 pgs (hereinafter "DEP Report") at p. 45.

[6] See, e.g., Dr. P Grandjean and Dr. PJ Landrigan, "Developmental neurotoxicity of industrial chemicals" The Lancet 2006; 368:2167-2178 and Joan Lowy, "Autism reaching 'epidemic' levels," Scripps Howard News Service, January 21, 2004 available at http://www.shns.com/shns/g_index2.cfm?action=detail&pk=CHILDAUTISM-01-21-04 (viewed July 25, 2007);

[7] http://www.epa.gov/tri/.

[8] The New Jersey Worker and Community Right to Know Act, N.J.S.A.34:5A; see the DEP site implementing the act at http://www.nj.gov/dep/opppc/crtk/index.html.

[9] http://www.oehha.ca.gov/prop65/prop65_list/files/060107LST.pdf (list as of June 1, 2007.) Note: chemicals that cause developmental problems are treated as chemicals that cause reproductive problems, and then the type of reproductive problem is identified as "developmental."

[10] See, e.g. the DEP report at pp.10-11.

[11] If the facility manages 5,000 pounds or more of one of these chemicals on site, then releases in any amount must be reported. If they manage less than 5,000 pounds, only releases over 2,000 pounds must be reported.

[12] Although lead and its compounds and mercury and its compounds are reported as four separate chemicals, lead and its compounds are both carcinogens and developmental toxins, mercury and its compounds are both developmental toxins, and all four are PBTs. Thus for simplicity we have combined lead and its compounds as "lead" and mercury and its compounds as "mercury." Note, lead compounds are not specifically identified as developmental or reproductive toxicants under Proposition 65. Environmental Defense, however, classifies lead compounds as "recognized" developmental and reproductive toxicants on its Scorecard.org website. The TOXNET database of the National Library of Medicine cites several studies suggesting that exposure to inorganic lead compounds can lead to reproductive problems and impaired neurological development in children. As a result, we include lead compounds as recognized developmental and reproductive toxicants for purposes of this study. We made a similar determination for cadmium compounds, even though Proposition 65 lists only elemental cadmium as a developmental and reproductive toxicant.

[13] See the DEP Report, Figure 32 page 51.

[14] "FISHING FOR TROUBLE, A Survey of Mercury Contamination in America's Waterways"; Jeremiah Baumann, United States Public Interest Research Group, Michael T. Bender, Mercury Policy Project and Jane Melanie Williams, California Communities Against Toxics (February 1999) p. 4 available at http://www.mercurypolicy.org/exposure/documents/fishing_for_trouble.pdf (visited July 20, 2007).

[15] http://www.epa.gov/waterscience/fish/advisories/2006/tech.html#table3 (visited July 20, 2007)

[16] See the DEP report at figure 38 pg. 56

[17] See, e.g.: http://www.m-tc.com/paint_stripper/dichloromethane_alternative_paint_stripper.htm (visited July 15, 2007), and http://www.sigmaaldrich.com/Area_of_Interest/Research_Essentials/Solvents/Key_Resources/Me_THF.html (visited July 15, 2007).

[18] http://www.cleanersolutions.org/index.php?action=solvent_replace&submit=Submit&page=0&sortby=safety&sortasc=1 (visited July 15, 2007)

[19] Export Case Information, Lead Free Electronics Industry, Toxics Use Reduction Institute, available at http://www.turi.org/home/turi_publications (visited July 15, 2007.) See also the individual companies' websites, looking under RoHS information (RoHS is the acronym for the EU regulation.)

[20] "A GUIDE TO MERCURY REDUCTION IN INDUSTRIAL AND COMMERCIAL SETTINGS", Inland Ispat Indiana Harbor Works, Bethlehem Steel Burns Harbor Division, United States Steel Gary Works, The Delta Institute, Lake Michigan Forum July, 2001, available at http://www.delta-institute.org/publications/Steel-Hg-Report-0627011.pdf (visited July 20, 2007)

[21] The Pollution Prevention Act of 1991. See the DEP website at http://www.nj.gov/dep/opppc/ and the discussion in the DEP Report at p. 8.

[22] The DEP Report analyzed the toxic use, waste and release information for New Jersey industries from 1994-2004 and from 2000-2004 (depending on the industry and chemical) and found in general and in the aggregate, significant reductions in toxics use, waste and reduction when quantities were adjusted for production, meaning each produced unit involved less toxics than before. However, in many cases the absolute amount of toxics increased, and from a public health perspective, the absolute amount of toxics is much more important than simply the amount per unit of production. Similarly, not all facilities decreased their toxics use or releases; a number increased use, releases, or both.

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