

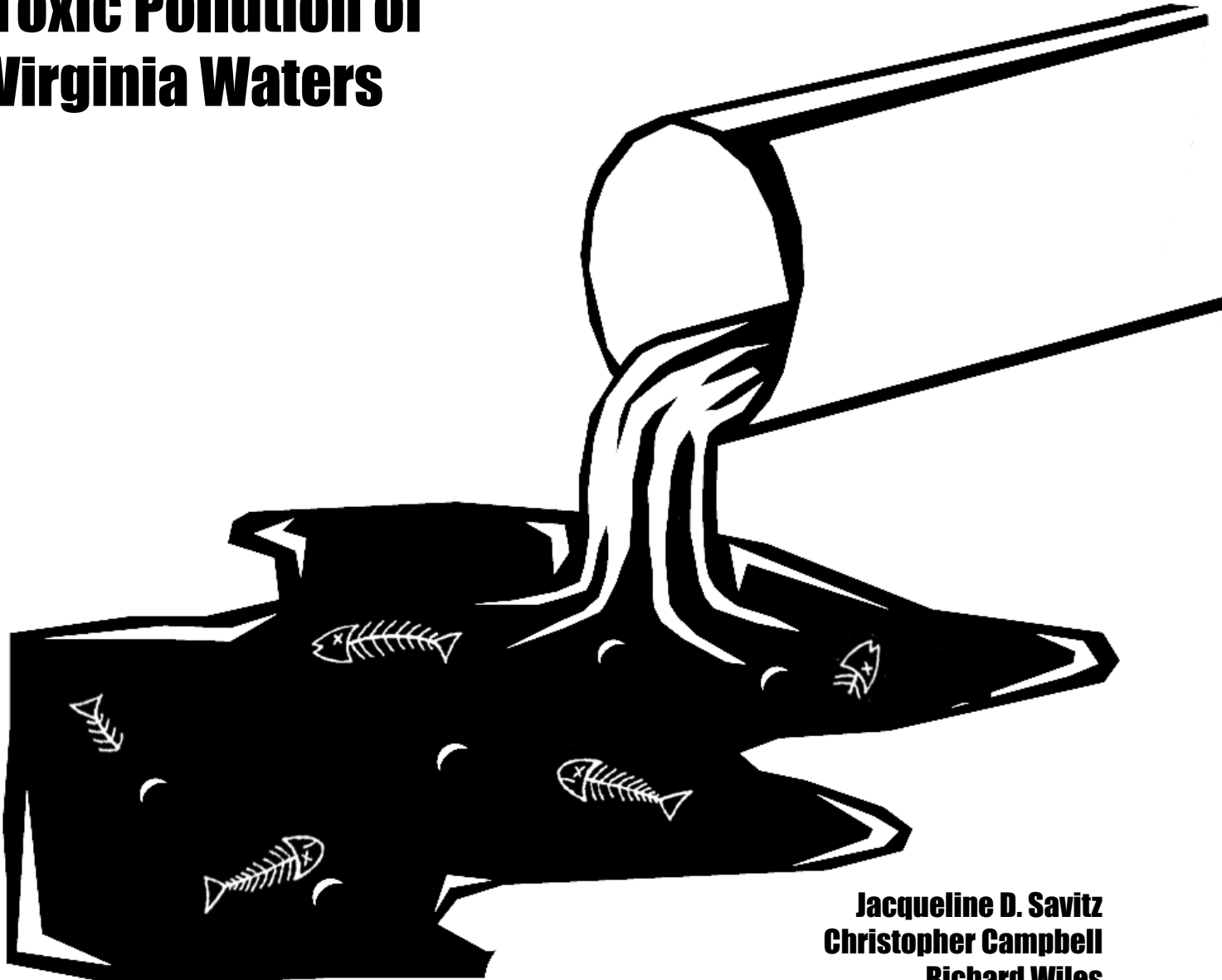


The State PIRGs



Dishonorable Discharge

Toxic Pollution of Virginia Waters



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Toxic Pollution of Virginia Waters

Executive Summary

Most Virginia 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 Virginia streams and rivers.

The citizens of Virginia 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 Virginia and nationwide.

Factories and other industrial facilities dumped more than 10.1 million pounds of toxic substances directly into Virginia's waters between 1990 and 1994, according to a new analysis of the federal Toxics Release Inventory (TRI) (Table 1). Virginia ranked 14th 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 ninety million pounds of toxic materials were flushed to sewage treatment plants in Virginia from 1990 through 1994, 8th 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 Virginia raises the total amount of toxics dumped to the state's waters to an estimated 32 million pounds (Table 1).

Gravelly Run received the greatest amount of toxic water pollution in Virginia from 1990-1994, a total of 6,330,000 pounds, followed by the Blackwater River, the James River, and the Elizabeth River (Table 2). The ten most polluted waterways in Virginia received 9,780,000 pounds of toxic pollution between 1990 and 1994, 97.2% percent of the total in the State.

The top three facilities reporting the most toxic pollution of Virginia's waters over this period were Allied-Signal Inc. in Hopewell, which dumped 6,400,000 pounds of

toxic chemicals, followed by Union Camp Corporation, and Westvaco Corporation in the towns of Franklin, and Covington, respectively (Table 3). The toxic chemicals dumped in the greatest amounts were ammonia, a total of 7,250,000 pounds, followed by ammonium nitrate solution, and methanol (Table 4).

Westvaco Corporation dumped the most carcinogens into Virginia's waters, a total of 22,300 pounds, followed by Hercules Inc. and Chesapeake Paper Products Company (Table 8). The Jackson River received the greatest amount of cancer-causing toxic chemicals in Virginia, a total of 22,000 pounds, followed by the Nottoway River and the Pamunkey River (Table 7).

Georgia-Pacific Corporation dumped the greatest amount of persistent toxic metals in Virginia's waters, a total of 30,000 pounds, followed by Philip Morris USA and Mann Ind. Inc.* (Table 8). The James River received the greatest amount of persistent toxic metals, a total of 56,000 pounds, followed by the Elizabeth River and an unnamed tributary to Wood Creek (Table 7).

Merck & Company Inc. dumped the greatest amount of toxic chemicals that cause reproductive damage or birth defects into Virginia's waters, a total of 58,000 pounds, followed by U.S. Navy and Allied-Signal Inc. (Table 8). The Shenandoah River received the greatest amount of toxic chemicals that cause reproductive damage or birth defects, a total of 58,000 pounds, followed by Willougeby Bay and Gravelly Run (Table 7).

These discharges to Virginia's waters include only those wastes released by companies physically located in Virginia. 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). In Virginia, over 9,000 miles of lakes surveyed had elevated levels 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 90¹ 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 343² 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 sewers 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 Virginia’s waters, we used EPA’s assumption that 25 percent of all toxic chemicals transferred to POTWs pass-through untreated³. Table 1 presents the EWG estimate of toxic chemicals assumed to be discharged by the POTWs in Virginia. 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 also 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 pounds⁴ 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

¹Estimate 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).

²The 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.

³EPA 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.

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

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
Toluene
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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Virginia

Toxic pollution of Virginia waters (1990-1994)

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

Direct Water Discharges	10,061,147 Pounds
Estimated Sewer Discharges‡	21,929,336 Pounds
Total Discharges to Waters	31,990,483 Pounds

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

River or Water Body	Toxic chemical release to waterbody (pounds)
Gravelly Run	6,330,209
Blackwater River	1,488,346
James River	566,612
Elizabeth River	397,692
Jackson River	369,329
Smith River	301,589
Shenandoah River	146,354
Poythress Run	70,383
John H. Kerr Reservoir	59,173
Roanoke River	48,583

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

Facility	City	Toxic chemical release to waters (pounds)
Allied-Signal Inc.	Hopewell	6,400,592
Union Camp Corp.	Franklin	1,488,346
Westvaco Corp.	Covington	369,130
Du Pont	Richmond	364,648
Du Pont*	Martinsville	299,195
J. H. Miles & Co. Inc.	Norfolk	248,133
Merck & Co. Inc.	Elkton	140,110
Hoechst Celanese Corp.	Portsmouth	111,014
Philip Morris USA	Chester	85,457
Clarksville Finishing Plant	Clarksville	59,173

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

Chemical	Toxic chemical release to waters (pounds)
Ammonia	7,246,791
Ammonium nitrate (solution)	1,836,071
Methanol	368,076
Chlorine	147,985
Xylene (mixed isomers)	58,435
Acetone	45,418
Sulfuric acid	44,347
Zinc compounds	44,185
Chloroform	36,312
Glycol ethers	23,901

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

Facility	City	Toxic chemical release to sewers (pounds)
Hercules	Hopewell	31,940,718
Stone Container Corp.	Hopewell	25,167,400
Allied-Signal Inc.	Hopewell	22,774,991
B. I. Chemicals Inc.	Petersburg	2,796,724
Goldschmidt Chemical Corp.	Hopewell	595,967
Sterilization Services Of VA	Richmond	386,843
Westover Dairy	Lynchburg	285,832
Wood Fiber Ind.	Danville	280,531
AT&T	Richmond	274,830
Anheuser-Busch Inc.	Williamsburg	265,754

‡ Total discharges of toxic chemicals to sewer systems in Virginia was 87,717,344 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.

Virginia

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

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

Carcinogens	82,282 Pounds
Persistent Toxic Metals	88,893 Pounds
Reproductive Toxins	96,916 Pounds
Total (see note)	257,422 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. Virginia waters receiving the greatest amounts of carcinogens, persistent toxic metals, and reproductive toxins** (1990-1994).**

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

River or Water Body	Carcinogens** released to waters (lbs.)
Jackson River	22,300
Nottoway River	20,689
Pamunkey River	14,436
James River	12,331
Blackwater River	4,135

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

River or Water Body	Persistent toxic metals released to waters (lbs.)
James River	56,022
Elizabeth River	6,954
Unnamed Tributary To Wood Creek	4,521
Maury River	4,462
Rutledge Creek	3,505

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

River or Water Body	Reproductive toxins** released to waters (lbs.)
Shenandoah River	58,180
Willougeby Bay	16,000
Gravelly Run	12,445
Maury River	5,996
Smith River	2,098

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

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

Facility	City	Carcinogens** released to waters (lbs.)
Westvaco Corp.	Covington	22,300
Hercules Inc.	Franklin	20,689
Chesapeake Paper Prods. Co.	West Point	14,436
Georgia-Pacific Corp.	Big Island	4,300
ICI Americas Inc.	Hopewell	4,151

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

Facility	City	Persistent toxic metals released to waters (lbs.)
Georgia-Pacific Corp.	Big Island	29,524
Philip Morris USA	Chester	16,523
Mann Ind. Inc.*	Williamsburg	5,762
Newport News Shipbuilding	Newport News	4,520
Chesapeake Prods. Inc.	Chesapeake	4,233

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

Facility	City	Reproductive toxins** released to waters (lbs.)
Merck & Co. Inc.	Elkton	58,180
U.S. Navy	Norfolk	16,000
Allied-Signal Inc.	Hopewell	12,445
Lees Carpets	Glasgow	5,996
Liberty Fabrics Inc.	Woolwine	1,848

* 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.

The Environmental Working Group is a non-profit environmental research organization based in Washington, D.C.
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Gravelly Run in Virginia

Total toxic pollution reported (1990-1994): 6,330,209 Pounds

Table 1. Polluters discharging the greatest amounts of toxic chemicals to Gravelly Run in Virginia (1990-1994).

Facility	City	Toxic chemical release to water (pounds)
Allied-Signal Inc.	Hopewell	6,330,209

Table 2. Toxic chemicals discharged in the greatest amounts to Gravelly Run in Virginia (1990-1994).

Chemical	Toxic chemical release to waterbody (pounds)
Ammonia	4,435,139
Ammonium nitrate (solution)	1,835,821
Sulfuric acid	41,340
Toluene	9,464
Phenol	3,290
Benzene	2,981
Ethylbenzene	1,817
Chlorine	347

‡ 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 Gravelly Run in Virginia (1990-1994).**

Carcinogens	2,981 Pounds
Persistent Toxic Metals	0 Pounds
Reproductive Toxins	12,445 Pounds
Total‡	12,445 Pounds

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

Top dischargers of carcinogens to Gravelly Run in Virginia (1990-1994).**

Facility	City	Carcinogens** released to water (lbs)
Allied-Signal Inc.	Hopewell	2,981

Top dischargers of persistent toxic metals to Gravelly Run in Virginia (1990-1994).

Facility	City	Persistent toxic metals released to water (lbs)

Top dischargers of reproductive toxins to Gravelly Run in Virginia (1990-1994).**

Facility	City	Reproductive toxins** released to water (lbs)
Allied-Signal Inc.	Hopewell	12,445

The Blackwater River in Virginia

Total toxic pollution reported (1990-1994): 1,488,346 Pounds

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

Facility	City	Toxic chemical release to water (pounds)
Union Camp Corp.	Franklin	1,488,346

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

Chemical	Toxic chemical release to waterbody (pounds)
Ammonia	1,474,500
Catechol	8,474
Chloroform	4,105
Methanol	776
Acetone	424

‡ 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 Blackwater River in Virginia (1990-1994).**

Carcinogens	4,135 Pounds
Persistent Toxic Metals	0 Pounds
Reproductive Toxins	0 Pounds
Total‡	4,135 Pounds

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

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

Facility	City	Carcinogens** released to water (lbs)
Union Camp Corp.	Franklin	4,135

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

Facility	City	Persistent toxic metals released to water (lbs)

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

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

The James River in Virginia

Total toxic pollution reported (1990-1994): 566,612 Pounds

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

Facility	City	Toxic chemical release to water (pounds)
Du Pont	Richmond	364,648
Philip Morris USA	Chester	85,457
Georgia-Pacific Corp.	Big Island	57,199
ICI Americas Inc.	Hopewell	18,347
Allied-Signal Inc.	Chester	17,600
Brown & Williamson Tobacco*	Chester	7,621
Newport News Shipbuilding	Newport News	4,520
Lynchburg Fndy. Co.	Lynchburg	3,729
Babcock & Wilcox Co.	Lynchburg	3,328
Hanson Porcelain Co. Inc.	Lynchburg	

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

Chemical	Toxic chemical release to waterbody (pounds)
Ammonia	376,312
Chlorine	82,182
Zinc compounds	31,051
Methanol	23,669
Zinc (fume or dust)	18,295
Ethylene glycol	9,959
Acetaldehyde	8,451
Biphenyl	5,500
Bis(2-ethylhexyl) adipate	1,969
Nickel compounds	1,574

‡ 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 James River in Virginia (1990-1994).**

Carcinogens	12,331 Pounds
Persistent Toxic Metals	56,022 Pounds
Reproductive Toxins	929 Pounds
Total‡	65,653 Pounds

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

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

Facility	City	Carcinogens** released to water (lbs)
Georgia-Pacific Corp.	Big Island	4,300
ICI Americas Inc.	Hopewell	4,151
Newport News Shipbuilding	Newport News	1,765
Hanson Porcelain Co. Inc.	Lynchburg	1,020
Du Pont	Richmond	771

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

Facility	City	Persistent toxic metals released to water (lbs)
Georgia-Pacific Corp.	Big Island	29,524
Philip Morris USA	Chester	16,523
Newport News Shipbuilding	Newport News	4,520
Hanson Porcelain Co. Inc.	Lynchburg	2,030
Lynchburg Fndy. Co.	Lynchburg	1,217

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

Facility	City	Reproductive toxins** released to water (lbs)
Hanson Porcelain Co. Inc.	Lynchburg	520
Du Pont	Richmond	409

The Elizabeth River in Virginia

Total toxic pollution reported (1990-1994): 397,692 Pounds

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

Facility	City	Toxic chemical release to water (pounds)
J. H. Miles & Co. Inc.	Norfolk	248,133
Hoechst Celanese Corp.	Portsmouth	111,014
Weaver Fertilizer Co. Inc.	Chesapeake	31,660
Chesapeake Prods. Inc.	Chesapeake	4,268
Norshipco*	Norfolk	1,850
U.S. Navy	Portsmouth	765

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

Chemical	Toxic chemical release to waterbody (pounds)
Ammonia	390,701
Copper compounds	3,050
Zinc compounds	2,277
Manganese compounds	1,112
Lead compounds	515

‡ 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 Elizabeth River in Virginia (1990-1994).**

Carcinogens	522 Pounds
Persistent Toxic Metals	6,954 Pounds
Reproductive Toxins	5 Pounds
Total‡	6,966 Pounds

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

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

Facility	City	Carcinogens** released to water (lbs)
Chesapeake Prods. Inc.	Chesapeake	515

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

Facility	City	Persistent toxic metals released to water (lbs)
Chesapeake Prods. Inc.	Chesapeake	4,233
Norshipco*	Norfolk	1,850
U.S. Navy	Portsmouth	750
Hoechst Celanese Corp.	Portsmouth	121

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

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

The Jackson River in Virginia

Total toxic pollution reported (1990-1994): 369,329 Pounds

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

Facility	City	Toxic chemical release to water (pounds)
Westvaco Corp.	Covington	369,130
Applied Extrusion Techs. Inc.	Covington	199

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

Chemical	Toxic chemical release to waterbody (pounds)
Methanol	323,000
Chloroform	17,000
Acetone	15,900
Ammonia	4,440
Acetaldehyde	4,000
Methyl ethyl ketone	2,010
Phenol	1,310
Formaldehyde	1,300
Acrylic acid	196
Cresol (mixed isomers)	170

‡ 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 Jackson River in Virginia (1990-1994).**

Carcinogens	22,300 Pounds
Persistent Toxic Metals	0 Pounds
Reproductive Toxins	0 Pounds
Total‡	22,300 Pounds

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

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

Facility	City	Carcinogens** released to water (lbs)
Westvaco Corp.	Covington	22,300

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

Facility	City	Persistent toxic metals released to water (lbs)
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Top dischargers of reproductive toxins to the Jackson River in Virginia (1990-1994).**

Facility	City	Reproductive toxins** released to water (lbs)
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The Smith River in Virginia

Total toxic pollution reported (1990-1994): 301,589 Pounds

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

Facility	City	Toxic chemical release to water (pounds)
Du Pont*	Martinsville	299,195
Liberty Fabrics Inc.	Woolwine	1,889
Virginia Mirror Co. Inc.*	Martinsville	250
Courtaulds Performance Films*	Fieldale	250

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

Chemical	Toxic chemical release to waterbody (pounds)
Ammonia	299,190
Glycol ethers	1,848
Xylene (mixed isomers)	250
Ethylene glycol	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 the Smith River in Virginia (1990-1994).**

Carcinogens	0 Pounds
Persistent Toxic Metals	41 Pounds
Reproductive Toxins	2,098 Pounds
Total‡	2,139 Pounds

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

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

Facility	City	Carcinogens** released to water (lbs)

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

Facility	City	Persistent toxic metals released to water (lbs)

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

Facility	City	Reproductive toxins** released to water (lbs)
Liberty Fabrics Inc.	Woolwine	1,848
Virginia Mirror Co. Inc.*	Martinsville	250

The Shenandoah River in Virginia

Total toxic pollution reported (1990-1994): 146,354 Pounds

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

Facility	City	Toxic chemical release to water (pounds)
Merck & Co. Inc.	Elkton	140,110
Coors Brewing Co.	Elkton	6,244

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

Chemical	Toxic chemical release to waterbody (pounds)
Xylene (mixed isomers)	58,180
Acetone	20,830
Methanol	18,380
Cyanide compounds	15,470
Ethylbenzene	14,400
Ammonia	11,787
Chlorine	4,927
Chloromethane	2,330

‡ 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 Shenandoah River in Virginia (1990-1994).**

Carcinogens	0 Pounds
Persistent Toxic Metals	0 Pounds
Reproductive Toxins	58,180 Pounds
Total‡	58,180 Pounds

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

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

Facility	City	Carcinogens** released to water (lbs)

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

Facility	City	Persistent toxic metals released to water (lbs)

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

Facility	City	Reproductive toxins** released to water (lbs)
Merck & Co. Inc.	Elkton	58,180

Poythress Run in Virginia

Total toxic pollution reported (1990-1994): 70,383 Pounds

Table 1. Polluters discharging the greatest amounts of toxic chemicals to Poythress Run in Virginia (1990-1994).

Facility	City	Toxic chemical release to water (pounds)
Allied-Signal Inc.	Hopewell	70,383

Table 2. Toxic chemicals discharged in the greatest amounts to Poythress Run in Virginia (1990-1994).

Chemical	Toxic chemical release to waterbody (pounds)
Ammonia	70,365

‡ 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 Poythress Run in Virginia (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 Poythress Run in Virginia (1990-1994).**

Top dischargers of carcinogens to Poythress Run in Virginia (1990-1994).**

Facility	City	Carcinogens** released to water (lbs)

Top dischargers of persistent toxic metals to Poythress Run in Virginia (1990-1994).

Facility	City	Persistent toxic metals released to water (lbs)

Top dischargers of reproductive toxins to Poythress Run in Virginia (1990-1994).**

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

The John H. Kerr Reservoir in Virginia

Total toxic pollution reported (1990-1994): 59,173 Pounds

Table 1. Polluters discharging the greatest amounts of toxic chemicals to the John H. Kerr Reservoir in Virginia (1990-1994).

Facility	City	Toxic chemical release to water (pounds)
Clarksville Finishing Plant	Clarksville	59,173

Table 2. Toxic chemicals discharged in the greatest amounts to the John H. Kerr Reservoir in Virginia (1990-1994).

Chemical	Toxic chemical release to waterbody (pounds)
Chlorine	33,831
Ammonia	21,368
Chromium compounds	2,503
1,2,4-Trichlorobenzene	1,148
Biphenyl	323

‡ 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 John H. Kerr Reservoir in Virginia (1990-1994).**

Carcinogens	0 Pounds
Persistent Toxic Metals	2,503 Pounds
Reproductive Toxins	0 Pounds
Total‡	2,503 Pounds

Table 4. Polluters reporting the greatest amounts of carcinogens, persistent toxic metals, and reproductive toxins** discharged to the John H. Kerr Reservoir in Virginia (1990-1994).**

Top dischargers of carcinogens to the John H. Kerr Reservoir in Virginia (1990-1994).**

Facility	City	Carcinogens** released to water (lbs)

Top dischargers of persistent toxic metals to the John H. Kerr Reservoir in Virginia (1990-1994).

Facility	City	Persistent toxic metals released to water (lbs)
Clarksville Finishing Plant	Clarksville	2,503

Top dischargers of reproductive toxins to the John H. Kerr Reservoir in Virginia (1990-1994).**

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

The Roanoke River in Virginia

Total toxic pollution reported (1990-1994): 48,583 Pounds

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

Facility	City	Toxic chemical release to water (pounds)
Hurt Finishing	Hurt	48,292
Federal-Mogul Corp.*	Blacksburg	166

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

Chemical	Toxic chemical release to waterbody (pounds)
Ammonia	41,600
Chlorine	3,602
Ethylene glycol	3,043
Copper compounds	113

‡ 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 Roanoke River in Virginia (1990-1994).**

Carcinogens	35 Pounds
Persistent Toxic Metals	290 Pounds
Reproductive Toxins	15 Pounds
Total‡	305 Pounds

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

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

Facility	City	Carcinogens** released to water (lbs)

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

Facility	City	Persistent toxic metals released to water (lbs)
Federal-Mogul Corp.*	Blacksburg	163

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

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