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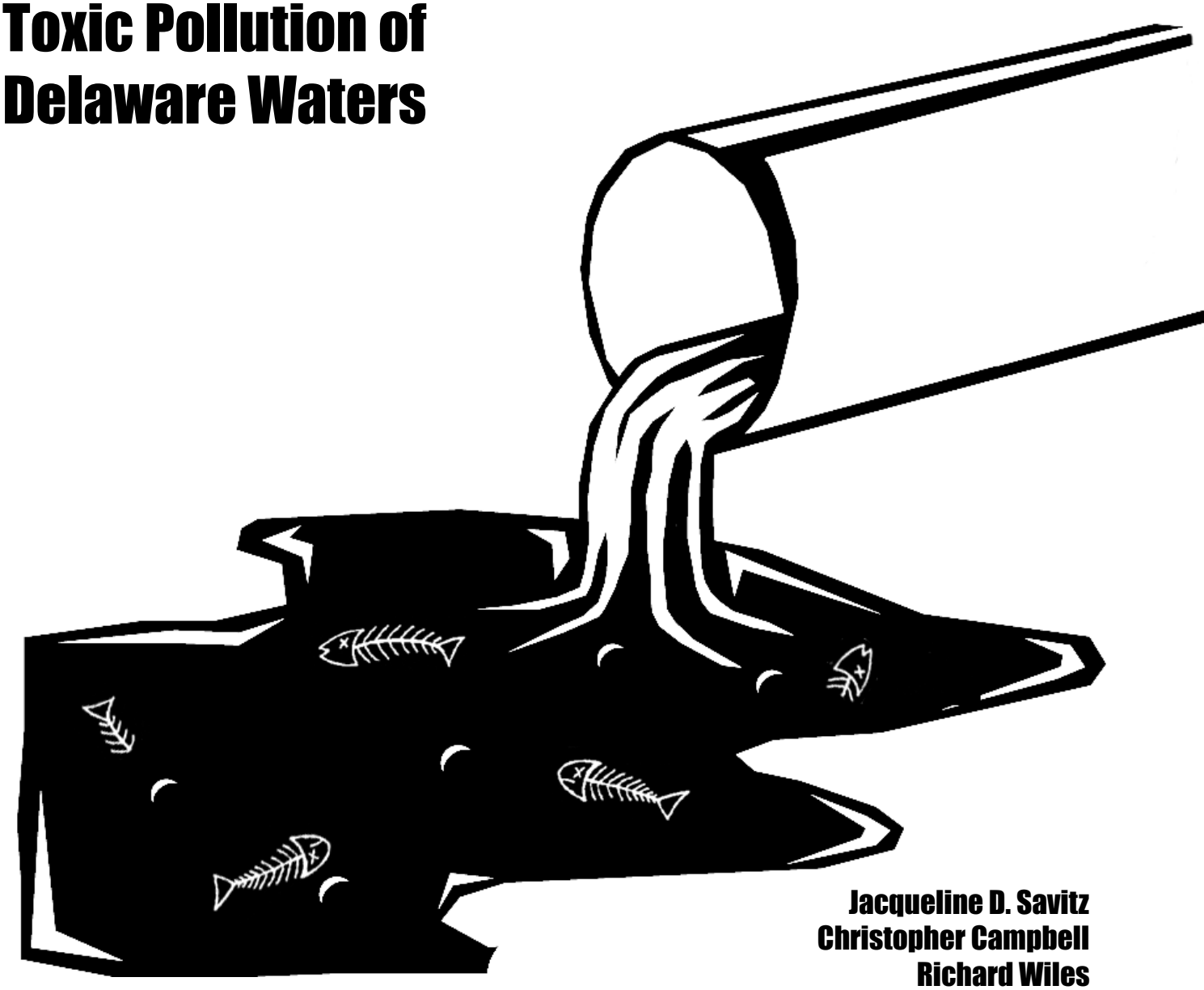
Dishonorable Discharge

Toxic Pollution of Delaware Waters



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Toxic Pollution of Delaware Waters

Executive Summary

Most Delaware citizens would be surprised to learn that scores of businesses and facilities across the state *legally* dump tons of toxic chemicals into the state's rivers, streams, lakes, and bays. Many of these same polluters flush millions more pounds of toxic substances down the drain to sewage treatment plants that taxpayers pay to operate and maintain. None of the toxic chemicals sent to publicly financed sewage treatment systems are reported as pollution by the EPA, even though a great deal of the toxic load eventually finds its way to Delaware streams and rivers.

The citizens of Delaware have a right to know about any pollution of their water, air or land that may pose a risk to human health or the environment. The goal of *Dishonorable Discharge* is to inform the public about the massive level of toxic pollution of the waters in their state, and point out the need for more comprehensive reporting of toxic chemical use, transport, and pollution, in Delaware and nationwide.

Factories and other industrial facilities dumped more than 1.2 million pounds of toxic substances directly into Delaware's waters between 1990 and 1994, according to a new analysis of the federal Toxics Release Inventory (TRI) (Table 1). Delaware ranked 35th among the states in toxic water pollution reported over those five years. Because of weaknesses and loopholes in federal pollution laws, most, if not all of these toxic discharges are perfectly legal.

As large as they are, these figures substantially underestimate toxic releases to waters and the environment because the TRI requires reporting of only about 340 of the 73,000 chemicals in commerce. The TRI also exempts certain industries from reporting, including utilities, sewage treatment plants, municipal incinerators, and manufacturing facilities with fewer than ten employees.

In addition, almost fifteen (14.8) million pounds of toxic materials were flushed to sewage treatment plants in Delaware from 1990 through 1994, 23rd in the nation (Table 1.) EPA estimates that twenty-five percent of all discharges nationwide flow through sewage treatment plants untreated (EPA 1995). Applying this 25 percent estimate to Delaware raises the total amount of toxics dumped to the state's waters to an estimated 5.0 million pounds (Table 1).

The Delaware River received the greatest amount of toxic water pollution in Delaware from 1990-1994, a total of 939,000 pounds, followed by Red Clay Creek, the Savannah Ditch, and White Clay Creek (Table 2). The nine most polluted waterways in Delaware received 1,240,000 pounds of toxic pollution between 1990 and 1994, 99.7% percent of the total in the State.

The top three facilities reporting the most toxic pollution of Delaware's waters over this period were Star Enterprises in Delaware City, which dumped 658,000 pounds of toxic chemicals, followed by General Chemical Corporation, and NVF Company in the towns of Claymont, and Yorklyn, respectively (Table 3). The toxic chemicals dumped in the greatest amounts were ammonia, a total of 465,000 pounds, followed by diethanolamine, and zinc compounds (Table 4).

Star Enterprises dumped the most carcinogens into Delaware's waters, a total of 2,700 pounds, followed by Standard Chlorine Of Delaware and Johnson Controls Inc.* (Table 8). The Delaware River received the greatest amount of cancer-causing toxic chemicals in Delaware, a total of 3,956 pounds, followed by Drawyer Creek (Table 7).

NVF Company in Yorklyn dumped the greatest amount of persistent toxic metals in Delaware's waters, a total of 167,000 pounds, followed by NVF Company* in Newark and General Motors Corporation* (Table 8). Red Clay Creek received the greatest amount of persistent toxic metals, a total of 167,000 pounds, followed by White Clay Creek and Little Mill Creek (Table 7).

Star Enterprises dumped the greatest amount of toxic chemicals that cause reproductive damage or birth defects into Delaware's waters, a total of 8,000 pounds, followed by ICI Surfactants Inc. (Table 8). The Delaware River received the greatest amount of toxic chemicals that cause reproductive damage or birth defects, a total of 8,000 pounds (Table 7).

These discharges to Delaware's waters include only those wastes released by companies physically located in Delaware. Many waterways receive additional pollution from sources outside of the state. Information on toxic water pollution in other states can be found in EWG's state reports series, and in the national report, *Dishonorable Discharge*.

Recommendations

Americans have a right to know about any use, transport, or release of toxic substance in their communities that might pose a risk to human health or the environment. Required reporting under the TRI provides only a small portion of this information. Much more complete reporting is needed. Americans also have a right to know about toxic chemicals in the products they buy that may pose a risk to them and their children.

Full accounting of the use of toxic materials reveals many low cost opportunities for pollution prevention. In New Jersey, state officials estimate that every dollar spent on such materials accounting practices generates five to eight dollars in increased efficiency (GAO 1994). Without materials accounting industry will miss many opportunities for substantial low cost reductions in pollution, and the public and policy makers will be unable formulate strategies that most effectively reduce exposure to toxic substances in the environment and consumer products.

We recommend:

- Timely implementation of the EPA's proposed expansion of industries and facilities required to report toxic releases under the TRI.

- Expansion of TRI reporting requirements to include full materials accounting for any facility or industry that uses or releases a toxic substance that may pose a risk to human health and the environment.

*This facility reported no discharges in 1994, and may also have reported zero discharges for other years.

Dishonorable Discharge

Toxic pollution of rivers, lakes, streams, and bays is a serious problem in all 50 states. Twenty five years after the passage of the Clean Water Act, nearly forty (40) percent of America's rivers, lakes, and coastal waters remain unsafe for fishing, swimming or basic recreation (EPA 1996b). 100% of Delaware's estuaries, rivers, and streams, and 81% of its lakes have fish consumption advisories largely due to the presence of toxic chemicals. (EPA 1995b). The pollution that fouls these waterways costs the state's economy millions of dollars in tourism, fishing, and development revenues that otherwise could be earned on or near these waters were they not so polluted (EPA 1996b).

Dishonorable Discharge Underestimates Toxic Pollution

The Toxics Release Inventory (TRI) provides a rough estimate of a small portion of the toxic chemicals that flow into America's waters. The toxic discharges reported in this study are based on TRI reported toxic releases to waterways and so-called "transfers" of toxics to publicly owned treatment works (POTWs) — the term of art that industry and the EPA use when an industrial facility dumps toxic chemicals into the local sewer.

The figures reported in *Dishonorable Discharge* dramatically underestimate the total amounts of toxic compounds that have been discharged, dumped, or made their way into rivers and lakes across the country over the past five years.

About 90[1] percent of all toxic discharges coming out of pipes into water (so-called point source discharges) are not reported to the TRI. This is because the TRI requires reporting on only about 343[2] of some 73,000 chemicals used in commerce, and because the TRI exempts many polluters (utilities, certain industries, and those with fewer than ten employees) from reporting requirements (EPA 1996).

About half of all toxics that pollute rivers come from surface runoff and air deposition, as opposed to pipes. Comprehensive accounting of this "nonpoint source" pollution is not available for all rivers on a national basis.

Taking all of the limitations of the existing information into account, Environmental Working Group believes that an accurate estimate of the total load of toxic pollution in many rivers and lakes over the past five years might be 20 times greater than the amounts reported here.

Hiding Toxics in the Sewer

The EPA does not include so-called "transfers" of toxic chemicals to sewer systems as an official "release" of a toxic chemical into the environment (EPA 1996). At the same time, the EPA estimates that 25 percent of all toxic chemicals transferred to sew-

ers from industrial facilities pass through treatment and into the waterways that receive wastewater (EPA 1995).

Transfers of toxic chemicals to publicly owned treatment works (POTWs) — otherwise known as sewage treatment plants — were four times greater in 1994 than the amount of toxic chemicals released directly to water that are reported in the entire TRI that year. To estimate the total amounts of toxic substances dumped into Delaware's waters, we used EPA's assumption that 25 percent of all toxic chemicals transferred to POTWs pass-through untreated[3]. Table 1 presents the EWG estimate of toxic chemicals assumed to be discharged by the POTWs in Delaware. Estimates of toxic discharges from POTWs to specific rivers and bodies of water could not be accurately estimated because the sewage treatment plants are not required to report to the TRI.

Assuming a 25 percent flow-through does not permit discharge estimates for individual toxic chemicals that flow through the sewer system into waterways. In reality some chemicals flow through POTW's untouched, while others are removed and held in the sludge, broken down in treatment, or allowed to evaporate into the ambient air as toxic pollutants.

How Toxic is Toxic?

Some 340 substances were required to be reported to the EPA for the years analyzed in this report. According to the EPA:

"For a chemical or chemical category to remain on or be added to the TRI list, it must be known to cause or reasonably be anticipated to cause one of the following:

- Significant adverse acute health effects at concentration levels that are reasonably likely to exist beyond facility boundaries as a result of continuous, or frequently recurring releases;

- In humans — cancer; teratogenic effects; or serious irreversible reproductive dysfunction, neurologic disorders, heritable genetic mutations, or other chronic health effects;

- A significant adverse effect on the environment because of its toxicity, its toxicity and persistence in the environment, or its toxicity and tendency to bioaccumulate in the environment of sufficient seriousness to warrant reporting under EPCRA section 313" (EPA 1996).

For most of the TRI chemicals, federal regulators and scientists have a disturbingly incomplete understanding of the long term toxic effects on the environment or human health. The vast majority of compounds reported in the TRI are not fully studied, even though they have triggered one of the above criteria.

Toxic discharges and runoff to water are a serious and largely unaddressed environmental and human health problem. Most, if not all of the pollution reported in Dishonorable Discharge is legal. Current pollution control laws like the Clean Water Act (CWA), the Resource Conservation and Recovery Act (RCRA), and the Toxic Substances Control Act (TSCA) do little to move the nation towards reducing the toxic pollution cited in this report. In effect, these laws issue pollution licenses or exemptions from regulations.

One of the more glaring exemptions may be the so-called "domestic sewage exclusion" under RCRA, whereby toxic contaminants sent to sewage treatment plants escape otherwise applicable federal hazardous waste regulations. This accounts for the huge amounts of toxic chemicals that were dumped down the drain by American industry and end up in the nation's rivers and streams. Another major source of toxic pollution of waters is agricultural pesticides. The runoff of pesticides from agricultural fields is not regulated under any federal law, and is not tabulated by the TRI nor included in this report. About 1.1 billion pounds[4] of pesticides were used in the United States in 1993 alone (Aspelin 1994).

Dishonorable Discharge is based on data collected by the U.S. Environmental Protection Agency's Toxics Release Inventory (TRI) for the reporting years 1990 through 1994, which includes the most recent data available. It includes the releases of only 343 chemicals from about 27,000 manufacturing facilities. The limitations of these data have been described above.

Analyzing Discharges by Body of Water

Discharges from TRI facilities were assigned to a given waterway based on the "receiving stream" reported to the EPA. Most waterways reported as "tributary" streams were included with their respective rivers in this report when it was possible to link them. For purposes of this analysis, toxic release data for major rivers themselves are tabulated separately, not summed as part of larger watersheds. For example, a "Tributary to the Mississippi River" was counted as Mississippi River, while the Missouri River was not, even though it eventually joins the Mississippi just above St. Louis. Small streams receiving large quantity discharges (such as Gravelly Run in Virginia and Clear Creek in Colorado) were reported individually, just as they are recorded in the TRI. State-level reports only include discharges to a given river from facilities that are physically located in this state, not discharges from facilities located in other states upstream.

Reporting Toxics Dumped Down the Drain

Enormous quantities of toxic chemicals are discharged to waterways via sewer systems. These so-called "transfers" of toxic chemicals to publicly owned treatment works (POTWs) totaled more than 250 million pounds in 1994, compared to 66 million pounds of direct discharges to waters reported in that same year. While the EPA does not count these transfers as environmental releases in the TRI, the Agency estimates that an average of 25 percent of these transfers flow through sewer systems into receiving waters (EPA 1995).

To better illustrate the amount of toxic chemicals that actually make it into the nation's waters each year, we assumed that on average 25 percent of the toxic chemicals transferred to POTWs (a.k.a. sewers) by a reporting facility, ultimately pass through the sewage treatment plant untreated and in most cases are discharged to receiving waters.

Toxic chemical releases through POTWs were estimated statewide, but were not attributed to specific rivers at the state level due to the difficulty of verifying the receiving waters. Environmental Working Group will attempt to identify receiving waters more precisely future reports. All other analyses including facility discharges and top chemicals reflect direct discharges only, and not POTW release estimations.

Total discharges of persistent toxic metals, known or possible carcinogens, and chemicals known to cause reproductive effects, were calculated for specific rivers

based on information characterizing the toxic properties of these substances previously published by the EPA, the State of California, and the State of New Jersey, as well as other toxicological literature (Environmental Protection Agency, 1996; California Code of Regulations; New Jersey Department of Health; and Dixon, 1986). EPA's inclusion of known, probable, and possible carcinogens is based on determinations made by the Occupational Safety and Health Administration (OSHA), the National Toxicology Program (NTP), and the International Agency for Research on Cancer (IARC) (EPA 1996). Lists of chemicals included are found in the Appendix.

Notes

[1]Estimate based on EPA report (National Sediment Contaminant Point Source Inventory: Analysis of Release Data for 1992. Final Draft.) (EPA, 1995) where data from TRI were compared to the Permit Compliance System (PCS) Database and found to represent only about 9%, at most, of discharges reported in PCS. Estimates from the GAO indicate that PCS regulates only 23% of all toxic water pollution (GAO, 1994).

[2]The exact number of chemicals required varies with the year. In 1994, 343 chemicals were reported. EPA has recently expanded the inventory to include about 650. These data, to be reported for 1995, will be available in 1997.

[3]EPA uses this factor since it is unlikely to greatly overestimate or underestimate the exact treatment efficiency (EPA 1995). This number will vary for any specific chemical; however it estimates pass through for chemicals as a whole, and is not applied to specific chemicals in this report.

[4]This value refers to pesticide active ingredients. The total volume of pesticide products, including so-called inert ingredients is far higher.

Appendix

Carcinogens

1,1,2,2-Tetrachloroethane
1,1-Dimethylhydrazine (UDMH) (alar trans. prod.)
1,2-Dibromo-3-chloropropane (DBCP)
1,3-Butadiene
1,3-Dichloropropylene
1,3-Propane sultone
1,4-Dioxane
1-Amino-2-methylanthraquinone
1-Naphthylamine
2,4,6-Trichlorophenol
2,4-Diaminoanisole
2,4-Diaminoanisole sulfate
2,4-Diaminotoluene
2,4-Dinitrotoluene
2-Acetylaminofluorene
2-Aminoanthraquinone
2-Methylaziridine (Propyleneimine)
2-Naphthylamine
2-Nitropropane
3,3'-Dichlorobenzidine
3,3'-Dimethoxybenzidine (ortho-Dianisidine)
3,3'-Dimethylbenzidine
4,4'-Diaminodiphenyl ether (4,4'-Oxydianiline)
4,4'-Methylene bis(2-chloroaniline)
4,4'-Methylene bis(N,N-dimethyl) benzenamine
4,4'-Methylenedianiline
4,4'-Thiodianiline
4-Aminobiphenyl (4-aminodiphenyl)
4-Dimethylaminoazobenzene
4-Nitrobiphenyl
5-Nitro-o-anisidine
Acetaldehyde
Acetamide
Acrylamide
Acrylonitrile
Allyl chloride
Aniline
Arsenic
Arsenic compounds
Asbestos
Auramine
Benzene
Benzidine [and its salts]
Benzotrichloride
Benzyl chloride
Beryllium and beryllium compounds
Beryllium compounds
beta-Propiolactone
Bis (2-chloroethyl) ether
Bis(chloromethyl) ether
Bromodichloromethane
Bromoform
Cadmium
Cadmium compounds
Captan
Carbon tetrachloride
Chlordane
Chloroethane (Ethyl chloride)
Chloroform
Chloromethyl methyl ether
Chlorophenols
Chlorothalonil
Chromium
Cupferron
D&C Red No. 19
DDVP (Dichlorvos)
Di -(2-ethylhexyl)phthalate
Dichloromethane (Methylene chloride)
Diepoxybutane
Diethyl sulfate
Dimethyl sulfate
Dimethylcarbamoyl chloride
Direct Black 38
Direct Blue 6
Direct Brown 95
Epichlorohydrin
Ethyl acrylate
Ethylene dibromide
Ethylene dichloride (1,2-Dichloroethane)
Ethylene oxide
Ethylene thiourea (EBDC trans prod.)
Ethyleneimine
Formaldehyde
Hexachlorobenzene
Hexachloroethane
Hexamethylphosphoramide
Hydrazine
Hydrazine sulfate
Hydrazobenzene (1,2-Diphenylhydrazine)
Isosafrole
Lead
Lead compounds
Lindane
Methyl iodide
Michler's ketone
Mustard Gas
N-Nitroso-N-ethylurea
N-Nitroso-N-methylurea
N-Nitrosodi-n-butylamine
N-Nitrosodi-n-propylamine
N-Nitrosodiethylamine
N-Nitrosodimethylamine
N-Nitrosodiphenylamine
N-Nitrosomethylvinylamine
N-Nitrosomorpholine
N-Nitrosonornicotine
N-Nitrosopiperidine
Nickel
Nickel compounds
Nitrilotriacetic acid
Nitrofen
Nitrogen mustard (Mechlorethamine)
ortho-Anisidine
ortho-Anisidine hydrochloride
ortho-Toluidine
ortho-Toluidine hydrochloride
p-Aminoazobenzene
p-Cresidine
p-Dichlorobenzene
p-Nitrosodiphenylamine
Pentachlorophenol
Polybrominated biphenyls
Polychlorinated biphenyls
Propylene oxide
Saccharin
Safrole
Styrene
Styrene oxide
Tetrachloroethylene (Perchloroethylene)
Thioacetamide
Thiourea
Toluene-2,4-diisocyanate
Toluene-2,6-diisocyanate
Toxaphene (Polychorinated camphenes)
Trichloroethylene
Tris(2,3-dibromopropyl)phosphate
Urethane (Ethyl carbamate)
Vinyl bromide
Vinyl chloride
Vinyl trichloride (1,1,2-Trichloroethane)

Persistent Toxic Metals

Antimony & Antimony Compounds
Arsenic & Arsenic Compounds
Barium & Barium Compounds
Beryllium & Beryllium Compounds
Cadmium & Cadmium Compounds
Chromium & Chromium Compounds
Cobalt & Cobalt Compounds
Copper & Copper Compounds
Lead & Lead Compounds
Manganese & Manganese Compounds
Mercury & Mercury Compounds
Nickel & Nickel Compounds
Selenium & Selenium Compound
Silver & Silver Compounds
Thallium & Thallium Compounds
Zinc & Zinc Compounds

Chemicals that Affect Reproduction

1,2-Dibromo-3-chloropropane
Cadmium
Carbon disulfide
Diethylhexyl phthalate
o-Dinitrobenzene
m-Dinitrobenzene
p-Dinitrobenzene
Ethylene glycol monoethyl ether
Ethylene glycol monomethyl ether
Ethylene oxide
Hexamethylphosphoramide
Lead
Styrene
Toulene
Trichloroethylene
Xylene(mixed isomers)
o-xylene
m-xylene
p-xylene
Di-n-butyl phthalate
Glycol ethers
Mercury Compounds
Mercury
Benzene
Aluminum
Arsenic
Nickel
Lindane
Vinyl Chloride

Source: Environmental Working Group. Compiled from California Proposition 65, EPA's TRI Public Data Release, New Jersey Department of Health, Hazardous Substances Fact Sheets, and Toxic Responses of the Reproductive System (Dixon 1986).

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ENVIRONMENTAL WORKING GROUP™

Dishonorable Discharge

Delaware

Toxic pollution of Delaware waters (1990-1994)

Table 1. Total reported toxic pollution of Delaware waters (1990-1994).

Direct Water Discharges	1,245,579 Pounds
Estimated Sewer Discharges‡	3,705,571 Pounds
Total Discharges to Waters	**4,951,150 Pounds**

Table 2. Delaware waters receiving the greatest amounts of toxic pollution (1990-1994).

River or Water Body	Toxic chemical release to waterbody (pounds)
Delaware River	939,106
Red Clay Creek	167,467
Savannah Ditch	81,000
White Clay Creek	40,185
Swan Creek	12,216
Whartons Branch	759
Beaver Dam Branch	750
Little Mill Creek	250
Drawyer Creek	147

Table 3. Polluters reporting the greatest amounts of toxic chemicals discharged to Delaware waters (1990-1994).

Facility	City	Toxic chemical release to waters (pounds)
Star Enterprises	Delaware City	658,350
General Chemical Corp.	Claymont	241,600
NVF Co.	Yorklyn	167,467
Perdue Farms Inc.	Georgetown	81,000
NVF Co.*	Newark	40,185
Standard Chlorine Of	Delaware City	27,529
Townsends Inc.*	Millsboro	12,216
Occidental Chemical Corp.	Delaware City	5,459
Du Pont*	Seaford	3,559
Georgia Gulf Corp.	Delaware City	3,121

Table 4. Toxic chemicals discharged in the greatest amounts to Delaware waters (1990-1994).

Chemical	Toxic chemical release to waters (pounds)
Ammonia	465,099
Diethanolamine	462,255
Zinc compounds	207,909
Sulfuric acid	37,020
Ethylene glycol	25,723
Chlorine	17,931
Methanol	3,084
Benzene	2,741
Toluene	2,698
1,2,4-Trimethylbenzene	2,629

Table 5. Polluters reporting the greatest amounts of toxic chemicals discharged to Delaware sewage treatment facilities (1990-1994).

Facility	City	Toxic chemical release to sewers (pounds)
Ciba-Geigy	Newport	11,073,061
Noramco Of Delaware Inc.	Wilmington	1,672,483
ICI Surfactants Inc.	New Castle	886,447
Chrysler Corp.	Newark	503,553
James River Paper Co. Inc.	Newark	119,295
Conagra Broiler Co.	Milford	87,400
Playtex Prods. Inc.	Dover	86,600
Zeneca Inc.	New Castle	83,860
Du Pont	Newport	68,614
Rhone-Poulenc	New Castle	58,768

‡ Total discharges of toxic chemicals to sewer systems in Delaware was 14,822,284 in 1990-94. EPA estimates that 25% of all toxic discharges to sewers pass through sewage treatment plants to receiving waters (EPA 1995).

* This polluter did not report any discharges to water in 1994. See Table 9 for year to year pollution figures.

Source: Environmental Working Group. Compiled from U.S. Environmental Protection Agency, Toxics Release Inventory 1990-1994.

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ENVIRONMENTAL WORKING GROUP™

Dishonorable Discharge

Delaware

Toxic pollution of Delaware waters (1990-1994). Carcinogens, persistent toxic metals, and reproductive toxins

Table 6. Total carcinogens, persistent toxic metals, and reproductive toxins** discharged into Delaware waters (1990-1994).**

Carcinogens	4,115 Pounds
Persistent Toxic Metals	208,246 Pounds
Reproductive Toxins	8,425 Pounds
Total (see note)	**217,637 Pounds**

Note: The sum of carcinogens, persistent toxic metals, and reproductive toxins listed in Table 6 may be larger than the total because a chemical may be in one or more categories, i.e. a chemical may be both a carcinogen and a reproductive toxin. Chemicals were counted only once for the total in Table 6.

Table 7. Delaware waters receiving the greatest amounts of carcinogens, persistent toxic metals, and reproductive toxins** (1990-1994).**

Waters receiving the greatest amounts of carcinogenic chemicals in Delaware (1990-1994).**

River or Water Body	Carcinogens** released to waters (lbs.)
Delaware River	3,956
Drawyer Creek	147

Waters receiving the greatest amounts of persistent toxic metals in Delaware (1990-1994).

River or Water Body	Persistent toxic metals released to waters (lbs.)
Red Clay Creek	167,462
White Clay Creek	40,185
Little Mill Creek	250
Drawyer Creek	147
Delaware River	116

Waters receiving the greatest amounts of reproductive toxins in Delaware (1990-1994).**

River or Water Body	Reproductive toxins** released to waters (lbs.)
Delaware River	8,400

Table 8. Polluters reporting the greatest amounts of carcinogens, persistent toxic metals, and reproductive toxins** discharged to Delaware waters (1990-1994).**

Top dischargers of carcinogenic chemicals to Delaware waters (1990-1994).**

Facility	City	Carcinogens** released to waters (lbs.)
Star Enterprises	Delaware City	2,670
Standard Chlorine Of	Delaware City	1,088
Johnson Controls Inc.*	Middletown	147
ICI Surfactants Inc.	New Castle	139

Top dischargers of persistent toxic metals to Delaware waters (1990-1994).

Facility	City	Persistent toxic metals released to waters (lbs.)
NVF Co.	Yorklyn	167,462
NVF Co.*	Newark	40,185
General Motors Corp.*	Wilmington	250
Johnson Controls Inc.*	Middletown	147

Top dischargers of reproductive toxins to Delaware waters (1990-1994).**

Facility	City	Reproductive toxins** released to waters (lbs.)
Star Enterprises	Delaware City	7,900
ICI Surfactants Inc.	New Castle	307

* This polluter did not report any discharges to water in 1994. See Table 9 for year to year pollution figures.

** Carcinogens and reproductive toxins defined by the State of California Proposition 65, EPA's TRI Public Data Release and other literature. See full report for references.

Source: Environmental Working Group. Compiled from U.S. Environmental Protection Agency, Toxics Release Inventory 1990-1994.

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Dishonorable Discharge

The Delaware River in Delaware

Total toxic pollution reported (1990-1994): 939,106 Pounds

Table 1. Polluters discharging the greatest amounts of toxic chemicals to the Delaware River in Delaware (1990-1994).

Facility	City	Toxic chemical release to water (pounds)
Star Enterprises	Delaware City	658,350
General Chemical Corp.	Claymont	241,600
Standard Chlorine Of	Delaware City	27,529
Occidental Chemical Corp.	Delaware City	5,444
Georgia Gulf Corp.	Delaware City	3,121
ICI Surfactants Inc.	New Castle	1,776
Du Pont	Edgemoor	1,238

Table 2. Toxic chemicals discharged in the greatest amounts to the Delaware River in Delaware (1990-1994).

Chemical	Toxic chemical release to waterbody (pounds)
Diethanolamine	462,255
Ammonia	374,007
Sulfuric acid	37,015
Ethylene glycol	25,723
Chlorine	13,273
Benzene	2,741
Toluene	2,693
1,2,4-Trimethylbenzene	2,629
Xylene (mixed isomers)	2,585
Methyl tert-butyl ether	2,530

‡ The sum of carcinogens, persistent toxic metals, and reproductive toxins listed in Table 3 may be larger than the total because a chemical may be in one or more categories. Chemicals were counted only once for the total in Table 3.

* This polluter did not report any discharges to water in 1994. See Table 9 for year to year pollution figures.

** Carcinogens and reproductive toxins defined by the State of California Proposition 65, EPA's TRI Public Data Release and other literature. See full report for references.

Table 3. Total carcinogens, persistent toxic metals, and reproductive toxins** discharged to the Delaware River in Delaware (1990-1994).**

Carcinogens	3,956 Pounds
Persistent Toxic Metals	116 Pounds
Reproductive Toxins	8,400 Pounds
Total‡	**9,487 Pounds**

Table 4. Polluters reporting the greatest amounts of carcinogens, persistent toxic metals, and reproductive toxins** discharged to the Delaware River in Delaware (1990-1994).**

Top dischargers of carcinogens to the Delaware River in Delaware (1990-1994).**

Facility	City	Carcinogens** released to water (lbs)
Star Enterprises	Delaware City	2,670
Standard Chlorine Of	Delaware City	1,088
ICI Surfactants Inc.	New Castle	139

Top dischargers of persistent toxic metals to the Delaware River in Delaware (1990-1994).

Facility	City	Persistent toxic metals released to water (lbs)

Top dischargers of reproductive toxins to the Delaware River in Delaware (1990-1994).**

Facility	City	Reproductive toxins** released to water (lbs)
Star Enterprises	Delaware City	7,900
ICI Surfactants Inc.	New Castle	307

Source: Environmental Working Group. Compiled from U.S. Environmental Protection Agency, Toxics Release Inventory 1990-1994.

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Dishonorable Discharge

Red Clay Creek in Delaware

Total toxic pollution reported (1990-1994): 167,467 Pounds

Table 1. Polluters discharging the greatest amounts of toxic chemicals to Red Clay Creek in Delaware (1990-1994).

Facility	City	Toxic chemical release to water (pounds)
NVF Co.	Yorklyn	167,467

Table 2. Toxic chemicals discharged in the greatest amounts to Red Clay Creek in Delaware (1990-1994).

Chemical	Toxic chemical release to waterbody (pounds)
Zinc compounds	167,462

‡ The sum of carcinogens, persistent toxic metals, and reproductive toxins listed in Table 3 may be larger than the total because a chemical may be in one or more categories. Chemicals were counted only once for the total in Table 3.

* This polluter did not report any discharges to water in 1994. See Table 9 for year to year pollution figures.

** Carcinogens and reproductive toxins defined by the State of California Proposition 65, EPA's TRI Public Data Release and other literature. See full report for references.

Table 3. Total carcinogens, persistent toxic metals, and reproductive toxins** discharged to Red Clay Creek in Delaware (1990-1994).**

Carcinogens	0 Pounds
Persistent Toxic Metals	167,462 Pounds
Reproductive Toxins	0 Pounds
Total‡	**167,462 Pounds**

Table 4. Polluters reporting the greatest amounts of carcinogens, persistent toxic metals, and reproductive toxins** discharged to Red Clay Creek in Delaware (1990-1994).**

Top dischargers of carcinogens to Red Clay Creek in Delaware (1990-1994).**

Facility	City	Carcinogens** released to water (lbs)

Top dischargers of persistent toxic metals to Red Clay Creek in Delaware (1990-1994).

Facility	City	Persistent toxic metals released to water (lbs)
NVF Co.	Yorklyn	167,462

Top dischargers of reproductive toxins to Red Clay Creek in Delaware (1990-1994).**

Facility	City	Reproductive toxins** released to water (lbs)

Source: Environmental Working Group. Compiled from U.S. Environmental Protection Agency, Toxics Release Inventory 1990-1994.

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Dishonorable Discharge

The Savannah Ditch in Delaware

Total toxic pollution reported (1990-1994): 81,000 Pounds

Table 1. Polluters discharging the greatest amounts of toxic chemicals to the Savannah Ditch in Delaware (1990-1994).

Facility	City	Toxic chemical release to water (pounds)
Perdue Farms Inc.	Georgetown	81,000

Table 2. Toxic chemicals discharged in the greatest amounts to the Savannah Ditch in Delaware (1990-1994).

Chemical	Toxic chemical release to waterbody (pounds)
Ammonia	81,000

‡ The sum of carcinogens, persistent toxic metals, and reproductive toxins listed in Table 3 may be larger than the total because a chemical may be in one or more categories. Chemicals were counted only once for the total in Table 3.

* This polluter did not report any discharges to water in 1994. See Table 9 for year to year pollution figures.

** Carcinogens and reproductive toxins defined by the State of California Proposition 65, EPA's TRI Public Data Release and other literature. See full report for references.

Table 3. Total carcinogens, persistent toxic metals, and reproductive toxins** discharged to the Savannah Ditch in Delaware (1990-1994).**

Carcinogens	0 Pounds
Persistent Toxic Metals	0 Pounds
Reproductive Toxins	0 Pounds
Total‡	**0 Pounds**

Table 4. Polluters reporting the greatest amounts of carcinogens, persistent toxic metals, and reproductive toxins** discharged to the Savannah Ditch in Delaware (1990-1994).**

Top dischargers of carcinogens to the Savannah Ditch in Delaware (1990-1994).**

Facility	City	Carcinogens** released to water (lbs)

Top dischargers of persistent toxic metals to the Savannah Ditch in Delaware (1990-1994).

Facility	City	Persistent toxic metals released to water (lbs)

Top dischargers of reproductive toxins to the Savannah Ditch in Delaware (1990-1994).**

Facility	City	Reproductive toxins** released to water (lbs)

Source: Environmental Working Group. Compiled from U.S. Environmental Protection Agency, Toxics Release Inventory 1990-1994.

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Dishonorable Discharge

White Clay Creek in Delaware

Total toxic pollution reported (1990-1994): 40,185 Pounds

Table 1. Polluters discharging the greatest amounts of toxic chemicals to White Clay Creek in Delaware (1990-1994).

Facility	City	Toxic chemical release to water (pounds)
NVF Co.*	Newark	40,185

Table 2. Toxic chemicals discharged in the greatest amounts to White Clay Creek in Delaware (1990-1994).

Chemical	Toxic chemical release to waterbody (pounds)
Zinc compounds	40,185

‡ The sum of carcinogens, persistent toxic metals, and reproductive toxins listed in Table 3 may be larger than the total because a chemical may be in one or more categories. Chemicals were counted only once for the total in Table 3.

* This polluter did not report any discharges to water in 1994. See Table 9 for year to year pollution figures.

** Carcinogens and reproductive toxins defined by the State of California Proposition 65, EPA's TRI Public Data Release and other literature. See full report for references.

Table 3. Total carcinogens, persistent toxic metals, and reproductive toxins** discharged to White Clay Creek in Delaware (1990-1994).**

Carcinogens	0 Pounds
Persistent Toxic Metals	40,185 Pounds
Reproductive Toxins	0 Pounds
Total‡	**40,185 Pounds**

Table 4. Polluters reporting the greatest amounts of carcinogens, persistent toxic metals, and reproductive toxins** discharged to White Clay Creek in Delaware (1990-1994).**

Top dischargers of carcinogens to White Clay Creek in Delaware (1990-1994).**

Facility	City	Carcinogens** released to water (lbs)

Top dischargers of persistent toxic metals to White Clay Creek in Delaware (1990-1994).

Facility	City	Persistent toxic metals released to water (lbs)
NVF Co.*	Newark	40,185

Top dischargers of reproductive toxins to White Clay Creek in Delaware (1990-1994).**

Facility	City	Reproductive toxins** released to water (lbs)

Source: Environmental Working Group. Compiled from U.S. Environmental Protection Agency, Toxics Release Inventory 1990-1994.

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Dishonorable Discharge

Swan Creek in Delaware

Total toxic pollution reported (1990-1994): 12,216 Pounds

Table 1. Polluters discharging the greatest amounts of toxic chemicals to Swan Creek in Delaware (1990-1994).

Facility	City	Toxic chemical release to water (pounds)
Townsends Inc.*	Millsboro	12,216

Table 2. Toxic chemicals discharged in the greatest amounts to Swan Creek in Delaware (1990-1994).

Chemical	Toxic chemical release to waterbody (pounds)
Ammonia	10,092
Chlorine	2,124

‡ The sum of carcinogens, persistent toxic metals, and reproductive toxins listed in Table 3 may be larger than the total because a chemical may be in one or more categories. Chemicals were counted only once for the total in Table 3.

* This polluter did not report any discharges to water in 1994. See Table 9 for year to year pollution figures.

** Carcinogens and reproductive toxins defined by the State of California Proposition 65, EPA's TRI Public Data Release and other literature. See full report for references.

Table 3. Total carcinogens, persistent toxic metals, and reproductive toxins** discharged to Swan Creek in Delaware (1990-1994).**

Carcinogens	0 Pounds
Persistent Toxic Metals	0 Pounds
Reproductive Toxins	0 Pounds
Total‡	**0 Pounds**

Table 4. Polluters reporting the greatest amounts of carcinogens, persistent toxic metals, and reproductive toxins** discharged to Swan Creek in Delaware (1990-1994).**

Top dischargers of carcinogens to Swan Creek in Delaware (1990-1994).**

Facility	City	Carcinogens** released to water (lbs)

Top dischargers of persistent toxic metals to Swan Creek in Delaware (1990-1994).

Facility	City	Persistent toxic metals released to water (lbs)

Top dischargers of reproductive toxins to Swan Creek in Delaware (1990-1994).**

Facility	City	Reproductive toxins** released to water (lbs)

Source: Environmental Working Group. Compiled from U.S. Environmental Protection Agency, Toxics Release Inventory 1990-1994.

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Dishonorable Discharge

Whartons Branch in Delaware

Total toxic pollution reported (1990-1994): 759 Pounds

Table 1. Polluters discharging the greatest amounts of toxic chemicals to Whartons Branch in Delaware (1990-1994).

Facility	City	Toxic chemical release to water (pounds)
Vlasic Foods Inc.*	Millsboro	759

Table 2. Toxic chemicals discharged in the greatest amounts to Whartons Branch in Delaware (1990-1994).

Chemical	Toxic chemical release to waterbody (pounds)
Chlorine	759

‡ The sum of carcinogens, persistent toxic metals, and reproductive toxins listed in Table 3 may be larger than the total because a chemical may be in one or more categories. Chemicals were counted only once for the total in Table 3.

* This polluter did not report any discharges to water in 1994. See Table 9 for year to year pollution figures.

** Carcinogens and reproductive toxins defined by the State of California Proposition 65, EPA's TRI Public Data Release and other literature. See full report for references.

Table 3. Total carcinogens, persistent toxic metals, and reproductive toxins** discharged to Whartons Branch in Delaware (1990-1994).**

Carcinogens	0 Pounds
Persistent Toxic Metals	0 Pounds
Reproductive Toxins	0 Pounds
Total‡	**0 Pounds**

Table 4. Polluters reporting the greatest amounts of carcinogens, persistent toxic metals, and reproductive toxins** discharged to Whartons Branch in Delaware (1990-1994).**

Top dischargers of carcinogens to Whartons Branch in Delaware (1990-1994).**

Facility	City	Carcinogens** released to water (lbs)

Top dischargers of persistent toxic metals to Whartons Branch in Delaware (1990-1994).

Facility	City	Persistent toxic metals released to water (lbs)

Top dischargers of reproductive toxins to Whartons Branch in Delaware (1990-1994).**

Facility	City	Reproductive toxins** released to water (lbs)

Source: Environmental Working Group. Compiled from U.S. Environmental Protection Agency, Toxics Release Inventory 1990-1994.

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Dishonorable Discharge

Beaver Dam Branch in Delaware

Total toxic pollution reported (1990-1994): 750 Pounds

Table 1. Polluters discharging the greatest amounts of toxic chemicals to Beaver Dam Branch in Delaware (1990-1994).

Facility	City	Toxic chemical release to water (pounds)
Allen Family Foods Inc.*	Harbeson	750

Table 2. Toxic chemicals discharged in the greatest amounts to Beaver Dam Branch in Delaware (1990-1994).

Chemical	Toxic chemical release to waterbody (pounds)
Chlorine	750

‡ The sum of carcinogens, persistent toxic metals, and reproductive toxins listed in Table 3 may be larger than the total because a chemical may be in one or more categories. Chemicals were counted only once for the total in Table 3.

* This polluter did not report any discharges to water in 1994. See Table 9 for year to year pollution figures.

** Carcinogens and reproductive toxins defined by the State of California Proposition 65, EPA's TRI Public Data Release and other literature. See full report for references.

Table 3. Total carcinogens, persistent toxic metals, and reproductive toxins** discharged to Beaver Dam Branch in Delaware (1990-1994).**

Carcinogens	0 Pounds
Persistent Toxic Metals	0 Pounds
Reproductive Toxins	0 Pounds
Total‡	**0 Pounds**

Table 4. Polluters reporting the greatest amounts of carcinogens, persistent toxic metals, and reproductive toxins** discharged to Beaver Dam Branch in Delaware (1990-1994).**

Top dischargers of carcinogens to Beaver Dam Branch in Delaware (1990-1994).**

Facility	City	Carcinogens** released to water (lbs)

Top dischargers of persistent toxic metals to Beaver Dam Branch in Delaware (1990-1994).

Facility	City	Persistent toxic metals released to water (lbs)

Top dischargers of reproductive toxins to Beaver Dam Branch in Delaware (1990-1994).**

Facility	City	Reproductive toxins** released to water (lbs)

Source: Environmental Working Group. Compiled from U.S. Environmental Protection Agency, Toxics Release Inventory 1990-1994.

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Dishonorable Discharge

Little Mill Creek in Delaware

Total toxic pollution reported (1990-1994): 250 Pounds

Table 1. Polluters discharging the greatest amounts of toxic chemicals to Little Mill Creek in Delaware (1990-1994).

Facility	City	Toxic chemical release to water (pounds)
General Motors Corp.*	Wilmington	250

Table 2. Toxic chemicals discharged in the greatest amounts to Little Mill Creek in Delaware (1990-1994).

Chemical	Toxic chemical release to waterbody (pounds)
Zinc compounds	250

‡ The sum of carcinogens, persistent toxic metals, and reproductive toxins listed in Table 3 may be larger than the total because a chemical may be in one or more categories. Chemicals were counted only once for the total in Table 3.

* This polluter did not report any discharges to water in 1994. See Table 9 for year to year pollution figures.

** Carcinogens and reproductive toxins defined by the State of California Proposition 65, EPA's TRI Public Data Release and other literature. See full report for references.

Table 3. Total carcinogens, persistent toxic metals, and reproductive toxins** discharged to Little Mill Creek in Delaware (1990-1994).**

Carcinogens	0 Pounds
Persistent Toxic Metals	250 Pounds
Reproductive Toxins	0 Pounds
Total‡	**250 Pounds**

Table 4. Polluters reporting the greatest amounts of carcinogens, persistent toxic metals, and reproductive toxins** discharged to Little Mill Creek in Delaware (1990-1994).**

Top dischargers of carcinogens to Little Mill Creek in Delaware (1990-1994).**

Facility	City	Carcinogens** released to water (lbs)

Top dischargers of persistent toxic metals to Little Mill Creek in Delaware (1990-1994).

Facility	City	Persistent toxic metals released to water (lbs)
General Motors Corp.*	Wilmington	250

Top dischargers of reproductive toxins to Little Mill Creek in Delaware (1990-1994).**

Facility	City	Reproductive toxins** released to water (lbs)

Source: Environmental Working Group. Compiled from U.S. Environmental Protection Agency, Toxics Release Inventory 1990-1994.

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Dishonorable Discharge

Drawyer Creek in Delaware

Total toxic pollution reported (1990-1994): 147 Pounds

Table 1. Polluters discharging the greatest amounts of toxic chemicals to Drawyer Creek in Delaware (1990-1994).

Facility	City	Toxic chemical release to water (pounds)
Johnson Controls Inc.*	Middletown	147

Table 2. Toxic chemicals discharged in the greatest amounts to Drawyer Creek in Delaware (1990-1994).

Chemical	Toxic chemical release to waterbody (pounds)
Lead compounds	147

‡ The sum of carcinogens, persistent toxic metals, and reproductive toxins listed in Table 3 may be larger than the total because a chemical may be in one or more categories. Chemicals were counted only once for the total in Table 3.

* This polluter did not report any discharges to water in 1994. See Table 9 for year to year pollution figures.

** Carcinogens and reproductive toxins defined by the State of California Proposition 65, EPA's TRI Public Data Release and other literature. See full report for references.

Table 3. Total carcinogens, persistent toxic metals, and reproductive toxins** discharged to Drawyer Creek in Delaware (1990-1994).**

Carcinogens	147 Pounds
Persistent Toxic Metals	147 Pounds
Reproductive Toxins	0 Pounds
Total‡	**147 Pounds**

Table 4. Polluters reporting the greatest amounts of carcinogens, persistent toxic metals, and reproductive toxins** discharged to Drawyer Creek in Delaware (1990-1994).**

Top dischargers of carcinogens to Drawyer Creek in Delaware (1990-1994).**

Facility	City	Carcinogens** released to water (lbs)
Johnson Controls Inc.*	Middletown	147

Top dischargers of persistent toxic metals to Drawyer Creek in Delaware (1990-1994).

Facility	City	Persistent toxic metals released to water (lbs)
Johnson Controls Inc.*	Middletown	147

Top dischargers of reproductive toxins to Drawyer Creek in Delaware (1990-1994).**

Facility	City	Reproductive toxins** released to water (lbs)

Source: Environmental Working Group. Compiled from U.S. Environmental Protection Agency, Toxics Release Inventory 1990-1994.

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