

# 2012 VIRGINIA TOXICS RELEASE INVENTORY REPORT

Summary of Data from 2012 Industry Reports



[www.deq.virginia.gov](http://www.deq.virginia.gov)

March 2014

## **Virginia Department of Environmental Quality Mission and Programs**

It is the policy of the Virginia Department of Environmental Quality (DEQ) to protect the environment of Virginia in order to promote the health and well-being of Virginians. To this end, DEQ implements numerous programs, as described on DEQ's website at <http://www.deq.virginia.gov/Programs.aspx>. These programs range from media specific programs on air quality, water quality, and waste management, to area programs (such as the Chesapeake Bay Program and the Virginia Coastal Zone Management Program), to more specific programs (such as Small Business Assistance and Citizen Monitoring). DEQ is committed to pollution prevention and elimination or reduction of waste at the source of generation. An example of a pollution prevention program is the Virginia Environmental Excellence Program. All parts of the DEQ and other sectors of government, Virginia businesses and industry, and Virginia's citizens have a role in managing and controlling the release of toxic chemicals in the Commonwealth.

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## **Executive Summary**

In March of each year, the Virginia Department of Environmental Quality (DEQ) publishes the Virginia Toxics Release Inventory (TRI) Report, pursuant to Virginia Code § 10.1-1186.1. The TRI program continues to fulfill its goal of providing chemical use, release, and waste management information to the public. The Virginia TRI Report contains information on the release or other management of listed chemicals and chemical categories, as reported by Virginia industries in specified industrial sectors and by federal facilities located within the Commonwealth. The facilities' reports are required by Title III of the federal Superfund Amendment and Reauthorization Act (SARA Title III), also known as the Emergency Planning and Community Right-to-Know Act (EPCRA). The Virginia TRI Report is a multi-media report, covering air, water, and waste management activities, and it addresses a variety of handling practices, including releases, recycling, energy recovery, and on-site and off-site treatment and disposal. The 2012 TRI data represents the 26<sup>th</sup> year of data collection from facilities for distribution to the public.

This year's Virginia TRI Report covers calendar year 2012, which is the most recent year of available data. The Virginia TRI Report includes all reports and revisions received by DEQ on or before January 15, 2014. For calendar year 2012, 419 Virginia facilities filed 1,442 individual reports on the release, transfer, or management of TRI chemicals or chemical categories. This was a 1.70 percent increase from the 412 facilities and a 1.69 percent increase from the 1,418 reports filed for calendar year 2011. In 2012, Virginia facilities reported the release, transfer, or management of 149 chemicals and chemical categories, of the more than 650 chemicals and chemical categories which are subject to the TRI reporting requirements.

According to the reports, Virginia facilities reported the release, transfer, or on-site management of 872.95 million pounds of TRI chemicals during calendar year 2012 (a 1.48 percent increase from 2011). Of this total:

- 32.68 million pounds of TRI chemicals were released on-site at reporting Virginia facilities (a 16.69 percent decrease from 2011);
- 65.29 million pounds of TRI chemicals were transferred off-site from reporting Virginia facilities for treatment, recycling, energy recovery, or disposal (a 4.98 percent decrease from 2011); and
- 774.97 million pounds of TRI chemicals were managed on-site by treatment, recycling, or energy recovery (a 3.02 percent increase from 2011).

Since the inception of the TRI Program there has been a decreasing trend in the amount of TRI chemicals being released to the environment. Overall results from the most recent TRI data show:

- The total amount of TRI chemicals reported as released to air for 2012 decreased by 1.57 million pounds (7.85 percent) compared to 2011.
- The total amount of TRI chemicals reported as released to water for 2012 decreased by 4.95 million pounds (29.62 percent) compared to 2011.

- The total amount of TRI chemicals reported as released to land for 2012 decreased by 29,995 pounds (1.18 percent) compared to 2011.

The Virginia TRI Report addresses separately those TRI chemicals the U.S. Environmental Protection Agency (EPA) has designated as Persistent Bio-accumulative Toxins (PBTs). These chemicals remain in the environment for long periods of time, are not readily destroyed, and build up or accumulate in body tissue. According to the 2012 PBT reports:

- 206,964 pounds of PBT TRI chemicals were released on-site at reporting Virginia facilities;
- 539,827 pounds of PBT TRI chemicals were transferred off-site from reporting Virginia facilities for treatment, recycling, energy recovery, or disposal; and
- 315,376 pounds of PBT TRI chemicals were managed on-site by treatment, recycling, or energy recovery.

Dioxins and dioxin-like compounds account for 16.54 grams (approximately 0.04 pounds) of the PBT chemicals released, transferred, or managed by Virginia facilities during calendar year 2012.

As required by statute, the Virginia TRI Report also provides information by industrial sectors (identified by the North American Industry Classification System), facilities and facility location (jurisdiction). For calendar year 2012 three reporting industrial sectors accounted for 64.23 percent of the total on-site releases to the environment. The top three reporting industrial sectors were: Chemical Manufacturing, Utilities and Food Manufacturing. The text of the report provides additional information about the industrial sectors, facilities and jurisdictions with the largest reported on-site release, on-site management and other management of TRI chemicals.

The Virginia TRI Report provides the public with information concerning specified toxic chemicals and chemical compounds which are manufactured, processed, or otherwise used at Virginia facilities. Responsible use of the information can help the public and industry identify potential concerns and develop effective strategies for reducing toxic chemical usage and release. The TRI data does not, however, represent a measure of the public's exposure to chemicals, nor does it assess risk. Many of the releases are regulated and permitted under other state and federal programs that are designed to protect human health and the environment. Because of differences in report generation schedules and receipt of reports, the information in the Virginia TRI Report will not precisely match the information in the national Toxics Release Inventory - Public Data Release, located at <http://www2.epa.gov/toxics-release-inventory-tri-program/tri-data-and-tools>, as published by EPA.

## **Introduction**

### **Part One - Virginia TRI Reporting**

#### **Statutory and Regulatory Basis**

The Virginia TRI Report is published annually pursuant to Virginia Code § 10.1-1186.1. The TRI Report contains information on the release, transfer, or management of listed chemicals and chemical categories, as reported by more than 400 Virginia industries and federal facilities. The facilities are required to submit their reports pursuant to the federal Emergency Planning and Community Right-to-Know Act (EPCRA), also known as SARA Title III.<sup>1</sup> Virginia Code § 10.1-1186.1 directs DEQ to publish the Virginia TRI Report in March of each year and to include information for the most recent calendar year for which data are available, in this case, the calendar year 2012. The Virginia Code also directs the report to be organized by chemical, facility, facility location and standard industrial classification (SIC) code. Federal regulations require facilities to submit their TRI reports to the U.S. Environmental Protection Agency (EPA) and to the Commonwealth. The Virginia TRI Report is compiled directly from the reports received from Virginia facilities.

A glossary of terms used in the Virginia TRI Report is included as Appendix A.

#### **Current Year (2012) Virginia Facility Reports**

Pursuant to federal requirements, facilities are required to submit their reports for a calendar year by the following July 1<sup>st</sup>, for example, facilities were required to file their reports on their calendar year 2012 activities on or before July 1, 2013. Therefore, data for calendar year 2012 are the most recent available for the March 2014 report. The TRI Report includes all facility reports and revisions received by DEQ on or before January 15, 2014. For reporting year 2012, 419 Virginia facilities filed 1,442 individual reports on the release or other management of TRI chemicals or chemical categories, which represents a slight increase from the 412 facilities and 1,418 reports that were filed for reporting year 2011. Data for all reporting years are available to the public from DEQ's SARA Title III office. A digital copy of the TRI report and appendices are available to the public on DEQ's website at <http://www.deq.virginia.gov/Programs/Air/AirQualityPlanningEmissions/SARATitleIII/SARA313ToxicReleaseInventory.aspx>.

In 2012, Virginia facilities reported the release, transfer, or management of 149 of the more than 650 chemicals and chemical categories that are subject to TRI reporting requirements.

#### **Improvements to the 2012 Virginia TRI Report**

Continuing the policy changes which began with the 2002 report, the Virginia TRI Report contains additional information based on the recent North American Industry Classification System (NAICS) code ruling by EPA. Assessing risk is beyond the scope of the report and is subject to site-specific interpretations and calculations. Readers are encouraged to utilize the resources listed in the report, appendices and other data to analyze the overall use, release and management of TRI chemicals.

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<sup>1</sup> 42 U.S.C. § 11023, or SARA § 313

For reporting year 2012, one new chemical, Hydrogen Sulfide, was added to the list of reportable chemicals. Hydrogen sulfide was added to the list of TRI reportable chemicals in a final rule published on December 1, 1993. On August 22, 1994, EPA issued an Administrative Stay of the reporting requirements for hydrogen sulfide in order to evaluate issues brought to the Agency's attention after promulgation of the final rule concerning the human health effect basis for the listing. EPA has completed the evaluation of the human health and environmental effects of Hydrogen Sulfide and the Administrative Stay on TRI reporting of Hydrogen Sulfide was lifted on October 17, 2011.

Virginia is one of 35 states participating in the State Data Exchange program for online data collection of TRI reports. States which join the TRI State Data Exchange can save resources by sending all of their data electronically via the Central Data Exchange (CDX). Participating states may be viewed at the following site <http://www2.epa.gov/toxics-release-inventory-tri-program/tri-data-exchange>.

## **Part Two - National Toxics Release Inventory Reporting Program**

### **The National Toxics Release Inventory**

The Virginia TRI Report is compiled directly from reports Virginia facilities submit under federal law and regulations.<sup>2</sup> Using those same authorities, EPA compiles and maintains nationwide information in the *Toxics Release Inventory – National Analysis*, which is available to the public on EPA's website at <http://www.epa.gov/tri/>. The National Toxics Release Inventory was established to provide information to the public about the presence and release of toxic and hazardous chemicals in their communities. From inception, the national TRI program and Virginia's program have been expanding and evolving to meet the needs of an informed public. A list of supplementary resources on the program can be found in Appendix B and more detailed information about the historical changes to the TRI program can be found in Chapter Four.

### **Facilities Which Must Report**

Under the national TRI program, a facility must submit a TRI report (or reports) to EPA and the state if:

- 1) **The facility has ten or more full-time employees** (a combined total for all employees of 20,000 hours or more for the year);
- 2) **The facility's primary business is within one of the covered North American Industrial Classification System (NAICS) codes.** The industry sectors include metal mining, coal mining, paper and allied products, chemicals and allied products, petroleum terminals and bulk stations, and others. The complete list of covered industry groups is provided in Appendix H; and
- 3) **The facility manufactured, processed, or otherwise used a reportable toxic chemical in quantities greater than the established threshold during the course of a calendar year.** The annual thresholds for non-PBT TRI chemicals are 25,000 pounds for manufacturing, 25,000 pounds

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<sup>2</sup> The national TRI was established under Title III, Section 313, of the Federal Superfund Amendments and Reauthorization Act (SARA), which is also known as the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), 42 U.S.C § 11023. The related federal regulations are found at 40 CFR Part 372.

for processing, and 10,000 pounds for "otherwise use". For PBT chemicals, the thresholds are lower and vary by chemical. For example, dioxin and dioxin-like compounds have a threshold of 0.1 grams, while lead and lead compounds, have a reporting threshold of 100 pounds. For PBT chemicals, these lower reporting thresholds apply whether the chemical is manufactured, processed, or otherwise used.

Federal facilities also are required to comply with EPCRA and the Pollution Prevention Act (PPA) of 1990, in accordance with Executive Order 13148. The Executive Order requires all federal facilities which manufacture, process, or otherwise use any listed EPCRA Section 313 chemical above the reporting threshold to submit a TRI report. The first federal facility reports were submitted on or before July 1, 1995, for calendar year 1994.

## **Chemicals and Chemical Categories**

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

- Adverse acute health effects at significant concentration levels beyond facility boundaries as a result of continuous or frequently occurring releases;
- Cancer in humans; or
- A significant adverse effect on the environment because of the chemical's toxicity and persistence in the environment.

As new chemicals of concern are identified, they are added to the TRI list. Conversely, if TRI chemicals are found not to meet the toxicity requirements, they can be deleted. Currently, the reportable TRI chemical list contains more than 650 chemicals and chemical categories. A complete list of TRI chemicals and chemical categories for calendar year 2012 reports is available to the public on EPA's website at <http://www2.epa.gov/toxics-release-inventory-tri-program/tri-listed-chemicals>.

For 2012, Virginia facilities reported the release, transfer, or management of 149 of the more than 650 chemicals and chemical categories which are subject to the TRI reporting requirements.

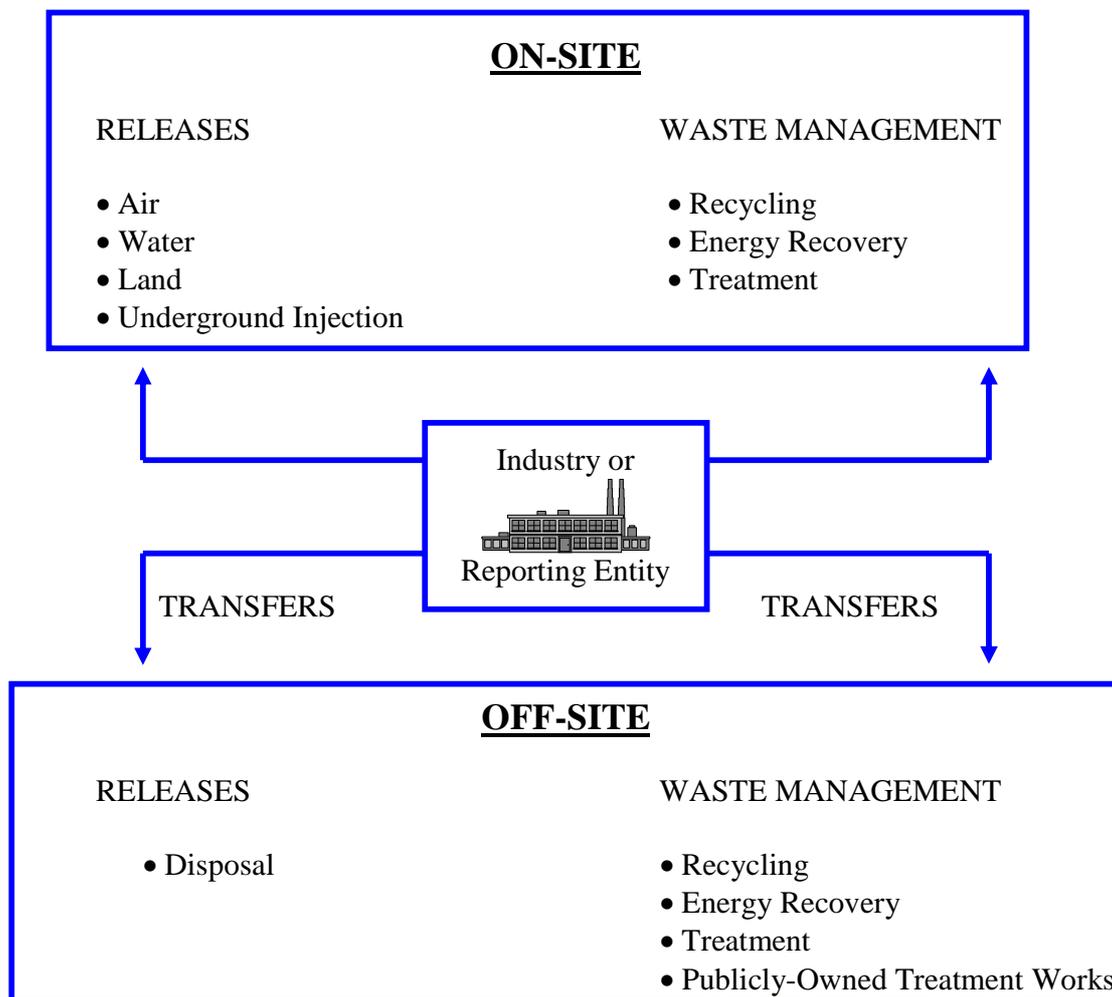
## **Reporting Forms and Activities Which Must Be Reported**

Each year, reporting facilities submit one reporting form for each TRI chemical or chemical category which is manufactured, processed, or otherwise used in amounts equal to or greater than the threshold values. For each TRI chemical or chemical category, facilities must submit either a Form A (simplified form) or a Form R (long form). Examples of both forms for reporting year, 2012, are provided in Appendix D. Form A has restrictions governing its use. The 2009 Omnibus Appropriation Act has returned TRI reporting requirements to the rules in effect prior to the TRI Burden Reduction Rule, announced in December, 2006. The change requires the reports on PBT chemicals be submitted on the Form R. For all other chemicals, the shorter form, Form A, may be used only if the "annual reporting amount" is 500 pounds or less and the chemical was manufactured, processed, or otherwise used in an amount not exceeding 1 million pounds during the reporting year.

Data used to prepare quantitative information in the Virginia TRI Report come principally from Part II of the Form R reports, and specifically from Sections 5, 6, 7 and 8 of Part II, Form R. These sections are referred to throughout the Virginia TRI Report and are described below:

- **Section 5: Quantity of toxic chemical entering/releasing to each environmental medium on-site.** Release reporting is broken down into categories: releases to the air (from stack and fugitive emissions), releases to water (on-site and to publicly-owned treatment works (POTWs)) and releases to land (underground injection, disposal to land, Resource Conservation and Recovery Act (RCRA) Subtitle C landfill, other landfills, land treatment/application farming, surface impoundment, or other disposal).
- **Section 6: Transfers of the toxic chemical in wastes to off-site locations.** Section 6 contains two main subsections: transfers to POTWs and transfers to all other off-site locations (in-state or out-of-state). Facilities are required to provide the name and location of off-site locations, the quantity transferred and the method of management (treated, disposed, recycled, or burned for energy recovery).
- **Section 7: On-site waste treatment methods and efficiency (including energy recovery processes and recycling processes).** Facilities are asked to provide mostly qualitative information on the on-site treatment processes, the estimated range of influent concentration and the efficiency of the operation.
- **Section 8: Source reduction and recycling activities.** Section 8 was added to the Form R reporting as a result of the federal Pollution Prevention Act of 1990 to track production-related activities. Section 8 extracts and re-aggregates data reported in Sections 5 through 7 into environmental releases (production-related on-site and off-site releases), off-site transfers/management and on-site management. Where Section 7 contains qualitative information about on-site management practices, a subsection of Section 8 asks for related quantitative data. Section 8 and its subsections also request previous year reporting and future year estimates for production-related releases, transfers for off-site management and on-site management. Other subsections of Section 8 ask for episodic/catastrophic releases (non-production related), qualitative information on source reduction activities and a production ratio or activity index to better engage the facility's efforts in source reduction. The flow chart (Figure 1) on the following page illustrates the information collected on Form R for TRI chemicals.

**Figure 1 - Schematic Diagram of the TRI Data Collected**



**Part Three - Uses and Limitations of TRI Data**

The Virginia TRI Report provides the public with information concerning designated toxic chemicals and chemical categories manufactured, processed, or otherwise used at facilities, including the amounts released to the environment and managed as wastes.

Industry can use the data to: obtain an overview of use and release of toxic chemicals, identify and reduce costs associated with toxic waste, identify promising areas for pollution prevention, establish reduction targets and measure and document progress toward reduction goals.

The public availability of the data has assisted many facilities in working with their communities to develop effective strategies for reducing environmental and human health risks that may result from toxic chemical releases.

Nevertheless, there are limitations on the use of TRI data:

1. The TRI Report contains reported information on the quantities of chemicals released and managed, not the public's exposure to, or risk from, the chemicals. Risk to human health by a chemical release depends on the toxicity of the chemical; how it disperses, reacts, or persists in the environment; and the quantity, concentration and type of human exposure. Furthermore, chemicals reported for the TRI Report are not weighted by their toxicity. For example, a pound of one substance may be more toxic or hazardous than 1,000 pounds of another. Due to the limited nature of TRI data collected, readers are strongly discouraged from making any health or environmental risk/exposure assessments from the information presented. Many of the TRI chemical releases are permitted under other federal and state regulatory programs. Data from these regulatory programs may provide additional information to better inform residents about their environment.
2. The TRI program captures only a portion of all toxic chemical releases in Virginia. The TRI reporting program does not account for TRI chemicals from most non-manufacturing facilities, facilities with fewer than 10 employees, facilities that do not meet the chemical quantity thresholds, other non-industrial sources, or transportation-related emissions.
3. The majority of facilities report TRI data based on estimates. The TRI program does not require facilities to monitor releases, only to use best available data in the facilities' estimates. Using different methods to estimate data can result in significant variability from one facility to another, as well as from one year to the next.
4. Patterns of releases and other waste management activities can change significantly from one year to the next. Thus, the data in this report for a specific facility differ from those reported for a prior year.
5. Direct comparison between figures in the current year's report and figures in past Virginia Toxics Release Inventory Summary Reports is discouraged because of changes in reporting requirements and the authorized incorporation of revisions to previous years' data. Several historical comparisons, with appropriate standardization of data, are provided in Chapter 4 and Appendix E.
6. EPA is required by law to compile an annual *Toxics Release Inventory – National Analysis* on the national level. The data published in the Virginia TRI Report is anticipated to not completely correspond to the data published by the EPA. Contributing factors include: differing dates on which data are extracted for processing, revised facility reports, and facilities which mistakenly report to the Commonwealth or EPA but not both. DEQ and EPA continue to work together to rectify such differences.

The data for calendar year 2012 show an increase (1.48 percent) in the amount of TRI chemicals released on-site, transferred off-site and managed on-site from 2011 (see Chapter 4). There has been a downward trend in the amount of TRI chemicals released to the environment and managed as wastes in Virginia since the implementation of the TRI Program in 1988. The increase in the total amount of TRI chemicals reported in 2012 is due to an increase in the amount of TRI chemicals being recycled and used for energy recovery on-site

## **Chapter One - 2012 Virginia TRI Data Review**

Chapter One describes the 2012 reporting year data, based on the type of activity and the chemicals and chemical categories reported. The chapter is divided into four parts. Part One presents an overview and summary of 2012 data collected. Part Two discusses on-site releases of TRI chemicals to the environment, whether to air, water, or land. These data are derived from Section 5 of the Form R reports. Part Three of Chapter One discusses the off-site transfers of TRI chemicals, whether to POTWs or to other off-site locations. These data are derived from Section 6 of the Form R reports. Part Four of Chapter One discusses on-site and off-site management activities. These data are derived from Section 8 of the Form R reports. While Chapter One includes all TRI chemicals, Chapter Two addresses PBT chemicals in more detail.

As described in the Introduction, Section 8 of the federal Form R asks facilities to extract and re-aggregate certain data from Sections 5 and 6. To avoid double-counting these chemicals in the Overview and Summary, only data which are independent of Sections 5 and 6 are presented when discussing "On-Site Management" in Part One of this chapter. When discussing Section 8 data as a whole, however, all these data are used in Part Four of this chapter; including data extracted and re-aggregated from Sections 5 and 6, so the balance between various on-site and off-site management activities can be shown. Appendices H and I contain facility-specific information, arranged by jurisdiction, for TRI chemicals (excluding PBTs) and for PBT chemicals, respectively.

### **Part One - 2012 Overview and Summary**

For calendar year 2012, Virginia facilities reported they released, transferred, or managed approximately 872.95 million pounds of TRI chemicals (see Table 1).

Approximately 32.68 million pounds of TRI chemicals were reported to have been released on-site to the environment. Air releases represented 18.40 million pounds, or 56.31 percent of all the TRI chemicals released on-site in 2012. Releases to the water totaled approximately 11.76 million pounds, or 35.99 percent of the total released on-site. Releases to the land totaled approximately 2.52 million pounds, or 7.70 percent of the total released on-site. For 2012, the amount of TRI chemical releases to the environment represented approximately 3.74 percent of the total TRI chemicals reported.

Off-site transfers totaled approximately 65.29 million pounds of TRI chemicals. Off-site transfers to POTWs totaled approximately 17.70 million pounds. Off-site transfers to other (non-POTW) facilities (for treatment, recycling, energy recovery and disposal) totaled approximately 47.59 million pounds. For 2012, the amount of TRI chemicals transferred off-site represented approximately 7.48 percent of the total for TRI chemicals by this measure.

Facilities reported approximately 774.97 million pounds of TRI chemicals were managed on-site by treatment, recycling, or energy recovery. For 2012 the amount of chemicals managed on-site represents approximately 88.78 percent of the total TRI chemicals.

**Table 1. Summary of Data by Type of Release, Transfer and On-Site Management for TRI Chemicals (in pounds per year)**

ON-SITE RELEASES BY MEDIA (Section 5 of Form R)	
Total Air	18,404,742.64
Fugitive Air	2,813,663.22
Stack Air	15,591,079.43
Total Water	11,763,752.27
Total Land	2,515,235.83
Landfills	1,526,196.80
Land Treatment / Application	4,067.19
Surface Impoundment	702,154.55
Other Disposal	282,817.29
<b>Total On-Site Releases to Media</b>	<b>32,683,730.75</b>
OFF-SITE TRANSFERS BY TYPE (Section 6 of Form R)	
Publicly Owned Treatment Works (POTWs) (includes metals and metal compounds)	17,701,446.65
Total Other Off-Site Transfers	47,589,511.24
Off-Site Transfers for Recycling	15,293,122.37
Off-Site Transfers for Energy Recovery	7,504,873.77
Off-Site Transfers for Other Treatment	18,224,738.69
Off-Site Transfers for Disposal	6,566,776.41
<b>Total Off-Site Transfers</b>	<b>65,290,957.89</b>
ON-SITE MANAGEMENT (From Section 8 of Form R) *	
Treated On-Site	68,653,896.67
Recycled On-Site	701,320,211.31
Energy Recovery On-Site	5,003,060.00
<b>Total On-Site Management</b>	<b>774,977,167.98</b>
Total TRI Chemicals Released On-site to Media, Transferred Off-site, or Managed On-site by Reporting Facilities	<b>872,951,856.62</b>

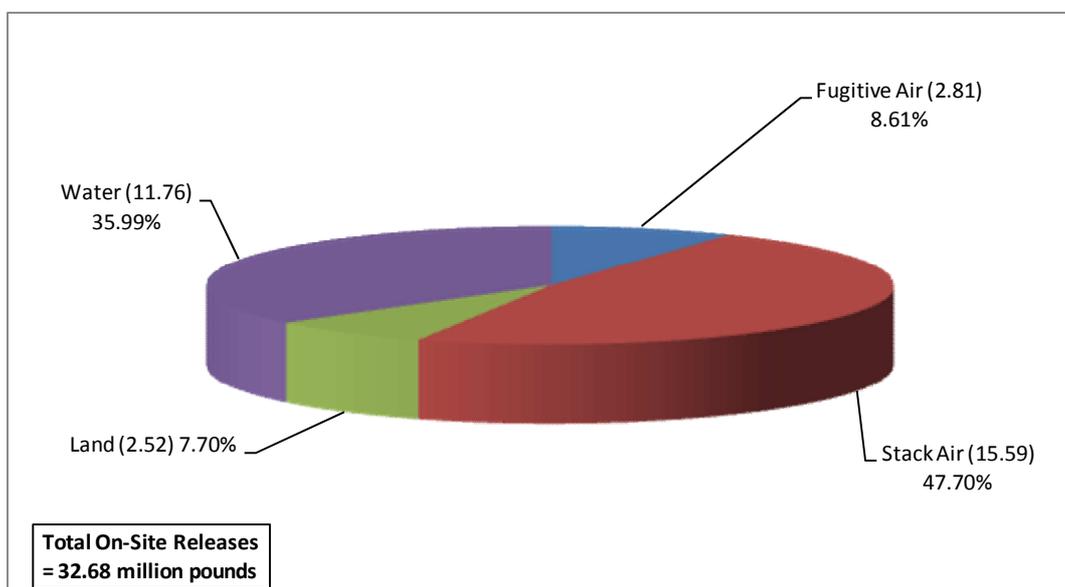
\* The data for the on-site management of TRI chemicals are a summary of data collected from Part II, Sections 8.2, 8.4, and 8.6 of the Form R. These sections, in turn, are quantitative data not reported anywhere else in the Form R and reflect on the descriptive data reported in Part II, Section 7 (on-site management practices - treatment, energy recovery and recycling) of the Form R. Data extracted and re-aggregated to Section 8 from Sections 5 and 6 of Form R have not been included here to avoid duplicate counting.

**Part Two - On-Site Releases to the Environment**

Part Two of Chapter One discusses the on-site releases of TRI chemicals to the environment by facilities, as reported in Section 5 of the TRI Form R. The quantities reported in Section 5 include production-related releases, any catastrophic releases or one-time events not associated with routine production processes.

A release refers to an on-site discharge of TRI chemicals to the air, water, land, and/or disposal in underground injection wells. Any reductions in waste achieved by on-site treatment methods are taken into account when facilities determine their release data. Approximately 32.68 million pounds of TRI chemicals were reported as released into the environment by reporting facilities for reporting year 2012.

**Figure 2. On-Site Releases of TRI Chemicals to All Media for Reporting Year 2012** (From Section 5 of Form R. The number inside the parentheses is the quantity of releases in each category in millions of pounds and the percent figure is the percent of total on-site releases.) There were no underground injection releases reported in 2012.

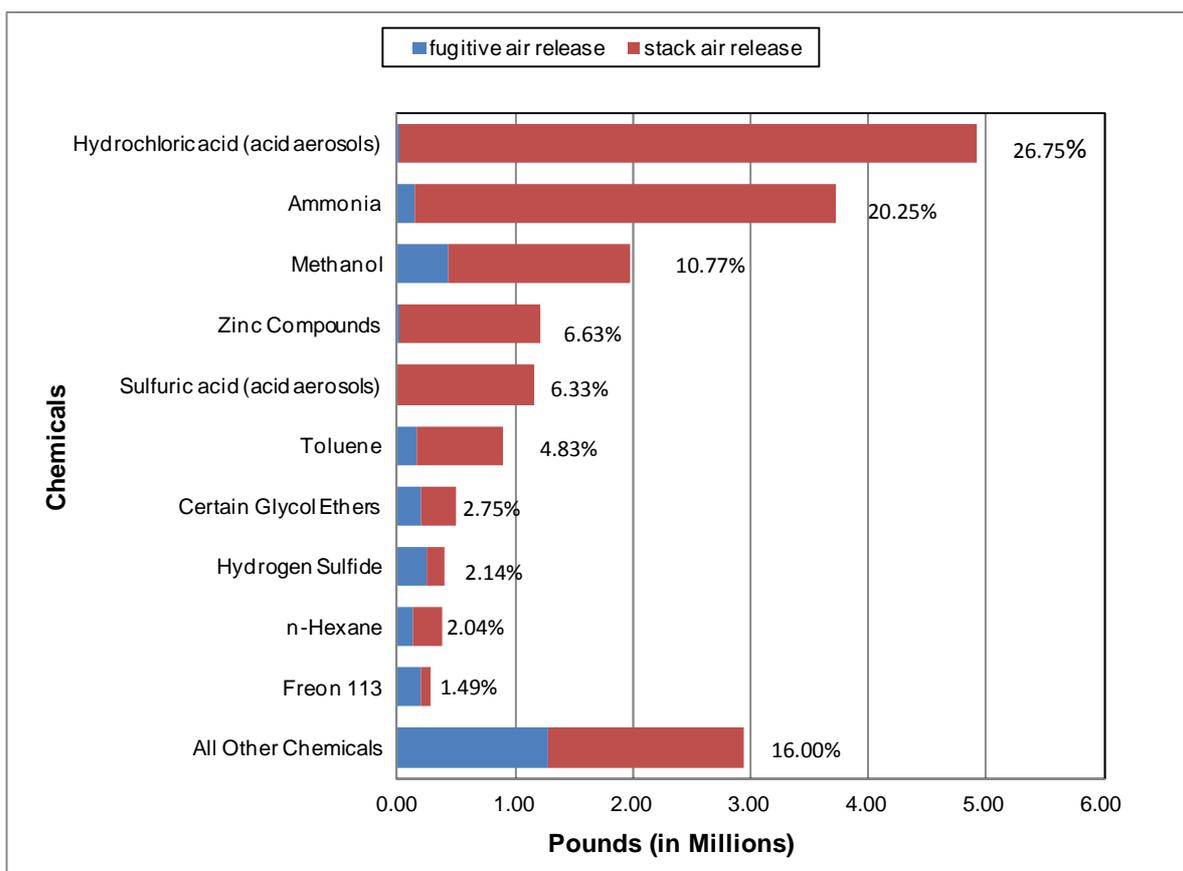


**On-Site Releases to the Air**

On-site air releases are classified as either “fugitive” (non-point source) or “stack” (point source) air emissions. Examples of fugitive air emissions are equipment leaks from valves, pump seals, flanges, compressors, sampling connections, open-ended lines, and evaporative losses from surface impoundments and spills. Stack air emissions are releases to the air which are conveyed through stacks, ducts, pipes, vents, or other confined air streams. Most, if not all, facilities reporting to TRI have permitted stack air emissions.

Based on the amount of fugitive and stack emissions reported, the total amount of releases to the air of all TRI chemicals was approximately 18.40 million pounds, which accounted for 56.31 percent of the total on-site releases to all media (air, water, and land). Ten TRI chemicals released to the air made up approximately 84.00 percent of the total reported TRI air emissions in 2012 (See Figure 3). Those ten TRI chemicals were: hydrochloric acid, ammonia, methanol, zinc compounds, sulfuric acid, toluene, certain glycol ethers, hydrogen sulfide, n-hexane and freon 113. Most reported acid aerosols such as hydrochloric acid and sulfuric acid were reported as generated during the combustion of coal or oil. Electric power generating facilities contributed to the emissions of acid aerosols. Ammonia, methanol and toluene continued to be the air pollutants reported primarily from the manufacturing sector.

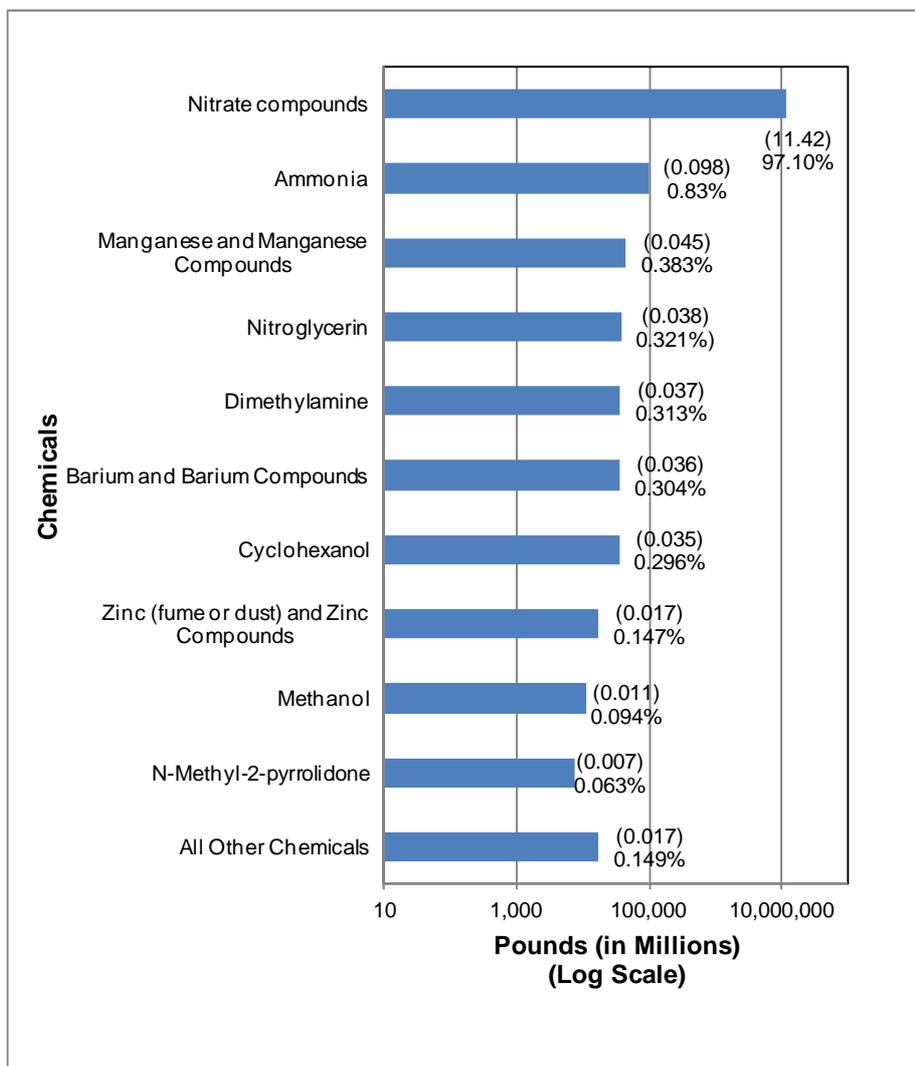
**Figure 3. Top Ten TRI Chemicals Released to the Air On-Site in 2012** (From Section 5 of Form R. The number next to each bar is the percent of total air releases for all 2012 chemicals reported.)



**On-Site Releases to Water**

On-site releases to water include discharges to surface waters, such as rivers, lakes, ponds, and streams. Reported on-site releases of TRI chemicals to water in 2012 totaled approximately 11.76 million pounds and accounted for 35.99 percent of all on-site releases to the air, water, and land in 2012. Ten chemicals and chemical categories accounted for more than 99.85 percent of the on-site TRI chemical releases to the water. Those ten TRI chemicals were: nitrate compounds (97.10 percent of total releases to water), ammonia, manganese and manganese compounds, nitroglycerin, dimethylamine, barium and barium compounds, cyclohexanol, zinc and zinc compounds, methanol and n-methyl-2-pyrrolidone. Nitrate compounds are a common byproduct of industrial wastewater treatment processes and have consistently been reported as the chemical released in the highest quantity to the surface water.

**Figure 4. Top Ten TRI Chemicals Released to Water On-Site in 2012** (from Section 5 of Form R.) The information presented here is in logarithmic, base 10 scale, which compresses the bar chart to show up to 840-fold magnitudes of the difference between nitrate compounds and other chemicals. Please note the scale mark of 1.000 means 1 million pounds, the scale mark of 0.100 means 0.1 million pounds, etc. The number by the bars represents the quantity in millions of pounds followed by percent of total reported releases to water.

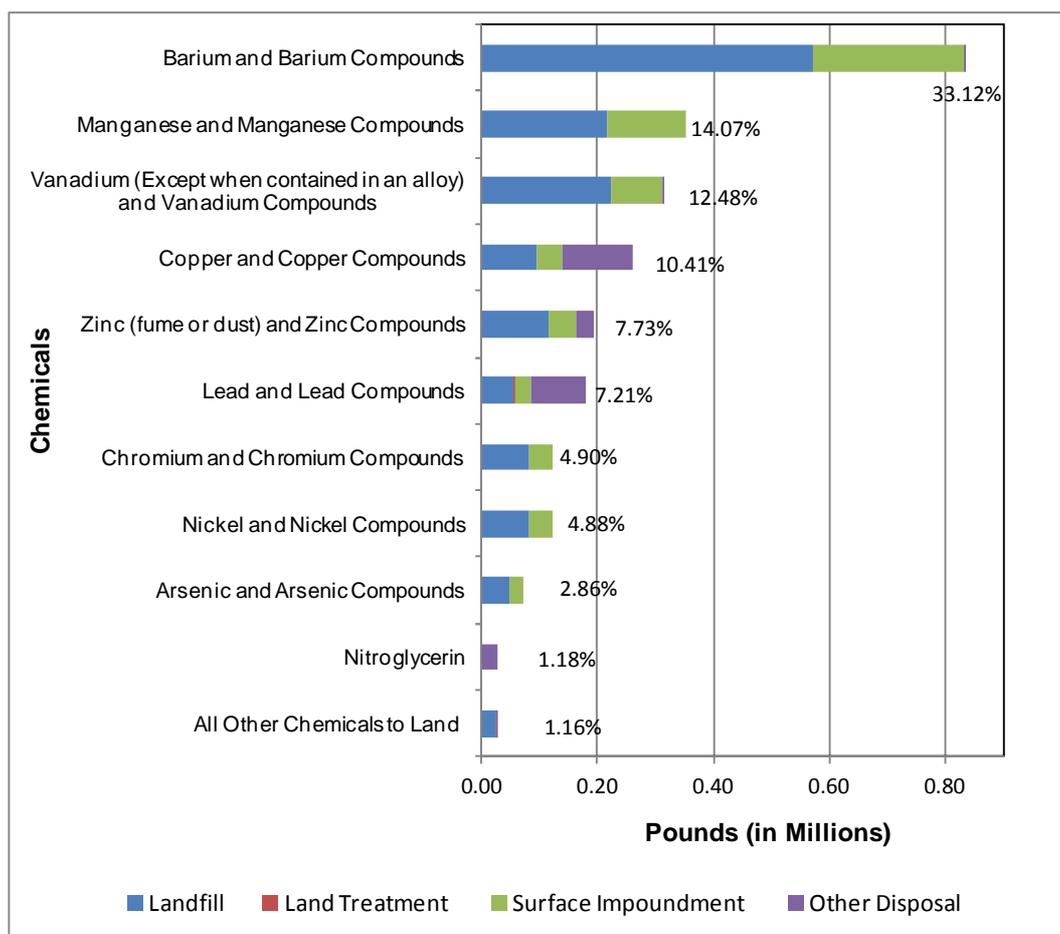


**On-Site Releases to the Land**

On-site releases to the land refer to land filling, surface impoundment, land treatment/application farming, or any other release of a TRI chemical to land within the boundaries of a facility. Virginia does not permit underground injection as a method of hazardous waste disposal (nor was any reported) and no underground injection or RCRA Subtitle C-permitted land disposal of TRI chemicals was reported in 2012.

The total amount of TRI chemicals released to the land in Virginia during 2012 was approximately 2.52 million pounds, which accounted for 7.70 percent of all reported on-site TRI releases (releases to the air, water and land). Ten TRI chemicals constituted approximately 98.84 percent of all of the TRI chemicals released to the land. They were: barium and barium compounds, manganese and manganese compounds, vanadium and vanadium compounds, copper and copper compounds, zinc and zinc compounds, lead and lead compounds, chromium and chromium compounds, nickel and nickel compounds, arsenic and arsenic compounds and nitroglycerin (Figure 5). Metals and metal compounds such as barium are found naturally in coal combusted for energy generation and in the ashes remaining after combustion of the coal.

**Figure 5. Top Ten TRI Chemicals Released On-Site to the Land in 2012** (From Section 5 of Form R. The number next to each bar is the percent of total on-site land releases for all 2012 reported.)



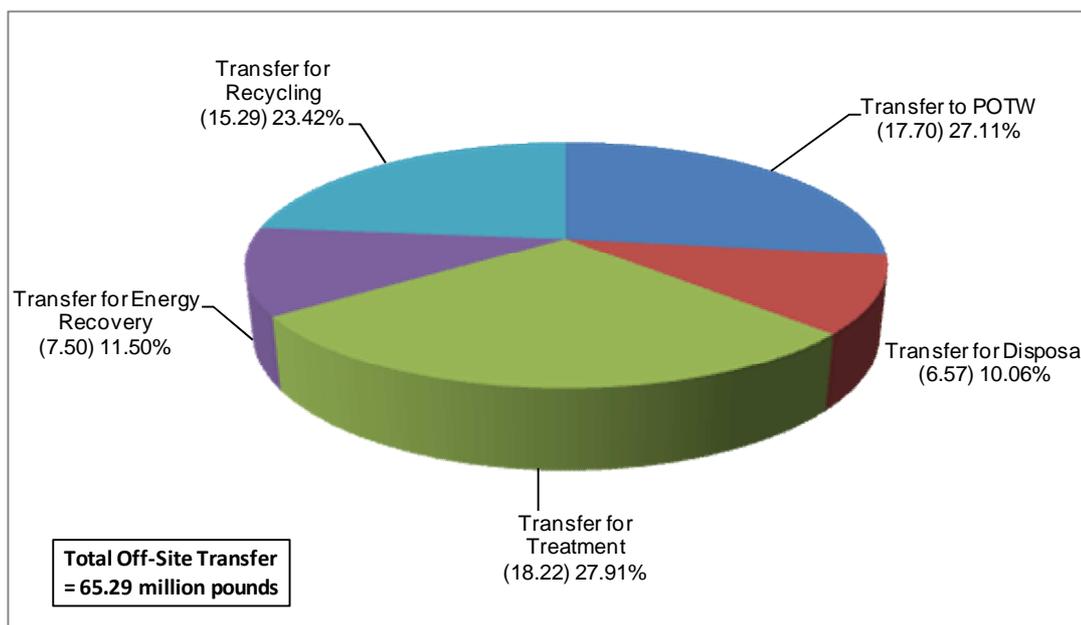
**Part Three - Off-Site Transfers**

Transfers refer to TRI chemicals sent off-site. Transfers are reported as transfers to POTWs or other off-site destinations, such as incinerators, landfills, or other facilities for treatment, recycling, energy recovery, or disposal which are not part of the reporting facility.

In this section, data were collected from Section 6 of Form R. For 2012, approximately 65.29 million pounds of TRI chemicals were reported as sent off-site for further management or disposal.

**Figure 6. All Off-Site Transfers of TRI Chemicals for Reporting Year 2012**

(From Section 6 of Form R. The number inside the parentheses is the quantity of transfers in each category in millions of pounds and the percent figure is the percent of total transfers.)

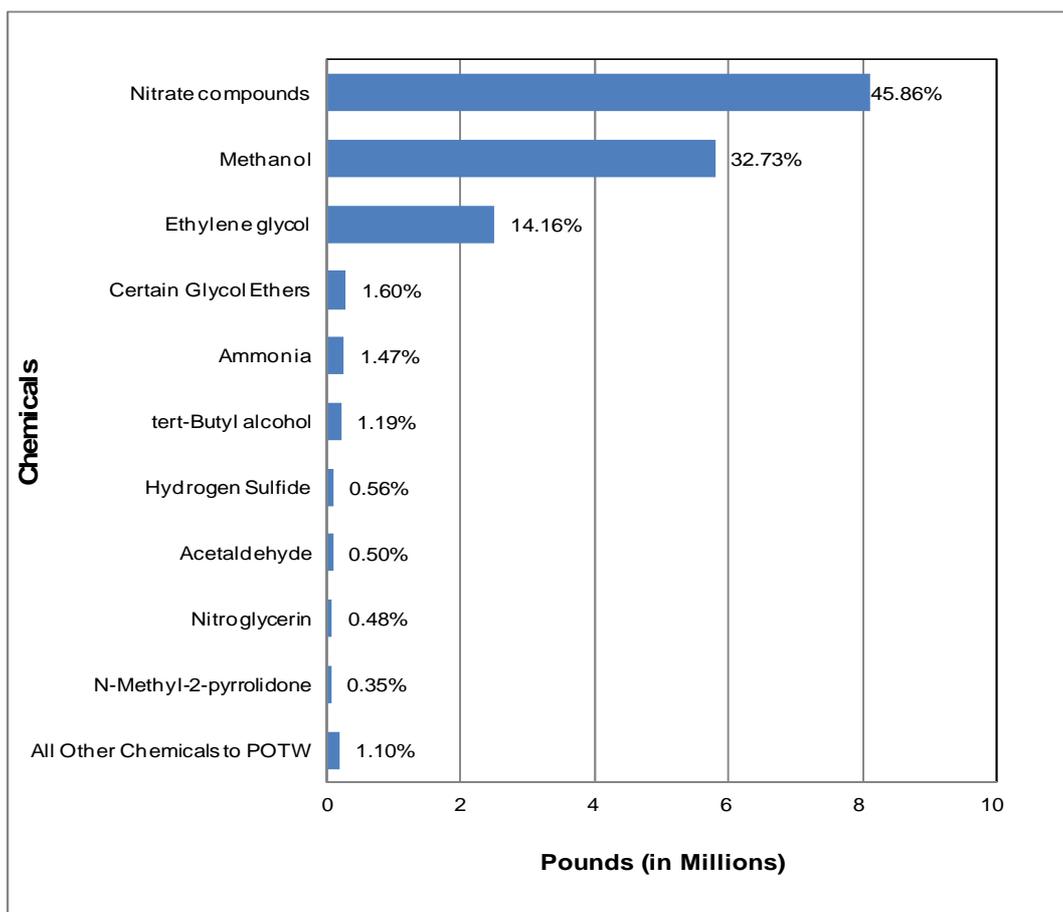


**Transfers to Publicly-Owned Treatment Works**

A POTW is a wastewater treatment facility which is owned by a state or local government. Wastewater from facilities reporting under TRI is transferred through pipes or sewers to the POTW. The TRI information summarized below reports transfers of a chemical to a POTW; however, a transfer to a POTW is not necessarily the same as the release of a chemical to the environment. TRI chemicals may be treated, destroyed, and/or removed from the environment in a POTW's physical, chemical and biological treatment processes. Some TRI chemicals are almost completely destroyed by a POTW. However, not all chemicals can be treated or removed by a POTW. Some chemicals such as metals and metal compounds may be removed but not destroyed. These metals may ultimately be disposed of in a permitted landfill, disposed of in a permitted land application process, or released through a permitted discharge to receiving waters.

Ten TRI chemicals accounted for approximately 98.90 percent or 17.51 million pounds of the approximately 17.70 million pounds of TRI chemicals transferred to POTWs in reporting year 2012. Nitrate compounds were the leading pollutant discharged to POTWs for treatment for the current reporting period. The other nine top-reported TRI chemicals transferred to POTWs in reporting year 2012 were: methanol, ethylene glycol, certain glycol ethers, ammonia, tert-butyl alcohol, hydrogen sulfide, acetaldehyde, nitroglycerin and n-methyl-2-pyrrolidone.

**Figure 7. Top Ten TRI Chemicals Transferred to Publicly-Owned Treatment Works (POTWs) in 2012** (From Section 6.1 of the Form R. The number next to each bar is the percent of total transfers to POTW.)

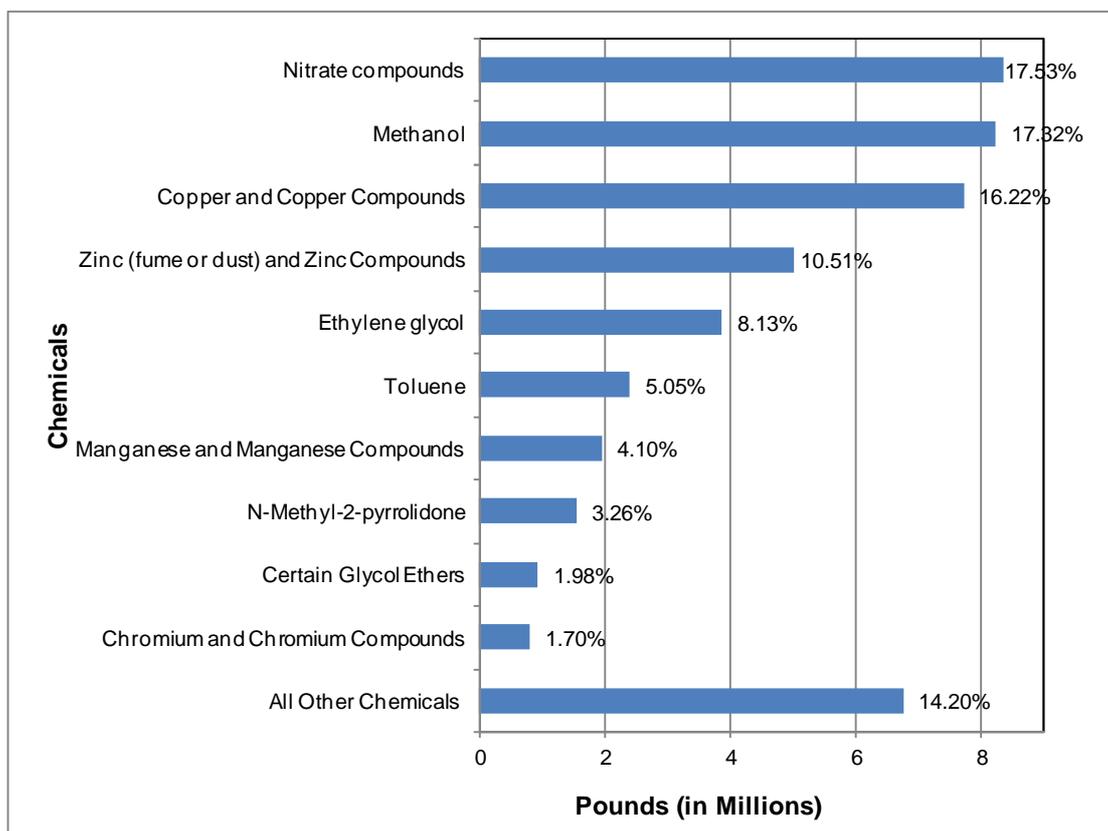


**Transfers to Other Off-Site Locations**

The Form R also reports the transfers of TRI chemicals to facilities other than POTWs. These off-site locations include incinerators, landfills, other treatment, energy recovery, recycling, and/or disposal facilities. Off-site transfers can be to facilities located inside or outside of the Commonwealth.

In 2012 the total amount of TRI chemicals transferred to other off-site locations was approximately 47.59 million pounds. Ten TRI chemicals represented approximately 85.80 percent of the total TRI chemicals transferred off-site to locations other than POTWs. Those ten TRI chemicals and chemical categories transferred off-site to locations other than POTWs in reporting year 2012 were: nitrate compounds, methanol, copper and copper compounds, zinc and zinc compounds, ethylene glycol, toluene, manganese and manganese compounds, n-methyl-2-pyrrolidone, certain glycol ethers and chromium and chromium compounds.

**Figure 8. Top Ten TRI Chemicals Transferred to Off-Site Locations Other than POTWs in 2012**  
 (From Section 6.2 of the Form R. The number next to each bar is the percent of total transfers to other off-site locations.)



**Part Four - On-Site and Off-Site Management**

Under the Pollution Prevention Act of 1990, facilities subject to EPCRA Section 313 must report their source reduction and recycling activities. Consequently, EPA added Section 8 to the Form R to track production-related activities. Section 8 contains 11 subsections and requires facilities to extract and re-aggregate data reported in Sections 5 through 7 into releases (on-site and off-site releases to the environment); off-site transfers/management; and on-site management categories. The current part of Chapter One discusses all of the data included in Section 8 so the relative methods of toxic chemical management can be compared.

Some of the data and information reported in Sections 5, 6, and 7 are handled differently for Section 8 reporting. The differences are the releases-to-the-environment data in Section 8 exclude catastrophic releases and one-time events not associated with the production process. Furthermore, metal and metal compounds reported as transfers for off-site management in Section 6 are aggregated with the on-site release data from Section 5 as releases to the environment. Metal and metal compounds cannot be destroyed through treatment; hence, their final disposal is considered a release to the environment. There are other differences in how quantities are reported, so the total toxics managed, as reported in Section 8, do not precisely match the total in Table 1. Also, Section 8 is the only part of the Form R which contains quantitative data on on-site waste management activities other than releases. While Section 7 contains qualitative information about on-site management practices, a subsection of Section 8 asks for quantitative data related to information reported in Section 7.

Consistent with the pollution prevention goal, Section 8 of Form R and its subsections also report additional information which addresses resource reduction efforts. In general, facilities utilize several options to manage TRI chemicals. Treatment of waste, both on-site and off-site, involves a variety of methods, including biological treatment, neutralization, incineration, and physical separation. Another option is on-site or off-site recycling. On-site or off-site recycling involves the toxic chemicals in waste being recovered or reclaimed and being returned for further processing or being made available for use in commerce. Energy recovery involves the combustion of toxic chemicals in industrial furnaces or boilers which generate energy for on-site or off-site use. The least preferable and last management option is disposal, which is considered a release to the environment.

As reported in Section 8 of the 2012 facility reports, 872.95 million pounds of production-related TRI chemicals were released, treated, recycled, or recovered both on-site and off-site from Virginia facilities. Approximately 88.78 percent of the TRI chemicals were managed on-site, and 3.74 percent of the TRI chemicals were released into the environment on-site. About 7.48 percent of the TRI chemicals were transferred off-site to be managed by various means.

**Chapter Two - 2012 TRI Data for PBT Chemicals**

Persistent bio-accumulative toxic chemicals are those which remain in the environment for long periods of time, are not readily destroyed, and build up or accumulate in body tissue. Because of these attributes, beginning with reporting year 2000, EPA added several PBT chemicals to the TRI reporting list, and it lowered the reporting thresholds for 18 PBT chemicals and chemical categories. Beginning with reporting year 2001, lead and lead compounds were added to the PBT list, and their thresholds lowered to 100 pounds per year. Previously, lead and lead compounds had been treated as non-PBT chemicals. For reporting year 2011 four PACs were added to the listing of reportable chemicals with a reporting threshold of 100 pounds. The additional PACs listed for reporting year 2011 are: 1,6-Dinitropyrene, 1,8-Dinitropyrene, 6-Nitrochrysene and 4-Nitropyrene.

For reporting year 2012, DEQ received 309 reports and revisions for PBT chemicals, out of a total of 1,442 TRI reports and revisions (21.43 percent). Table 2 shows the reporting thresholds for the TRI PBTs. The table also shows that only 9 of the 20 PBTs were reported as released, transferred, or managed by facilities in Virginia for reporting year 2012. Appendix G has facility-specific information for PBT chemicals.

**Table 2. TRI Reporting Year 2012 Persistent Bio-accumulative Toxic Chemicals - Reporting Thresholds and Number of Reports Received**

<b>CAS Number</b>	<b>Chemical /Chemical Category Name</b>	<b>Reporting Threshold</b>	<b>Reports Received</b>
309-00-2	Aldrin	100 lbs.	0
191-24-2	Benzo(g,h,i)perylene	10 lbs.	<b>29</b>
57-74-9	Chlordane	10 lbs.	0
N150	Dioxin and Dioxin-Like Compounds	0.1 gram	<b>20</b>
76-44-8	Heptachlor	10 lbs.	0
118-74-1	Hexachlorobenzene	10 lbs.	0
465-73-6	Isodrin	10 lbs.	0
7439-92-1	Lead	100 lbs.	<b>97</b>
N420	Lead Compounds	100 lbs.	<b>85</b>
7439-97-6	Mercury	10 lbs.	<b>9</b>
N458	Mercury Compounds	10 lbs.	<b>29</b>
72-43-5	Methoxychlor	100 lbs.	0
29082-74-4	Octochlorostyrene	10 lbs.	0
40487-42-1	Pendimethalin	100 lbs.	0
608-93-5	Pentachlorobenzene	10 lbs.	0
1336-36-3	Polychlorinated biphenyls (PCBs)	10 lbs.	0
N590	Polycyclic aromatic compounds (PACs)	100 lbs.	<b>40</b>
79-94-7	Tetrabromobisphenol A (TBBPA)	100 lbs.	0
8001-35-2	Toxaphene	10 lbs.	0
1582-09-8	Trifluralin	100 lbs.	0

Table 3 provides an overview and summary of 2012 PBT data. The data are organized as in Table 1, Chapter 1. In order to avoid duplicate counting, data extracted and re-aggregated in Section 8 from Sections 5 and 6 of Form R has not been included as "On-Site Management" in Table 3.

**Table 3. Summary of Data by Type of Release, Transfer, and On-Site Management for PBT Chemicals** (Dioxin and dioxin-like compounds are listed separately from the "Other PBT Chemicals" column because they were reported in grams, while the other PBT chemicals were reported in pounds. A conversion to pounds is shown adjacent to the reported number of dioxins in grams.)

ON-SITE RELEASES BY MEDIA (Section 5 of Form R)	<b>Dioxin and Dioxin-Like Compounds*</b> in amounts for the year		<b>Other PBT chemicals</b> in amounts for the year
	Grams (g)	Pounds (lbs)	Pounds (lbs)
Total Air	6.25	0.01	18,884.40
Fugitive Air	0.03	5.77E-05	4,384.68
Stack Air	6.23	0.01	14,499.72
Water	0.48	1.06E-03	5,667.89
Land	0.40	8.92E-04	182,411.65
<b>Total On-Site Releases to Media</b>	<b>7.14</b>	<b>0.02</b>	<b>206,963.94</b>
<b>OFF-SITE TRANSFERS BY TYPE</b> (Section 6 of Form R)			
Publicly Owned Treatment Works (POTWs) (includes metals and metal compounds)	0.00	0.00	978.31
<b>Total Other Off-Site Transfers</b>	<b>9.40</b>	<b>2.07E-02</b>	<b>538,848.97</b>
Off-Site Transfers for Recycling	0.00	0.00	219,755.75
Off-Site Transfers for Energy Recovery	0.00	0.00	3,844.89
Off-Site Transfers for Other Treatment	0.00	0.00	14,287.80
Off-Site Transfers for Disposal	9.40	2.07E-02	300,960.53
<b>Total Off-Site Transfers</b>	<b>9.40</b>	<b>2.07E-02</b>	<b>539,827.28</b>
<b>ON-SITE MANAGEMENT</b> (Section 8 of Form R)			
Treated On-Site	0	0	26.50
Recycled On-Site	0	0	315,349.74
Energy Recovery On-Site	0	0	0.00
<b>Total On-Site Management</b>	<b>0</b>	<b>0</b>	<b>315,376.24</b>
<b>Total PBT Chemicals Released On-site, Transferred Off-site, and Managed On-site by Reporting Facilities</b>	<b>16.54</b>	<b>0.04</b>	<b>1,062,167.46</b>

\* Facilities are allowed to report PBT chemicals up to 7 decimal places accuracy. For presentation purposes the summary amounts in this table have been rounded; however, the integrity of facility reported data have been maintained in the database. The specific data reported by each facility are provided in Appendix G.

Comparing Table 3 (PBT information) to Table 1 (information on all TRI chemicals), the amount of reported PBTs released on-site (206,964 pounds) was approximately 0.63 percent of the total TRI chemicals released on-site to the environment. The reported PBTs managed on-site (315,376 pounds) were less than one percent (0.04 percent) of the total TRI chemicals managed on-site. The reported PBTs transferred off-site for treatment, recycling, energy recovery, or disposal (539,827 pounds) were approximately 0.83 percent of the total TRI chemicals transferred off-site. In 2011, the previous reporting year, the on-site releases of PBT contributed to 0.69 percent of the total releases, 0.02 percent of on-site management and 1.31 percent of off-site transfers.

Information on the amounts of each individual chemical or chemical category released on-site, transferred off-site, and managed on-site for the seven PBT chemicals reported by Virginia facilities is provided in Table 4.

**Table 4. Reporting Year 2012 Amounts of TRI PBT Chemicals Released On-Site, Transferred Off-Site, and Managed On-Site by PBT** (Dioxin and Dioxin-like compounds have been converted to pounds and included in the totals)

Chemical Name	Released On-Site (in pounds)	Transferred Off-Site (in pounds)	Managed On-Site (in pounds)
Benzo(g,h,i)perylene	179.34	1,053.08	5,906.10
Dioxin and Dioxin-Like Compounds	0.02	0.02	0.00
Lead	26,810.62	120,258.22	30.24
Lead Compounds	170,996.52	393,294.31	25.60
Mercury	11.60	1,011.92	1.00
Mercury Compounds	1,322.35	1,333.64	0.00
Polycyclic aromatic compounds (PACs)	7,643.51	22,876.12	309,413.30
<b>Total for all 7 chemical/categories</b>	<b>206,963.95</b>	<b>539,827.30</b>	<b>315,376.24</b>

Of the PBTs listed in Table 4, lead and lead compounds, and PACs, represented the most reported on-site releases to the environment, off-site transfers and on-site management of PBT chemicals. Lead and lead compounds contributed to the bulk (95.58 percent) of the PBT on-site releases. Referring to Figure 5 in Chapter 1, lead and lead compounds ranked sixth in chemicals released on site to land in Virginia. Releases of lead and lead compounds and mercury and mercury compounds to the air (via stacks) or to the land (through fly ash disposal) can result from coal or oil combustion. PACs may form as a result of incomplete combustion of coal or oil or as a by-product of other industrial processes. PACs found in the waste stream can contain adequate British thermal units (BTUs) for energy recovery from incinerated waste.

Table 5 data show the distribution of PBTs versus reported activities (manufacture, process, or otherwise used). A facility may report more than one type of activity for a single TRI chemical.

**Table 5. Activities and Uses of PBT chemicals at facilities** (from Section 3 of the Form R) for 2012

Chemical Name	Manufacturing Only	Processing Only	Otherwise Use Only	Both Manufacturing & Processing	Both Manufacturing & Otherwise Use	Both Processing & Otherwise Use	Manufacturing & Processing & Otherwise Use
Benzo(g,h,i)perylene	15	19	8	5	6	0	1
Dioxin and Dioxin-Like Compounds	20	0	0	0	0	0	0
Lead	9	68	32	5	1	2	2
Lead Compounds	43	56	41	8	18	1	14
Mercury	2	4	1	1	0	0	1
Mercury Compounds	1	7	4	1	0	2	0
Polycyclic aromatic compounds (PACs)	24	21	15	7	11	0	1
Total for all 7 chemical/categories	114	175	101	27	36	5	19

Table 5 shows “processing only” was the most frequently reported activity (175) involving PBT chemicals. "Processing only" was followed by “manufacturing only” (114) and “otherwise use only” (101). The major industrial sectors which reported processing of lead or lead compounds were the furniture and fixture industries; stone, clay, glass and concrete products industries; primary metal and fabricated metal products industries; electronic or electrical equipment manufacturers; petroleum bulk plant operators; and manufacturer of transportation equipment. Dioxin and dioxin-like compounds are normally a product of incomplete combustion of waste streams containing chlorinated products. Lead or lead compounds can be co-manufactured under chemical manufacturing processes or as a by-product of fuel (coal or fuel oil) combustion. Industries such as primary metal; stone, clay and glass products; transportation equipment manufacturers; electric power generation facilities; solvent recovery facilities; and paper and allied products industries were key reporters of lead compounds and mercury compounds in all three (manufacturing, processing, and otherwise used) activities.

## **Chapter Three – Industrial Sectors, Facilities, and Locations**

In the current chapter, data are presented by industrial sectors, as identified by the primary North American Industry Classification System Code (Part One), facilities (Part Two), and facility locations (Part Three). The chapter identifies the top ten Virginia industrial sectors, facilities and facility locations (also referred to as jurisdictions) based on the reported on-site releases and the total on-site management of TRI chemicals.

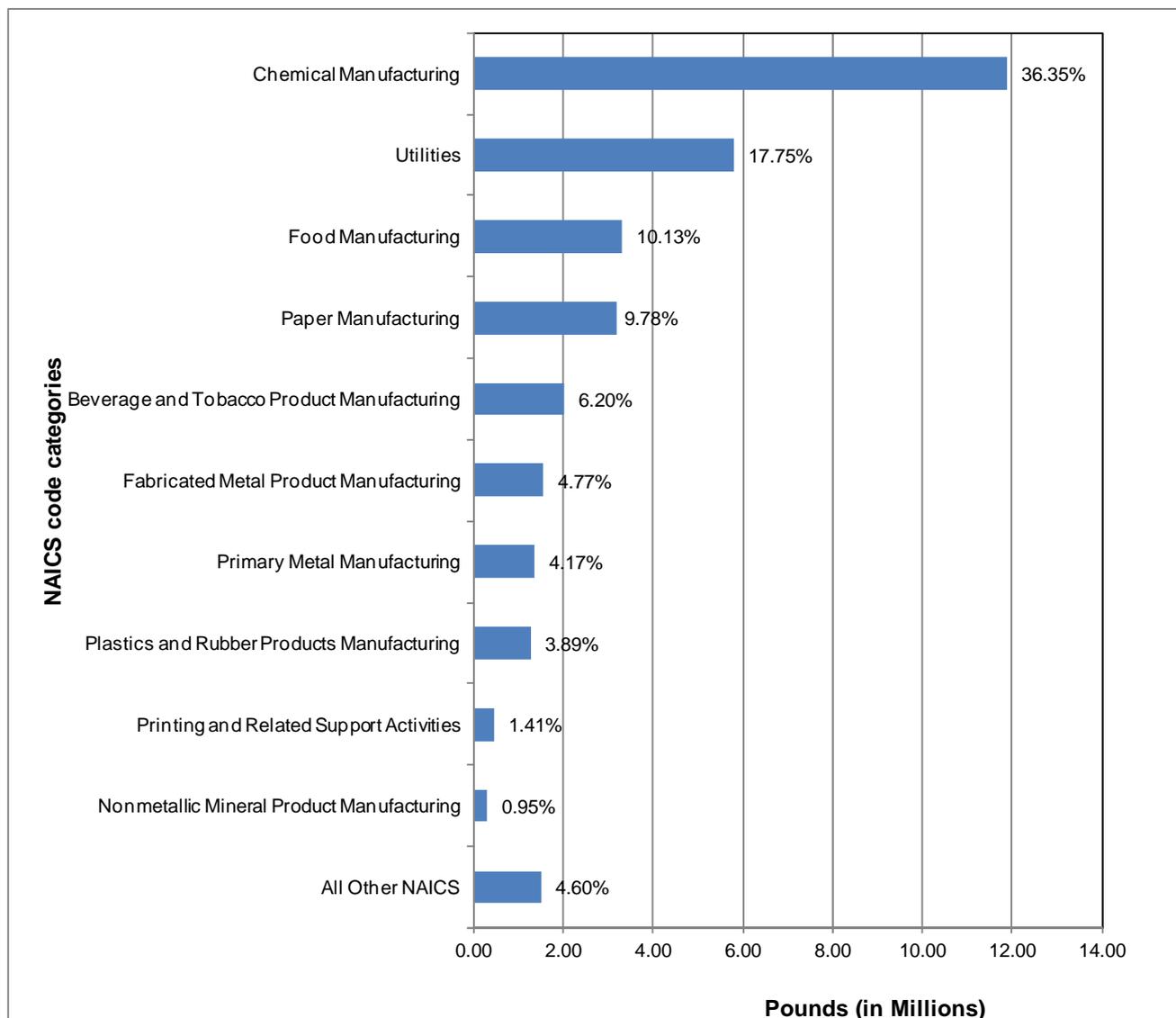
As with Table 1 (Chapter 1) and Table 3 (Chapter 2), in order to avoid double counting, the data in the current chapter for on-site management does not include the data extracted and re-aggregated from Sections 5 and 6 of Form R. Complete rankings of industrial sectors, facilities and jurisdictions are included in the appendices H, I, and J.

### **Part One - Industrial Sectors**

#### **Industrial Sectors Reporting On-Site Releases of TRI Chemicals**

Twenty-six industrial sectors, including federal facilities, are subject to TRI reporting requirements (see Appendix C). The three industrial sectors reporting the most on-site releases of TRI chemicals for 2012, based on the primary North American Industrial Classification System (NAICS) Code, were: chemical manufacturing; utilities (electric, gas, and sanitary services); and food manufacturing. These three sectors contributed to 64.23 percent of the total on-site releases to the environment. The remaining industrial sectors for 2012 were: paper manufacturing, beverage and tobacco product manufacturing, fabricated metal product manufacturing, primary metal manufacturing, plastics and rubber manufacturing, printing and related support activities and nonmetallic mineral product manufacturing. A complete ranking of industrial sectors reporting on-site TRI releases is provided in Appendix H-1.

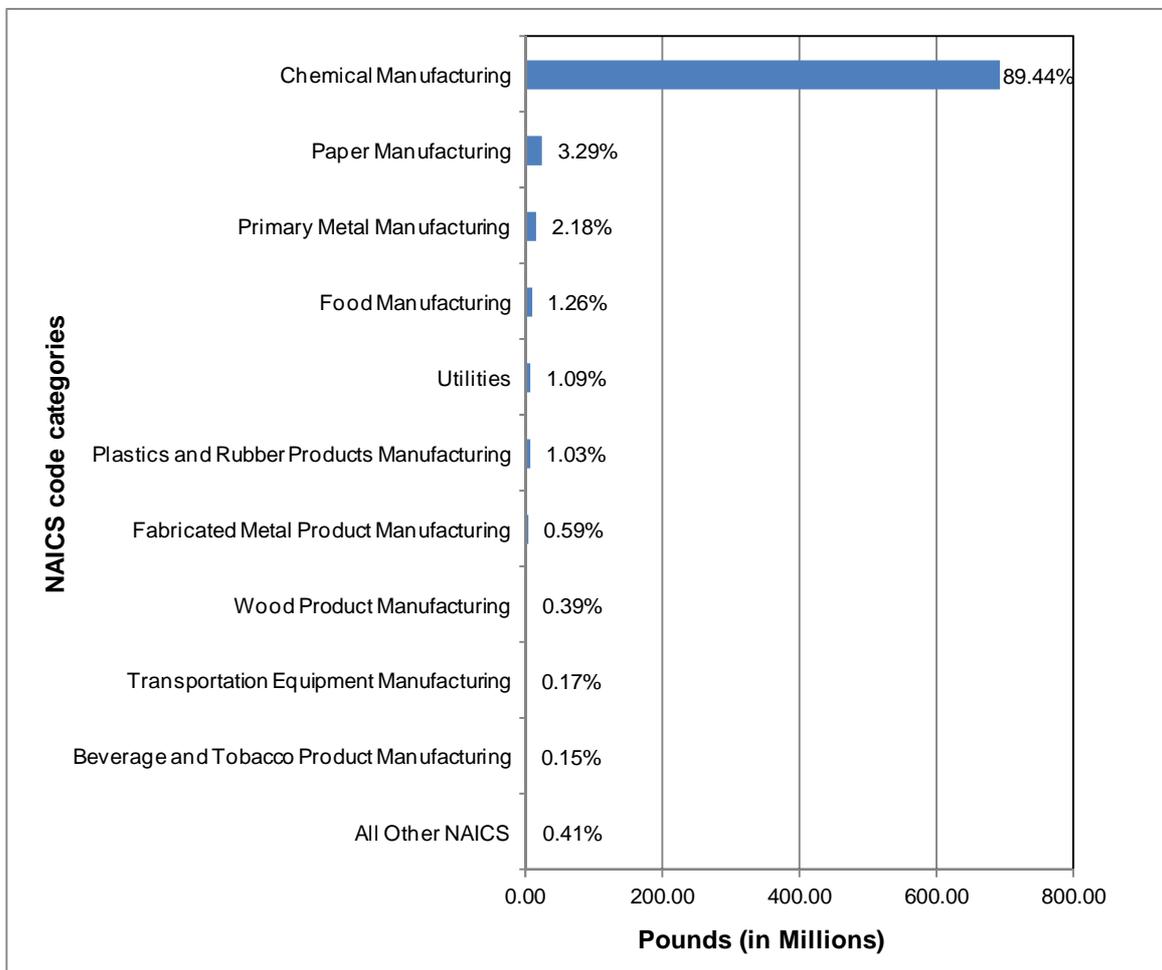
**Figure 9. Top 10 Reporting Industrial Sectors (based on NAICS codes) Releasing TRI Chemicals On-Site in Virginia for 2012** (from Section 5 of the Form R. The number next to each bar is the percent of total on-site releases for all 2012 chemicals reported.)



**Industrial Sectors Reporting On-Site Management of TRI Chemicals**

The three industrial sectors reporting the most on-site management of TRI chemicals (see Figure 10) for 2012 based on the primary NAICS Code were: chemical manufacturing, paper manufacturing, and primary metal manufacturing. These three sectors contributed to 94.91 percent of the total of on-site management of TRI chemicals. The remaining top ten industrial sectors for 2012 were: food manufacturing, utilities, plastics and rubber manufacturing, fabricated metal products manufacturing, wood product manufacturing, transportation equipment manufacturing and beverage and tobacco product manufacturing. A complete ranking of industrial sectors reporting on-site TRI management is provided in Appendix H-2.

**Figure 10. Top 10 Reporting Industrial Sectors (based on NAICS codes) Managing TRI Chemicals On-Site in Virginia for 2012** (from Section 8 of the Form R. The number next to each bar is the percent total of on-site management for all 2012 chemicals reported. Figure 10 does not include the data extracted and re-aggregated from Sections 5 and 6 of Form R.)



**Part Two - Facilities**

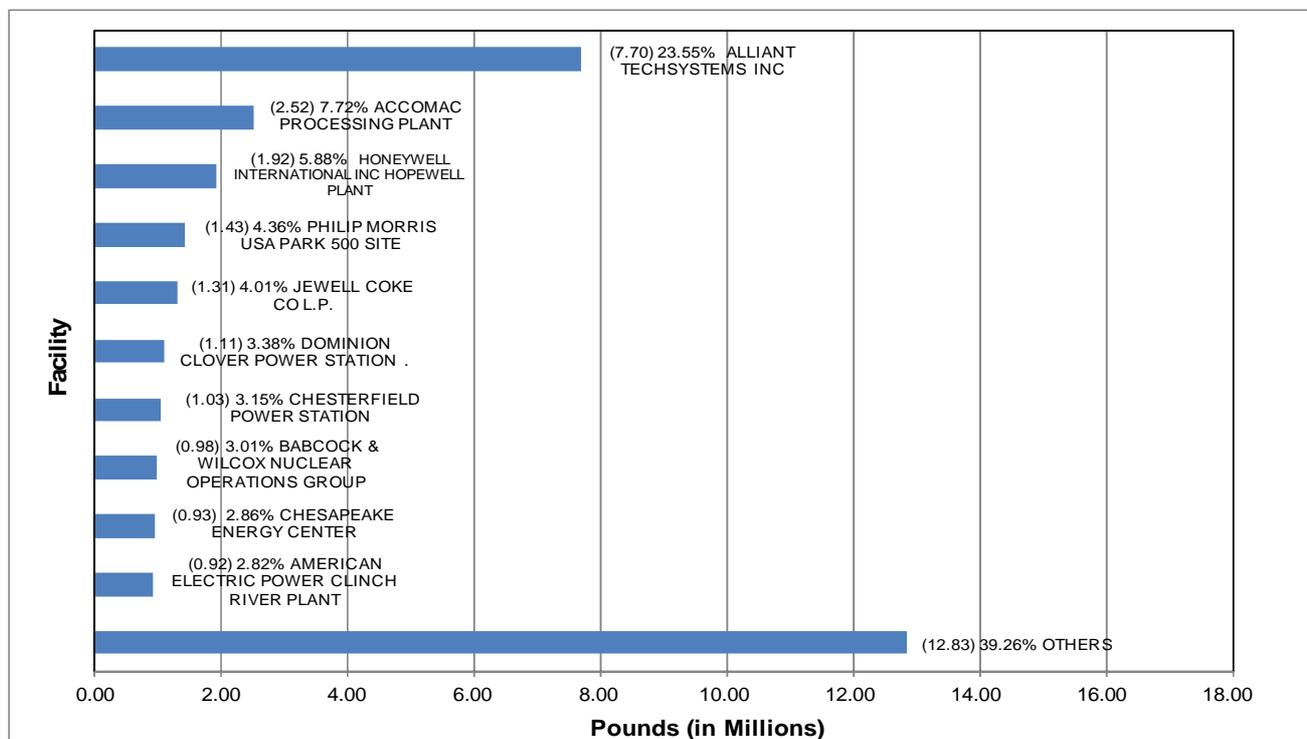
**Facilities Reporting On-Site Releases of TRI Chemicals**

Virginia facilities that reported the highest contributions to the on-site release of TRI chemicals to the air (fugitive and stack), water, and land in 2012 were:

- Alliant Techsystems Inc. - Radford, Montgomery County
- Accomac Processing Plant - Accomack County
- Honeywell International Inc. - Hopewell City
- Phillip Morris USA Park 500 Site - Chester, Chesterfield County
- Jewell Coke Co L.P. - Buchanan County
- Dominion Clover Power Station - Clover, Halifax County
- Chesterfield Power Station - Chester, Chesterfield County
- Babcock & Wilcox Nuclear Operations Group - Campbell County
- Chesapeake Energy Center - Chesapeake City
- American Electric Power Clinch River Plant - Cleveland, Russell County

These facilities accounted for 60.74 percent (19.85 million pounds) of all reported TRI releases to these media for 2012. Of the ten facilities, four are utility facilities; two are chemical manufacturing facilities; one is a beverage and tobacco product manufacturing facility; one is a food manufacturing facility; one is a fabricated metal product manufacturing facility; and one is a petroleum and coal products manufacturing facility. Figure 11 shows the quantity of TRI chemicals each of these facilities released in Virginia in 2012. See Appendix I-1 for a complete ranking of on-site releases by facility.

**Figure 11. 2012 Top Ten Virginia Facilities Reporting Releases of TRI Chemicals On-Site** (from Section 5 of the Form R. The numbers next to each bar are the total on-site releases (in millions of pounds), in the parentheses, and the percent of total on-site releases for all 2012 chemicals reported for each facility.)



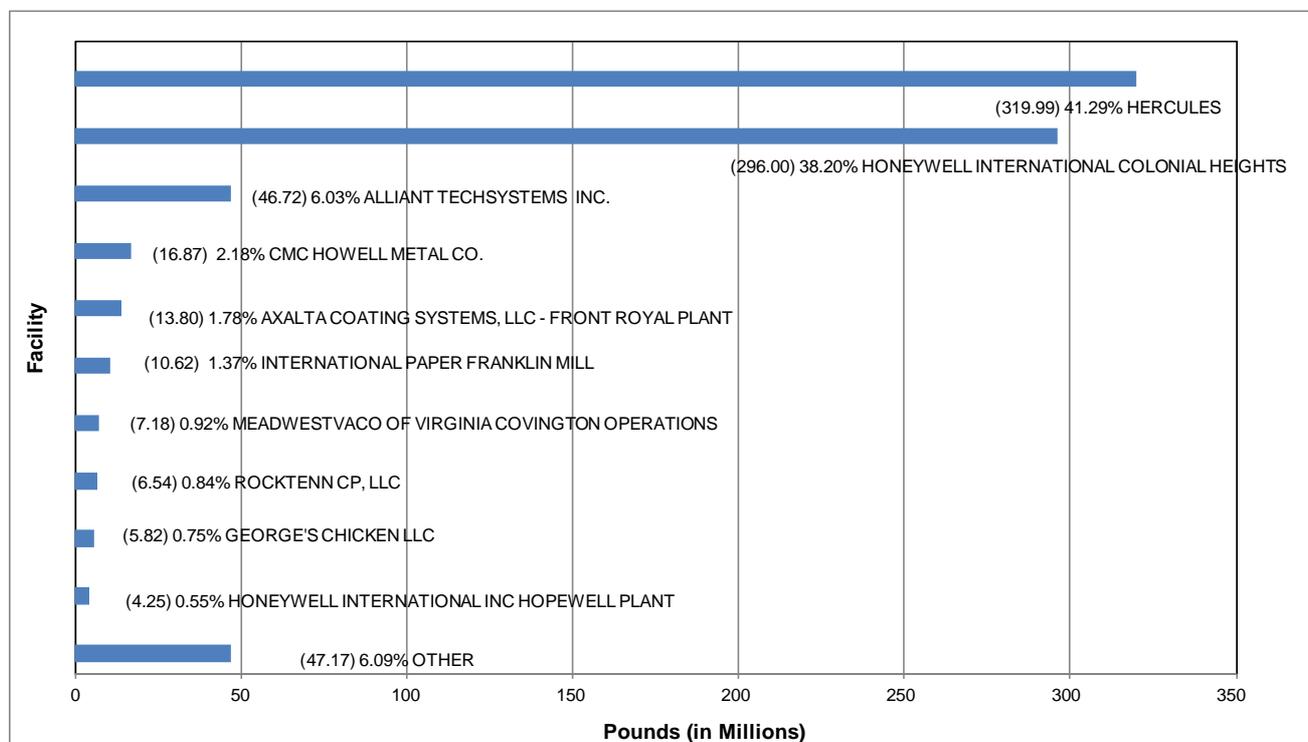
**Facilities Reporting On-Site Management of TRI Chemicals**

Figure 12 shows the ten Virginia facilities reporting management of the greatest quantity of TRI chemicals on-site in 2012 other than releases. These facilities were:

- Hercules Inc. - Hopewell City
- Honeywell International Colonial Heights Plant - Colonial Heights, Chesterfield County
- Alliant Techsystems Inc. - Radford, Montgomery County
- CMC Howell Metal Co. - New Market, Shenandoah County
- Axalta Coating Systems, LLC - Front Royal Plant - Front Royal, Warren County
- International Paper Franklin Mill – Franklin, Isle of Wight County
- Meadwestvaco of Virginia Covington Operations - Covington City
- Rocktenn CO, LLC - West Point, King William County
- George's Chicken LLC - Edinburg, Shenandoah County
- Honeywell International Inc Hopewell Plant - Hopewell City

These facilities accounted for approximately 93.91 percent (727.78 million pounds) of all reported on-site management (other than releases) in 2012. Figure 12 shows the quantity of TRI chemicals each of these facilities managed on-site in Virginia in 2012. Of the ten facilities, five are chemical manufacturing facilities; three are paper manufacturing facilities; one is a primary metal manufacturing facility; and one is a food manufacturing facility. See Appendix I-2 for a ranking of on-site management by facility.

**Figure 12: 2012 Top Ten Virginia Facilities Managing TRI Chemicals On-Site, Other than Releases** (from Section 8 of the Form R. The number next to each bar is the total on-site management (in millions of pounds) for each facility, in the parentheses, and the percent of total on-site management of TRI chemicals for each facility. This figure does not include the data extracted and re-aggregated from Sections 5 and 6 of Form R)



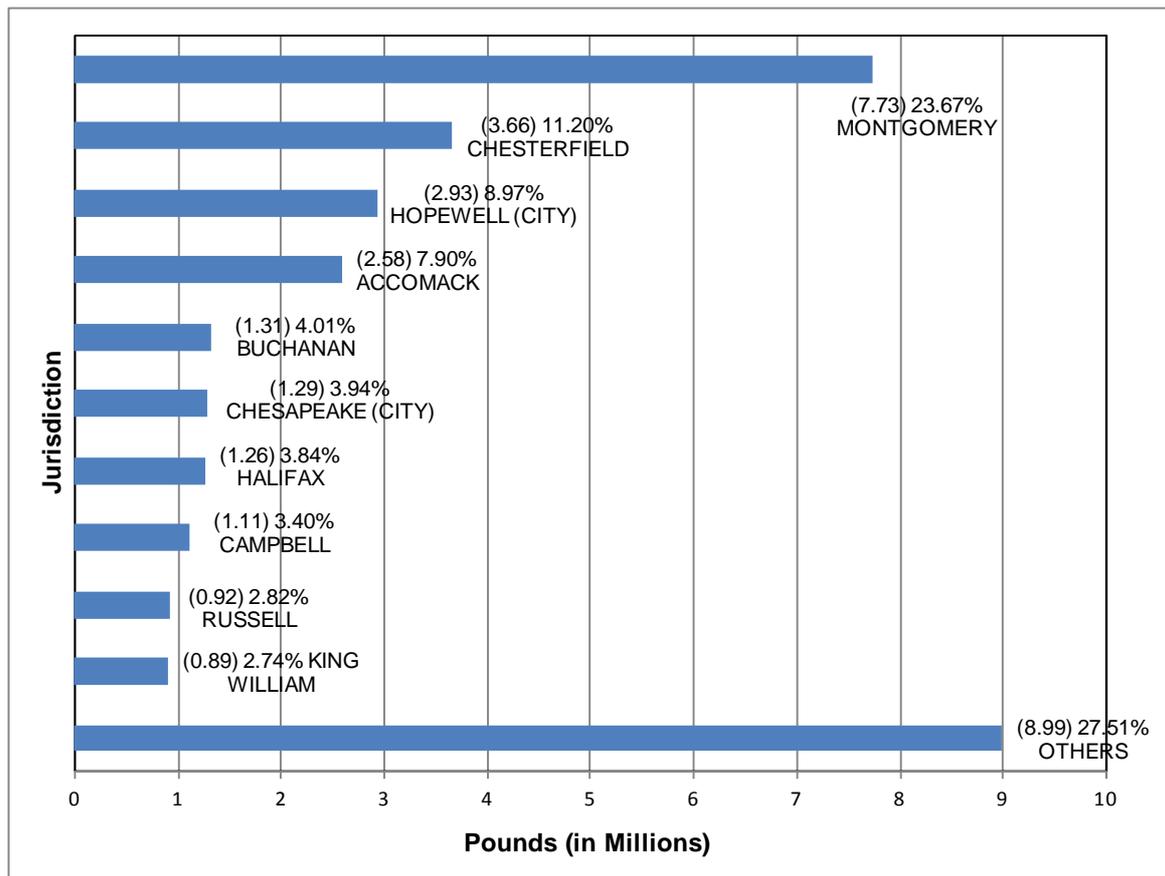
**Part Three - Jurisdictions**

**Jurisdictions with Facilities Reporting On-Site Releases of TRI Chemicals**

The Virginia jurisdictions (counties and independent cities) with facilities having the largest reported amount of total TRI chemicals released on-site to the environment (air, water, and land) in 2012 were as follows: Montgomery County, Chesterfield County, Hopewell, Accomack County, Buchanan County, Chesapeake, Halifax County, Campbell County, Russell County and King William County. The reported on-site releases occurring within these jurisdictions comprised 72.49 percent (23.69 million pounds) of the total TRI chemicals released on-site into the Virginia environment by reporting facilities in Virginia.

Appendix J-1 contains a ranking of jurisdictions by the on-site releases of facilities located in each jurisdiction. Furthermore, Appendices F and G contain detailed information about facilities located in these jurisdictions.

**Figure 13. 2012 Top Ten Virginia Jurisdictions for On-Site TRI Releases Reported by Facilities** (from Section 5 of the Form R). The number next to each bar represents the total on-site releases (in millions of pounds), in the parentheses, and the percent of the total on-site releases for each jurisdiction.

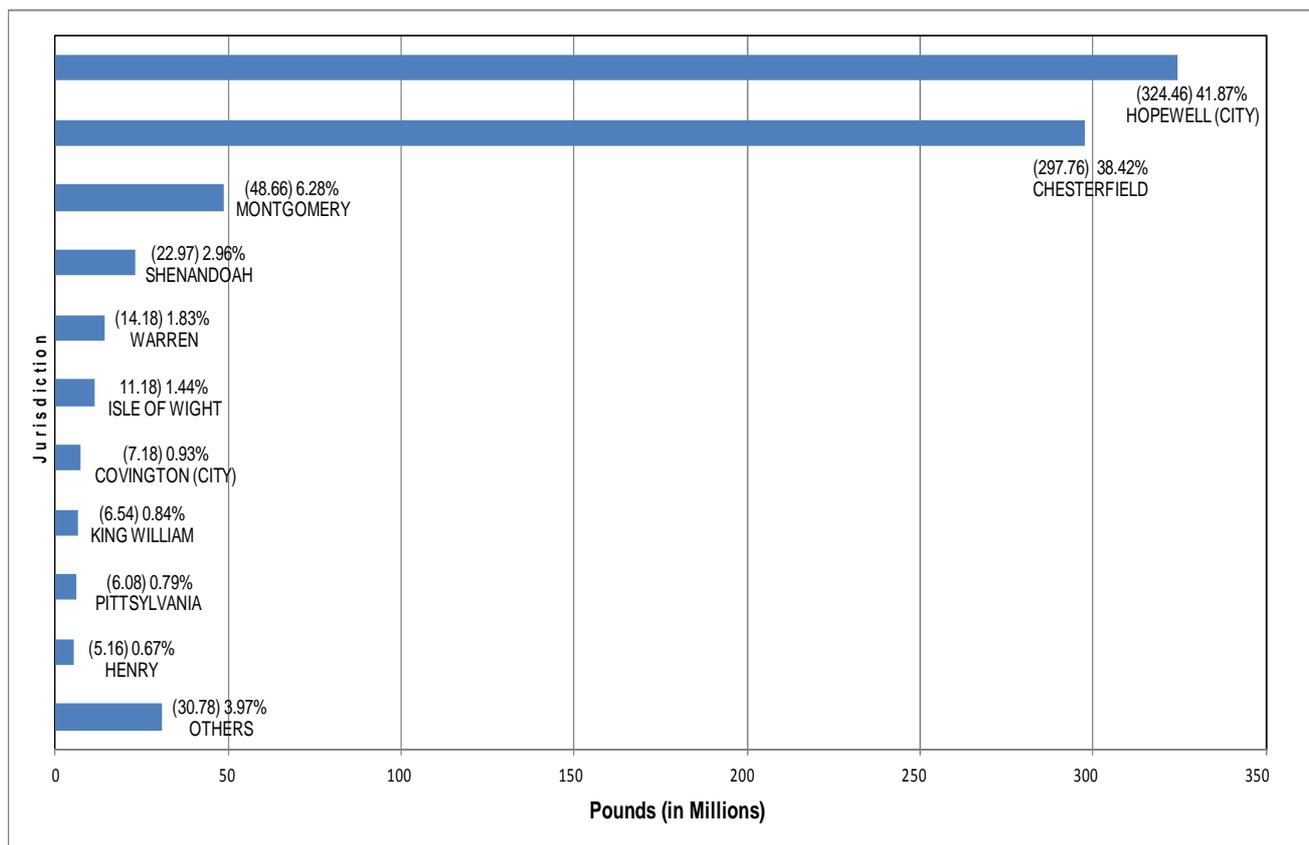


**Jurisdictions with Facilities Reporting Other On-site Management of TRI Chemicals**

The Virginia jurisdictions with facilities having the largest amount of total reportable TRI chemicals managed on-site (other than releases) were: Hopewell, Chesterfield County, Montgomery County, Shenandoah County, Warren County, Isle of Wight, Covington, King William County, Pittsylvania County and Henry County. The on-site management of these chemicals in these jurisdictions comprised 96.03 percent (744.16 million pounds) of total TRI chemicals managed on-site (other than releases) by reporting facilities in Virginia.

Appendix J-2 contains a ranking of jurisdictions by the on-site management of facilities located there. Furthermore, Appendices F and G contain detailed information about facilities located in these jurisdictions.

**Figure 14. 2012 Top Ten Virginia Jurisdictions for TRI Chemicals Managed On-Site as Reported by Facilities:** (from Section 8 of the Form R. The number next to each bar is the total on-site management (in millions of pounds), in the parentheses, and the percent of the total of TRI chemicals managed on-site for each jurisdiction. Figure 14 does not include the data extracted and re-aggregated from Sections 5 and 6 of Form R.)



**Chapter Four – Virginia TRI Historical Comparison**

Since the inception of the TRI program, the TRI program has been expanding and evolving, providing more information to the public about the presence and release of toxic and hazardous chemicals in communities. Over the past 26 years, various regulatory changes have occurred. In addition, facilities are authorized to revise reports from previous years. Allowing facilities to submit revised reports for previous years makes direct comparison of current data to historical reports difficult and potentially misleading. Appendix E provides further information about the changes in reporting requirements and sets out limited historical data which have been standardized.<sup>3</sup>

Nevertheless, reporting years 2010, 2011 and 2012 are generally comparable and Chapter Four presents data for those three years. All revisions for these reporting years received on or before January 15, 2014, have been incorporated. Beginning with reporting year 2001, lead and lead compounds were re-designated as PBT chemicals, and the threshold for reporting was reduced to 100 pounds, which caused facilities to submit more reports for lead and lead compounds for reporting years 2001 through 2008.

Table 6 compares TRI data for reporting years 2010 to 2012 by type of release, transfer and on-site management.

For reporting year 2012 the total amount of on-site releases shows a decrease from the corresponding amount for reporting year 2011; off-site transfers decreased and on-site management increased from the corresponding amount for reporting year 2011. From 2011 to 2012 the total TRI chemicals released on-site, transferred off-site, or managed on-site increased by 1.48 percent.

The most noticeable change for the on-site releases in Table 6 is a 7.85 percent decrease in on-site releases to air, a 29.62 percent decrease in on-site releases to water and a 1.18 percent decrease in on-site releases to land. There was an overall decrease of 16.69 percent for on-site releases from 2011 to 2012.

Table 6 also shows that the on-site management of TRI chemicals through treatment, recycling, or energy recovery decreased in 2012. The most notable changes for the 2012 report data were the increase in on-site energy recovery by 23.65 percent and the increase in on-site recycling by 3.41 percent. The overall quantities of TRI chemicals managed on-site increased by 3.02 percent for 2012.

The overall quantities of TRI chemicals transferred off-site for further management or disposal decreased by 4.98 percent from 2011 to 2012. The most notable changes for off-site transfers is the 54.88 percent decrease in TRI chemicals being transferred off site for to a POTW and the 133.31 percent increase in TRI chemicals being transferred off-site for disposal .

Longer term trends can be seen in the last column of Table 6. Over the three years, on-site releases of TRI chemicals decreased by 27.27 percent, off-site transfers decreased by 17.60 percent and on-site management decreased by 1.39 percent. From 2010 through 2012, Virginia facilities reported a 4.08 percent decrease in the release, transfer, or other management of TRI chemicals.

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<sup>3</sup> The information in Appendix E is historical and is for general comparison only.  
*Virginia TRI Report – Summary of Data  
from 2012 Facility Reports (issued March 2014)*

**Table 6. Comparison Summary Data by Type of Release, Transfer and On-Site Management for TRI Chemicals for 2009, 2011 and 2012 (from Table 1)**

MANAGEMENT ACTIVITIES	RY 2010 (POUNDS)	RY 2011 (POUNDS)	RY 2012 (POUNDS)	Changes 2011-2012	% Change 2011-2012	% Change 2010-2012
<b>ON-SITE RELEASES</b>						
AIR (TOTAL)	23,674,105.09	19,972,182.96	18,404,742.64	-1,567,440.32	-7.85%	-22.26%
FUGITIVE AIR	2,938,995.58	2,839,363.98	2,813,663.22	-25,700.77	-0.91%	-4.26%
STACK AIR	20,735,109.51	17,132,818.98	15,591,079.43	-1,541,739.55	-9.00%	-24.81%
WATER	18,015,631.92	16,714,203.66	11,763,752.27	-4,950,451.38	-29.62%	-34.70%
LAND	3,247,284.82	2,545,231.62	2,515,235.83	-29,995.79	-1.18%	-22.54%
<b>TOTAL</b>	<b>44,937,021.83</b>	<b>39,231,618.24</b>	<b>32,683,730.75</b>	<b>-6,547,887.49</b>	<b>-16.69%</b>	<b>-27.27%</b>
<b>OFF-SITE TRANSFERS</b>						
POTW	17,097,584.24	39,231,618.24	17,701,446.65	-21,530,171.58	-54.88%	3.53%
OTHER OFF-SITE TRANSFERS	62,135,336.42	52,372,568.11	47,589,511.24	-4,783,056.87	-9.13%	-23.41%
RECYCLING	36,951,977.43	16,340,865.75	15,293,122.37	-1,047,743.38	-6.41%	-58.61%
ENERGY RECOVERY	4,323,545.54	6,444,065.31	7,504,873.77	1,060,808.46	16.46%	73.58%
OTHER TREATMENT	17,657,248.24	17,147,254.24	18,224,738.69	1,077,484.45	6.28%	3.21%
DISPOSAL	3,202,565.22	2,814,644.09	6,566,776.41	3,752,132.32	133.31%	105.05%
<b>TOTAL</b>	<b>79,232,920.66</b>	<b>68,713,433.86</b>	<b>65,290,957.89</b>	<b>-3,422,475.97</b>	<b>-4.98%</b>	<b>-17.60%</b>
<b>ON-SITE MANAGEMENT</b>						
TREATED ON-SITE	90,924,187.52	70,070,059.43	68,653,896.67	-1,416,162.76	-2.02%	-24.49%
RECYCLED ON-SITE	688,774,463.08	678,174,426.77	701,320,211.31	23,145,784.54	3.41%	1.82%
ENERGY RECOVERY ON-SITE	6,193,687.15	4,046,006.74	5,003,060.00	957,053.26	23.65%	-19.22%
<b>TOTAL</b>	<b>785,892,337.75</b>	<b>752,290,492.94</b>	<b>774,977,167.98</b>	<b>22,686,675.04</b>	<b>3.02%</b>	<b>-1.39%</b>
<b>GRAND TOTAL</b>	<b>910,062,280.24</b>	<b>860,235,545.04</b>	<b>872,951,856.62</b>	<b>12,716,311.58</b>	<b>1.48%</b>	<b>-4.08%</b>

Table 7 compares, in detail, the TRI data for PBT chemicals by type of release, transfer, and on-site management for reporting years 2010 to 2012. From 2011 to 2012, the total of PBT chemicals released on-site, transferred off-site, or managed on-site decreased by 17.63 percent.

The most notable change for the 2012 report data was the increase in the on-site recycling of PBT chemicals compared to 2011. Table 7 also shows a decrease in the total of PBT chemicals released on-site, transferred off-site, or managed on-site of PBT chemicals for reporting years 2010 to 2012 and shows an increase in the management of PBT chemicals on-site.

**Table 7. Comparison Summary Data by Type of Release, Transfer, and On-site Management for PBT chemicals for 2009, 2011 and 2012 (from Table 3)**

MANAGEMENT ACTIVITES	RY 2010 (POUNDS)	RY 2011 (POUNDS)	RY 2012 (POUNDS)	Changes 2011-2012 (POUNDS)	% Change 2011-2012	% Change 2010-2012
<b>ON-SITE RELEASES</b>						
AIR (TOTAL)	41,395.28	32,178.67	18,884.41	-13,294.26	-41.31%	-54.38%
FUGITIVE AIR	19,454.52	15,113.92	4,384.68	-10,729.25	-70.99%	-77.46%
STACK AIR	21,940.74	17,064.73	14,499.74	-2,564.99	-15.03%	-33.91%
WATER	2,954.42	1,834.86	5,667.89	3,833.03	208.90%	91.84%
LAND	338,012.45	235,972.56	182,411.65	-53,560.91	-22.70%	-46.03%
<b>TOTAL</b>	<b>382,362.14</b>	<b>269,986.08</b>	<b>206,963.95</b>	<b>-63,022.12</b>	<b>-23.34%</b>	<b>-45.87%</b>
<b>OFF-SITE TRANSFERS</b>						
POTW	1,298.00	918.64	978.31	59.66	6.49%	-24.63%
OTHER OFF-SITE TRANSFERS	978,126.75	896,817.15	538,848.99	-357,968.16	-39.92%	-44.91%
RECYCLING	587,231.85	548,165.52	219,755.75	-328,409.77	-59.91%	-62.58%
ENERGY RECOVERY	59.27	2,286.43	3,844.89	1,558.47	68.16%	6386.63%
OTHER TREATMENT	3,685.61	2,692.41	14,287.80	11,595.39	430.67%	287.66%
DISPOSAL	387,150.00	343,672.80	300,960.55	-42,712.25	-12.43%	-22.26%
<b>TOTAL</b>	<b>979,424.74</b>	<b>897,735.79</b>	<b>539,827.30</b>	<b>-357,908.49</b>	<b>-39.87%</b>	<b>-44.88%</b>
<b>ON-SITE MANAGEMENT</b>						
TREATED ON-SITE	5.40	5.40	26.50	21.10	390.74%	390.66%
RECYCLED ON-SITE	185,776.11	121,721.90	315,349.74	193,627.84	159.07%	69.75%
ENERGY RECOVERY ON-SITE	0.00	0.00	0.00	0.00	0.00%	0.00%
<b>TOTAL</b>	<b>185,781.51</b>	<b>121,727.30</b>	<b>315,376.24</b>	<b>193,648.94</b>	<b>159.08%</b>	<b>69.76%</b>
<b>GRAND TOTAL</b>	<b>1,547,568.39</b>	<b>1,289,449.17</b>	<b>1,062,167.49</b>	<b>-227,281.68</b>	<b>-17.63%</b>	<b>-31.37%</b>

**Chapter Five - Conclusion**

The 2012 Virginia TRI Report is issued pursuant to Virginia Code §10.1-1186.1. The report has information on chemicals and chemical categories, activities involving their use, industrial sectors, facilities and facility locations (jurisdictions).

The report provides information concerning listed toxic chemicals and chemical categories that are manufactured, processed, or otherwise used at Virginia facilities, including amounts released to the environment, transferred off-site and managed on-site. Industry can use the data in a variety of ways, including as a measurement of progress toward reduction targets.

Since 1988, the amount of TRI chemicals released or otherwise managed has decreased. The data for reporting year 2012 shows a decrease in the amount of TRI chemicals released on-site. The data also indicate a decrease in off-site transfers and an increase in on-site management of TRI chemicals. At this time, it is not possible to predict with confidence whether these trends will continue.