A TOXIC FLOOD

Why We Need Stronger Regulations to Protect Public Health From Industrial Water Pollution
Food & Water Watch works to ensure the food, water and fish we consume is safe, accessible and sustainable. So we can all enjoy and trust in what we eat and drink, we help people take charge of where their food comes from, keep clean, affordable, public tap water flowing freely to our homes, protect the environmental quality of oceans, force government to do its job protecting citizens, and educate about the importance of keeping shared resources under public control.

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About Food & Water Watch

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Revision

In 2014, Ohio Valley Electric, previously ranked at number one among the Toxic 100 Water Polluters, submitted new data to the U.S. E.P.A. revising its 2009 TRI reporting. Ohio Valley Electric has revised its reported water release of 27,090 pounds arsenic or arsenic compounds to 814 pounds. Based on the revision, Ohio Valley Electric is ranked 28th on the Toxic 100 Water Polluters with a RSEI Hazard of 1,249,698,036. The next edition of the Toxic 100 will reflect the most current information from U.S. E.P.A. The detailed data in this document do not reflect this revision.
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Executive Summary

Industrial facilities across the United States released more than 200 million pounds of toxic chemicals into our nation’s waterways in 2009. Many of these chemicals are known to increase the risk of cancer, reproductive and developmental problems, and a range of other health issues. In addition to chemicals known to be toxic, industry used and disposed of tens of thousands of other chemicals that have not been adequately evaluated and whose potential risks to human health are thus unknown.

The reality of this industrial water pollution indicates a serious problem with the effectiveness of federal environmental regulations that are supposed to protect public health. Industrial pollution is threatening the quality of our nation’s water resources and the health of our communities.

The public has a right to know what chemicals they may be exposed to in daily life. Embodying this right to know, federal law does require most but not all industrial facilities to report releases into the environment of about 650 chemicals that are known to be toxic. Through the Toxics Release Inventory (TRI), the U.S. Environmental Protection Agency (EPA) provides public access to the resulting data on industrial chemical releases.

The EPA’s Risk-Screening Environmental Indicators (RSEI) model is useful for adding meaning to the TRI data, making it possible to assess the risks to human health posed by facilities releasing toxic chemicals into the environment. Assessing such risks depends on the quantity of chemical released, the toxicity of the chemical and the likelihood of human exposure to the chemical or its byproducts. As a first step, a hazard score associated with the releases of toxic chemicals from a given facility can be calculated using the RSEI model; this is before factoring in the chance of actual human exposure to the hazard created by a release.

In this report, 2009 TRI data and the RSEI model are used to identify the entities most responsible for the total hazard from industrial water pollution in the United States. The report is based on research conducted at the Political Economy Research Institute of the University of
Massachusetts Amherst to compile a ranking of the Toxic 100 Water Polluters. The report shows that leading energy and chemical manufacturing companies are dumping massive amounts of toxic chemicals into surface waters, putting in danger the lives and wellbeing of those exposed to the resulting pollution.

**Key Findings (based on 2009 TRI data)**

### The Most Hazardous Water Polluters

Based on the hazard associated with each polluter’s total release of toxic chemicals into surface waters via direct discharges from facilities and releases following transfers to publicly owned water treatment facilities, the most hazardous polluters of U.S. waterways are:

- **No. 1:** Ohio Valley Electric Corporation, an energy company
- **No. 2:** Ferro Corporation, a producer of technology-based materials for manufacturers
- **No. 3:** American Electric Power, an energy company
- **No. 4:** U.S. Department of Defense
- **No. 5:** Southern Company, an energy company

Combined, the Ohio Valley Electric Corp. and Ferro Corp. were responsible for 30 percent of the total hazard from all industrial water pollution reported to the TRI in 2009. The 20 most hazardous polluters accounted for 80 percent of the total.

### Industries With the Most Hazardous Water Pollution

- **No. 1:** Electrical utilities, primarily due to releases of arsenic
- **No. 2:** Chemical manufacturing, led by Dow Chemical Company

### Leading Health Risk

- **Cancer:** Of the 10 most hazardous chemicals released into surface waters, more than half are implicated as causing cancer.

### Most Hazardous Pollutant

- **Arsenic:** Accounts for over 60 percent of the total hazard from industrial water pollution.

### The Most Threatened Regions in the United States

- **No. 1** most-threatened state: Ohio
- **No. 1** most-threatened metro area: New York City metropolitan area

**Recommendations**

Having a relatively small number of entities account for most of the hazard from industrial water pollution reported to the TRI means that regulators and policy-makers, by targeting monitoring and enforcement efforts to these polluters, can greatly improve the quality of U.S. waters, and therefore make great strides toward improving public health and the environment. To this end, the following steps should be taken:

- Congress should reform the 1976 Toxic Substances Control Act to shift the burden of ensuring the safety of chemicals from the government to industry. Reforms should, in the spirit of the precautionary principle, require industry to first prove that a chemical is safe, whether alone or in combination with other chemicals, before allowing the chemical to be released into the environment.
- Congress should amend the Emergency Planning and Community Right-to-Know Act to close loopholes that allow some industries, including the drilling and fracking industry, to avoid reporting releases of toxic chemicals.
- The most hazardous chemicals should be replaced with alternatives that pose significantly less risk to public health and the environment.
- The EPA should continue to improve the Toxics Release Inventory and integrative tools such as Risk-Screening Environmental Indicators to provide more user-friendly information to the public about the chemicals released into our environment.
- The EPA should strengthen enforcement of the Clean Water Act by requiring states to further restrict discharges of toxic chemicals, and by no longer accepting the notion that “dilution is the solution to pollution.”
- The EPA should coordinate the oversight of industrial discharges into waterways with the regulation of drinking water to ensure that our drinking water supplies are adequately protected.
- Congress should create a dedicated source of federal funding to improve our drinking water systems and wastewater systems to update treatment and testing capabilities to meet current needs.
Introduction

In the late 1960s, a series of environmental disasters, including the Cuyahoga River catching on fire, increased awareness of the need to protect the country’s waterways from industrial pollution. In 1972, Congress passed a series of amendments to strengthen the Federal Water Pollution Control Act of 1948, and, with additional amendments in 1977, the resulting body of law became known as the Clean Water Act. The Clean Water Act made it a national goal that “the discharge of pollutants into the navigable waters be eliminated by 1985,” and a national policy that “the discharge of toxic pollutants in toxic amounts be prohibited.”

Now, decades later, these goals have not been met. As detailed below, industrial facilities continue to release hundreds of millions of pounds of toxic chemicals into our waterways each year. Some of these chemicals are known to cause cancer, while others negatively affect reproductive health and childhood development. Children and industrial workers are particularly vulnerable to chemical exposure from these releases.

According to President Obama’s Panel on Cancer, “Manufacturing and other industrial products and processes are responsible for a great many of the hazardous occupational and environmental exposures experienced by Americans.” Yet the U.S. Environmental Protection Agency does not have adequate information to ensure the safety of chemicals before they are regularly used.

The chemical review process is time consuming and resource intensive, yet each year hundreds of new chemicals enter the market. In 1976, when the EPA was ordered to begin reviewing chemicals under the Toxic Substances Control Act (TSCA), about 62,000 chemicals were already in commercial use. Industry has registered more than 21,000 new chemicals since that time.

The onus is currently on the public, represented by the EPA, to demonstrate when new chemicals may negatively impact public health and safety — not on industry to demonstrate that these new chemicals are safe. In general, companies are not required to test new chemicals introduced into commerce each year for toxicity. Before the EPA can require extensive toxicity testing for a specific chemical, the agency must first establish that the chemical presents an “unreasonable risk of injury to human health or the environment.” To date, the EPA has required additional toxicity testing on only 200 of the 21,000 chemicals registered since the TSCA was passed in 1976.

The Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) requires that certain industrial facilities disclose to the public the amounts of toxic chemicals they release each year into the environment. The EPA’s Toxics Release Inventory (TRI) was established to facilitate this public disclosure. The TRI contains data on the disposal of over 650 distinct toxic chemicals.

Despite the large number of toxic chemicals being released into our surface waters — a primary source of drinking water — only 77 chemicals have a Maximum Contaminant Level (MCL), a legal limit set by the EPA under the Safe Drinking Water Act, on the allowable concentration level that can be present in drinking water. Each MCL is determined not just according to human health risk, but also by considering the availability and affordability of technology to reduce a specific contaminant level.

Of the 10 most hazardous industrial water pollutants compiled in this report, only two have relevant MCLs:
arsenic and the polycyclic aromatic hydrocarbon known as benzo(a)pyrene. Drinking water treatment plants do not have to test for hundreds of chemicals known to be toxic and for thousands of other potentially toxic chemicals. As a consequence, when industrial chemicals are dumped upstream of drinking water supply facilities, industrial chemicals could simply pass through treatment facilities, ending up in our drinking water. Adding insult to injury, approximately half of the industrial wastewater reported to the EPA is sent to publicly owned wastewater treatment plants, so taxpayers are paying to treat the toxic wastewater produced by industry to a level that is supposed to be safe to discharge back into source water.

While the TRI makes it possible for local communities to know what is being released into their environment, it does not provide information about the extent of the hazard that these releases create. The EPA’s Risk-Screening Environmental Indicators (RSEI) model can be used to address this need. Drawing on 2009 TRI data and the RSEI model, this report identifies the companies and industries responsible for the most hazardous industrial water pollution and the areas of the country facing the greatest threat.

The Most Hazardous Industrial Water Polluters in the United States

Industrial facilities released about 200 million pounds of toxic chemicals into U.S. surface waters in 2009. The total hazard posed by this industrial water pollution is determined by looking at the respective amounts of the different toxic chemicals released and accounting for the different toxicities of these chemicals. Thus, the companies that released the largest amounts of water pollutants, measured in pounds, were not necessarily the most hazardous water polluters.

Each facility that reported a chemical release to the TRI has an associated hazard, based on the amounts of each chemical released over the course of 2009 and on the respective toxicities of these chemicals (see Appendix for details). Knowledge of these releases, and their associated hazards, makes it possible to determine how the total hazard from all industrial water pollution was distributed across different polluters, different pollutants, different industries and different geographical regions. For example, the “hazard share” for a specific company can be calculated by adding up the hazards of that company’s reporting facilities, and then determining the fraction that the company contributed to the total hazard.

Companies were ranked according to the size of their hazard share. Researchers at the Political Economy Research Institute of the University of Massachusetts Amherst have compiled an expanded list called the Toxic 100 Water Polluters Index. Just 20 water polluters were responsible for 83 percent of the total hazard posed by this industrial water pollution. (See Table 1 on page 10.) Just five polluters — Ohio Valley Electric Corporation, Ferro Corporation, American Electric Power, the U.S. Department of Defense and Southern Company — were responsible for 52 percent of the total hazard due to all industrial water pollution reported to TRI. (See Figure 1.) The top two of these polluters, Ohio Valley Electric Corp. and Ferro Corp., accounted for about 30 percent of the total.

The 100 most hazardous polluters were responsible for about 98 percent of the total hazard posed by industrial water pollution reported to the TRI, although these companies released only about one-third of total industrial water pollution when measured in pounds. (See Table 2.)
on page 11.) Combined, the 20 most hazardous polluters accounted for about 15 percent of total industrial water pollution, again when measured in pounds, but these 20 polluters were responsible for over 83 percent of the total hazard. They released a smaller amount of chemicals into waterways than the next 80 polluters, but toxicities of the chemicals they did release were so high that their releases, collectively, were over five times more hazardous.

Among all industrial sectors of the U.S. economy, electric utilities produced the most hazardous water pollution. (See Table 3 on page 12.) They alone were responsible for more than half of the total hazard posed by industrial water pollution. The chemicals industry and the primary metals industry accounted for another 30 percent of the total hazard score from industrial water pollution. Note that the oil and natural gas extraction industry is not among the industrial sectors required to report releases to the TRI.23

**The Most Hazardous Industrial Water Pollutants**

The TRI includes more than 650 toxic chemicals,24 exposures to which are known to increase the risk of various health problems — from reproductive problems to developmental problems to cancer.25 Table 4 on page 12 lists the most hazardous industrial water pollutants, based on the quantity of each chemical released to surface waters and the respective toxicities of these chemicals. Almost all of the 10 most hazardous pollutants are known or suspected to cause cancer.

**The 10 Most Hazardous Water Pollutants and Their Health Risks**

(1) Arsenic and arsenic compounds accounted for almost 61 percent of the total hazard from industrial toxic releases into surface waters, five times the hazard share of any other toxic chemical. Arsenic occurs naturally and as a waste product from industrial and agricultural facilities.49 The inorganic form of arsenic, largely from industrial facilities, is most toxic.50 According to the International Agency for Research on Cancer (IARC) arsenic is a known human carcinogen.51 In addition to increasing cancer risk, exposure to arsenic can damage skin and harm the circulatory system.52 In 2009, coal-fired power plants accounted for a large portion of the arsenic released into surface waters. Arsenic was the most toxic chemical released by three of the five most hazardous polluters: Ohio Valley Electric Corp., American Electric Power and Southern Co.

(2) Hydrazine compounds are known carcinogens, according to the U.S. National Toxicology Program (NTP),53 that can also cause liver, kidney and nervous system problems.54 They are used to make pesticides and rocket fuel, to inhibit corrosion in industrial boilers, and in the pharmaceutical industry.55 Hydrazine was the most hazardous chemical released into surface waters by Ferro Corp., the second most hazardous industrial pollutant of surface waters.5

(3) Nitroglycerin exposure can cause an array of health problems including nausea and skin irritation.56 It can impact the cardiovascular and central nervous system, and sudden withdrawal from exposure may result in heart attacks.57 Nitroglycerin is used to make explosives, rocket propellants and medicines.58 Nitroglycerin was the most hazardous water pollutant released by the U.S. Department of Defense.

(4) Acrylamide is used to manufacture plastics, adhesives and cosmetics, and is often used in the treatment of wastewater.59 Classified as a “probable human carcinogen,”60 acrylamide can also affect the nervous system and cause blood problems.61 Acrylamide was the top hazardous chemical released into surface waters by BASF and by Evonik Industries AG.

(5) Polycyclic Aromatic Hydrocarbon releases occur as industrial byproducts of burning coal, fuel oils, garbage and other substances.62 According to the U.S. Department of Health and Human Services, they are “reasonably anticipated to be human carcinogens.”63 There is also evidence that certain polycyclic aromatic hydrocarbons are endocrine disruptors,64 and thus these compounds may negatively impact a person’s development, immune system, metabolism and reproductive system, as well as potentially cause a range of diseases and illnesses.65 Polycyclic aromatic hydrocarbons were the top hazardous chemical released by ExxonMobil.

(6) Acetaldehyde is classified by the NTP as a “reasonably anticipated” human carcinogen.66 Acetaldehyde’s health impacts can vary, and, according to the EPA, animal studies suggest that it may adversely impact a developing fetus.67 It is used to produce numerous industrial

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b The Environmental Health and Safety Manager of Ferro Corporation indicates that the company uses hydrazine hydrate rather than more toxic anhydrous hydrazine (personal communication, 9 May 2013). The TRI does not distinguish among hydrazine compounds, and hence the RSEI assigns a single toxicity weight to them. Public understanding of release hazards would be improved if TRI collected and reported data on specific hydrazine compounds.
compounds and manufacturing products,\textsuperscript{68} and is even used as a food additive and in fragrances.\textsuperscript{69} Acetaldehyde was the top hazardous water pollutant released by Celanese Corp.

(7) \textit{Acrylonitrile} is classified by the NTP as a “reasonably anticipated” human carcinogen.\textsuperscript{70} Most commonly, acrylonitrile releases come from certain industrial companies that manufacture acrylic and modacrylic fibers, but it can also be used to produce an array of goods ranging from certain plastics to pesticides.\textsuperscript{71} The chemical does not occur naturally.\textsuperscript{72}

(8) \textit{4,4’-Methylenedianiline}, an industrial chemical, is “possibly carcinogenic to humans,” according to the IARC.\textsuperscript{73} Its uses include the manufacturing of glues, dyes, rubber and polyurethane foams.\textsuperscript{74} Beyond being linked to cancer, 4,4’-methylenedianiline exposure may harm the skin, liver and thyroid, according to animal studies.\textsuperscript{75} 4,4’-methyleneedianiline was the top hazardous water pollutant released from Dow Chemical Co.

(9) \textit{Ethylene oxide} is a known carcinogen, according to the IARC,\textsuperscript{76} and it is also linked to pregnancy miscarriage and nervous system problems.\textsuperscript{77} The chemical is used to make a variety of industrial products, including solvents, anti-freeze, textiles, detergents and adhesives.\textsuperscript{78}

(10) \textit{1,4-Dioxane} is classified by the NTP as a “reasonably anticipated” human carcinogen.\textsuperscript{79} The chemical is used as a solvent, and small amounts may be present in cosmetics, shampoos and detergents.\textsuperscript{80} Exposure to 1,4-dioxane can cause kidney and liver problems, and even result in death.\textsuperscript{81}

\textbf{Where’s the Risk? The Most Threatened States and Metro Areas}

The threat from industrial water pollution looms much more seriously in certain areas of the country. (See Figure 2.) Just five states — Ohio, Virginia, New Jersey, Alabama and Texas — faced two-thirds of the total industrial water pollution hazard in 2009. (See Table 5 on page 13.)

Ohio was the most threatened state, with its residents experiencing a quarter of the total hazard from industrial water pollution. The worst industrial water polluters in Ohio were two power plants — one owned by Ohio Valley Electric Corp. and the other by American Electric Power. The second most threatened state was Virginia, due largely to a Department of Defense facility and a...
Dominion Resources power plant. Hazardous releases of hydrazine via transfers to a publicly owned water treatment facility from a chemical plant in South Plainfield owned by Ferro Corp. explain in part how New Jersey rounded out the top three most threatened states.

Among all metropolitan statistical areas, the New York City metro area accounted for the largest share of the total hazard from all industrial water pollution in 2009. (See Table 6 on page 13.) Residents of the five top metropolitan areas experienced about a third of the total hazard from industrial water pollution in the country in 2009.

Every state has facilities that release toxic chemicals to surface waters. Table 7 (see page 14) shows the two facilities that released the most hazardous industrial water pollution in each state. For each facility, the table includes the parent company that owns the facility, the top hazardous chemical released at the facility and the share that the listed facility contributes to the state’s total hazard score. In most but not all states, just two facilities were responsible for more than half of the state’s total water pollution hazard. (See Figure 3.)

Conclusion and Recommendations

The Toxics Release Inventory reveals the large quantities of toxic industrial chemicals released into our waterways each year. We reported how these releases translate to environmental hazard, and identified how this hazard breaks down by polluter, by industry, by pollutant and by geography. Many of the chemical releases from industrial facilities into U.S. waterways occur at locations that are upstream of public drinking water systems. These releases therefore put the people who rely on these drinking water systems at risk.

Policy can and must protect our nation’s waterways and public health. Specifically, the following steps should be taken to safeguard our nation’s water resources:

- The EPA should strengthen enforcement of the Clean Water Act by requiring states to further restrict discharges of toxic chemicals. The most effective way to improve the quality of our surface waters is to keep toxic chemicals from entering them in the first place. States should establish more-stringent limitations on chemical discharges.
Currently, EPA regulations allow states to authorize “mixing zones” in their state water quality standards, a regulatory approach based on the notion that “dilution is the solution to pollution.” This approach, however, does not adequately protect water supplies. Many chemicals are persistent in the environment and build up in river sediment and within the aquatic food chain, harming entire ecosystems. These chemicals cannot simply be diluted away. States should not be permitted to use “mixing zones” as a way to regulate toxic discharges.

- **Congress should reform the Toxic Substances Control Act (TSCA) and amend the Emergency Planning and Community Right-to-Know Act (EPCRA).** TSCA should require companies to provide adequate toxicity data to the EPA for chemicals being used, and make it easier for the EPA to require more toxicity information from industry if needed. Reforms should also give the EPA authority to prioritize chemicals of concern, based upon exposure level and chemical hazard information, and to require that the most-toxic chemicals manufactured be phased out and replaced with new, safer alternatives.

- **EPCRA should be amended to eliminate loopholes that allow selected industries, such as the oil and gas drilling and fracking industry, to avoid TRI reporting requirements.**

- **The EPA should require industry to prove that toxic chemicals pose no harm to human health, whether in isolation or in combination with other chemicals, before approving of their use.** The EPA should take a precautionary approach to the approval of chemicals rather than the current approach in which the onus is placed on the government to prove that a chemical is harmful to human health before it can be removed from industrial use. The European Union adopted such legislation in 2006.

- **The EPA should continue to strengthen the Toxics Release Inventory to provide more information to the public.** The EPA should continue to improve the quality of the TRI data and the speed at which these data are made available. The recent announcement that TRI data will be made available online more quickly than in the past, and the EPA’s recent decision to add 16 new chemicals to the TRI reporting requirements, are steps in the right direction. Such transparency is important not just for community awareness, but for how this awareness in turn motivates companies to change polluting practices.

- **The EPA should better protect source waters by tightening pollution limitations on point source industrial discharges.** Given the vast array of toxic chemicals being released into U.S. waterways, and given that these surface waters serve as vital drinking water supplies, the agency should eliminate gaps in drinking water standards by increasing the number of regulated contaminants. To expedite the process of regulating new chemicals, the EPA should move beyond addressing contaminants one at a time and set standards for groups of chemicals.

- **Congress should create a dedicated source of federal funding to improve our drinking water systems and wastewater treatment systems.** Our nation’s drinking water infrastructure is aging and in need of fundamental improvements, yet it is severely underfunded. Additional funding is also needed to enable municipalities to update treatment and testing methods to address new chemical contaminants, and to act on improved understanding of the hazards associated with longstanding contaminants.

Now is the time to make these changes, and to renew America’s water.
Table 1. The 20 Most Hazardous Water Polluters in the United States, 2009

<table>
<thead>
<tr>
<th>Rank</th>
<th>Polluter</th>
<th>Description</th>
<th>Hazard Share (% of Total)</th>
<th>Most Hazardous Facility</th>
<th>Facility Location</th>
<th>Most Hazardous Chemical Released</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ohio Valley Electric Corp.</td>
<td>Electricity generation in the Ohio River Valley</td>
<td>18.37</td>
<td>Kyger Creek Station</td>
<td>Cheshire, OH</td>
<td>Arsenic and arsenic compounds</td>
</tr>
<tr>
<td>2</td>
<td>Ferro Corp.</td>
<td>Supplies materials used in electronics, telecommunications, appliances, automotive, pharmaceuticals, etc.</td>
<td>10.95</td>
<td>Ferro Corp.</td>
<td>South Plainfield, NJ</td>
<td>Hydrazine</td>
</tr>
<tr>
<td>3</td>
<td>American Electric Power</td>
<td>Electricity generation</td>
<td>8.59</td>
<td>American Electric Power Cardinal Plant</td>
<td>Brilliant, OH</td>
<td>Arsenic and arsenic compounds</td>
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<tr>
<td>5</td>
<td>Southern Co.</td>
<td>Electricity generation in southeast U.S.</td>
<td>6.40</td>
<td>Barry Steam Plant</td>
<td>Bucks, AL</td>
<td>Arsenic and arsenic compounds</td>
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<tr>
<td>6</td>
<td>U.S. Tennessee Valley Authority</td>
<td>Electricity generation in 7 southeastern states (Owned by U.S. Government)</td>
<td>5.00</td>
<td>U.S. TVA, Windows Creek Fossil Plant</td>
<td>Stevenson, AL</td>
<td>Arsenic and arsenic compounds</td>
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<tr>
<td>7</td>
<td>PPL Corp.</td>
<td>Electricity generation</td>
<td>4.72</td>
<td>Kentucky Utilities Co., E.W. Brown Station</td>
<td>Harrodsburg, KY</td>
<td>Arsenic and arsenic compounds</td>
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<tr>
<td>8</td>
<td>Dominion Resources Inc.</td>
<td>Electricity generation and transmission; natural gas pipelines</td>
<td>2.97</td>
<td>Chesterfield Power Station</td>
<td>Chester, VA</td>
<td>Arsenic and arsenic compounds</td>
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<td>9</td>
<td>Dow Chemical Co.</td>
<td>Chemical company</td>
<td>2.95</td>
<td>Dow Chemical Co. Freeport Facility</td>
<td>Freeport, TX</td>
<td>4,4’-Methyleneedianiline</td>
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<tr>
<td>10</td>
<td>Evonik Industries</td>
<td>Multinational specialty chemicals company; makes plastics, solvents, adhesives, lubricants, etc.</td>
<td>2.80</td>
<td>Ashland Inc.</td>
<td>Greensboro, NC</td>
<td>Acrylamide</td>
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<td>11</td>
<td>Dynegy Inc.</td>
<td>Electricity generation in the Midwest, Northeast and West Coast</td>
<td>1.85</td>
<td>Dynegy Wood River Power Station</td>
<td>Alton, IL</td>
<td>Arsenic and arsenic compounds</td>
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<td>12</td>
<td>DTE Energy</td>
<td>Electricity generation and transmission; natural gas pipelines</td>
<td>1.73</td>
<td>Detroit Edison Monroe Power Plant</td>
<td>Monroe, MI</td>
<td>Arsenic and arsenic compounds</td>
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<td>13</td>
<td>Duke Energy</td>
<td>Energy generation</td>
<td>1.48</td>
<td>Wabash River Generating Station</td>
<td>West Terre Haute, IN</td>
<td>Arsenic and arsenic compounds</td>
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<td>14</td>
<td>BASF</td>
<td>Chemical company</td>
<td>1.30</td>
<td>CIBA Corp.</td>
<td>Suffolk, VA</td>
<td>Acrylamide</td>
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</tbody>
</table>

(continued on next page)
Table 1. The 20 Most Hazardous Water Polluters in the United States, 2009 – continued

<table>
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<tr>
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<th>Most Hazardous Facility</th>
<th>Facility Location</th>
<th>Most Hazardous Chemical Released</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Emerald Performance Materials LLC</td>
<td>Manufacturer of specialty chemicals for food additives, rubber, adhesives, fragrances, air fresheners, pharmaceuticals, other products</td>
<td>1.27</td>
<td>Emerald Polymer Additives LLC</td>
<td>Akron, OH</td>
<td>Acrylonitrile</td>
</tr>
<tr>
<td>16</td>
<td>NewPage</td>
<td>Coated paper manufacturer for use in magazines, books, catalogs, coupons, etc.</td>
<td>1.14</td>
<td>Luke Paper Co.</td>
<td>Luke, MD</td>
<td>Arsenic and arsenic compounds</td>
</tr>
<tr>
<td>17</td>
<td>Progress Energy Inc.</td>
<td>Electricity generation in North Carolina, South Carolina and Florida</td>
<td>1.05</td>
<td>Carolina Power &amp; Light Co., Roxboro Steam Electric Plant</td>
<td>Semora, NC</td>
<td>Arsenic and arsenic compounds</td>
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<tr>
<td>18</td>
<td>Honeywell International</td>
<td>Chemical manufacturing company</td>
<td>0.97</td>
<td>Honeywell International Inc., Geismas Plant</td>
<td>Carville, LA</td>
<td>Arsenic and arsenic compounds</td>
</tr>
<tr>
<td>19</td>
<td>ExxonMobil</td>
<td>Oil and natural gas extraction, refining and processing, including petrochemicals</td>
<td>0.93</td>
<td>ExxonMobil Chemical, Baton Rouge Chemical Plant</td>
<td>Baton Rouge, LA</td>
<td>Polycyclic aromatic compounds</td>
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<tr>
<td>20</td>
<td>Celanese Corp.</td>
<td>Producer of specialty and intermediate chemical products</td>
<td>0.92</td>
<td>Celanese LTD, Clear Lake Plant</td>
<td>Pasadena, TX</td>
<td>Acetaldehyde</td>
</tr>
</tbody>
</table>

Source: Food & Water Watch/PERI analysis of data from the US EPA Toxics Release Inventory and Risk Screening Environmental Indicators.

Table 2. Hazard Share Versus Amount of Toxic Chemicals Released to Surface Waters, 2009

<table>
<thead>
<tr>
<th>Companies</th>
<th>Hazard Share (% of Total)</th>
<th>Amount of Toxic Chemicals* (% of total weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top 20</td>
<td>83.4</td>
<td>33 million pounds (15.3%)</td>
</tr>
<tr>
<td>Next 80</td>
<td>14.9</td>
<td>41 million pounds (18.7%)</td>
</tr>
<tr>
<td>Top 100</td>
<td>98.3</td>
<td>74 million pounds (33.9%)</td>
</tr>
</tbody>
</table>

Source: Food & Water Watch/PERI analysis of data from the US EPA Toxics Release Inventory and Risk Screening Environmental Indicators.

* Amount of chemicals released to surface waters directly, combined with RSEI-based estimate of the amount of “transferred chemicals” that are released to surface waters indirectly after having passed through publicly owned treatment works (POTWs). See Appendix B for more information.
Table 3. The Industrial Sectors with the Most Hazardous Water Pollution

<table>
<thead>
<tr>
<th>Rank</th>
<th>Industrial Sector*</th>
<th>Total Number of Facilities</th>
<th>Hazard Share (% of Total)</th>
<th>Amount of Chemicals Released to Surface Water (pounds)</th>
<th>Amount of Chemicals Transferred to POTWs** (pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Electric Utilities</td>
<td>370</td>
<td>55.81</td>
<td>2,622,902</td>
<td>6,756</td>
</tr>
<tr>
<td>2</td>
<td>Chemicals</td>
<td>1267</td>
<td>17.37</td>
<td>29,014,457</td>
<td>87,113,726</td>
</tr>
<tr>
<td>3</td>
<td>Primary Metals</td>
<td>763</td>
<td>12.21</td>
<td>28,001,950</td>
<td>12,104,662</td>
</tr>
<tr>
<td>4</td>
<td>National Security</td>
<td>51</td>
<td>8.01</td>
<td>15,176,990</td>
<td>75,496</td>
</tr>
<tr>
<td>5</td>
<td>Paper</td>
<td>247</td>
<td>3.05</td>
<td>17,864,769</td>
<td>24,020,189</td>
</tr>
<tr>
<td>6</td>
<td>Petroleum</td>
<td>179</td>
<td>1.34</td>
<td>21,039,437</td>
<td>3,551,759</td>
</tr>
<tr>
<td>7</td>
<td>Wood Products</td>
<td>99</td>
<td>0.62</td>
<td>30,868</td>
<td>46,194</td>
</tr>
<tr>
<td>8</td>
<td>Metal Mining</td>
<td>34</td>
<td>0.3</td>
<td>486,766</td>
<td>6,847</td>
</tr>
<tr>
<td>9</td>
<td>Electrical Equipment</td>
<td>227</td>
<td>0.29</td>
<td>5,089</td>
<td>1,295,405</td>
</tr>
<tr>
<td>10</td>
<td>Fabricated Metals</td>
<td>1029</td>
<td>0.21</td>
<td>1,463,015</td>
<td>12,079,890</td>
</tr>
</tbody>
</table>

Source: Food & Water Watch/PERI analysis of data from the US EPA Toxics Release Inventory and Risk Screening Environmental Indicators.

* As classified under the North American Industry Classification System (NAICS)
** Publicly owned treatment works

Table 4. The Top Hazardous Industrial Water Pollutants, 2009

<table>
<thead>
<tr>
<th>Rank</th>
<th>Pollutant</th>
<th>Hazard Share (%)</th>
<th>Health Risks</th>
<th>Industrial Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Arsenic and arsenic compounds</td>
<td>60.60</td>
<td>Cancer</td>
<td>Waste product from glass and electronics manufacturing and from electricity generation</td>
</tr>
<tr>
<td>2</td>
<td>Hydrazine compounds</td>
<td>11.69</td>
<td>Cancer, neurotoxicity</td>
<td>Pesticides, rocket fuel, boiler water treatments, pharmaceuticals</td>
</tr>
<tr>
<td>3</td>
<td>Nitroglycerin</td>
<td>7.97</td>
<td>Harm to cardiovascular and central nervous system</td>
<td>Explosives, rocket fuels and medicines</td>
</tr>
<tr>
<td>4</td>
<td>Acrylamide</td>
<td>4.85</td>
<td>Cancer, nervous system and blood problems</td>
<td>Used in plastics, adhesives and cosmetics</td>
</tr>
<tr>
<td>5</td>
<td>Polycyclic aromatic compounds</td>
<td>2.62</td>
<td>Cancer, disruption of endocrine system</td>
<td>Tire manufacturing, paper mills, electricity generation and oil refineries</td>
</tr>
<tr>
<td>6</td>
<td>Acetaldehyde</td>
<td>2.15</td>
<td>Cancer</td>
<td>Manufacturing of many food additives</td>
</tr>
<tr>
<td>7</td>
<td>Acrylonitrile</td>
<td>2.05</td>
<td>Cancer</td>
<td>Manufacturing of acrylic/modacrylic fibers and some other products (i.e., plastics)</td>
</tr>
<tr>
<td>8</td>
<td>4,4’-Methylene-dianiline</td>
<td>1.38</td>
<td>Cancer</td>
<td>Chemical used to make polyurethane foams and other industrial products</td>
</tr>
<tr>
<td>9</td>
<td>Ethylene oxide</td>
<td>1.09</td>
<td>Cancer</td>
<td>Manufacturing of a variety of industrial products (i.e., solvents)</td>
</tr>
<tr>
<td>10</td>
<td>Dioxane</td>
<td>1.07</td>
<td>Cancer, liver and kidney damage</td>
<td>Solvent in chemical manufacturing</td>
</tr>
</tbody>
</table>

Source: Food & Water Watch/PERI analysis of data from the US EPA Toxics Release Inventory and Risk Screening Environmental Indicators.
### Table 5. The 10 Most Threatened States from Industrial Water Pollution

<table>
<thead>
<tr>
<th>Rank</th>
<th>State</th>
<th>Facilities</th>
<th>Hazard Share (% of Total)</th>
<th>Amount Released to Surface Water (pounds)</th>
<th>Amount Transferred to POTWs* (pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ohio</td>
<td>512</td>
<td>26.50</td>
<td>6,138,486</td>
<td>16,586,271</td>
</tr>
<tr>
<td>2</td>
<td>Virginia</td>
<td>148</td>
<td>12.16</td>
<td>18,572,616</td>
<td>17,471,203</td>
</tr>
<tr>
<td>3</td>
<td>New Jersey</td>
<td>125</td>
<td>11.30</td>
<td>5,829,664</td>
<td>11,762,218</td>
</tr>
<tr>
<td>4</td>
<td>Alabama</td>
<td>207</td>
<td>9.97</td>
<td>9,068,652</td>
<td>2,635,592</td>
</tr>
<tr>
<td>5</td>
<td>Texas</td>
<td>470</td>
<td>6.35</td>
<td>12,562,201</td>
<td>27,944,452</td>
</tr>
<tr>
<td>6</td>
<td>Kentucky</td>
<td>183</td>
<td>6.06</td>
<td>4,940,506</td>
<td>8,396,710</td>
</tr>
<tr>
<td>7</td>
<td>North Carolina</td>
<td>232</td>
<td>4.07</td>
<td>11,510,539</td>
<td>2,186,616</td>
</tr>
<tr>
<td>8</td>
<td>West Virginia</td>
<td>79</td>
<td>3.12</td>
<td>1,500,597</td>
<td>1,574,330</td>
</tr>
<tr>
<td>9</td>
<td>Louisiana</td>
<td>126</td>
<td>2.53</td>
<td>11,801,020</td>
<td>350,090</td>
</tr>
<tr>
<td>10</td>
<td>Illinois</td>
<td>387</td>
<td>2.44</td>
<td>10,223,373</td>
<td>5,531,305</td>
</tr>
</tbody>
</table>

*Source: Food & Water Watch/PERI analysis of data from the US EPA Toxics Release Inventory and Risk Screening Environmental Indicators.*

*Publicly owned treatment works*

### Table 6. The 10 Metro Areas with the Largest Share of Hazardous Industrial Water Pollution

<table>
<thead>
<tr>
<th>Rank</th>
<th>Metro Area</th>
<th>Facilities</th>
<th>Hazard Share (% of Total)</th>
<th>Amount Released to Surface Water (pounds)</th>
<th>Amount Transferred to POTWs** (pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>New York City--Northern New Jersey--Long Island, NY-NJ-PA</td>
<td>120</td>
<td>11.03</td>
<td>2,007,624</td>
<td>11,489,056</td>
</tr>
<tr>
<td>2</td>
<td>Blacksburg-Christiansburg-Radford, VA</td>
<td>9</td>
<td>7.97</td>
<td>12,071,401</td>
<td>1,132</td>
</tr>
<tr>
<td>3</td>
<td>Houston-Sugar Land-Baytown, TX</td>
<td>173</td>
<td>5.78</td>
<td>5,948,672</td>
<td>25,656,214</td>
</tr>
<tr>
<td>4</td>
<td>Weirton-Stublichville, WV-OH</td>
<td>11</td>
<td>5.20</td>
<td>339,716</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>Mobile, AL</td>
<td>18</td>
<td>3.00</td>
<td>293,256</td>
<td>395,141</td>
</tr>
<tr>
<td>6</td>
<td>Richmond, VA</td>
<td>27</td>
<td>2.86</td>
<td>589,463</td>
<td>15,537,484</td>
</tr>
<tr>
<td>7</td>
<td>Greensboro--High Point, NC</td>
<td>28</td>
<td>2.80</td>
<td>1,018</td>
<td>662,873</td>
</tr>
<tr>
<td>8</td>
<td>Birmingham--Hoover, AL</td>
<td>41</td>
<td>1.94</td>
<td>1,789,386</td>
<td>6,809</td>
</tr>
<tr>
<td>9</td>
<td>Baton Rouge, LA</td>
<td>38</td>
<td>1.89</td>
<td>7,251,099</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>Monroe, MI</td>
<td>7</td>
<td>1.63</td>
<td>32,383</td>
<td>91,993</td>
</tr>
</tbody>
</table>

*Source: Food & Water Watch/PERI analysis of data from the US EPA Toxics Release Inventory and Risk Screening Environmental Indicators.*

*Metropolitan area rankings exclude facilities located outside metro areas.*

**Publicly owned treatment works**
Table 7. Top Two Hazards from Industrial Facilities in Each State

<table>
<thead>
<tr>
<th>State or Territory, Rank</th>
<th>Facility</th>
<th>Owner</th>
<th>Most Hazardous Chemical Released</th>
<th>Share of Total State Hazard (% of Total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>U.S. TVA Widows Creek Fossil Plant</td>
<td>U.S. Tennessee Valley Authority</td>
<td>Arsenic and arsenic compounds</td>
<td>37%</td>
</tr>
<tr>
<td></td>
<td>Barry Steam Plant</td>
<td>Southern Co.</td>
<td>Arsenic and arsenic compounds</td>
<td>30%</td>
</tr>
<tr>
<td>Alaska</td>
<td>Pogo Mine</td>
<td>Teck Cominco American Inc.</td>
<td>Arsenic and arsenic compounds</td>
<td>65%</td>
</tr>
<tr>
<td></td>
<td>Tesoro Alaska Kenai Refinery</td>
<td>Tesoro Corp.</td>
<td>Polycyclic aromatic compounds</td>
<td>30%</td>
</tr>
<tr>
<td>Arizona</td>
<td>Freeport-McMoRan Miami Inc.</td>
<td>Freeport-McMoRan Copper &amp; Gold</td>
<td>Arsenic and arsenic compounds</td>
<td>76%</td>
</tr>
<tr>
<td></td>
<td>Intel Corp.</td>
<td>Intel Corp.</td>
<td>Glycol ethers</td>
<td>17%</td>
</tr>
<tr>
<td>Arkansas</td>
<td>Evergreen Packaging</td>
<td>Rank Group Investments</td>
<td>Acetaldehyde</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>Domtar A.W. LLC Ashdown Mill</td>
<td>Domtar Corp.</td>
<td>Acetaldehyde</td>
<td>27%</td>
</tr>
<tr>
<td>California</td>
<td>Koch Membrane Systems</td>
<td>Koch Industries</td>
<td>Dioxane</td>
<td>49%</td>
</tr>
<tr>
<td></td>
<td>Chevron Products Co. Div. of Chevron USA Inc.</td>
<td>Chevron Corp.</td>
<td>Polycyclic aromatic compounds</td>
<td>8%</td>
</tr>
<tr>
<td>Colorado</td>
<td>Suncor Energy Commerce City Refinery</td>
<td>Suncor Energy Inc.</td>
<td>Polycyclic aromatic compounds</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>Kodak Colorado Div.</td>
<td>Eastman Kodak Co.</td>
<td>Glycol ethers</td>
<td>13%</td>
</tr>
<tr>
<td>Connecticut</td>
<td>Phoenix Soil LLC</td>
<td>Phoenix Soil LLC</td>
<td>Polycyclic aromatic compounds</td>
<td>63%</td>
</tr>
<tr>
<td></td>
<td>Cytac Industries Inc.</td>
<td>Cytac Industries Inc.</td>
<td>Acrylamide</td>
<td>18%</td>
</tr>
<tr>
<td>Delaware</td>
<td>Ciba Corp.</td>
<td>BASF</td>
<td>p-Chloroaniline</td>
<td>38%</td>
</tr>
<tr>
<td></td>
<td>DuPont Edge Moor</td>
<td>E.I. du Pont de Nemours</td>
<td>Arsenic and arsenic compounds</td>
<td>36%</td>
</tr>
<tr>
<td>District of Columbia</td>
<td>U.S. Army Corps of Engineers Dalecarlia WTP</td>
<td>U.S. Department of Defense</td>
<td>Manganese and manganese compounds</td>
<td>62%</td>
</tr>
<tr>
<td></td>
<td>U.S. Army Corps of Engineers McMillan WTP Washington Aqueduct</td>
<td>U.S. Department of Defense</td>
<td>Chlorine</td>
<td>37%</td>
</tr>
<tr>
<td>Florida</td>
<td>Smurfit-Stone Container Enterprises Inc.</td>
<td>Smurfit-Stone Container</td>
<td>Acetaldehyde</td>
<td>29%</td>
</tr>
<tr>
<td></td>
<td>St. Johns River Power Park/Northside Generating Station</td>
<td>JEA</td>
<td>Arsenic and arsenic compounds</td>
<td>27%</td>
</tr>
<tr>
<td>Georgia</td>
<td>Yates Steam Electric Generating Plant</td>
<td>Southern Co.</td>
<td>Arsenic and arsenic compounds</td>
<td>36%</td>
</tr>
<tr>
<td></td>
<td>Wansley Steam Electric Generating Plant</td>
<td>Southern Co.</td>
<td>Arsenic and arsenic compounds</td>
<td>27%</td>
</tr>
</tbody>
</table>

(continued on next page)
Table 7. Top Two Hazards from Industrial Facilities in Each State – continued

<table>
<thead>
<tr>
<th>State or Territory, Rank</th>
<th>Facility</th>
<th>Owner</th>
<th>Most Hazardous Chemical Released</th>
<th>Share of Total State Hazard (% of Total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hawaii</td>
<td>1 Chevron Products Co. Hawaii Refinery</td>
<td>Chevron Corp.</td>
<td>Polycyclic aromatic compounds</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>2 Aloha Petroleum Barbers Point Terminal</td>
<td>Aloha Petroleum Barbers Point Terminal</td>
<td>Benzene</td>
<td>0%</td>
</tr>
<tr>
<td>Idaho</td>
<td>1 Clearwater Paper Corp.</td>
<td>Potlatch Corp.</td>
<td>Acetaldehyde</td>
<td>89%</td>
</tr>
<tr>
<td></td>
<td>2 U.S. EPA Fund-Lead Superfund Site/ Bunker Hill CTP</td>
<td>U.S. Environmental Protection Agency</td>
<td>Lead and lead compounds</td>
<td>3%</td>
</tr>
<tr>
<td>Illinois</td>
<td>1 Dynegy Wood River Power Station</td>
<td>Dynegy Inc.</td>
<td>Arsenic and arsenic compounds</td>
<td>39%</td>
</tr>
<tr>
<td></td>
<td>2 Dynegy Midwest Generation Inc. Baldwin Energy Complex</td>
<td>Dynegy Inc.</td>
<td>Arsenic and arsenic compounds</td>
<td>36%</td>
</tr>
<tr>
<td>Indiana</td>
<td>1 Wabash River Generating Station</td>
<td>Duke Energy</td>
<td>Arsenic and arsenic compounds</td>
<td>81%</td>
</tr>
<tr>
<td></td>
<td>2 USS Gary Works</td>
<td>USS Gary Works (U.S. Steel/ ArcelorMittal)</td>
<td>Arsenic and arsenic compounds</td>
<td>7%</td>
</tr>
<tr>
<td>Iowa</td>
<td>1 Cambrex Charles City Inc.</td>
<td>Cambrex Corp.</td>
<td>Arsenic and arsenic compounds</td>
<td>72%</td>
</tr>
<tr>
<td></td>
<td>2 Penford Products Co.</td>
<td>Penford Corp.</td>
<td>Acetaldehyde</td>
<td>18%</td>
</tr>
<tr>
<td>Kansas</td>
<td>1 Harcros Chemicals Inc.</td>
<td>Harcros Chemicals Inc.</td>
<td>Ethylene oxide</td>
<td>67%</td>
</tr>
<tr>
<td></td>
<td>2 Pentair Water Kansas City Operation</td>
<td>Pentair Inc.</td>
<td>Copper and copper compounds</td>
<td>17%</td>
</tr>
<tr>
<td>Kentucky</td>
<td>1 Kentucky Utilities Co. E.W. Brown Station</td>
<td>E.ON</td>
<td>Arsenic and arsenic compounds</td>
<td>43%</td>
</tr>
<tr>
<td></td>
<td>2 Kentucky Utilities Co. Ghent Station</td>
<td>E.ON</td>
<td>Arsenic and arsenic compounds</td>
<td>24%</td>
</tr>
<tr>
<td>Louisiana</td>
<td>1 Honeywell International Inc. Geismar Plant</td>
<td>Honeywell International Plant</td>
<td>Arsenic and arsenic compounds</td>
<td>38%</td>
</tr>
<tr>
<td></td>
<td>2 ExxonMobil Chemical Baton Rouge Chemical Plant</td>
<td>ExxonMobil</td>
<td>Polycyclic aromatic compounds</td>
<td>23%</td>
</tr>
<tr>
<td>Maine</td>
<td>1 Verso Paper Holdings LLC</td>
<td>Apollo Advisors</td>
<td>Acetaldehyde</td>
<td>61%</td>
</tr>
<tr>
<td></td>
<td>2 Domtar Maine LLC</td>
<td>Domtar Corp.</td>
<td>Acetaldehyde</td>
<td>14%</td>
</tr>
<tr>
<td>Maryland</td>
<td>1 Luke Paper Co.</td>
<td>NewPage</td>
<td>Arsenic and arsenic compounds</td>
<td>96%</td>
</tr>
<tr>
<td></td>
<td>2 Brandon Shores &amp; Wagner Complex</td>
<td>Constellation Energy</td>
<td>Arsenic and arsenic compounds</td>
<td>3%</td>
</tr>
</tbody>
</table>

(continued on next page)
<table>
<thead>
<tr>
<th>State or Territory, Rank</th>
<th>Facility</th>
<th>Owner</th>
<th>Most Hazardous Chemical Released</th>
<th>Share of Total State Hazard (% of Total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Massachusetts</td>
<td>1</td>
<td></td>
<td>Dominica Energy Brayton Point LLC</td>
<td>Arsenic and arsenic compounds</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td>ExxonMobil Corp Everett Terminal</td>
<td>Polycyclic aromatic compounds</td>
</tr>
<tr>
<td>Michigan</td>
<td>1</td>
<td></td>
<td>Detroit Edison Monroe Power Plant</td>
<td>Arsenic and arsenic compounds</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td>Detroit Edison Belle River Power Plant (Part)</td>
<td>Arsenic and arsenic compounds</td>
</tr>
<tr>
<td>Minnesota</td>
<td>1</td>
<td></td>
<td>GE Osmonics Inc.</td>
<td>Dioxane</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td>Flint Hills Resources LP</td>
<td>Benzene</td>
</tr>
<tr>
<td>Mississippi</td>
<td>1</td>
<td></td>
<td>Southern Wood Preserving of Hattiesburg Inc.</td>
<td>Arsenic and arsenic compounds</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td>Chevron Products Co. Pascagoula Refinery</td>
<td>Polycyclic aromatic compounds</td>
</tr>
<tr>
<td>Missouri</td>
<td>1</td>
<td></td>
<td>Bayer Cropscience</td>
<td>Hydrazine</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td>Buick Resource Recycling Facility LLC</td>
<td>Arsenic and arsenic compounds</td>
</tr>
<tr>
<td>Montana</td>
<td>1</td>
<td></td>
<td>Smurfit-Stone Container Enterprises Inc. Missoula Mill</td>
<td>Lead and lead compounds</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td>Montana Refining Co. Inc.</td>
<td>Benzene</td>
</tr>
<tr>
<td>Nebraska</td>
<td>1</td>
<td></td>
<td>Beef Products Inc.  (SSC)</td>
<td>Peroxyacetic acid</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td>Koch Nitrogen LLC</td>
<td>Lead and lead compounds</td>
</tr>
<tr>
<td>Nevada</td>
<td>1</td>
<td></td>
<td>Newmont Mining Corp. Twin Creeks Mine</td>
<td>Arsenic and arsenic compounds</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td>Ergon Asphalt Products Inc. Las Vegas</td>
<td>Polycyclic aromatic compounds</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>1</td>
<td></td>
<td>Amphenol APC Inc.</td>
<td>Lead and lead compounds</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td>Merrimack Station</td>
<td>Lead and lead compounds</td>
</tr>
<tr>
<td>New Jersey</td>
<td>1</td>
<td></td>
<td>Ferro Corp.</td>
<td>Hydrazine</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td>DuPont Chambers Works</td>
<td>Alachlor</td>
</tr>
<tr>
<td>New Mexico</td>
<td>1</td>
<td></td>
<td>Intel Corp.</td>
<td>Glycol ethers</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td>Lovington Refinery</td>
<td>Benzene</td>
</tr>
</tbody>
</table>

(continued on next page)
## Table 7. Top Two Hazards from Industrial Facilities in Each State – continued

<table>
<thead>
<tr>
<th>State or Territory, Rank</th>
<th>Facility</th>
<th>Owner</th>
<th>Most Hazardous Chemical Released</th>
<th>Share of Total State Hazard (% of Total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>International Paper Co.</td>
<td>International Paper Co.</td>
<td>Acetaldehyde</td>
<td>20%</td>
</tr>
<tr>
<td>North Carolina</td>
<td>Ashland Inc.</td>
<td>Ashland Inc.</td>
<td>Acrylamide</td>
<td>69%</td>
</tr>
<tr>
<td>2</td>
<td>Carolina Power &amp; Light Co. Roxboro Steam Electric Plant</td>
<td>Progress Energy Inc.</td>
<td>Arsenic and arsenic compounds</td>
<td>14%</td>
</tr>
<tr>
<td>North Dakota</td>
<td>Great River Energy Stanton Station</td>
<td>Great River Energy</td>
<td>Copper and copper compounds</td>
<td>65%</td>
</tr>
<tr>
<td>2</td>
<td>Basin Electric Leland Olds Station</td>
<td>Basin Electric Leland Olds Station</td>
<td>Arsenic and arsenic compounds</td>
<td>21%</td>
</tr>
<tr>
<td>Ohio</td>
<td>Kyger Creek Station</td>
<td>Ohio Valley Electric Corp.</td>
<td>Arsenic and arsenic compounds</td>
<td>69%</td>
</tr>
<tr>
<td>2</td>
<td>American Electric Power Cardinal Plant</td>
<td>American Electric Power</td>
<td>Arsenic and arsenic compounds</td>
<td>18%</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>Holly Refining &amp; Marketing Tulsa LLC</td>
<td>Sinclair Oil</td>
<td>Lead and lead compounds</td>
<td>41%</td>
</tr>
<tr>
<td>2</td>
<td>International Paper Co.</td>
<td>International Paper Co.</td>
<td>Acetaldehyde</td>
<td>30%</td>
</tr>
<tr>
<td>Oregon</td>
<td>Georgia Pacific Consumer Products LP Wauna Mill</td>
<td>Koch Industries</td>
<td>Acetaldehyde</td>
<td>34%</td>
</tr>
<tr>
<td>2</td>
<td>Georgia-Pacific Toledo</td>
<td>Koch Industries</td>
<td>Lead and lead compounds</td>
<td>33%</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>RRI Energy Inc. Conemaugh Power Plant</td>
<td>RRI Energy (Reliant Energy)</td>
<td>Arsenic and arsenic compounds</td>
<td>34%</td>
</tr>
<tr>
<td>2</td>
<td>RRI Energy Inc. Keystone Power Plant</td>
<td>RRI Energy (Reliant Energy)</td>
<td>Arsenic and arsenic compounds</td>
<td>15%</td>
</tr>
<tr>
<td>Puerto Rico</td>
<td>PREPA San Juan Steam Plant</td>
<td>Puerto Rico Electric Power Authority</td>
<td>Polycyclic aromatic compounds</td>
<td>57%</td>
</tr>
<tr>
<td>2</td>
<td>PREPA Aguirre Power Generation</td>
<td>Puerto Rico Electric Power Authority</td>
<td>Lead and lead compounds</td>
<td>26%</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>BB&amp;S Treated Lumber of New England</td>
<td>BB&amp;S Treated Lumber Co.</td>
<td>Arsenic and arsenic compounds</td>
<td>88%</td>
</tr>
<tr>
<td>2</td>
<td>Toray Plastics (America) Inc.</td>
<td>Toray Holding (USA) Inc.</td>
<td>Acetaldehyde</td>
<td>6%</td>
</tr>
<tr>
<td>South Carolina</td>
<td>Clariant Corp. Martin Plant</td>
<td>Clariant Corp.</td>
<td>Acrylamide</td>
<td>38%</td>
</tr>
<tr>
<td>2</td>
<td>Cross Generating Station</td>
<td>South Carolina Public Service Authority</td>
<td>Arsenic and arsenic compounds</td>
<td>24%</td>
</tr>
</tbody>
</table>
### Table 7. Top Two Hazards from Industrial Facilities in Each State – continued

<table>
<thead>
<tr>
<th>State or Territory, Rank</th>
<th>Facility</th>
<th>Owner</th>
<th>Most Hazardous Chemical Released</th>
<th>Share of Total State Hazard (% of Total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Dakota</td>
<td>1 John Morrell &amp; Co.</td>
<td>Smithfield Foods</td>
<td>Mercury and mercury compounds</td>
<td>99%</td>
</tr>
<tr>
<td></td>
<td>2 U.S. EPA Fund Superfund Sites Gilt Edge Mine Superfund Site</td>
<td>U.S. Environmental Protection Agency</td>
<td>Copper and copper compounds</td>
<td>0.1%</td>
</tr>
<tr>
<td>Tennessee</td>
<td>1 Eastman Chemical Co. Tennessee Operations</td>
<td>Eastman Chemical Co.</td>
<td>Arsenic and arsenic compounds</td>
<td>34%</td>
</tr>
<tr>
<td></td>
<td>2 U.S. TVA John Sevier Fossil Plant</td>
<td>U.S. Tennessee Valley Authority</td>
<td>Arsenic and arsenic compounds</td>
<td>19%</td>
</tr>
<tr>
<td>Texas</td>
<td>1 Dow Chemical Co. Freeport Facility</td>
<td>Dow Chemical Co.</td>
<td>4,4'-Methylenedianiline</td>
<td>44%</td>
</tr>
<tr>
<td></td>
<td>2 Celanese Ltd. Clear Lake Plant</td>
<td>Celanese Corp.</td>
<td>Acetaldehyde</td>
<td>14%</td>
</tr>
<tr>
<td>Utah</td>
<td>1 Kennecott Utah Copper Smelter &amp; Refinery</td>
<td>Rio Tinto PLC</td>
<td>Arsenic and arsenic compounds</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td>2 Kennecott Utah Copper Mine Concentrators &amp; Power Plant</td>
<td>Rio Tinto PLC</td>
<td>Arsenic and arsenic compounds</td>
<td>25%</td>
</tr>
<tr>
<td>Vermont</td>
<td>1 Vermont Circuits Inc.</td>
<td>Vermont Circuits Inc.</td>
<td>Copper and copper compounds</td>
<td>62%</td>
</tr>
<tr>
<td></td>
<td>2 IBM Corp.</td>
<td>IBM Corp.</td>
<td>Nitrate compounds</td>
<td>34%</td>
</tr>
<tr>
<td>Virginia</td>
<td>1 U.S. Army Radford Army Ammunition Plant</td>
<td>U.S. Department of Defense</td>
<td>Nitroglycerin</td>
<td>66%</td>
</tr>
<tr>
<td></td>
<td>2 Chesterfield Power Station</td>
<td>Dominion Resources Inc.</td>
<td>Arsenic and arsenic compounds</td>
<td>23%</td>
</tr>
<tr>
<td>Washington</td>
<td>1 Boise Cascade LLC</td>
<td>Boise Cascade</td>
<td>Acetaldehyde</td>
<td>38%</td>
</tr>
<tr>
<td></td>
<td>2 Transalta Centralia Generation/Mining</td>
<td>Transalta Centralia Generation/Mining</td>
<td>Arsenic and arsenic compounds</td>
<td>15%</td>
</tr>
<tr>
<td>West Virginia</td>
<td>1 American Electric Power Amos Plant</td>
<td>American Electric Power</td>
<td>Arsenic and arsenic compounds</td>
<td>44%</td>
</tr>
<tr>
<td></td>
<td>2 American Electric Power Kammer/ Mitchell Plants</td>
<td>American Electric Power</td>
<td>Arsenic and arsenic compounds</td>
<td>27%</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>1 Wausau Paper Mills LLC</td>
<td>Wausau Paper Corp</td>
<td>Acetaldehyde</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>2 Hercules Inc.</td>
<td>Hercules Inc.</td>
<td>Epichlorohydrin</td>
<td>13%</td>
</tr>
<tr>
<td>Wyoming</td>
<td>1 Black Hills Corp. Osage Power Plant</td>
<td>Black Hills Corp.</td>
<td>Lead and lead compounds</td>
<td>67%</td>
</tr>
<tr>
<td></td>
<td>2 PacifiCorp Dave Johnston Plant</td>
<td>Berkshire Hathaway</td>
<td>Copper and copper compounds</td>
<td>23%</td>
</tr>
</tbody>
</table>

Source: Food & Water Watch /PERI analysis of data from the U.S. EPA Toxics Release Inventory and Risk Screening Environmental Indicators.
Appendix B

Toxics Release Inventory (TRI) and Risk-Screening Environmental Indicators (RSEI)

As required by the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), the EPA compiles data on how much of each of the specific toxic chemicals are discharged by regulated facilities each year. The agency then makes the resulting TRI available to the public.

While the TRI provides the best available data on the quantities of industrial toxic chemicals released, the toxicities of individual chemicals vary. Quantifying the potential risks to public health and the environment from these toxic chemical releases is a complex endeavor. Some chemicals are far more toxic to ingest than others, and this needs to be accounted for to evaluate potential environmental health effects. Some chemicals are more persistent in the environment than others, or more readily dissolve in water than others, and this also needs to be accounted for when evaluating the health risks associated with a specific release of a specific chemical.

The EPA launched the Risk-Screening Environmental Indicators (RSEI) project in the 1990s to build on TRI data and ultimately quantify the risks to human health posed by exposure to environmental releases of toxic chemicals. Starting with the quantities of different chemicals released as reported to the TRI, the EPA’s RSEI model incorporates additional factors that define the risk to human health.

The RSEI project defines “hazard” as the quantity of chemicals released multiplied by the toxicity weight of each chemical. The toxicity weight represents how toxic the chemical is to humans, relative to other chemicals. The hazard as defined by the EPA’s RSEI project is the basis of the analysis presented in this report.

Toxicity

All of the chemicals in the TRI are toxic, but the health risk from oral ingestion can vary by many orders of magnitude. To express the total hazard for releases of multiple chemicals with different toxicities, the EPA assigns a toxicity weight to each chemical based on toxicological studies. Weights range from 0.02 to 500,000,000, with vinyl acetate (and aluminum dust) given a weight of 1.0. The toxicity weight for orally ingesting zinc is about 3.0 while the toxicity weight for ingesting mercury is 10,000, given that mercury is roughly 3,000 times more potentially harmful to ingest than the same amount of zinc.

The EPA has not yet assigned oral toxicity weights to all chemicals in the TRI database, and those chemicals without toxicity weights are not included in RSEI Hazard calculations. About 99 percent of releases have toxicity weights. Dioxin is one noteworthy toxic that lacks an assigned toxicity weight.

Hazard

Hazard expresses the danger to human health by combining company-reported release data, peer-reviewed toxicity information and, in the case of transfers to publicly owned treatment works (see below), estimates of how much of the chemical passes untreated through these facilities. The hazard posed by a release gives the best picture of the toxic environmental burden that facilities create at the point of release.

Missing from the calculation of a hazard are estimates of downstream population exposures. The RSEI also attempts to assess human exposures resulting from drinking water and fish consumption, but this requires assumptions regarding consumption parameters whose magnitude is uncertain. Moreover, releases of toxic chemicals into surface waters can have adverse environmental impacts apart from these human ingestion pathways. For these reasons, this study simply reports the RSEI Hazard scores.

Transfers

The TRI records releases of toxic chemicals directly into surface water and transfers of toxic chemicals to publicly operated treatment works (POTWs), usually through pipes running directly from the facility to the treatment system. POTWs remove some but not all of the transferred toxic chemicals, and those chemicals not removed are released into surface water.

The EPA’s Risk-Screening Environmental Indicators (RSEI) project assists public interpretation of the TRI data in several important ways. Some of what is counted as a “transfer” in the TRI slips past treatment, ending up in surface water. The TRI reports the amount transferred, and the RSEI estimates how much of the transfers to POTWs slip through treatment, joining direct releases into surface water. The resulting portrait of industrial toxic releases into our nation’s waterways includes both direct releases into surface water and the EPA’s estimate of post-treatment releases.
Endnotes


2 Dutzik (2009) at 4; Caplan (2001) at 1.


16 Schierow (2012) at 2 and 3.


18 EPA. “National Primary Drinking Water Regulations.” (EPA 816-F-09-004.) May 2009 at 5.


32 ACS (June 29, 2011).


37 ATSDR. “PAHs.” (1996); BCF. “PAHs.”


40 ACS (June 29, 2011).


42 ATSDR. “4,4’-Methylenedianiline. CAS # 101-77-9.” Agency for Toxic Substances and Disease Registry ToxFAQs. August 1999 at 1 and 2.


45 OSHA. “Ethylene Oxide. OSHA Fact Sheet.” 2002 at 1.

46 ACS (June 29, 2011).

47 ATSDR. “1,4 Dioxane. CAS # 123-91-1.” Agency for Toxic Substances and Disease Registry ToxFAQs. September 2007 at 1.
