DELAWARE 2018 TOXICS RELEASE INVENTORY REPORT

Prepared by the EPCRA Reporting Program
Department of Natural Resources and Environmental Control

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This report was prepared with the assistance of numerous individuals in the Department of Natural Resources and Environmental Control. The cover photo was provided by Robert Pritchett. Any questions or comments regarding this report should be directed to the principal author:

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DNREC MISSION STATEMENT

The mission of the Department of Natural Resources and Environmental Control is to ensure the wise management, conservation, and enhancement of the State's natural resources, protect public health and the environment, provide quality outdoor recreation, improve the quality of life, and educate the public on historic, cultural, and natural resource use, requirements and issues.

TABLE OF CONTENTS

Executive Summary 1

Introduction

What is the Toxics Release Inventory? 2
Reporting Requirements 3
Limitations of TRI Data 4
Recent Developments in TRI Reporting 5

2018 Data Summary

Data Summary 6
Types of Data 6
On-Site Releases
- Releases to Air 8
- Releases to Water 9
- Releases to Land 10

Off-Site Transfers 11
On-Site Waste Management 12
Total Waste 13

2018 Data Detail

On-Site Releases by County 14
Facility Map 15
NAICS Industry Groups 17
Releases From Top 15 Facilities 18
Facilities No Longer Reporting to TRI 20
Persistent Bioaccumulative Toxic (PBT) Chemicals 2008-2018 21
- Dioxin and Dioxin-Like Compounds. 23
- Mercury and Mercury Compounds 25

Carcinogenic TRI Chemicals 27
Carcinogen Trends, 2008-2018 27
Trend Analysis, Effect of Chemical and Facility Group Additions, 1990-2018 31
Release and Waste Management Trends, 2008-2018
- On-Site Releases, 2008-2018 34
- Off-Site Transfers, 2008-2018 37
- On-Site Waste Management, 2008-2018 39

Receiving TRI Chemicals in Wastes 41
Pollution Prevention Programs in Delaware 42
National Perspective 43
Nearby Facilities in Adjacent States 45
TRI and the Economy 48

For Further Information 49

TABLE OF CONTENTS, Continued

Appendices

Appendix A - What is Community Right-to-Know?
Appendix B - 2018 Facility Contacts
Appendix C - 2018 On-Site Releases by Facility and Chemical
Appendix D - 2018 Off-Site Transfers and Waste Managed On-Site by Facility
Appendix E - 2018 On-Site Release Summary by Facility (Ranked by Total On-Site Release)
Appendix F - 2018 On-Site Releases by Chemical and Facility
Appendix G - 2018 Off-Site Transfers and Waste Managed On-Site by Chemical
Appendix H - 2018 On-Site Release Summary by Chemical (Ranked by On-Site Release)
Appendix I - 2018 PBT Release and Transfer Detail (Alphabetical by Chemical)
Appendix J - 2018 Carcinogen Release Detail (Alphabetical by Chemical)
Appendix K - TRI Reporting Form R
Appendix L - TRI Reporting Form A
Appendix M - TRI Reporting Forms Dioxin Schedule 1

Tables

Table 1: Covered Industries 3
Table 2: 2018 TRI Data Summary 6
Table 3: TRI Chemicals Released to Water by Water Body in 2018. 9
Table 4: TRI Chemicals Released to Water by Basin 10
Table 5: 2018 TRI Data by Primary NAICS Group 17
Table 6: Top 15 Facilities - 2016 and 2018 Ranking by On-Site Release 19
Table 7: 2018 Delaware PBT Chemicals and Reporting Thresholds 21
Table 8: 2018 TRI PBT Data Summary 22
Table 9: 2018 TRI PBT Release by Chemical 23
Table 10: Dioxin Toxic Equivalent Factors (TEF) 24
Table 11: Facilities Sorted by Dioxin Toxic Equivalent Quantity (TEQ) 24
Table 12: Carcinogens Reported by Delaware Facilities for 2018 27
Table 13: 2008-2018 TRI Carcinogens, On-Site Releases 28
Table 14: Trend of On-Site Releases For Chemical and Facility Additions 32
Table 15: 2008-2018 TRI Data Summary 33
Table 16: Reports of Major Changes in On-Site Releases For 2018. 35
Table 17: Major Changes in Off-Site Transfers for 2018. 38
Table 18: Major Changes in On-Site Waste Management for 2018 40
Table 19: Summary of Transfers to Delaware Facilities From Other TRI Facilities in 2018 41
Table 20: Ranking of On-Site Releases for Select States. 43
Table 21: Select Facility Total On-Site Releases Compared to Delaware 44
Table 22: Comparison of Dioxin Totals For Select Facilities to Delaware Total 44
Table 23: Comparison of Mercury Totals For Select Facilities to Delaware Total 45
Table 24: Comparison of Total Waste for Select Facilities to Delaware Total 45
Table 25: On-Site Releases From Nearby Facilities in Adjacent States 46

TABLE OF CONTENTS, Continued

Figures

Figure 1: 2018 On-Site Releases 8
Figure 2: Top 15 Chemicals Released to Air 8
Figure 3: Top 14 Chemicals Released to Water 9
Figure 4: Top 5 Chemicals Released to Land 10
Figure 5: 2018 Off-Site Transfers 11
Figure 6: 2018 On-Site Waste Management 12
Figure 7: Total 2018 TRI Chemical Management 13
Figure 8: TRI On-Site Releases Reported by County 14
Figure 9: Top 5 NAICS Industries for 2018, Percent On-site Release 17
Figure 10: On-Site Releases to Media, Top 5 Industry Segments 18
Figure 11: 2018 On-Site Releases, Top 15 Facilities 18
Figure 12: Top 15 Facilities On-Site Release 19
Figure 13: Delaware Mercury Trends, On-Site Release, All Facilities 25
Figure 14: 2018 On-Site Mercury Releases From Delaware Facilities 26
Figure 15: Releases to Air, Water, and Land, All TRI Carcinogens, 2008-2018 28
Figure 16: Total TRI Carcinogen On-Site Release, 2008-2018 29
Figure 17: Effect of Chemical and Facility Group Additions, 1990-2018 32
Figure 18: Trend of Delaware TRI On-Site Releases, 2008-2018 34
Figure 19: On-Site Release Trend, Top 5 TRI chemicals, 2008-2018 35
Figure 20: Trend of TRI On-site Releases 2014-2018 36
Figure 21: Trend of Delaware On-site Releases without Delaware City Refinery 2014-2018 36
Figure 22: Off-Site Transfers, 2008-2018 37
Figure 23: Off-Site Transfers, 2008-2018 37
Figure 24: On-Site Waste Management, 2008-2018 39
Figure 25: Total TRI On-Site Release Trends, Delaware and Nearby States 44
Figure 26: Facilities in Nearby States 47
Figure 27: 2018 Production Index Distribution 48

Executive Summary

For 2018, 60 facilities submitted reports for 84 different chemicals. Approximately 6.17 million pounds were reported as being released onsite. Onsite releases of carcinogens decreased by 30.5% compared to 2017. Total onsite releases increased 1,576,000 pounds or 34% compared to 2017. Of this amount, approximately 14,000 pounds were released to land, while 740,000 pounds were released to air, and approximately 5.4 million pounds were released to water.

Onsite Releases

- **Of Carcinogens:** The total amount for onsite releases of carcinogens decreased by 34,000 pounds (30.5%) for 2018.
    - This was largely due to a 23,000-pound decrease in releases of vinyl chloride (a known carcinogen), and a 19,000 pound decrease in releases of vinyl acetate (a possible carcinogen) by Formosa Plastics.
    - The largest release amount in this category was 23,000 pounds of vinyl chloride, a known carcinogen, 100% reported by Formosa Plastics. Formosa ceased operations in August of 2018; so 2018 will be the last year the company will report to TRI.
- **Of PBT's:** The total amount for onsite releases of persistent bioaccumulative toxins (PBTs) increased by 3,900 pounds (77%) for 2018. But since 2008, total onsite releases of chemicals in this category have decreased by 73.5%: dioxins by 76%, lead and lead compounds by 73.5%, and mercury and mercury compounds by 80%.
    - The greatest increase in this category for 2018 was a 4,100-pound increase of lead releases to land reported by the U. S. Army's National Guard River Road Training Site Range in New Castle.
    - Releases of lead were also the largest amount reported in the PBT category, with almost 100% of the 7,900 pounds released reported by the National Guard Training Site Range.
- **To Land:** The total amount released onsite to land decreased by 10,000 pounds (42%) compared to 2017.
    - This was primarily the result of Honeywell in Claymont reporting a one-time release of ethylene glycol in 2017 as a result of a tank repair.
    - Lead was the top reported release to land, with almost 100% of the 7,900 pounds being released by the National Guard Training Site Range.
- **To Air:** The total amount of TRI chemicals reported as released onsite to air for 2018 decreased by 7,000 pounds (1%), compared to 2017.
    - Decreases in releases to air were reported by several facilities, with the largest being decreased sulfuric acid aerosol releases to air by PBF Energy's Delaware City Refinery, down 88,000 pounds compared to 2017. When a sulfur-bearing fuel such as refinery fuel gas is burned, the sulfur is initially converted to sulfur dioxide (SO2). Under certain conditions, a small portion of the SO_2 can form sulfuric acid aerosol. Increased releases are due to many factors, but are primarily due to higher sulfur content in crude stock.
    - Sulfuric acid was reported as the largest release to air at 276,000 pounds, with most of it being released by the Delaware City Refinery.
- **To Water:** The total amount released onsite to water increased by 1.6 million pounds (42%) compared to 2017.

- The increase in releases to water was largely due to increases of nitrate compounds releases reported by PBF Energy's Delaware City Refinery, up 1.6 million pounds compared to 2017. NOx is scrubbed out of the refinery's air emissions and diverted to water. So, releases of nitrate compounds by the refinery vary from year to year due to many factors, but are primarily due to changes in crude stock. In 2018, the Refinery's nitrate releases to water were within the limits of the company's permit with DNREC.
- Nitrate compounds were reported as the largest release to water at 5.4 million pounds, with 5.1 million pounds (94%) released by the Delaware City Refinery and 249,000 (4.6%) released by Perdue Farms Georgetown.

Offsite Transfers

- Transfers offsite decreased 3%, primarily the result of decreases in energy recovery. Offsite transfers are transfers of material to offsite locations (permitted waste treatment or water treatment facilities) for the purpose of disposal, recycling, energy recovery, or treatment.
- **Largest Change:** The largest increase reported was for offsite recycling of lead compounds by the Johnson Controls Battery Distribution Center, up 1 million pounds compared to 2017.
- **Largest Chemical Reported:** Lead compounds were the largest reported chemical amount transferred for offsite recycling at 7.7 million pounds, with 4.2 million pounds reported by the Johnson Controls Battery Plant, and 3.5 million pounds reported by the Johnson Controls Distribution Center, both facilities located in Middletown.

Onsite Management

- Waste managed onsite increased by 18.6%, due to increases in onsite treatment.
- **Largest Change:** The largest increase reported was for onsite treatment of hydrogen sulfide by PBF Energy's Delaware City Refinery, with an increase of 72.8 million pounds compared to 2017.
- **Largest Chemical Reported:** Hydrogen sulfide was also the largest reported chemical amount managed onsite, with 446.7 million pounds being treated onsite, with a majority of that amount being reported by the Delaware City Refinery. Hydrogen sulfide gas is produced during the petroleum refining process, and is then treated onsite and converted to elemental sulfur, a material that is sold for agricultural and chemical manufacturing uses.

What is the Toxics Release Inventory?

The Toxics Release Inventory, or TRI, is a publicly available data set containing information reported annually for toxic chemicals manufactured, processed, or otherwise used by certain facilities in Delaware and throughout the United States. Each year, these facilities report releases and waste management information for covered chemicals. The reportable list of toxic chemicals for 2018 included 595 individual chemicals and 32 chemical categories. October of 2018 marked the 32nd anniversary of the establishment of TRI under Title III, Section 313, of the 1986 Federal Superfund Amendments and Reauthorization Act (SARA 313) to provide information to the public about the presence and release of toxic chemicals in their communities. Title III is also known as the Emergency Planning and Community Right-to-Know Act (EPCRA). See ***Appendix A*** for more information.

Covered facilities report TRI information to the EPA and to the state in which the facility is located. In Delaware, the EPCRA Reporting Program within the Department of Natural Resources and Environmental Control (DNREC) receives and compiles TRI data from facilities located within the State. The DNREC EPCRA Reporting Program maintains a TRI database that is updated as new reports and revisions to old reports are received. The database currently contains 32 years of reported data. Most releases reported under TRI are also regulated through Federal and/or State permits.

This report contains detail from every 2018 TRI report or report revision from Delaware facilities received by DNREC as of October 1, 2019. Facilities must submit these reports to DNREC and the EPA by July 1 of each year. Several types of analyses are presented in this report based on this data and data from prior years. See ***Access to TRI Files,*** **under** ***For Further Information*****,** on page 49 for details.

Reporting Requirements

A facility is required to submit a report for a listed toxic chemical if the facility meets all of the following criteria:

1. Employs the equivalent of 10 or more full-time employees,
2. Is a covered industry, or is a Federal facility (See Table 1 below for a list of reporting industries), and,
3. Manufactures or processes more than 25,000 pounds, or otherwise uses more than 10,000 pounds, of the listed toxic chemical during the course of the calendar year. Threshold limits for specific chemicals known as PBTs (Persistent Bioaccumulative Toxics) are lower (see Table 7 on page 21).

Note that from time to time, the EPA proposes changes in reporting requirements. It gives agencies, reporting facilities, and other interested parties time to comment on these changes prior to making a final decision about the proposed change. See page 5 for more details.

Facilities that meet the criteria for reporting must submit one report for each listed toxic chemical if it was manufactured, processed, or otherwise used above threshold quantities. The reports cover releases and waste management activities during the prior calendar year.

It is important to note that a facility may need to report even if it has no releases of toxic chemicals, because reporting is based on the amount manufactured, processed, or otherwise used, and not the amount released.

The standard Form R report (see ***Appendix K*** for Form R) contains general facility information and complete data about on-site releases, off-site transfers, and on-site waste management activities. Form R can be used for all TRI reports. In lieu of Form R, the optional short Form A report (see ***Appendix L*** for Form A) may be used provided certain criteria are met. Form A, initiated in the 1997 reporting year, is a two-page report that provides facility information (essentially the same as Form R) and identification of the chemical, but does not provide any release, transfer, or waste management data. In Delaware, 15% of the TRI reports were filed as Form A for 2018. After a facility determines that it must report on a given chemical, the facility is eligible to use Form A if:

For non-PBT chemicals:

1. The total annual reportable amount (including the sum of on and off-site releases, disposal, treatment, recovery for recycle or energy) is less than 500 pounds; and,
2. The total annual amount of the chemical manufactured, processed, or otherwise used does not exceed 1,000,000 pounds.

For Persistent Bioaccumulative Toxic (PBT) Chemicals including dioxins:

1. **PBTs, including dioxins and dioxin-like compounds, may not be reported on Form A.**
2. Form R, Schedule 1 is an additional form that is required for dioxins.

Because of the lack of data in the Form A reports, DNREC has been collaborating with the reporting facilities and emphasizing the importance of reporting on Form R.

TABLE 1
NAICS COVERED INDUSTRIES

NAICS CODES	2018 INDUSTRY
212	Mining
221	Utilities
311	Food Manufacturing
313	Textile Products Mfg.
324	Petroleum and Coal Products Mfg.
325	Chemical Manufacturing
326	Plastics and Rubber Manufacturing
327	Non-metallic Mineral Product Mfg.
331	Primary Metal Manufacturing
332	Fabricated Metal Product Mfg.
333	Equipment Mfg.
335	Electrical Equipment Mfg.
339	Misc. Manufacturing
454	Non-Store Retailers
928	National Security

Table 1 is a list of covered industries reporting to the Delaware TRI program for 2018, along with the corresponding three primary digits of the North American Industrial Classification System (NAICS) Codes. NAICS 6-digit codes are used to identify the type of activities performed at a facility. Each industry sector represented by facilities reporting in Delaware for 2018 is shown in Table 5 on page 17. NAICS codes were used in TRI starting in 2006 to provide more discrimination between the various industry sectors reporting to TRI versus the previously used SIC codes. The EPA updated the NAICS codes used for TRI reporting from the 2012 to the 2017 standard, starting with the 2017 report year.

Limitations of TRI Data

The user of TRI data should be aware of its limitations in order to interpret its significance accurately.

- **NOT ALL FACILITIES ARE REQUIRED TO REPORT.** A relatively small number of facilities in Delaware are required to report under TRI, based on the criteria listed on page 3 and above. TRI facilities are primarily industrial/manufacturing facilities and facilities report releases and other waste management activity to TRI. TRI does not account for amounts of hazardous material stored at facilities. The DNREC program addressing inventories of material stored on site, the Hazardous Chemical Reporting program known as “Tier II” (also administered under EPCRA), includes a much greater number of facilities. Facilities report amounts and the location of chemicals stored on-site to Tier II, but not releases. For further information, see ***Hazardous Chemical Reporting in Appendix A.***

- **OTHER SOURCES NOT COVERED UNDER TRI ALSO RELEASE TOXIC CHEMICALS.** Other significant sources of pollution include small businesses, motor vehicles and agricultural operations. For example, on-road motor vehicles released an estimated 5,709 tons to air in Delaware just for the chemicals ammonia (NH_3) and volatile organic compounds (VOCs), for 2016. NH_3 and many VOCs are also TRI chemicals. See page 6, which shows that total TRI on-site releases for 2018 are 6,169,792 pounds, or 3,085 tons.

- **FACILITIES ARE REQUIRED TO BASE TRI DATA ON MEASUREMENTS AND MONITORED DATA ONLY IF THESE ARE AVAILABLE AT THE FACILITY.** If such data is not available, quantities may be estimated based on published emission factors, mass balance calculations, or good engineering judgment. Additional monitoring equipment and measurements are not required. For 2018, 11.5% of the reports representing 5.7% of reported on-site release amounts were estimated using monitoring data, with the balance being split between emission factors, mass balance calculations, and other methods.

- **THE DATA ESTIMATION METHODS MAY CHANGE OR VARY.** The methods of estimating or basis of calculating data used by different facilities, or even the same facility over time, may vary, and may result in significant changes in reporting while the actual release may remain relatively unchanged. DNREC performs cross-checks of the data with other information sources to verify its accuracy and contacts facilities concerning apparent discrepancies.

- **FACILITIES MAY REVISE FORM R DATA AT ANY TIME.** These revisions sometimes involve significant changes for data previously reported by the facility.

- **THE DATA DOES NOT INDICATE THE AMOUNT OF HUMAN EXPOSURE.** An important consideration to keep in mind is that TRI does not provide an indication of potential exposure to the reported releases and cannot be used by itself to determine the impact on public health. The chemical's release rate, toxicity, and environmental fate, as well as local weather and wind direction and the proximity of nearby communities to the release must be considered when assessing exposures. Small releases of highly toxic chemicals may pose greater risks than large releases of less toxic chemicals. The potential for exposure increases the longer the chemical remains unchanged in the environment. Some chemicals may quickly break down into less toxic forms, while others may accumulate in the environment, becoming a potential source of long-term exposure. The chemical exposure of a population depends on the environmental media (air, water, land) into which the chemical is released. The media also affect the type of exposure possible, such as inhalation, dermal exposure, or ingestion.

Despite these limitations, TRI serves as a valuable screening tool to identify areas of concern that may require further investigation.

Recent Developments in TRI Reporting

The TRI reporting requirements change as the EPA seeks to improve the program through changes to the list of reportable chemicals and through program expansions. Because of these changes, considerable caution must be exercised when comparing TRI data from previous years. Notations will be made to indicate which data is presented with adjustments in order to show it on a uniform year-to-year basis.

The EPA added a nonylphenol ethoxylates (NPE's) category in June, 2018. Reports for this chemical are due July 1, 2020 for the 2019 TRI reporting year, if TRI chemical use and other thresholds are met.

In November, 2019, the EPA requested public input on potentially adding per-and polyfluoroalkyl substances (PFAs) to the list of TRI reportable chemicals in the future.

2018 Data Summary

Delaware 2018 and 2017 TRI totals for on-site releases, off-site transfers, and wastes managed on-site are displayed in Table 2 for direct comparisons. For 2018, 60 facilities submitted 195 reports for 84 different chemicals. Total on-site releases increased by 34.3% (1,575,913 pounds). This increase was primarily driven by increases in nitrates released to water reported by the Delaware City Refinery. Off-site transfers were down 2.9%, with decreases in off-site energy recovery, disposal, and transfers to POTW's; partially offset by increases in off-site recycling and off-site treatment. On-site waste management increased by 18.6% compared to 2017. There were large increases in on-site treatment, and smaller increases in on-site recycling and energy recovery.

TABLE 2
2018 TRI DATA SUMMARY
(IN POUNDS)

	2017	2018
No. of Facilities	55	60
No of Form As	28	29
No of Form Rs	163	166
No. of Chemicals	82	84
On-site Releases		
Air	746,669	739,722
Water	3,823,135	5,416,033
Land	24,076	14,037
Total On-Site Releases	4,593,879	6,169,792
Off-Site Transfers		
POTW's	956,919	940,287
Recycle	8,876,457	9,126,594
Energy Recovery	1,679,546	1,210,933
Treatment	117,153	190,320
Disposal	373,297	187,375
Total Off-Site Transfers	12,003,373	11,655,509
On-Site Waste Mgmt.		
Recycle	9,712,512	10,725,721
Energy Recovery	12,475,029	13,854,373
Treatment	396,084,447	471,442,723
Total On-Site Mgmt.	418,271,988	496,022,818
Total Waste	434,869,240	513,848,119

Types of Data

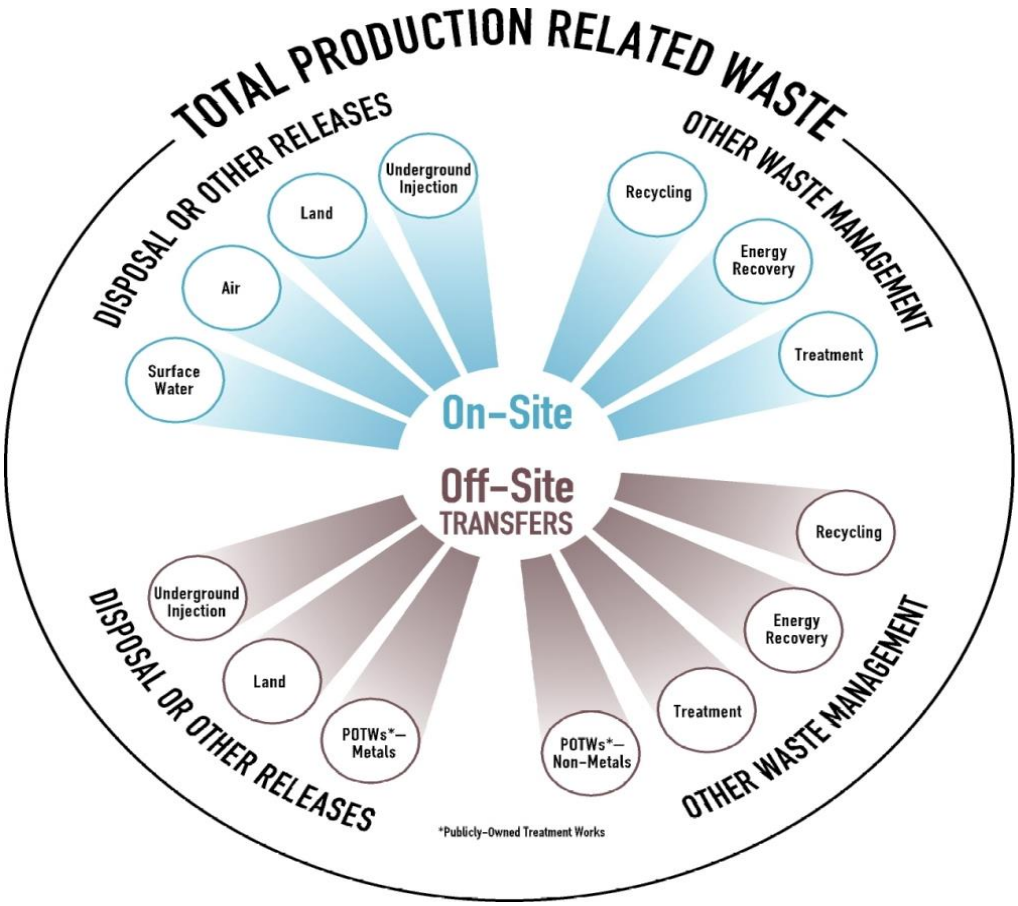
Table 2 lists the categories of data reported to Delaware and the EPA under the TRI program. Within the reports received from facilities, the data is broken down into additional sub-categories. For ease of presentation in this report, the data has been grouped into these categories as described below.

On-Site Releases: On-site releases in Delaware are to **air, water,** or **land**. There are four TRI categories, but one of these, **underground injection** of TRI chemical waste, is not permitted in Delaware. The **release to air** category includes stack releases collected by mechanical means such as vents, ducts, or pipes, and fugitive releases escaping collection, including equipment leaks and evaporation. **Releases to water** are to water bodies, including streams, rivers, lakes, bays, or oceans. This includes releases from contained sources, such as industrial process outflow or open trenches. Releases to water which result from TRI-reportable chemicals in runoff and storm water runoff are also reportable. **Releases to land** are to (1) RCRA (Resource Conservation and Recovery Act) landfills, in which wastes are buried, (2) surface impoundments, which are uncovered holding areas used to volatilize and/or settle waste materials, (3) other land disposal such as waste piles or releases to land such as spills or leaks, (4) land application/treatment in which waste containing a listed chemical is applied to or incorporated into soil, and (5) other non-RCRA landfills.

Off-Site Transfers: Off-site transfers include transfer of chemical waste to **POTWs** (publicly owned treatment works, typically waste water treatment plants), **recycle** operations (five types), **energy recovery** operations (two types), **treatment** operations (six types), and **disposal** (fourteen types). The receiving facilities are separate from the facility generating the waste. These five main categories of off-site transfers cover the types of final off-site management undertaken for each chemical.

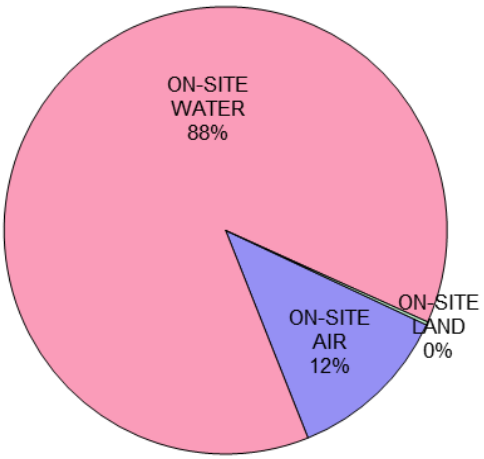
On-Site Waste Management: Waste management operations at the facility generating the waste are categorized to include **recycle**, **energy recovery**, and **treatment.**

The diagram below shows these types of data and how they are related to the four main categories of on- and off-site releases, disposals, and other waste management.



Amounts Reported: The amounts reported are in pounds per year, with a few exceptions, such as dioxins and dioxin like compounds, which are reported in grams. Certain chemical compounds have only the weight of the specific ion or elemental form reported instead of the entire compound, such as nitrate compounds or lead compounds. Also, specific chemicals are only required to be reported in certain states, such as hydrochloric and sulfuric acid, which are only required to be reported as aerosols or gases. For further information on the specific chemical reporting requirements, please refer to the TRI guidance documents at: https://ofmpub.epa.gov/apex/guideme_ext/f?p=104:1.

FIGURE 1
2018 ON-SITE RELEASES



TOTAL REPORTED
POUNDS 6,169,792

On-Site Releases

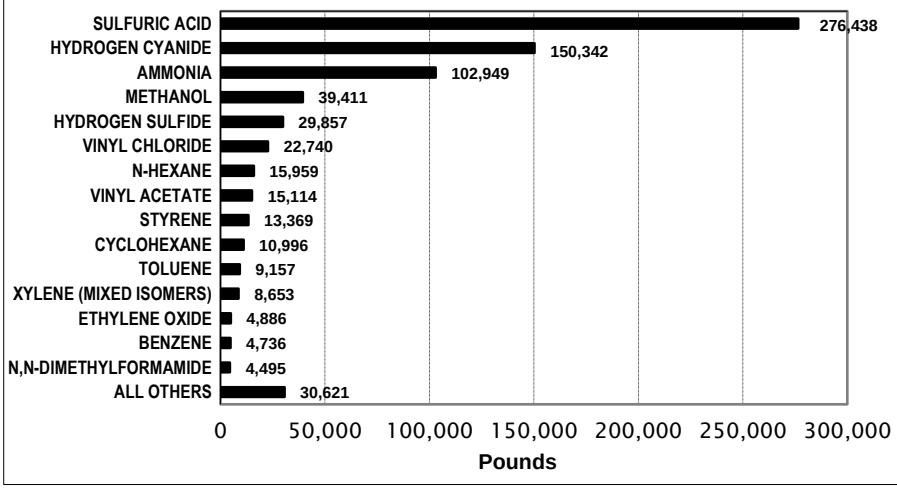
On-site TRI releases are emissions from a facility to the environment, including emissions to the air, discharges to surface water, and disposal onto or into the ground. These on-site releases to air, water, and land reported under TRI for 2018 made up about 1.2% of all TRI-reported waste amounts. The remaining 98.8% of waste is managed on or off-site as shown in the diagram on the previous page and as seen in Figure 7 on page 13.

Figure 1 shows the totals of on-site releases reported in Delaware. A large portion, 88% of the total on-site release, is to water. Additional analysis of on-site releases is presented in Figures 2, 3, and 4, which show the top 15 chemicals released to air, the top 14 released to water, and the 5 chemicals released to land. A trend graph for 2008-2018 for all reported on-site releases is on page 34, and a trend graph for the top five chemicals is on page 35. Additional detail about on-site releases can be found in Appendices C, E, F, and H.

Releases to Air

Figure 2 depicts the on-site releases to air of the top 15 chemicals compared to the other 54 chemicals that were reported as released to air in 2018. Sulfuric Acid aerosol (gas) releases, which make up 37.4% of all on-site releases to air, are released largely in the crude oil refining process by the Delaware City Refinery. Sulfuric acid releases have decreased by 25.2% compared to 2017, largely due to a 87,705 pound (24.3%) decrease in sulfuric acid aerosol releases reported by the Delaware City Refinery. This is due to many factors, with the largest being changes in crude oil. The second largest air release, hydrogen cyanide accounted for 20.3% of all releases to air, and was reported only by the

FIGURE 2
TOP 15 CHEMICALS RELEASED TO AIR



Delaware City Refinery. The third largest air-release, ammonia (13.9%), can be used as a refrigerant for petrochemical, food processing, and chemical facilities and is also a by-product of air pollution control activities. Seven facilities reported releases of ammonia, with the Delaware City Refinery (67.4% of the total) releasing the largest amount to air. Methanol releases were fourth largest, 5.3% of all releases to air; and were reported by eight facilities with BASF Corp reporting the highest amount, 28,226 pounds, or 71.6% of the total. Hydrogen sulfide, which accounted for 4% of all on-site releases to air, was predominantly released to air by Mountaire Farms of Delaware (51.5%) and the Delaware City Refinery (47.6%). Vinyl chloride, which ranks 6th in releases to air, is used in the manufacture of polyvinylchloride (PVC). Formosa Plastics reported all of the releases to air of vinyl chloride and vinyl acetate, which made up 3.1% and 2% of air releases, respectively. Formosa ceased operations in August of 2018, so 2018 will be the last year they will report to TRI. N-hexane accounted for 2.2% of all releases to air, with the Delaware City Refinery reporting 99.9% of the total. The remaining chemicals in Figure 2 were each less than 2% of the total on-site releases to air.

Releases to Water

TABLE 3

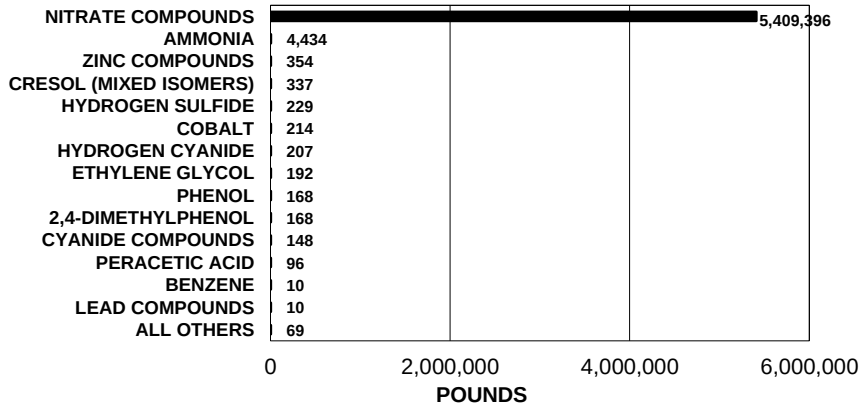
TRI CHEMICALS RELEASED TO WATER BY WATER BODY IN 2018

WATER BODY	NO. OF FACILITIES	NO. OF REPORTS	**RELEASE** (IN POUNDS)
ARMY CREEK	2	3	**357**
BEAVERDAM CREEK	1	1	**61,673**
CHRISTINA RIVER	1	3	**0**
DEEP CREEK	1	3	**0**
DELAWARE RIVER	4	39	**5,104,870**
DRAWYER CREEK	1	2	**8**
ISLAND CREEK	1	3	**0**
SANDY BRANCH	1	1	**6**
SAVANNAH DITCH	1	2	**249,119**
STATE TOTAL		57	**5,416,033**

Releases to water made up the largest portion of on-site releases at 88%. Table 3 shows the total amount of TRI chemicals released to each water body that received a TRI chemical. Not every report to a water body in Table 3 shows a release quantity. In Delaware, 20 of the 57 reports listing a water body as a possible destination for a release to water did not report any quantities actually released to that water body. These facilities reporting zero for the release amount for a specific chemical met the TRI reporting requirements and did not have an actual release to the body of water, but had the potential of a release.

The Delaware River received 94.3% of all releases to water, the Savannah Ditch 4.6%, and Beaverdam Creek 1.1%. Figure 3 shows the relative relationship of the top 14 TRI chemicals to all other chemicals (17) reported as released to water. This clearly

FIGURE 3
TOP 14 CHEMICALS RELEASED TO WATER



shows the influence that nitrate compounds have on the total. The nitrate compounds category was the top chemical released, (99.9% of the total release to water), followed by ammonia (0.08%). The remaining chemicals released to water were each 0.01% or less of the total releases to water. The Delaware City Refinery reported a release of 5,098,700 pounds of nitrate compounds to water for 2018, Perdue Georgetown reported 249,023 pounds, and Allen Harim Harbeson reported 61,673. The biological treatment of nitrogen-containing substances such as ammonia and animal waste is responsible for the formation of nitrate compounds, which are released to water. Metallic compounds (cobalt, cyanide, lead, and zinc) are generally products of fuel combustion, and petroleum, ore and metal refining. The Delaware City Refinery, Johnson Controls Battery Plant, and V&S Delaware Galvanizing are the facilities reporting releases of these metal compounds to water.

Table 4 shows the total amount of TRI chemicals for 2018 released to each basin in the State of Delaware. The Inland Bays include lands that drain into the Indian River Bay/Rehoboth Bay area, then to the Atlantic Ocean. The Piedmont Basin contains lands that drain to the portion of the Delaware River above the City of New Castle. The Delaware River, Christina River, Army Creek, Beaverdam Creek, and Drawyer Creek all eventually feed into the Delaware Bay. Sandy Branch and Deep Creek feed into the Nanticoke River, and then to the Chesapeake Bay. Island Creek and Savannah Ditch feed into the Inland Bays, and then into the Atlantic Ocean. The total amount released to water increased by 1,592,899 pounds in 2018, largely the result of an increase in the reported release of nitrate compounds by the Delaware City Refinery. Additional discussion about these releases can be found in the ***Trend Analysis*** section starting on page 31.

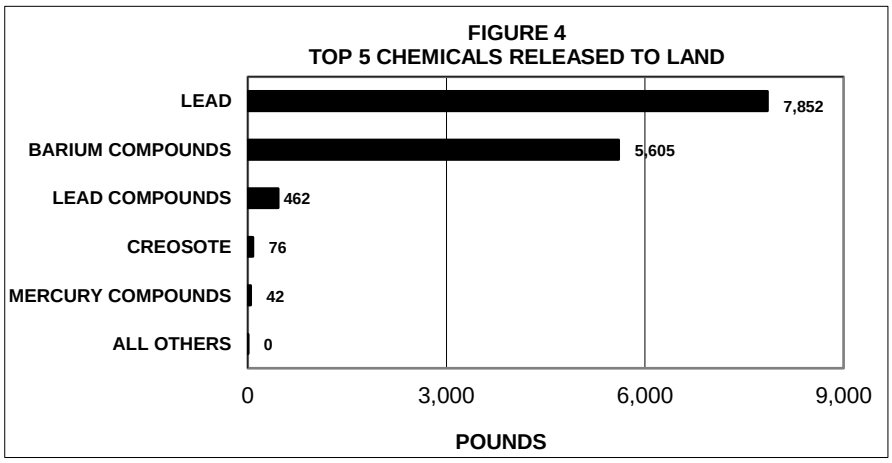
TABLE 4

TRI CHEMICALS RELEASED TO WATER BY BASIN IN 2018

BASIN	RELEASE (IN POUNDS)	PERCENT
CHESAPEAKE	6	0.0%
DELAWARE BAY	5,166,906	95.4%
INLAND BAYS	249,119	4.6%
PIEDMONT	2	0.0%
STATE TOTAL	**5,416,033**	**100.0%**

Releases to Land

Releases to land are shown in Table 2 on page 6. These releases are relatively small, amounting to 0.2% of total on-site releases. Figure 4 shows the contribution for the 5 chemicals reported as being released to land. The largest 2018 release to land was lead. All of the 2018 releases to land were metals and metal compounds, with the exception of creosote. Most of the metals and



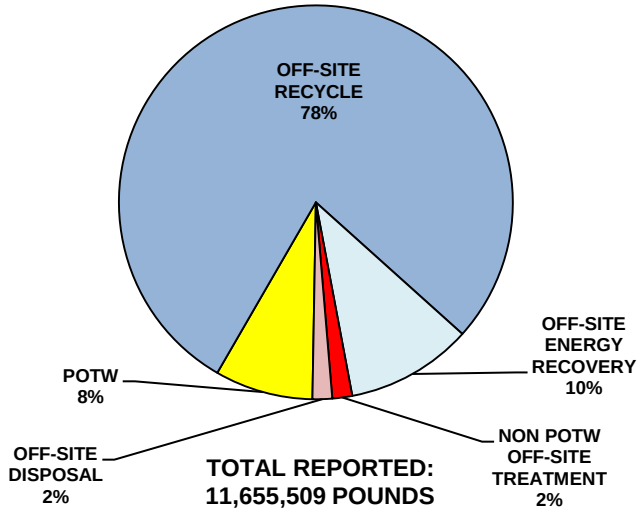
metal compounds reported were deposited by ammunition use, or formed during combustion from metal impurities that exist in coal or oil, or are contained in the base metal scrap produced in metal working processes. Lead, barium compounds, lead compounds, and mercury compounds were the metals and metal compounds reported, accounting for 99.5% of all on-site releases to land and were primarily reported by two facilities. The U. S. Army's National Guard Training Site Range reported the largest amount, 7,816 pounds of lead released to land. The Indian River Generating Station reported the second largest release to land, with 5,605 pounds of barium compounds. Creosote, the only non-metal reported in this category, accounted for 0.5% of the total on-site releases to land. Additional discussion about releases to land and their trends can be found in the ***Trend Analysis*** section starting on page 31.

Descriptions of some of the hazards that these chemicals, which were released to air, water, or land, may cause to humans, can be found in the ***Chemical Data Fact Sheets*** section under ***For Further Information*** on page 49. Facility specific information is available via the ***2018 TRI Facility Profiles,*** see ***Access to TRI Files*** under the ***Further Information Section*** on page 49.

Off-Site Transfers

Off-site transfers are material transfers to off-site locations for the purpose of disposal, recycling, energy recovery, or treatment. Treatment could be at a private waste treatment facility or at a POTW, typically a city or county wastewater treatment plant. The total amounts of chemical wastes transferred off-site decreased by 2.9% (347,896 pounds) since 2017. Off-site transfers account for 2.3% of total TRI waste and are about 2 times the amount released on-site. Overall decreases occurred in off-site energy recovery, disposal, and transfers to POTW's; and increases occurred in off-site recycling and treatment. The largest reductions include the 490,050 pound decrease in Rohm & Haas (B2 B3 B8's) off-site recycling of n,n-dimethylformamide, and Noramco's reported decrease of 471,067 pounds in toluene sent off-site for energy recovery. The largest increase reported was for lead compounds sent off-site for recycling by the Johnson Controls Distribution Center: 1,032,333 pounds. Figure 5 shows the relative portions of the five off-site transfer categories. Table 2 on page 6 shows these amounts in tabular form, and ***Appendices D and G*** provide additional detail about transfers from each facility.

FIGURE 5
2018 OFF-SITE TRANSFERS

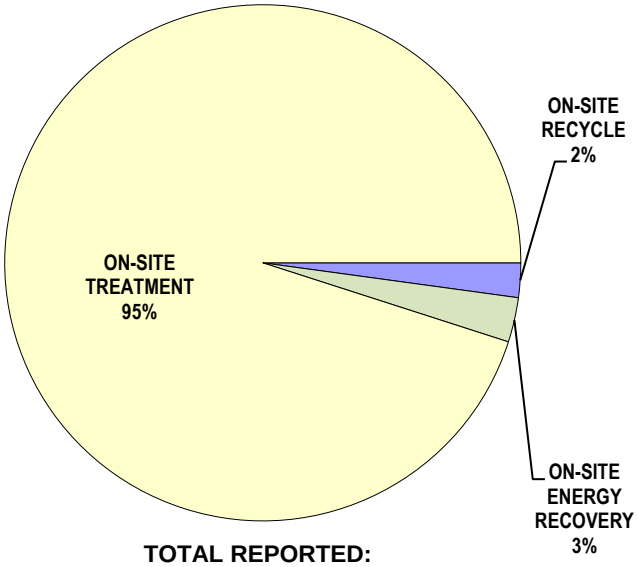


TRI chemicals in wastes are transported by various means from Delaware to their final destinations,

most of which are out-of-state. For 2018, TRI chemicals were sent from Delaware TRI reporting facilities to 17 states, some as far away as Texas and North Dakota, and to Canada, in addition to locations in Delaware. Ninety-nine percent of TRI chemicals in all wastes shipped off-site (not including direct transfers to POTW's) were sent to out-of-state locations for further processing and/or disposal. However, all transfers to POTWs generated by Delaware facilities were treated in Delaware. Off-site transfer to recycle operations accounted for 78% of the amounts within the five categories in off-site transfers, while energy recovery accounted for 10%, transfers to POTWs accounted for 8%, disposals accounted for 2% of the transfers, and non-POTW treatment was 2%. Eighty-eight percent of the transfers to POTWs were to the City of Wilmington POTW, and all of the 940,287 pounds treated at all POTWs were treated at Delaware POTW facilities. BASF Corp makes 53% (436,449 pounds, 89% of which is methanol) of the total TRI chemical transfers to the Wilmington POTW.

On-Site Waste Management

FIGURE 6
2018 ON-SITE WASTE MANAGEMENT



TOTAL REPORTED: 496,022,818 POUNDS

On-site waste management is the amount of waste that never leaves the facility and is managed by the facility on-site. These activities generally represent a lower risk to the environment, as the materials are typically destroyed on site, although a small fraction may escape treatment and these amounts are reported as on-site releases. The categories of **Treatment, Recycle, and Energy Recovery** are used to define on-site management activities related to TRI chemical wastes. The total amount of TRI chemicals managed on-site is 96.5% of the total TRI chemical waste. Figure 6 shows the portions of these wastes processed on-site. ***Appendices D and G*** provide additional detail for on-site waste management. Facility specific information is available via the ***2018 TRI Facility Profiles,*** see ***Access to TRI Files*** under the ***Further Information Section*** on page 49.

Waste Treatment (471,442,723 pounds) includes the amount of toxic material that was destroyed in on-site waste treatment operations. The Delaware City Refinery had the highest total amount of on-site waste treatment, combining for 467,785,078 pounds (99.2%) of the TRI waste treated on-site. Treatment of hydrogen sulfide at the Delaware City Refinery in the amount of 446,479,559 pounds was the highest single on-site treatment amount.

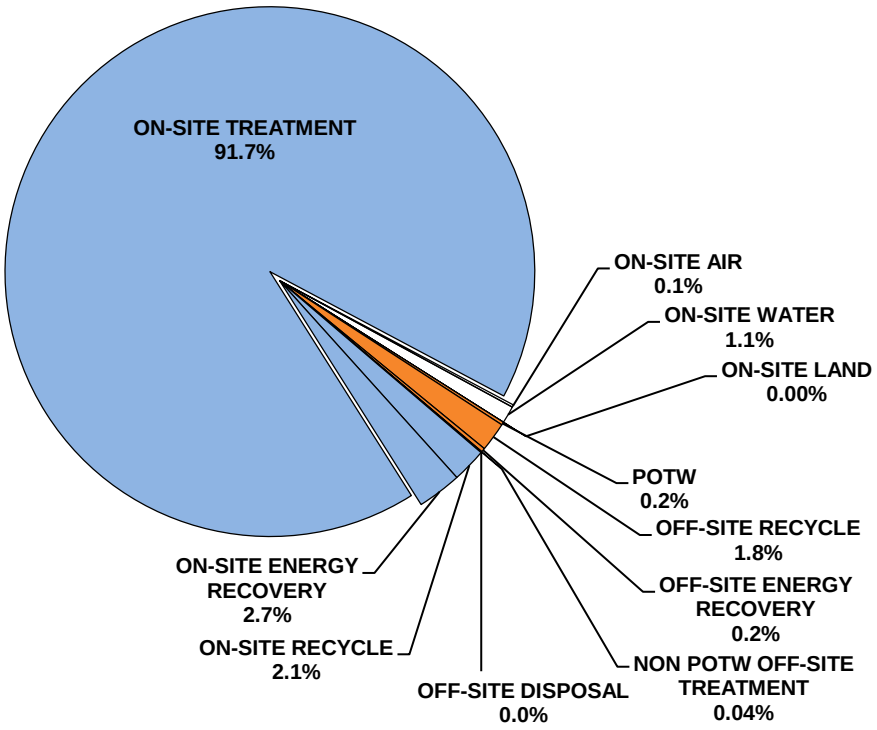
Recycled waste (10,725,721 pounds) is the quantity of toxic material recovered at the facility and made available for further use. Rohm & Haas (B2, B3, B8) recycled n,n-dimethylformamide, Air Liquide Advanced Separations recycled methanol and n-hexane, V&S Galvanizing recycled zinc compounds and lead, BASF recycled methanol, and Orient recycled aniline. These five facilities combined to report 99.8% of the total amount recycled on-site.

Energy Recovery includes the quantity of toxic material that had heat value and was combusted in some form of energy recovery device such as a heat boiler. The Delaware City Refinery was the only facility in the State to report on-site energy recovery. For 2018, the refinery reported 13,854,373 pounds of TRI chemicals processed on-site for energy recovery, with ammonia accounting for 95.5% or 13.2 million pounds.

Total TRI Waste

Total TRI waste is the combined total of the on-site release, off-site transfer, and on-site waste management amounts in the TRI chemical reports. Figure 7 provides a perspective of the total TRI chemical waste picture in Delaware. About 1.2% of the total reported TRI waste is released on-site, 2.3% is transferred off-site for treatment or disposal, and 96.5% is managed on-site through treatment, energy recovery, and recycle operations by the facilities generating the waste. Figure 7 shows the relative portions of the various sub-categories of TRI release and waste management.

FIGURE 7
TOTAL 2018 TRI CHEMICAL MANAGEMENT
TOTAL REPORTED: 513,848,119 POUNDS

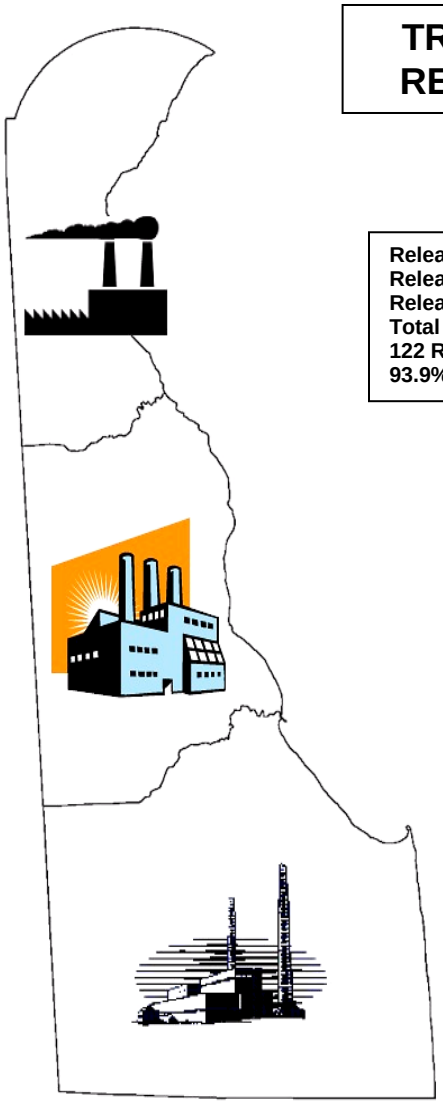


2018 Data Detail

On-Site Releases by County

Figure 8 below provides basic on-site release information for each county in the State.

FIGURE 8



TRI ON-SITE RELEASES REPORTED BY COUNTY

NEW CASTLE

Releases to Air = 680,838 Pounds
Releases to Water = 5,105,236 Pounds
Releases to Land = 7,923 Pounds
Total On-Site Releases = 5,793,996 Pounds
122 Reports, 32 Facilities
93.9% of Statewide Releases

KENT

Releases to Air = 12,479 Pounds
Releases to Water = 0 Pounds
Releases to Land = 5 Pounds
Total On-Site Releases = 12,483 Pounds
29 Reports, 11 Facilities
0.2% of Statewide Releases

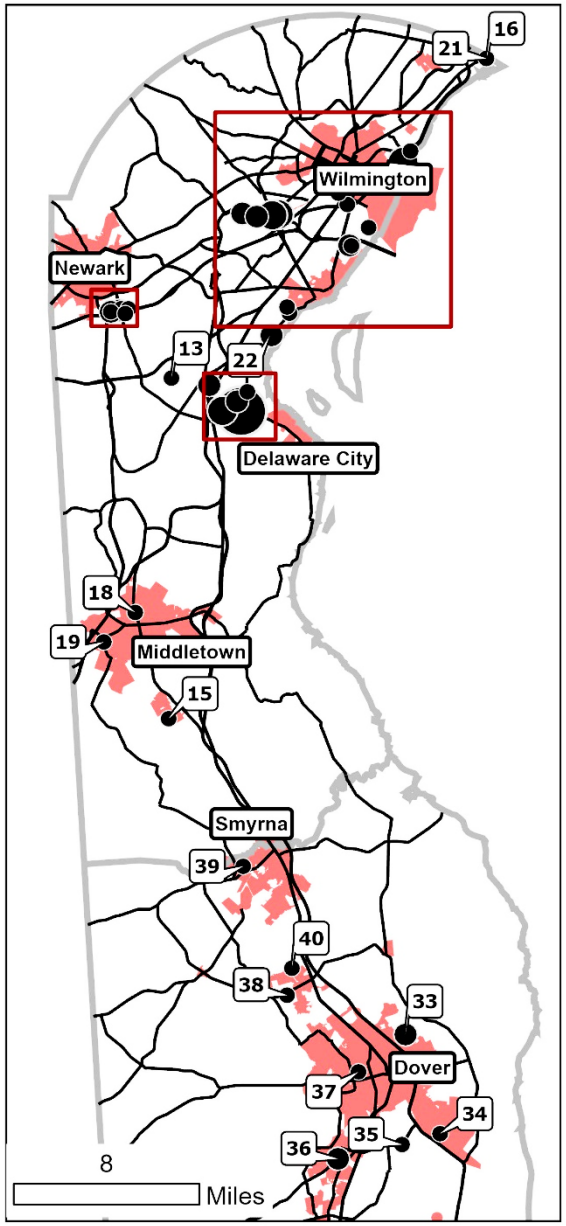
SUSSEX

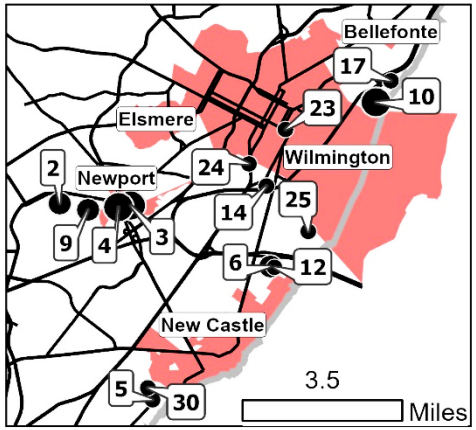
Releases to Air = 46,406 Pounds
Releases to Water = 310,798 Pounds
Releases to Land = 6,109 Pounds
Total On-Site Releases = 363,313 Pounds
44 Reports, 17 Facilities
5.9% of Statewide Releases

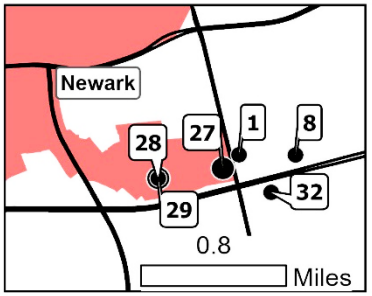
Source: DNREC 2018 TRI Database 10-1-19

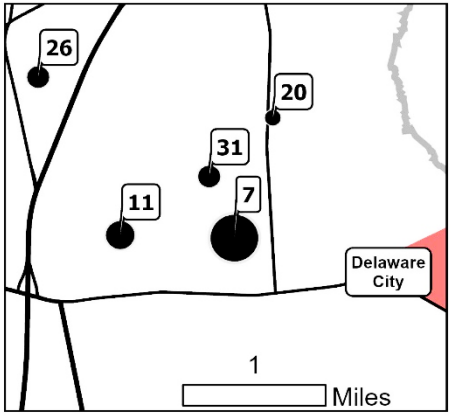
Facility Locations and Information

The map on the following two pages shows the location of each reporting facility in the State, with the facility location marker size depicting the size of its on-site release relative to other facilities in Delaware. Facility contact information is in Appendix B. The ***2018 Facility Profiles*** provide a facility overview (see ***Access to TRI Files*** under the ***Further Information section*** on page 49).

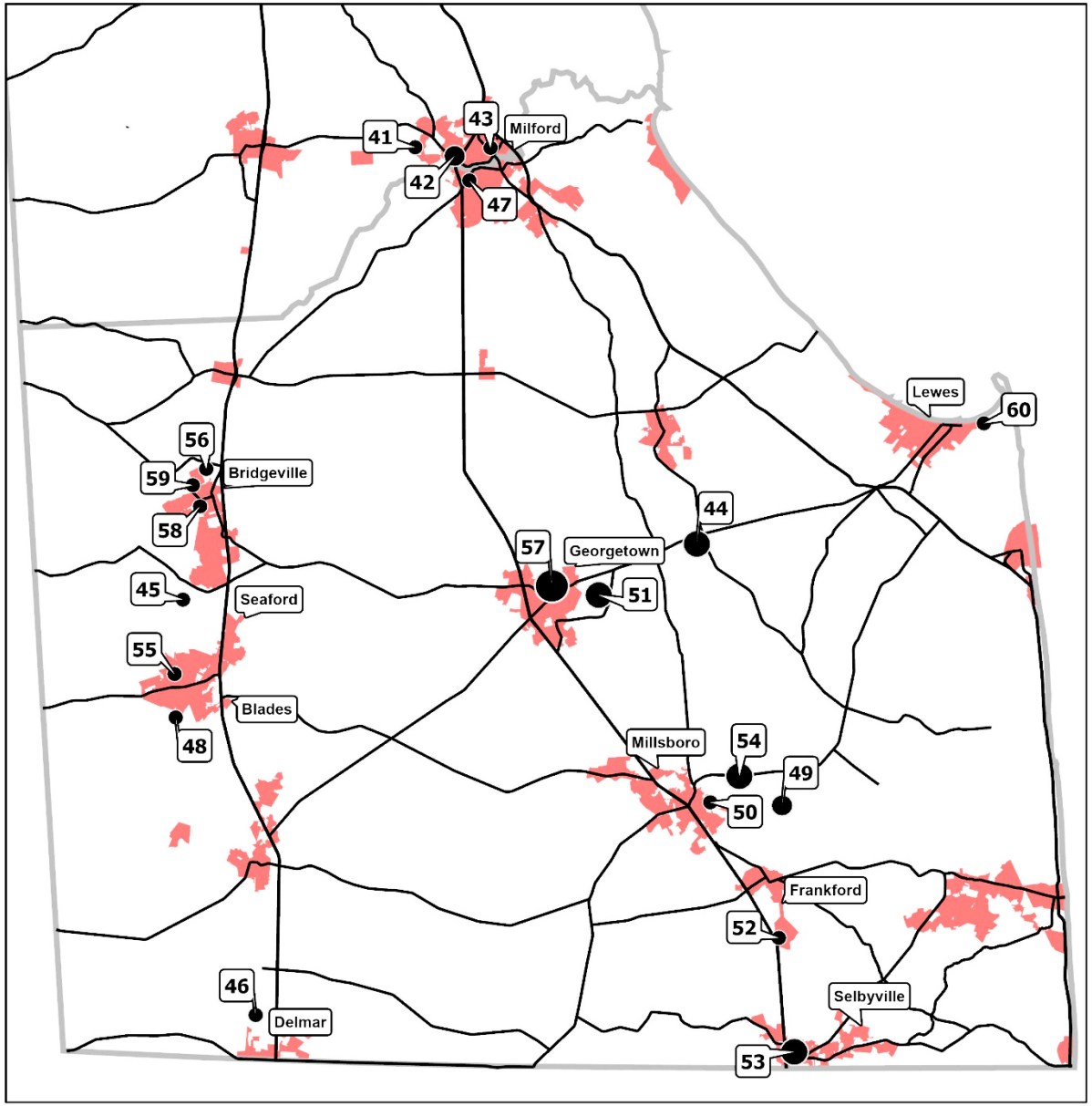








MAP ID	FACILITY
	New Castle County
1	AEARO TECHNOLOGIES
2	AGILENT TECHNOLOGIES
3	AIR LIQUIDE ADVANCED SEPARATIONS
4	BASF COLORS AND EFFECTS USA LLC
5	COLOR WORKS PAINTING
6	CRODA
7	DELAWARE CITY REFINERY
8	DUHADAWAY TOOL & DIE SHOP INC
9	DYK AUTOMOTIVE LLC
10	EDGE MOOR/HAY ROAD ENERGY CENTERS
11	FORMOSA PLASTICS
12	FUJIFILM
13	HMA-HERITAGE CONCRETE-BEAR
14	HMA-HERITAGE CONCRETE-HEALD STREET
15	HMA-HERITAGE CONCRETE-MIDDLETOWN
16	HONEYWELL
17	IKO
18	JOHNSON CONTROLS BATTERY PLANT
19	JOHNSON CONTROLS DISTRIBUTION
20	KUEHNE
21	MESSER LLC
22	NATIONAL GUARD TRAINING SITE RANGE
23	NORAMCO INC
24	OWEN STEEL COMPANY
25	PRINCE MINERALS LLC
26	ROGERS CORP
27	ROHM & HAAS B2 B3 B8
28	ROHM & HAAS B5 B6
29	ROHM & HAAS B7 B15
30	V&S DELAWARE GALVANIZING
31	VEOLIA - RED LION PLANT
32	VP RACING FUELS
	Kent County
33	CALPINE CORP - GARRISON ENERGY CENTER
34	DOVER AFB
35	GRIFFITH ENERGY - CARL KING
36	HANDYTUBE
37	HANESBRANDS
38	HMA-HERITAGE CONCRETE-CHESWOLD
39	METAL MASTERS
40	PPG INDUSTRIES



MAP ID	FACILITY
	Kent County
41	BALTIMORE AIRCOIL COMPANY
42	DENTSPLY SIRONA WEST PLANT
43	PERDUE MILFORD
	Sussex County
44	ALLEN HARIM FOODS HARBESON
45	ALLEN HARIM FARMS SEAFORD MILL
46	AMICK FARMS
47	DENTSPLY SIRONA MAIN PLANT
48	GAC SEAFORD
49	INDIAN RIVER GENERATING STATION
50	INTERVET
51	JUSTIN TANKS
52	MOUNTAIRE FARMS - FRANKFORD MILL
53	MOUNTAIRE FARMS - SELBYVILLE
54	MOUNTAIRE FARMS OF DELAWARE
55	ORIENT CORP
56	PERDUE BRIDGEVILLE
57	PERDUE GEORGETOWN
58	PICTSWEET BRIDGEVILLE
59	SIMMONS BRIDGEVILLE
60	SPI PHARMA

The size of the facility marker indicates the relative amount of on-site release.

8 Miles

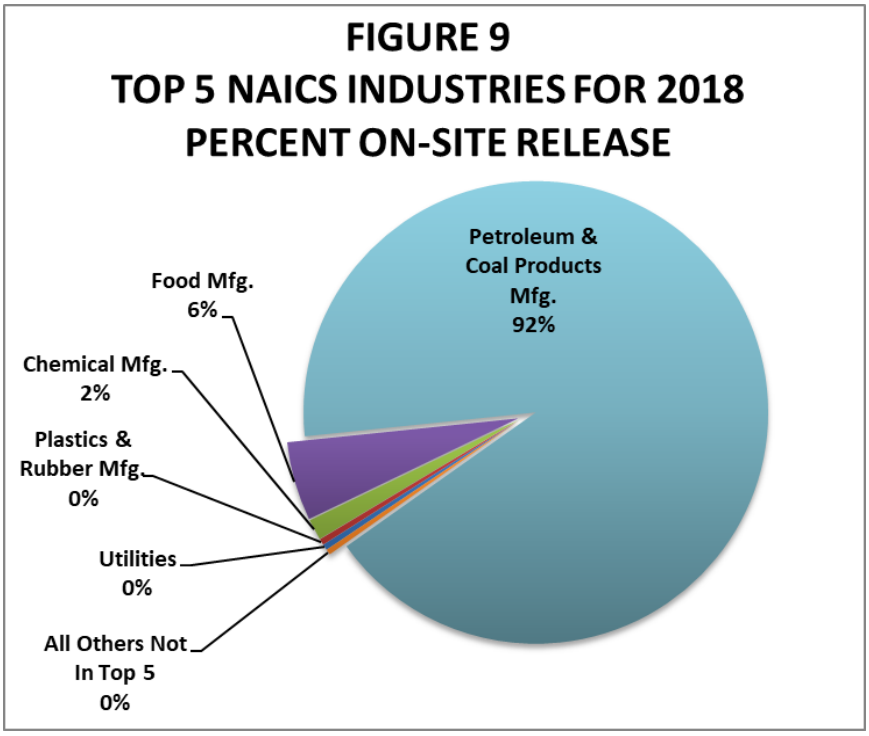
NAICS Industry Groups

Table 5 provides a description of each North American Industrial Classification System (NAICS) industry group and the number of facilities in each group that reported in Delaware, along with the total reported amounts for each NAICS code. This table also provides on-site releases, off-site transfers, and wastes managed on-site for each group.

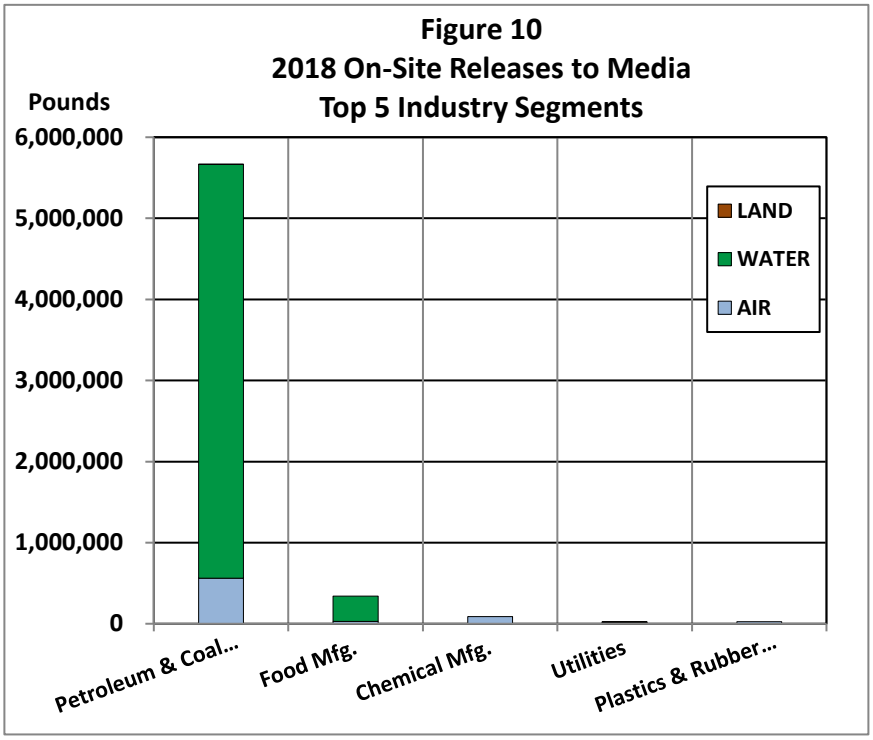
TABLE 5
2018 TRI DATA BY PRIMARY NAICS GROUP
(in pounds)

NAICS CODE	INDUSTRY GROUP	REPORTS	FACILITIES	FORM A	FORM R	ON-SITE RELEASE	OFF-SITE TRANSFERS	ON-SITE WASTE MGMT.
212	Mining	3	1	2	1	2	0	0
221	Utilities	12	3	0	12	24,946	135	885,879
311	Food Mfg.	29	11	18	11	340,178	88,410	1,477,880
313	Textile Products Mfg.	8	4	0	8	7,300	616,121	4,571,245
324	Petroleum & Coal Products Mfg.	41	4	2	39	5,665,307	79,510	481,640,003
325	Chemical Mfg.	51	15	4	47	89,623	1,496,758	1,601,490
326	Plastics & Rubber Mfg.	11	4	0	11	26,230	260,209	5,423,790
327	Non-metallic Mineral Product Mfg.	4	4	0	4	35	0	0
331	Primary Metal Mfg.	4	1	0	4	1,313	84,328	0
332	Fabricated Metal Product Mfg.	10	5	0	10	959	513,445	422,531
333	Equipment Mfg.	5	1	0	5	15	751,515	0
335	Electrical Equipment Mfg.	5	2	0	5	33	7,756,507	0
339	Misc. Manufacturing	3	2	0	3	5,778	8,571	0
454	Non-Store Retailers	3	1	3	0	0	0	0
928	National Security	6	2	0	6	8,071	0	0
	TOTAL	195	60	29	166	6,169,792	11,655,509	496,022,818

Figure 9 shows the percent contribution of each of the top five NAICS groups and all others not in the top five, compared to the reported total on-site releases. The top five NAICS groups 324 (Petroleum and Coal Products Mfg.), 311 (Food Manufacturing), 325 (Chemical Mfg.), 221 (Utilities), and 326 (Plastics and Rubber Mfg.), account for 99.6% of the total on-site releases within the State. Facilities not in the top five NAICS industry groups contributed only 23,508 pounds of on-site releases, less than 0.4% of the 2018 on-site release total.



Depending on the NAICS group, releases to air, water, and land can be very different. Figure 10 shows the top 5 NAICS groups in Delaware and to what media the releases occurred. For example, petroleum and coal products manufacturing reported 10% of their releases were to air, and 90% of their releases were to water. Food manufacturing reported 9% of their releases were to air, and 91% of their releases were to water. Chemical manufacturing reported 100% of their releases were to air. Utilities reported having their releases split between air and land, with 76% of the releases to air and 24% of the releases to land. All of the releases for plastics and rubber manufacturing were to air. Keep in mind this is based on a small sample size due to the overall low number of facilities reporting in Delaware. Other states will have greatly different results among NAICS groups, particularly those states whose industries have little presence in Delaware, such as mining or forestry/paper products manufacturing.



RELEASES FROM THE TOP 15 FACILITIES

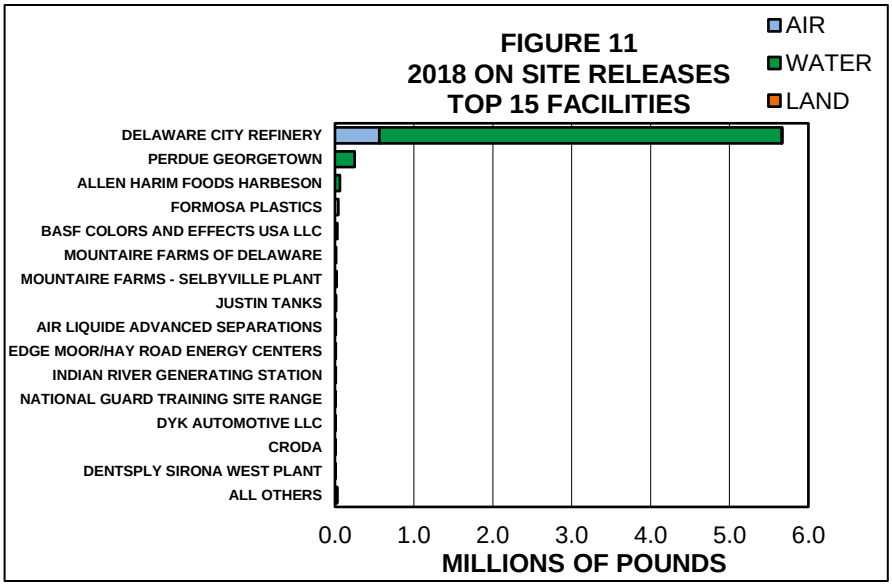


Figure 11 shows the relative contribution of each of the top 15 reporting facilities to on-site releases. The top five facilities accounted for 6,047,015 pounds, or 98% of all on-site releases. Of the 6,169,792 pounds that were reported as released on-site by all 60 facilities Statewide, the top 15 facilities accounted for total releases of 6,146,519 pounds, or 99.6% of the total on-site releases.

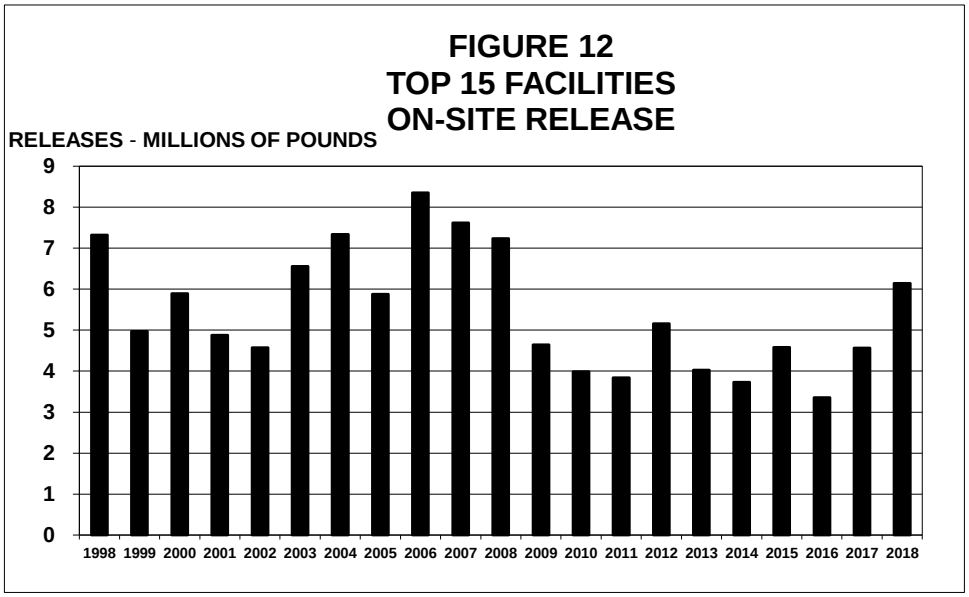
TABLE 6
TOP 15 FACILITIES 2017 AND 2018 RANKING BY ON-SITE RELEASE
(in pounds)

2017 RANK	2018 RANK	FACILITY	2018 TOTAL AIR	2018 TOTAL WATER	2018 TOTAL LAND	2018 ON-SITE RELEASE	2017 ON-SITE RELEASE	2017 TO 2018 CHANGE IN RELEASES	
1	1	DELAWARE CITY REFINERY	560,363	5,104,867	76	5,665,307	3,995,973	1,669,333	42%
2	2	PERDUE GEORGETOWN	109	249,119	-	249,228	277,061	(27,833)	-10%
4	3	ALLEN HARIM FOODS HARBESON	0	61,673	-	61,673	74,690	(13,017)	-17%
3	4	FORMOSA PLASTICS	41,454	1	-	41,455	84,597	(43,142)	-51%
5	5	BASF COLORS AND EFFECTS USA LLC	29,352	-	-	29,352	24,530	4,822	20%
8	6	MOUNTAIRE FARMS OF DELAWARE	15,748	-	-	15,748	13,516	2,232	17%
NR	7	MOUNTAIRE FARMS - SELBYVILLE PLANT	13,524	6	-	13,530	667	12,863	1928%
11	8	JUSTIN TANKS	13,362	-	-	13,362	8,948	4,414	49%
9	9	AIR LIQUIDE ADVANCED SEPARATIONS	10,401	-	-	10,401	13,264	(2,863)	-22%
12	10	EDGE MOOR/HAY ROAD ENERGY CENTERS	10,172	2	-	10,174	8,858	1,316	15%
7	11	INDIAN RIVER GENERATING STATION	3,583	-	6,109	9,692	14,382	(4,690)	-33%
NR	12	NATIONAL GUARD TRAINING SITE RANGE	0	-	7,816	7,816	3,733	4,083	109%
NR	13	DYK AUTOMOTIVE LLC	6,520	-	-	6,520	5,355	1,165	22%
NR	14	CRODA	6,484	-	-	6,484	3,701	2,783	75%
13	15	DENTSPLY SIRONA WEST PLANT	5,778	-	-	5,778	8,292	(2,515)	-30%
		ALL OTHERS	**22,873**	**365**	**35**	**23,273**	**56,313**	**(33,040)**	**-59%**
		TOP 15	**716,849**	**5,415,668**	**14,002**	**6,146,519**	**4,537,567**	**1,608,952**	**35%**
		STATE TOTALS, ALL FACILITIES	**739,722**	**5,416,033**	**14,037**	**6,169,792**	**4,593,879**	**1,575,913**	**34%**

NR- Not ranked in the top 15 for 2017
DNR- Did not report in 2017
Source: 2017 and 2018 DNREC TRI Databases, October 2018

Table 6 shows the 2018 ranking of the top 15 facilities along with their 2017 ranking and the reported amounts of on-site releases for both years. Releases to the environment because of remedial actions, accidents, or one-time catastrophic events are included in these values. The percent change in total on-site releases for each of the top 15 facilities from 2017 to 2018 is also shown, and some of these changes are significant.

Figure 12 shows the totals for on-site releases for the top 15 reporting facilities from 1998-2018, not adjusted for changes in reporting requirements. The total on-site release trend for these facilities is up 1.2 million pounds (35%) since 2017 and down 1.2 million pounds (16%) since 1998 after reaching a peak of 8.4 million pounds in 2006. These facilities reported 99.6% of the total on-site releases in the State for 2018, while the remaining 40 facilities reported 0.4%.



Nine facilities of the top 15 facilities reported an increase in on-site releases, while six reported a decrease for 2018. Changes at the facility, such as the way releases are estimated, how

waste is managed, changes in raw materials or processing methods, or installation of new or improved equipment possibly used to limit or eliminate releases of specific chemicals or all chemicals, may affect reported releases. The largest change in total pounds of on-site releases reported by the top 15 facilities were increases in the release of nitrate compounds to water reported by the Delaware City Refinery, up by 1,625,805 pounds. The Refinery also reported a large increase in hydrogen cyanide released to air, up by 127,963 pounds compared to 2017; and a large decrease in sulfuric acid released to air, down by 87,705 pounds since 2017. Significant decreases in releases of nitrates to water were reported by both Perdue in Georgetown (down 23,283 pounds) and Allen Harim Foods in Harbeson (down 13,017). Mountaire Farms in Selbyville reported a 12,934 pound increase in ammonia releases for 2018, as they fell below the reporting threshold for ammonia in 2017.

Although the TRI program itself does not regulate or limit emissions, other DNREC and federal programs do issue permits and limit emissions from operating facilities. TRI data is also shared with other programs within DNREC to verify data accuracy and to provide data and information to those programs.

Facilities No Longer Reporting to TRI

In the normal annual cycle of TRI reporting, some facilities may fall below the reporting thresholds and some facilities may close. In recent years, this involved the annual loss of 1-3 facilities, partially offset by 1-3 new facilities that started to report each year.

Formosa ceased operations in August of 2018, and PPG and Hanes also shut down in 2018; so 2018 will be the last year these facilities will report to TRI. Service Energy did not file 2018 TRI reports, because they fell below the reporting threshold.

MacDermid ceased operations in February of 2017; so they did not file 2017 TRI reports, because they fell below the reporting threshold for the year. Chemours Edge Moor ceased operations in September of 2015, so they did not file 2016 TRI reports. Facilities that did not file 2014 TRI reports because they closed permanently were: Evraz Claymont Steel, BASF Seaford, Motech Americas in Newark, and HMA Heritage Concrete in Frankford. Chrome Deposit ceased operations and closed in 2012, and NRG Dover converted to natural gas and ceased burning coal; so these two facilities did not file 2013 TRI reports.

New Facilities Reporting to TRI

Simmons in Bridgeville, and Messer in Claymont, were new TRI reporters for 2018. Simmons provides frozen meat ingredients for the pet food industry. Messer produces industrial gas products. Fujifilm, which had been below the reporting threshold for 2016 and 2017, reported to TRI for 2018. Three HMA-Heritage Concrete facilities that had fallen below the TRI reporting threshold for 2017, again reported for 2018. And a new HMA-Heritage facility in Middletown reported to TRI for the first time in 2018.

Calpine Corporation's Garrison Energy Center in Dover filed TRI reports for the first time for the 2016 reporting year. DYK Automotive LLC in Wilmington also report to TRI for the first time for 2016. More information concerning these facilities is contained in this report, the report ***Appendices***, and the ***2018 TRI Facility Profiles***.

Persistent Bioaccumulative Toxic (PBT) Chemicals, 2008-2018

For reporting year 2000 and beyond, the EPA established substantially lower reporting thresholds for 12 existing chemicals and one chemical category that are highly persistent and bioaccumulative in the environment. Six new chemicals and one new category were also added to the PBT list for 2000. The new thresholds apply regardless of whether the PBT chemical is manufactured, processed, or otherwise used. For 2011, four of the 16 new chemicals added were also PACs, and they are now included in the PACs category.

Table 7 provides a current list of the PBT chemicals and their thresholds, and the number of reports received for each chemical for 2018.

TABLE 7
2018 DELAWARE PBT CHEMICALS AND REPORTING THRESHOLDS
(pounds/year)

Chemical or Chemical Category	Threshold (Pounds)	2018 REPORTS
Aldrin	100	0
Benzo[g,h,I]perylene	10	1
Chlordane	10	0
Dioxin and dioxin-like compounds category	0.1 grams	3
Heptachlor	10	0
Hexabromocyclododecane Category	100	0
Hexachlorobenzene	10	0
Isodrin	10	0
Lead	100	6
Lead compounds category	100	5
Mercury	10	2
Mercury compounds category	10	3
Methoxychlor	100	0
Octachlorostyrene	10	0
Pendimethalin	100	0
Pentachlorobenzene	10	0
Polychlorinated biphenyls (PCBs)	10	0
Polycyclic aromatic compounds category (PACs)	100	3
Tetrabromobisphenol A	100	0
Toxaphene	10	0
Trifluralin	100	0
	TOTAL	23

PBTs have been receiving increased scrutiny as we have learned more about them, and reporting of PBTs has been progressively emphasized. These chemicals are of particular concern because they are not only toxic, but also because they remain in the environment for long periods of time, are not readily destroyed, and accumulate in body tissues.

In 2008, new data elements became available for dioxin and dioxin-like compounds (DLCs). The 17 compounds that fall under the TRI category of DLCs have a wide range (1.0000 to 0.0003) of toxicity; these values are called the Toxic Equivalent Factor (TEF). In order to compare them on an equal toxicity basis, we multiply the TEF by the pounds reported to get the Toxic Equivalent Quantity (TEQ). Facilities reporting on dioxins are also now required to report the amounts released or managed as waste for each of the 17 DLCs. See ***Appendix M*** for a copy of the DLC reporting form, Schedule 1. These amounts are provided along with the original amount reported in pounds. See pages 23-24 for additional detail on dioxins.

Table 8 shows the results of PBT reporting for 2016-2017 compared to total 2018 TRI data. The total count of PBT reports, 23, is lower than the counts of all recent years except 2017. PBT on-site releases for 2018 comprise 0.1% of the total TRI on-site releases. Total PBT wastes are 1.5% of total TRI wastes. No PBT reports can be filed on Form A. See page 3 for an explanation of PBT and non-PBT chemicals.

PBT on-site releases were higher for 2018 by 3,867 pounds (77%); with the greatest increase coming from the U. S. Army's National Guard River Road Training Site Range in New Castle with higher releases of lead to land by 4,083 pounds. Lead and lead compounds made up 95% of the total on-site PBT releases for 2018. Since 2008, the trend of PBT on-site releases is down 73%.

TABLE 8
2018 TRI PBT DATA SUMMARY
(IN POUNDS)

	PBTs only 2016	PBTs only 2017	PBT's only 2018
No. of Facilities	17	12	14
No. of Form A's	NA	NA	NA
No. of Form R's	25	19	23
No. of Chemicals	7	7	7
On-Site Releases			
Air	517	517	505
Water	33	62	24
Land	6,058	4,440	8,356
On-Site Releases	6,608	5,018	8,885
Off-Site Transfers			
POTW's	2	1	6
Recycle	4,924,884	6,932,803	7,729,401
Energy Recovery	0	0	0
Treatment	0	0	0
Disposal	24,926	2,978	1,430
Total Transfers	4,949,812	6,935,781	7,730,838
On-Site Waste Mgmt.			
Recycle	7,123	7,873	4,122
Energy Recovery	0	0	0
Treatment	825	825	842
Total On-Site Mgmt.	7,948	8,698	4,964
Total PBT Waste	4,964,368	6,949,497	7,744,687

The total PBT waste amount increased by 795,186 pounds (11%) for 2018 compared to 2017. The primary reason for this increase was the increased transfers of lead compounds to off-site recycling by the Johnson Controls Distribution Center.

Table 9, on page 23, shows the amounts of each PBT chemical reported as released by the TRI reporting facilities in 2018. The Delaware City Refinery reported the largest PBT release to air, 266 pounds of polycyclic aromatic compounds (PACs). The Johnson Controls Battery Plant reported the largest PBT release to water, 8 pounds of lead compounds. The U. S. Army's National Guard Training Site Range reported the largest release to land, 7,816 pounds of lead. Over 99% of the PBT amounts transferred off-site for recycle was lead compounds from Johnson Controls Battery Plant and Distribution Center. Additional detail for mercury and mercury compounds, another important PBT, is in a separate section on page 25.

Three companies (The Delaware City Refinery, IKO, and V&S Galvanizing) reported the entire amount of on-site PBT chemical waste management. The refinery treated 462 pounds of benzo(g,h,i)perylene and 380 pounds of polycyclic aromatic compounds (PACs) on-site. IKO recycled 551 pounds of PACs on-site and V&S Galvanizing recycled 3,571 pounds of lead on-site. ***Appendix I*** shows the PBT data detail, listing each PBT chemical and the facilities

reporting on it.

TABLE 9

2018 PBT RELEASE SUMMARY

(REPORTS AMOUNTS IN POUNDS)

2018 PBT CHEMICAL	FORM R REPORTS	TOTAL AIR	TOTAL WATER	TOTAL LAND	ON-SITE TOTAL	TRANSFERS OFF SITE	ON-SITE WASTE MGMT.
BENZO (G,H,I)PERYLENE	1	0.75	4.66	0.00	5.41	0.00	462.00
DIOXIN AND DIOXIN-LIKE COMPOUNDS	3	0.0055	0.0000	0.0000	0.0055	0.0002	0.0000
LEAD	6	9.31	3.40	7851.67	7864.37	5627.00	3,571.00
LEAD COMPOUNDS	5	127.03	10.25	462.00	599.28	7,724,820.43	0.00
MERCURY	2	12.48	0.0100	0.00	12.49	170.68	0.00
MERCURY COMPOUNDS	3	88.53	1.53	42.30	132.36	71.80	0.00
POLYCYCLIC AROMATIC COMPOUNDS	3	266.60	4.00	0.00	270.60	148.10	931.20
TOTALS	**23**	**505**	**24**	**8,356**	**8,885**	**7,730,838**	**4,964**

Source: 2018 DNREC TRI Database, October 2019

Dioxins are reportable in grams and have been converted to pounds for this report.

Four decimal places are used where small amounts are not -0-.

Dioxin and Dioxin-Like Compounds

The term “dioxins” is used by the EPA TRI program and in this report to indicate the group of 17 dioxins and dioxin-like compounds (DLCs) reportable to TRI, out of a family of several hundred dioxins and dioxin-like compounds, including furans. These dioxins are also part of the PBT category, and you can see the totals for releases and other waste management in Table 9 above. In recent years, on-site release of DLCs has been in the range of 2.5-15.8 grams. For 2018, the amount was 2.5 grams.

On May 10, 2007, the EPA Toxics Release Inventory Program issued a final rule expanding reporting requirements for the DLCs category. The final rule requires that, in addition to the total amount released for the entire category, facilities must report the amount of each individual member for each release and waste management activity on a new form (Schedule 1). A template for the Schedule 1 form is given in ***Appendix M*** of this report. The reporting requirements of the final rule applied to the 2008 reporting year and to following years.

The reason for this rule is that the toxicity levels of these 17 DLCs vary greatly, and some compounds in this group have Toxic Equivalent Factors (TEF) **3,333 times less** than others. Because of this great variation, the Toxicity Equivalent Quantity (TEQ) is a way to show toxic chemical amounts on an equal toxicity basis. The EPA and DNREC use the individual mass quantity data to calculate TEQ amounts (Weight X TEF = TEQ). This data is available to the public along with the mass data. Table 10, on the following page, shows all 17 DLCs that are reportable to TRI and some basic information about them.

Among the “dioxins” included in TRI reports is the very toxic 2,3,7,8-TCDD dioxin (#1 in Table 10), which is the congener generally of most concern. All TRI “dioxins” are reportable in grams and were converted to pounds for this report since all other chemicals are reported in pounds (1 gram = 0.002205 pounds). You can see that TRI dioxin numbers 1 and 2 have the highest TEF (1.0000), and numbers 7 and 17 have the lowest (0.0003). This is a range of 3,333 to 1. In order to show the toxicity effects of the 17 dioxins on an equal basis, the amounts released in pounds are multiplied by their TEF. The resulting TEQ allows them to be compared on an equal toxicity level.

TABLE 10
DIOXIN TOXIC EQUIVALENT FACTORS (TEF)

TRI No.	Dioxin Chemical (DLC) Name	Abbreviated Name	CAS	TEF
1	2,3,7,8-tetrachlorodibenzo-p-dioxin	2,3,7,8-TCDD	1746-01-6	1.0000
2	1,2,3,7,8-pentachlorodibenzo-p-dioxin	1,2,3,7,8-PeCDD	40321-76-4	1.0000
3	1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	1,2,3,4,7,8-HxCDD	39227-28-6	0.1000
4	1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	1,2,3,6,7,8-HxCDD	57653-85-7	0.1000
5	1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	1,2,3,7,8,9-HxCDD	19408-74-3	0.1000
6	1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	1,2,3,4,6,7,8-HpCDD	35822-46-9	0.0100
7	1,2,3,4,6,7,8,9-octachlorodibenzo-p-dioxin	1,2,3,4,6,7,8,9-OCDD	3268-87-9	0.0003
8	2,3,7,8-tetrachlorodibenzofuran	2,3,7,8-TCDF	51207-31-9	0.1000
9	1,2,3,7,8-pentachlorodibenzofuran	1,2,3,7,8-PeCDF	57117-41-6	0.0300
10	2,3,4,7,8-pentachlorodibenzofuran	2,3,4,7,8-PeCDF	57117-31-4	0.3000
11	1,2,3,4,7,8-hexachlorodibenzofuran	1,2,3,4,7,8-HxCDF	70648-26-9	0.1000
12	1,2,3,6,7,8-hexachlorodibenzofuran	1,2,3,6,7,8-HxCDF	57117-44-9	0.1000
13	1,2,3,7,8,9-hexachlorodibenzofuran	1,2,3,7,8,9-HxCDF	72918-21-9	0.1000
14	2,3,4,6,7,8-hexachlorodibenzofuran	2,3,4,6,7,8-HxCDF	60851-34-5	0.1000
15	1,2,3,4,6,7,8-heptachlorodibenzofuran	1,2,3,4,6,7,8-HpCDF	67562-39-4	0.0100
16	1,2,3,4,7,8,9-heptachlorodibenzofuran	1,2,3,4,7,8,9-HpCDF	55673-89-7	0.0100
17	1,2,3,4,6,7,8,9-octachlorodibenzofuran	1,2,3,4,6,7,8,9-OCDF	39001-02-0	0.0003

Also, you can see how, for a dioxin like numbers 1 and 2, where the TEF is highest at 1.000, the TEQ amounts are greater than the weight percentages. Conversely, for dioxin numbers 7 and 17, where the TEF values are a low 0.003, the TEQ amounts are smaller than their weight percentages. For example, Edge Moor/Hay Road Energy Centers reported dioxin number 7 (TEF = 0.0003) as 56.8% of the total weight, but this was only 0.5% of the TEQ. The total on-site release amounts in pounds and their corresponding TEQ amounts reported by the three facilities that reported on dioxins in Delaware for 2018 were calculated and are presented in the Table 11. The 2018 total of 0.0055 pounds, or 2.5 grams, was released on-site, which is DOWN 17% from the 2017 total of 0.006634 pounds, or 3 grams. Dioxin releases have trended downward over the last ten years, down a total of .0173 pounds (7.86 grams), or 76% since 2008. Because of the differences in distribution of individual dioxins and dioxin-like compounds, the rankings may change when comparing by pounds or by TEQ. In addition, the pounds released or managed as waste are shown in ***Appendix I***.

TABLE 11
2018 FACILITIES SORTED BY DIOXIN TOXIC EQUIVALENT QUANTITY (TEQ)

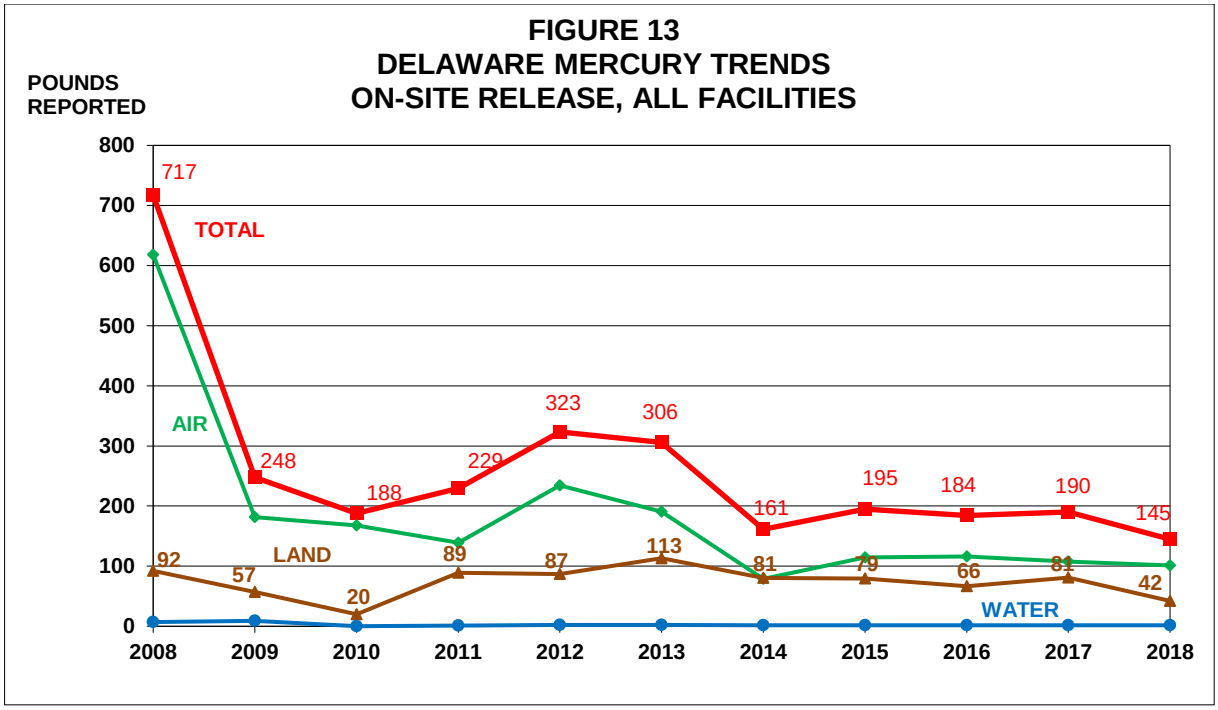
SORTED BY TOTAL ON-SITE TEQ FACILITY	TOTAL ON-SITE TEQ, LBS.	ON-SITE TEQ RANK	TOTAL ON-SITE LBS. RELEASE	ON-SITE LBS. RANK
DELAWARE CITY REFINERY	0.0001551	1	0.001268	2
EDGE MOOR/HAY ROAD ENERGY CENTERS	0.0001414	2	0.004222	1
FORMOSA PLASTICS	0.0000004	3	0.000009	3
TOTALS	0.0002969		0.005500	

Mercury and Mercury Compounds

Mercury (elemental mercury) and mercury compounds are an important part of the PBT category, and this section discusses some of the data in these reports. Control of mercury and mercury compounds has become increasingly important as we have learned more about mercury, and that mercury is a serious pollutant. Children, including unborn babies, exposed to mercury compounds can have impaired functions, including verbal, attention, motor control, and intelligence. Adults may be at lower risk than children, but mercury in fish consumed by adults may lead to problems similar to those found in children, as well as reproductive and cardiovascular problems. A significant source of mercury pollution comes from the air, as mercury released from power plants is deposited on water and land, where runoff may also migrate to the water. Many lakes and streams are impaired as a result of mercury releases from coal-burning power plants. As mercury makes its way into the food chain, restrictions on eating fish harvested from these water bodies has become more commonplace.

For 2018, total on-site releases of mercury and mercury compounds decreased 45 pounds (24%) to a total of 145 pounds. This was largely the result of a decrease in releases to land of 38.6 pounds by the Indian River Generating Station. On-site releases of mercury and mercury compounds on the whole are down 80% since 2008.

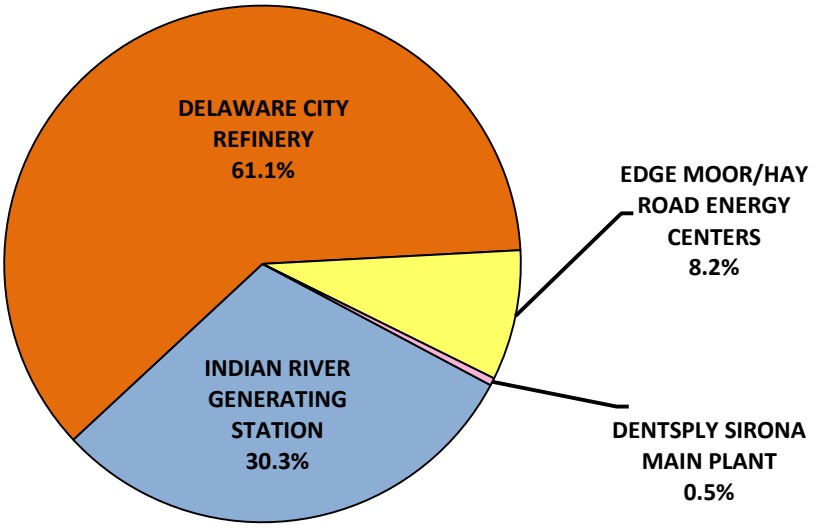
Figure 13 shows the combined trend for mercury and mercury compounds, and how the trend has been greatly influenced by on-site releases to air.



The Delaware City Refinery reported the highest on-site release amount of mercury for 2018, with the majority of releases to air. Indian River Generating was the second largest

contributor for on-site mercury releases in 2018, with the majority of releases to land. Figure 14 shows the percentage contributed by each of the facilities that reported a mercury or mercury compound release in 2018. On-site release amounts for mercury and mercury compounds can also be found in ***Appendix F*** on page **F**-7 and ***Appendix I*** on page **I**-1.

FIGURE 14
2018 ON-SITE MERCURY RELEASES FROM DELAWARE FACILITIES



145 POUNDS REPORTED RELEASED ON-SITE

Carcinogenic TRI Chemicals

TABLE 12
CARCINOGENS REPORTED BY DELAWARE FACILITIES FOR 2018

CHEMICAL NAME	IARC	NO. OF REPORTS
4,4'-METHYLENEBIS(2-CHLOROANILINE)	1	2
ARSENIC COMPOUNDS	1	1
ASBESTOS (FRIABLE)	1	1
BENZENE	1	1
CHROMIUM COMPOUNDS	1	2
ETHYLENE OXIDE	1	1
NICKEL COMPOUNDS	1	3
VINYL CHLORIDE	1	1
1,3-BUTADIENE	2A	1
CREOSOTE	2A	1
LEAD	2A	6
LEAD COMPOUNDS	2A	5
TRICHLOROETHYLENE	2A	1
COBALT COMPOUNDS	2B	1
CUMENE	2B	2
ETHYLBENZENE	2B	3
HYDRAZINE	2B	1
HYDRAZINE SULFATE	2B	1
NAPHTHALENE	2B	4
NICKEL	2B	3
NITROBENZENE	2B	1
P-CHLOROANILINE	2B	1
POLYCYCLIC AROMATIC COMPOUNDS	2B	3
PROPYLENE OXIDE	2B	1
STYRENE	2B	2
TETRACHLOROETHYLENE	2B	1
TOLUENE DIISOCYANATE (MIXED ISOMERS)	2B	1
VINYL ACETATE	2B	1
CHEMICALS = **28**	REPORTS = **52**	

Source: 2018 DNREC TRI Database, October 2019

Some chemicals are reportable under TRI because they are carcinogens, and are known or suspected to cause cancer in humans. Table 12 shows those carcinogens that were reported by Delaware facilities for 2018. Each chemical is determined to be a carcinogen by either the International Agency for Research on Cancer (IARC) or the National Toxicology Program (NTP). Next to the chemical is their rating listed as: Known (1), Probable (2A), or Possible (2B) carcinogen. Of the 6.17 million pounds of TRI chemicals reported by facilities in Delaware as released on-site to the environment in 2018, 1.2% (76,545 pounds) were known or suspected carcinogens. Nine existing TRI chemicals were added to the list of carcinogens starting with the 2017 TRI reporting year. Of these chemicals, only cumene, a possible carcinogen, is reported by two Delaware facilities, the Delaware City Refinery and the Dover Air Force Base. For additional information on cancer rates and causes, please go to the Division of Public Health cancer web site listed in the "***For Further Information"*** section on page 49.

Carcinogen Trends, 2008-2018

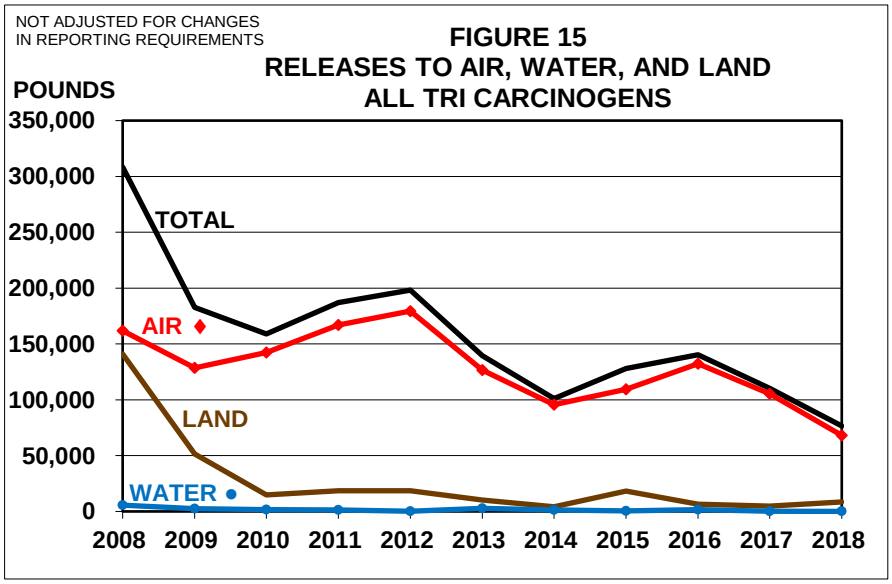
The number of facilities reporting on carcinogens for 2018 was 31, up from 26 facilities in 2017. The number of carcinogen reports increased by four to 52 in 2018; and the total number of reported carcinogenic chemicals remained the same, at 28. On-site releases of all carcinogens decreased 30.5% (33,604 pounds) compared to 2017, and have decreased 91.1% (780,366 pounds) since the peak in 1998. Releases of some individual chemicals in the carcinogen category have also trended downward: over the last ten years releases of lead and lead compounds are down by 73%, and releases of polycyclic aromatic compounds (PAC's) are down by 69%. The largest 2018 decreases in on-site releases were Formosa Plastics' reported decrease in vinyl chloride releases (down 50%), and vinyl acetate releases (down 56%). Other carcinogens saw smaller decreases in releases, with some facilities reporting increases. See ***Appendix J*** for detailed information on 2018 carcinogen releases.

Table 13 shows amounts released on-site for carcinogens from 2008-2018, and Figure 15 shows the trend, which has been generally downward during this time period.

TABLE 13
2008-2018 TRI CARCINOGENS
REPORTED ON-SITE RELEASES, NOT ADJUSTED

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
KNOWN											
AIR	69,781	60,664	63,975	70,033	73,545	58,914	59,175	51,188	51,619	55,355	32,373
WATER	4,452	2,059	576	1,318	121	429	1,187	226	1,584	11	11
LAND	104,112	26,843	8,843	552	558	411	0	0	0	0	0
KNOWN TOTAL	178,345	89,567	73,394	71,903	74,224	59,753	60,362	51,413	53,203	55,366	32,384
PROBABLE											
AIR	14,604	11,112	15,175	16,040	7,008	7,480	7,568	4,629	4,337	1,721	1,736
WATER	5	5	1,146	124	58	163	97	82	23	52	14
LAND	8,661	7,115	5,404	17,458	17,017	8,991	3,351	17,278	6,106	4,487	8,390
PROBABLE TOTAL	23,270	18,232	21,725	33,623	24,083	16,633	11,016	21,989	10,466	6,260	10,140
POSSIBLE											
AIR	77,436	56,817	63,059	80,974	98,864	60,152	28,732	53,472	76,332	48,169	33,997
WATER	1,170	522	38	25	20	2,053	29	30	14	24	24
LAND	28,203	17,459	615	562	901	947	817	979	365	330	0
POSSIBLE TOTAL	106,809	74,798	63,713	81,561	99,785	63,152	29,577	54,481	76,711	48,523	34,021
TOTAL AIR	161,821	128,593	142,210	167,047	179,417	126,545	95,475	109,289	132,288	105,245	68,106
TOTAL WATER	5,627	2,586	1,761	1,468	199	2,645	1,313	337	1,620	86	49
TOTAL LAND	140,976	51,417	14,862	18,572	18,476	10,348	4,168	18,257	6,471	4,817	8,390
GRAND TOTAL	308,424	182,596	158,832	187,087	198,092	139,538	100,955	127,884	140,379	110,149	76,545

Source: DNREC TRI 2018 Database, October 2019



For 2018, on-site releases of all carcinogens are down 30.5%, or 33,604 pounds. Figure 15 shows a trend for each of the category releases by media and the total reported carcinogen release. The general trend has been down. In recent years, releases to air have largely influenced the total, while releases to land and water play a much smaller part.

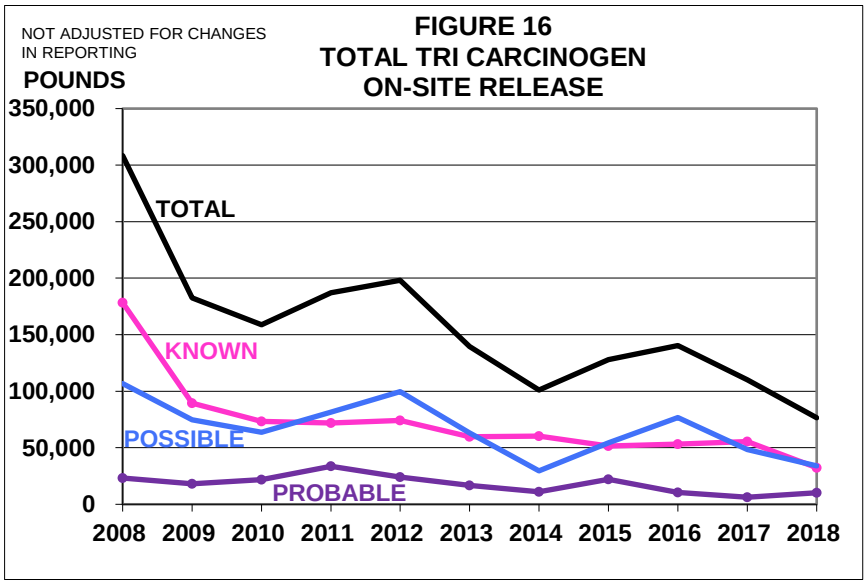
Known Carcinogens

Known Carcinogens, although only making up about one fourth of the reports, are significant because of their high toxicity classification. Known carcinogens made up 42.3% of the total on-site carcinogen releases reported for 2018. Figure 16, on the next page, shows the trend of each of the three carcinogen groups and their effect on the total on-site release. On-site releases of known carcinogens decreased since 2017, down by 41.5%. On-site releases of known carcinogens are down 550,749 pounds (94.4%) since 1998.

Almost all (100%) of the total known carcinogen amount was reported released on-site to air, 0% to land, and 0% to water for 2018. Releases to air of known carcinogens are 47.5% of

all carcinogen on-site releases to air. Reported releases to air of known carcinogens decreased by 42.3% (22,982 pounds) in 2018, and are down 84.5% from the amount reported in 1998.

Vinyl chloride, with a total release to air of 22,740 pounds and only reported by Formosa Plastics, is the highest (70.2%) of the total releases in the known carcinogen category and also the highest of all 28 carcinogens reported. Vinyl chloride contributed 70.2% of the known carcinogen category releases to air in 2018, 33.3% of all carcinogen releases to air, and 29.7% of carcinogen total on-site releases in 2018. The second highest known carcinogen in 2018 was benzene. Benzene, largely released to air, and all from the Delaware City Refinery, has declined 91.9% from 58,371 pounds released in 1995 (from the Delaware City Refinery and the now closed Metachem facility) to 4,736 pounds in 2018. Benzene made up 14.6% of the known carcinogen releases to air for 2018, down from 23% for 1995.



Ethylene oxide ranks third in total on-site releases in the known carcinogen category at 4,886 pounds, up from 2,318 pounds in 2017. Croda reported all of the ethylene oxide released for 2018, and releases of ethylene oxide were only to air.

Nickel compounds, all of which was released to air (5.9 pounds), ranks fourth in total on-site releases in the known carcinogen category. Small amounts were reported by Baltimore Aircoil and Owen Steel.

Probable Carcinogens

This category has the least number of chemicals (5), and the least released on-site (13.2%), but has some important chemicals in it: lead and lead compounds, trichloroethylene (TCE), creosote, and 1,3-butadiene. During 2018, 82.7% of the five probable carcinogens reported was released on-site to land, while 17.1% was released to air, and 0.1% was released to water.

Lead, 99.4% of which was reported by the U. S. Army's National Guard River Road Training Site Range, was the highest reported amount of on-site release of a probable carcinogen, with 7,864 pounds for 2018, up from 3,745 pounds reported in 2017. Of the amount released in 2018, 7,852 pounds were released to land, 9 pounds to air, and 3 pounds to water.

Trichloroethylene (TCE) reported by HandyTube was the second highest release of a probable carcinogen with 1,313 pounds reported as released to air. On-site releases of this chemical have not changed significantly since 2017. However, TCE releases have trended

downward from 1995-2018, declining by 95.5%, down from 29,332 pounds reported for 1995 to 1,313 pounds for 2018.

Lead compounds had the third highest reported amount of on-site release of a probable carcinogen, with 599 pounds for 2018, a decrease from 839 pounds reported in 2017. The Indian River Generating Station reported the highest release, 462 pounds to land and 10 pounds released to air, or 78.8% of total amount reported by the 5 facilities reporting lead compounds for 2018. The remaining 4 facilities had smaller amounts reported as released to air, water, or land.

The probable carcinogen on-site release total increased by 3,880 pounds (62%) for 2017-2018 and is now at 10,140 pounds, 18.9% of the 1998 amount.

Possible Carcinogens

This category has the most chemicals and number of reports, encompassing 44.4% of all on-site releases reported for carcinogens. About 99.9% of the total possible carcinogen amount is reported as released on-site to air, 0.1% to land, and 0% to water. The trend for 2018 is down by 29.9%, or 14,502 pounds from 2017; and down 84.6%, or 186,199 pounds, since 1998. The highest chemical release in this category is vinyl acetate at 15,114 pounds, all of which was reported released to air by Formosa Plastics. Vinyl acetate makes up 44.4% of all possible carcinogen on-site releases. Reported on-site releases of vinyl acetate decreased by 19,048 pounds (56%) for 2018.

Styrene is the second highest release in the possible carcinogen category for 2018, with reports totaling 13,374 pounds, all but 5 pounds to air. Justin Tanks reported 99.9% of the styrene releases for 2018, 13,362 pounds of styrene, all released to air; up 49% from 8,948 total pounds reported by Justin Tanks for 2017. The other facility reporting styrene releases was the Delaware City Refinery with 12 pounds. Total reported styrene releases for 2018 increased by 4,410 pounds.

As before, in ***Limitations of TRI Data*** on Pages 4-5, we urge caution when using this data, as **the TRI data does not indicate the amount, if any, of human exposure**.

Trend Analysis

Effect of Chemical and Facility Group Additions, 1990-2018

Although the TRI program began with reporting for 1987, the next two years were marked with a change each year in the manufacturing, processing, and otherwise use threshold amounts. For 1987, the thresholds were 75,000 pounds for manufacturing and processing, and 10,000 pounds for otherwise use. For 1988, the thresholds were 50,000/10,000 pounds, and for 1989 and beyond, the thresholds were 25,000/10,000 pounds. It is not possible to make a meaningful comparison of trends during this time, as the number of facilities and the number of reports varied because of the changing reporting criteria.

Significant groups of chemicals and facilities were added to the TRI program:

- **Chemical List Changes**

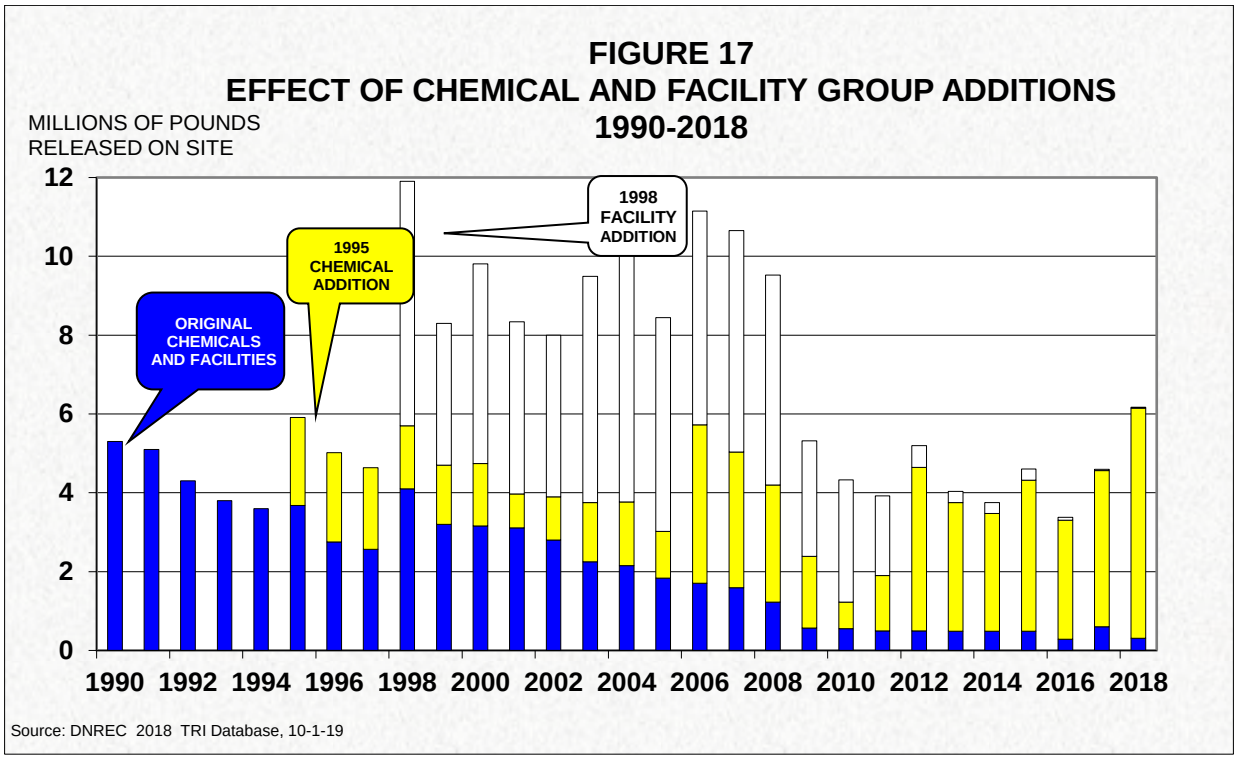
  For reporting year 1995 and beyond, the EPA significantly expanded the list of chemicals. The list increased by 282 chemicals and chemical categories, added to the original list of 238 chemicals. Of the 1995 chemicals added, the addition of nitrate compounds has resulted in the most significant increases in Delaware's release totals in recent years. Also during 1989-1995, other chemicals and categories were added or deleted, including chemical categories which are highly persistent and bioaccumulative in the environment (PBTs), bringing the total chemical count for 1995 to 581 and the chemical category count to 30. See details on the PBT chemical reports starting on page 21, and in Appendix I.

  Other additions to the chemical list have occurred over time, including recently. In the 2011 reporting year, 16 new carcinogens, four of which are in the polycyclic aromatic compounds (PAC) category, were added to the list of reportable chemicals. For 2012, Hydrogen Sulfide was added to the list of reportable chemicals. Hydrogen Sulfide reports increased on-site treatment reported amounts by 329 million pounds in 2012 and is discussed in greater detail in ***On-site Waste Management Trends*** on page 39. For the 2014 reporting year, o-nitrotoluene was added to the list of reportable TRI chemicals. For 2015, a nonylphenol category was added to the list of reportable TRI chemicals. The EPA added the chemical 1-bromopropane to the list of TRI reportable chemicals for the 2016 reporting year. The EPA added a hexabromocyclododecane chemical category for the 2017 reporting year. These additions bring the total chemical count to 595 listed chemicals and 32 chemical categories. Also, starting with the 2017 reporting year, nine existing TRI chemicals were added to the list of carcinogens. Of these chemicals, only cumene, a possible carcinogen, is reported by two Delaware facilities, the Delaware City Refinery and the Dover Air Force Base.

- **Industry Expansion - 1998**

  Beginning with the 1998 reporting year, the EPA added seven industries to the list of facilities covered under TRI. Prior to the 1998 reporting year, only manufacturers (and Federal facilities) were required to report (see Table 1 on page 3). The greatest impact to Delaware is the Electric Utilities (NAICS 221). The industry expansion significantly increased the amount of reported releases. This did not necessarily represent an increase in toxic releases in Delaware, but rather provided additional information to the public. Other smaller groups as noted above, or even individual chemicals, are also added or deleted over time.

Figure 17 shows these effects starting in 1990 and following the trend of each group since it was added to the TRI program. Data from the beginning of the TRI program in 1987-89 is excluded because reporting requirements changed significantly and a valid comparison of that data with later data is not feasible.



The trend of each group and the reports affecting the trends will be discussed in this Trend Analysis section. All groups have changed over time, with increases and decreases reflecting both changes in business conditions and improvements in analysis. Table 14 shows the amount reported in millions of pounds for each group at the time it was added, the 2018 reported amount, and the amount of change since the time it was added. If each group had remained constant at the time of its addition, amounts reported for 2018 would be 13.73 million pounds instead of the 6.17 million pounds actually reported for 2018. Due to several factors, including facility efforts to reduce pollution, increased regulation, partial or complete shutdown of facilities, and declining business conditions, the reporting facilities in Delaware have effected a reduction of 7.56 million pounds, or 55%.

TABLE 14
TREND OF ON-SITE RELEASES FOR CHEMICAL AND FACILITY ADDITIONS

GROUP	STARTING YEAR AMOUNT Millions of Pounds	2018 AMOUNT Millions of Pounds	CHANGE SINCE STARTING Millions of Pounds	PERCENT CHANGE
Original Facilities and Chemicals	5.30	0.31	-4.99	-94%
1995 Chemical Addition	2.23	5.84	3.61	162%
1998 Facility Addition	6.20	0.02	-6.18	-100%
TOTAL	13.73	6.17	-7.56	-55%

TABLE 15
2008-2018 TRI DATA SUMMARY
(IN POUNDS)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
No. of Facilities	69	63	61	63	60	62	57	59	59	55	60
No. of Form As	31	29	31	34	33	33	31	31	33	28	29
No. of Form Rs	288	227	197	209	202	195	177	189	176	163	166
No. of Chemicals	100	90	79	90	88	91	88	90	85	82	84
On-Site Releases											
Air	5,845,072	3,194,221	3,519,986	2,416,526	1,109,209	998,934	805,127	712,043	546,310	746,669	739,722
Water	2,796,686	1,590,679	600,479	1,230,737	3,777,904	2,881,902	2,931,067	3,862,398	2,812,016	3,823,135	5,416,033
Land	885,976	537,489	210,747	278,669	306,702	151,956	17,910	29,078	22,011	24,076	14,037
Unadjusted On-Site Release	9,527,735	5,322,389	4,331,212	3,925,932	5,193,815	4,032,792	3,754,104	4,603,520	3,380,338	4,593,879	6,169,792
Off-site Transfers											
POTWs	1,117,335	636,602	996,970	1,048,588	814,866	935,842	934,025	1,035,534	997,109	956,919	940,287
Recycle	7,535,371	5,367,592	5,662,694	8,027,133	9,383,706	9,009,366	7,384,097	6,805,511	7,249,685	8,876,457	9,126,594
Energy Recovery	3,695,215	2,330,189	1,857,131	2,110,293	2,556,954	1,874,068	2,005,555	1,968,891	1,612,951	1,679,546	1,210,933
Treatment	150,297	140,248	336,190	274,727	963,123	1,112,090	314,129	229,453	256,899	117,153	190,320
Disposal	3,129,281	2,785,524	4,563,328	2,307,186	2,419,683	1,571,572	2,356,053	1,612,829	561,263	373,297	187,375
Unadjusted Total Transfers	15,627,498	11,260,156	13,416,312	13,767,928	16,138,331	14,502,937	12,993,859	11,652,217	10,677,907	12,003,373	11,655,509
On-Site Waste Mgmt.											
Recycle	10,870,477	5,630,119	7,678,337	7,974,584	9,326,213	11,642,121	11,636,106	10,756,074	11,859,042	9,712,512	10,725,721
Energy Recovery	20,932,200	14,670,034	-	9,172,883	16,227,012	15,659,902	15,930,970	15,963,550	12,727,241	12,475,029	13,854,373
Treatment	42,281,742	38,179,139	32,895,795	38,585,960	376,100,649	375,430,183	470,213,664	397,416,374	361,034,681	396,084,447	471,442,723
Unadjusted Total On-Site Mgmt.	74,084,419	58,479,292	40,574,132	55,733,427	401,653,874	402,732,206	497,780,740	424,135,997	385,620,964	418,271,988	496,022,818
Total Waste	99,239,652	75,061,836	58,321,655	73,427,286	422,986,019	421,267,934	514,528,704	440,391,734	399,679,208	434,869,240	513,848,119

NOT ADJUSTED FOR CHANGES IN REPORTING REQUIREMENTS

SOURCE: DNREC 2018 DATABASE, OCTOBER 2019

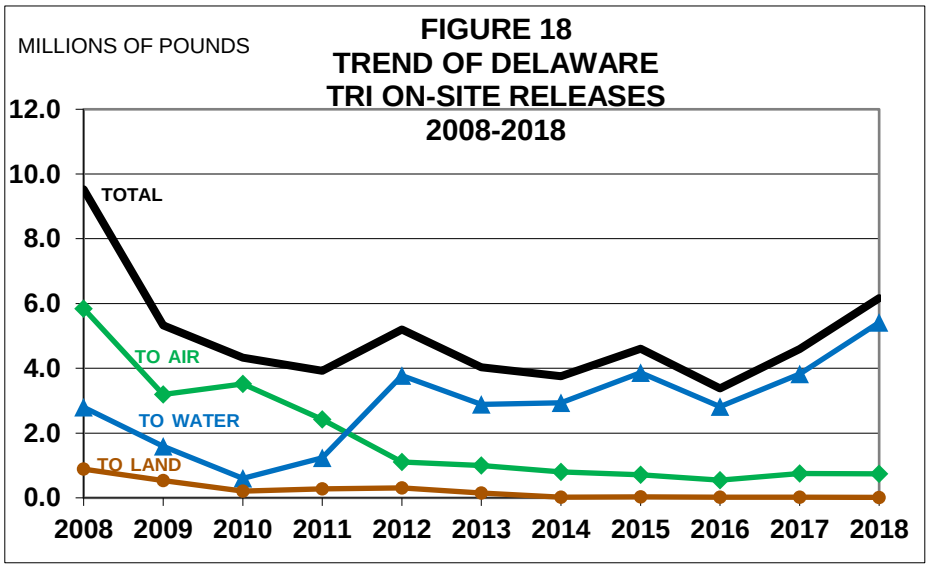
Release and Waste Management Trends, 2008-2018

Table 15 on page 33 shows amounts reported for each of the last 10 years. Earlier data is available back to 1987, the first year of the TRI program. Changes in reporting requirements over time have caused an increase both in the total number of chemicals and in the total number industries that are subject to reporting. Significant changes to the TRI reporting requirements occurred in 1995, 1998 and 2000, when large increases in chemicals (1995), industries subject to reporting (1998), and reductions in PBT thresholds (2000) occurred. The 2012 reporting year marked the addition of hydrogen sulfide to the list of reportable chemicals. Comparison of this data with earlier data must be done carefully, as some chemicals and/or industries may not have been required to report over the entire time.

The analysis presented in this section uses 2008 as a base year for presenting trends for all reportable chemicals and facilities. Sections covering on-site releases and off-site transfers are **not adjusted** for any changes in reporting requirements. However, in the on-site releases section, further analysis is presented on on-site releases, showing the impact of the Delaware City Refinery on the overall releases using 2014 as a base year. The on-site management section discusses the impact of the addition of hydrogen sulfide to the list of reportable chemicals.

On-Site Releases, 2008-2018

Figure 18 shows the on-site release trends during 2008-2018. On-site releases include emissions to the air, discharges to bodies of water and releases at the facility to land, including on-site landfills. On-site release amounts increased by 34.3% for 2018 (1,575,913 pounds) following a 35.9% increase (1,213,542 pounds) for 2017.



Significant changes in the amounts reported for 2017-2018 include the facilities and chemicals shown in Table 16 on the next page. To put the changes in perspective for 2018, there were 67 reports with a higher amount, 65 reports with a lower amount, and 63 reports with no reported change from the 2017 amount. There were 5 reports with an increase greater than 10,000 pounds and 6 reports with a decrease greater than 10,000 pounds.

TABLE 16
REPORTS OF MAJOR CHANGES IN ON-SITE RELEASES FOR 2018 FROM 2017

FACILITY	CHEMICAL	MEDIA	CHANGE IN ON-SITE RELEASES (pounds)
Delaware City Refinery	Sulfuric Acid	Air	-87,705
Perdue Georgetown	Nitrate Compounds	Water	-23,283
BASF	Methanol	Air	+28,226
Delaware City Refinery	Hydrogen Cyanide	Air	+127,963
Delaware City Refinery	Nitrate compounds	Water	+1,625,805

Some of these changes (higher or lower) may have been caused by normal year-to-year variations in production levels at the facility, or by the chemical content of raw materials. Some changes may also have been caused by improvements in the way facilities estimate amounts. These changes are the primary reasons for the reductions and increases in the totals for 2017-2018. Changes are also discussed in the ***Facilities No Longer Reporting Section*** on page 20. Facility specific information is available via the ***2018 TRI Facility Profiles,*** see ***Access to TRI Files*** under the ***Further Information Section*** on page 49. In addition, you may contact a facility for a more in-depth discussion of the reasons for specific changes, and consult the appendices in this report for the exact amounts that were reported.

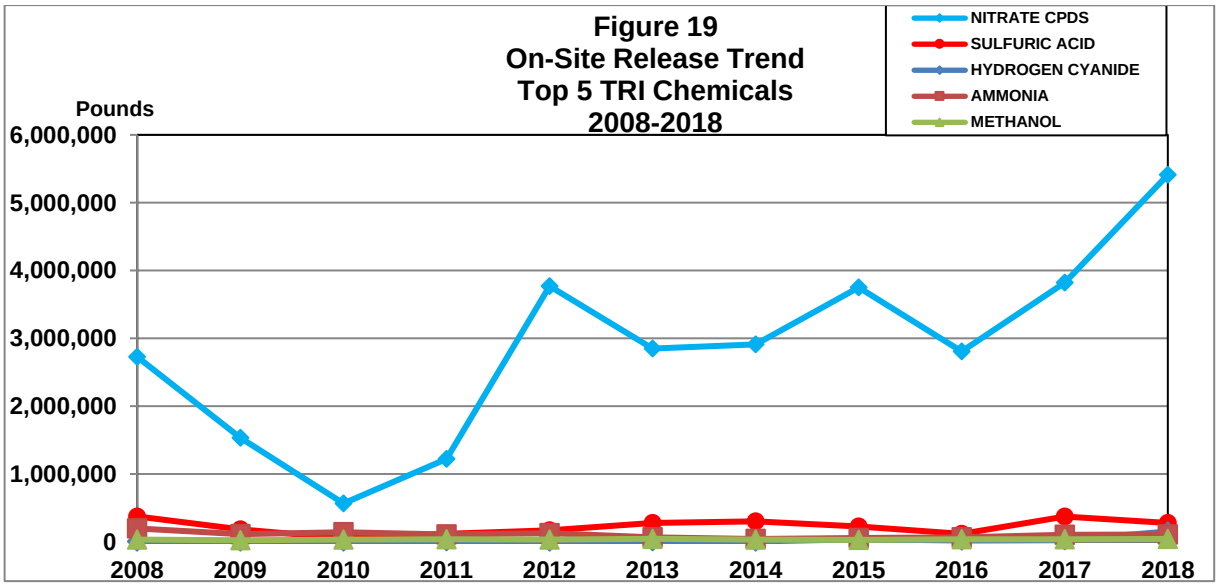
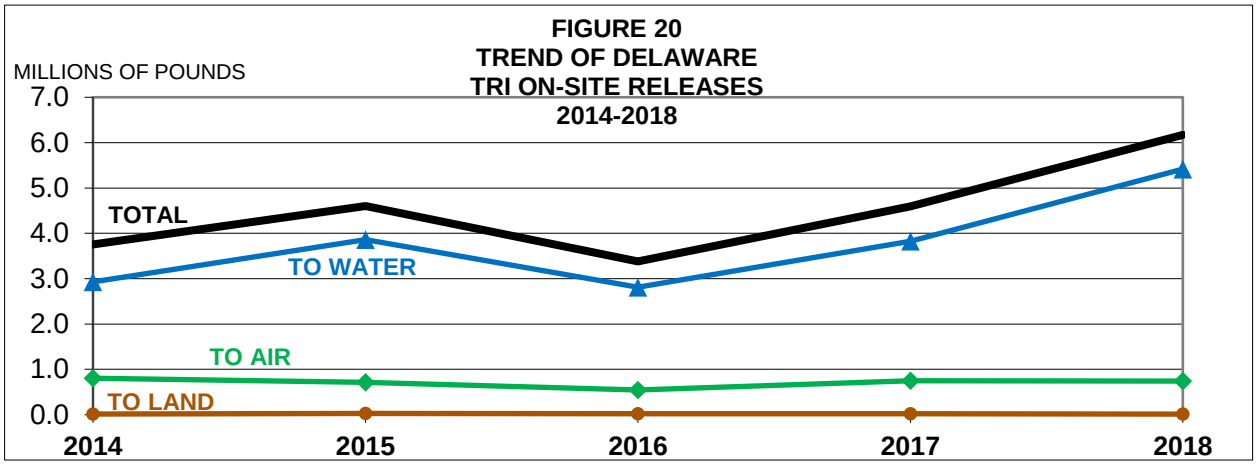
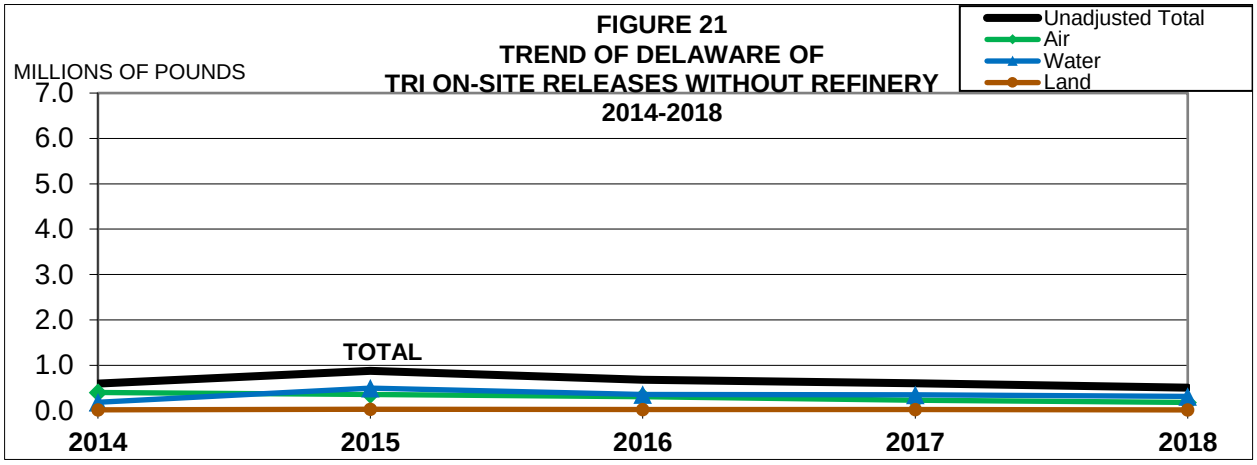


Figure 19 shows the trend since 2008 for the top five chemicals based on on-site release amounts reported for 2018 in Delaware. These five chemicals represent 97% of all on-site releases from the 84 chemicals reported in 2018. Nitrate compound releases trended downward from 2008 through 2010, when the Delaware City Refinery was in the process of shutting down and preparing to be sold. From 2010 through 2012, nitrate compound releases

trended upward with the refinery coming back online and being in full operation. Nitrate compound releases accounted for 87.7% (5.4 millions pounds) of all on-site releases in 2018. Sulfuric acid ranked second in on-site releases, accounting for 4.4% (276,438 pounds). Sulfuric acid releases trended downward from 2008 through 2010, then trended upward from 2010 to 2014 with the Delaware City Refinery coming back online, and have varied from year to year since 2014. Hydrogen cyanide ranked third in on-site releases, accounting for 2.4% of the total. The Delaware City Refinery released 100% of the hydrogen cyanide reported to air in 2018, up 85% over 2017, with past release amounts varying year to year, and with 2018 amounts being the highest. Ammonia ranked fourth in on-site releases, accounting for 1.7% (107,383 pounds). Methanol ranked fifth, and accounted for 0.6% of the total in on-site releases. BASF accounted for 71.6% of the total on-site releases for methanol, which were up 11.1% over 2017, with the total releases of methanol varying small amounts in recent years.

Figure 20 shows the on-site releases to air, water and land over the last 5 reporting years from 2014 through 2018. As the figure depicts, total releases mirror the trend of releases to water. This is due to nitrate compounds reported as released to water by the Delaware City Refinery, which accounted for 87.7% of all onsite releases in 2018. Figures 20 and 21 provide a side by side comparison showing the impact the refinery has on the overall on-site releases. Figure 21 shows all other on-site releases, with the releases of the Delaware City Refinery removed. Onsite releases reported from all other facilities have dropped by 15.4% (92,043 pounds)

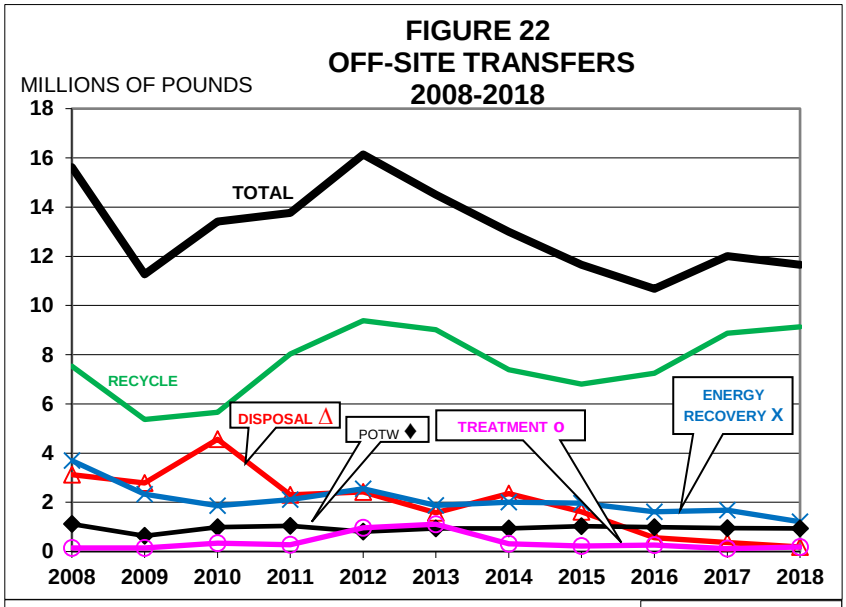


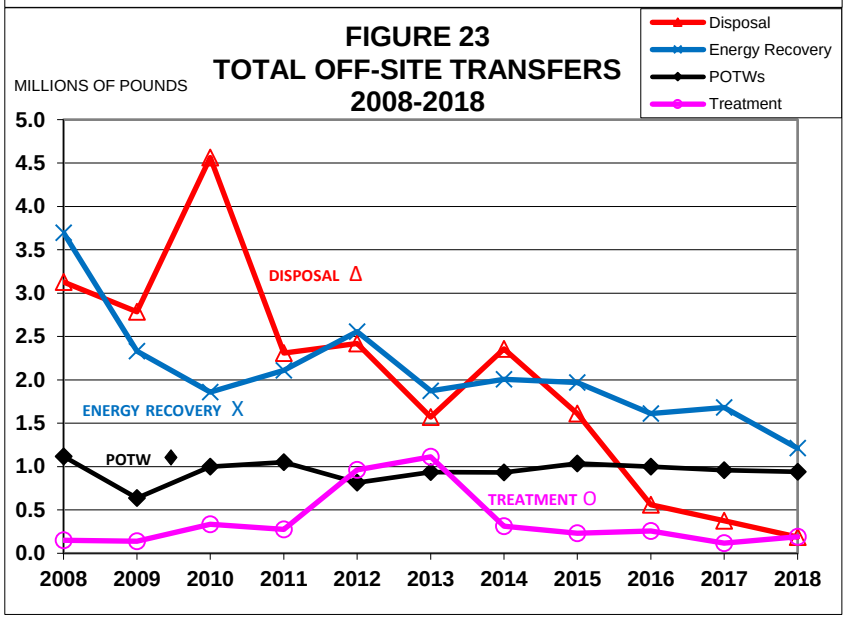


since 2014; while total on-site releases, with the refinery releases included, are up by 64.3% (2,415,688 pounds) compared to 2014. One reason for the decrease in on-site releases, excluding the Delaware City Refinery, is the economy, which effects production at the facilities. Ultimately many of their on-site releases have declined in recent years and indirectly caused part of the reduction. Another potential reason is the shifting nature of industry in Delaware.

Off-Site Transfers, 2008-2018

An off-site transfer is a transfer of toxic chemicals as wastes to another facility that is physically separate from the reporting facility and may even be out-of-state (see page 11 for more information on off-site transfers). Chemicals are reported as transferred to an off-site facility when they are transported away from the reporting facility for the purposes of treatment at a publicly-owned treatment works (POTW, typically a waste water treatment plant), recycle, disposal, energy recovery, or non-POTW treatment facility. Although the off-site transfers may be of less immediate local concern than on-site releases, the transfers to POTWs, treatment, and disposal facilities still represent toxic chemicals as wastes that must be ultimately accounted for.





As noted on page 11 and seen in Table 15 on page 33, the amounts reported as transferred off-site are about 1.9 times greater than the amounts of on-site releases. Figures 22 and 23 show the trends in amounts of TRI chemicals in wastes transferred off-site for all facilities and chemicals reporting since 2008. To increase clarity, the lower portion (0 - 8 million pounds) of Figure 22 is expanded in Figure 23. For comparison, please look at the

corresponding values in Table 15 on page 33. Off-site transfers decreased 2.9% (348,933 pounds) in 2018, driven by decreases in amounts sent off-site for energy recovery and disposal, and transfers to POTW's; and offset partially by increases in off-site transfers for treatment and recycling.

Table 17, below, shows that the largest off-site transfer increase was for lead compounds sent off-site for recycling by the Johnson Controls Distribution Center. The second largest increase reported was in off-site energy recovery of biphenyl by BASF. The largest decreases in off-site transfers was for N,N-dimethylformamide sent for recycling by Rohm & Haas B2, B3, B8; followed by Noramco's reported decrease in toluene sent off-site for energy recovery, and BASF's reported decrease in methanol sent to the POTW and off-site for recycling. Sixty-three reports showed decreases, while 53 reported increases in off-site transfers for 2018.

TABLE 17

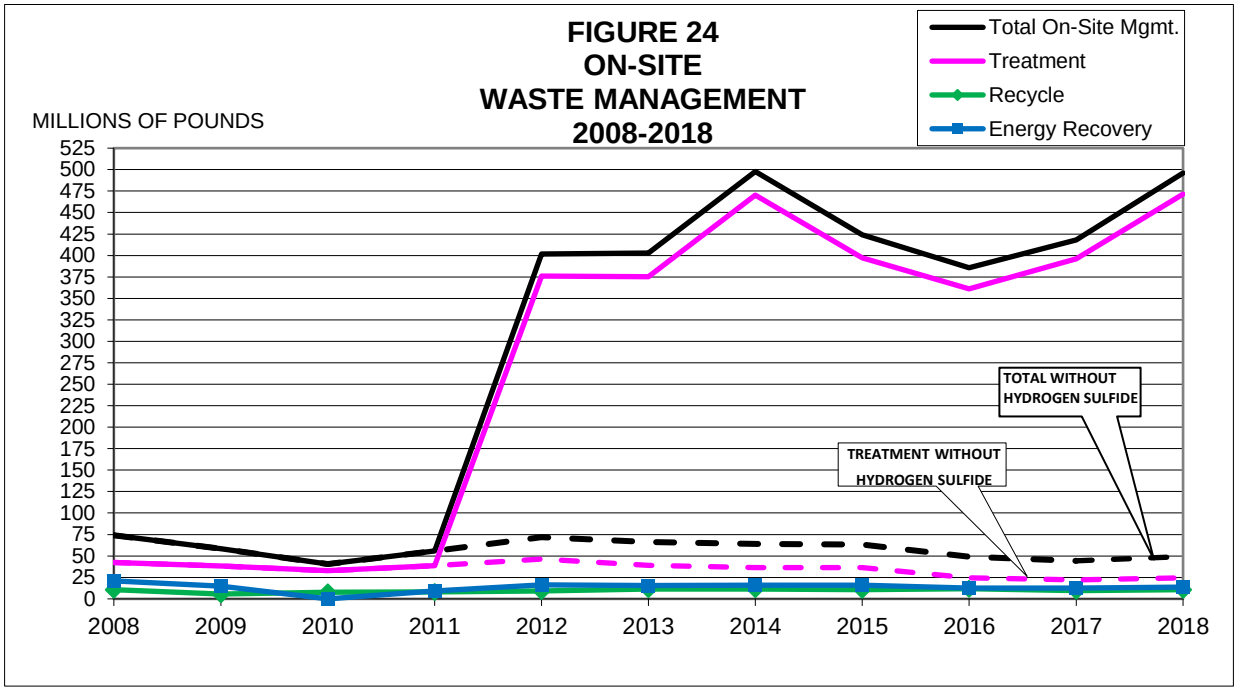
MAJOR CHANGES IN OFF-SITE TRANSFERS FOR 2018 FROM 2017

FACILITY	CHEMICAL	OFF-SITE METHOD	CHANGE (pounds)
Rohm & Haas B2 B3 B8	N,N-Dimethylformamide	Recycle	-490,050
Noramco	Toluene	Energy Recovery	-471,067
BASF	Methanol	POTW + Recycle	-420,719
Johnson Controls Plant	Lead Compounds	Recycle	-235,023
BASF	Biphenyl	Energy Recovery	+122,237
Johnson Controls Distrib.	Lead Compounds	Recycle	+1,032,333

On-Site Waste Management, 2008-2018

At some facilities, wastes are managed on-site instead of being sent off-site for processing or disposal. On-site waste management (recycling, recovery for energy, or treatment at the facility) is the processing of chemicals in wastes that do not leave the site of the reporting facility. Although these amounts represent a loss of raw materials and/or finished product to the facility as waste, they are not as much of a threat to the environment as the on-site release categories; since these amounts are treated or recycled and not disposed of or released to the on-site environment. There may be, of course, the risk that these chemicals may be accidentally released on-site to the environment during the waste management process. Also, most waste management operations are not 100% efficient, so a portion of the waste being treated in these operations could be released on-site and must be accounted for in the on-site releases reported by the facility.

Figure 24 below shows the trends for the three on-site waste management activities since 2008. Overall, on-site waste management amounts increased 18.6% (77,750,829 pounds) in 2018 compared to 2017. The on-site management of hydrogen sulfide accounted for 90% (446,744,053 pounds) of all on-site waste management activities, with the Delaware City Refinery treating the largest amount at 446,479,559 pounds. As noted on page 31, the addition of Hydrogen Sulfide to the list of reportable chemicals resulted in a 329 million pound increase in on-site treatment amounts reported for 2012.



The Delaware City Refinery is the only facility in the state that reports on-site energy recovery, which is part of its air pollution control activities. On-site energy recovery was up 11.1% (1,379,344 pounds) compared to 2017, with the refinery reporting ammonia as having the largest increase in energy recovery compared to 2017.

The largest changes reported in on-site waste management for 2018 are:

TABLE 18

MAJOR CHANGES IN ON-SITE WASTE MANAGEMENT FOR 2018 FROM 2017

FACILITY	CHEMICAL	ON-SITE WASTE MANAGEMENT METHOD	AMOUNT OF CHANGE (pounds)
Air Liquide	N-Hexane	Recycle	+875,864
Delaware City Refinery	Carbon Disulfide	Treatment	+1,008,694
Air Liquide - Medal	Methanol	Recycle	+1,055,188
Delaware City Refinery	Ammonia	Energy Recovery	+1,403,960
Delaware City Refinery	Carbonyl Sulfide	Treatment	+1,886,040
Delaware City Refinery	Hydrogen Sulfide	Treatment	+72,750,948

These changes were balanced by smaller increases and decreases from other reports. Thirty-nine reports showed an increase in a waste management amount, while 19 reports showed a decrease for 2018. Total pounds for on-site waste management, excluding the addition of hydrogen sulfide, have decreased by 24.8 million pounds, or 33.5%, over the last 10 years or since 2008. The on-site waste management amount totals are in Table 15 on page 33, and Figure 6 on page 12 shows the relative amounts.

Total Waste, 2008-2018

No trend is shown for total waste, as it would be dominated by on-site waste management, as shown in Figure 7 on page 13.

Receiving TRI Chemicals in Wastes

When a facility transfers TRI chemical waste off-site, these wastes go to a receiving facility. Table 19 shows the total amounts of TRI chemicals reported as sent to 16 Delaware facilities from both in-state and out-of-state TRI facilities for 2018. The DNREC TRI program does not receive reports from any out-of-state TRI facilities that transfer wastes into Delaware; this data was obtained from the EPA.

TABLE 19
SUMMARY OF REPORTED TRI TRANSFERS
TO DELAWARE FACILITIES
FROM OTHER TRI FACILITIES IN 2018
(IN POUNDS)

DELAWARE RECEIVING FACILITY	TOTAL TRANSFERS TO DELAWARE FROM DELAWARE TRI FACILITIES	TOTAL TRANSFERS TO DELAWARE FROM OUT-OF-STATE TRI FACILITIES	TOTAL TRANSFERS RECEIVED BY DELAWARE FACILITIES
BEAR DE POTW	18		18
BRIDGEVILLE WASTEWATER TREATMENT PLANT	80,372		80,372
CLEAN EARTH OF NEW CASTLE	535	687	1,222
DELAWARE RECYCLABLE PRODUCTS INC.	0.0002		0.0002
DIAMOND STATE RECYCLING CORP	49,011		49,011
DSWA CENTRAL SOLID WASTE MANAGEMENT CENTER	3,867		3,867
DSWA CHERRY ISLAND LANDFILL	794		794
DSWA JONES CROSSROADS LANDFILL	86		86
INNOSPEC FUEL SPECIALTIES		139	
KENT COUNTY REGIONAL WWTF	27,560		27,560
MB RECYCLING		1,372	
MIDDLETOWN-TOWNSEND-ODESSA TREATMENT PLANT	6		6
R & M RECYCLING LLC	43		43
SEAFORD WASTEWATER TREATMENT FACILITY	1,700		1,700
SELBYVILLE WASTEWATER TREATMENT FACILITY	6,094		6,094
WASTE MANAGEMENT OF DELAWARE	5		5
WILMINGTON WASTEWATER TREATMENT PLANT	824,537		824,537
TOTAL TRI TRANSFERS REPORTED	**994,628**	**2,198**	**995,315**

Source: U.S. EPA 2018 Data October, 2019

The top receiving facility is the Wilmington Wastewater Treatment Plant, receiving TRI chemicals in wastewater from regional customers. The Bridgeville Wastewater Treatment Plant received the second largest amount, from one Delaware customer. Diamond State Recycling received the third highest amount, for recycling, from three facilities in Delaware. Kent County Regional Waste Water Treatment Facility received the fourth highest amount, from five facilities. The fifth largest amount transferred to a Delaware facility was to the Selbyville Wastewater Treatment Facility, receiving TRI chemicals from one Delaware facility. These five receiving facilities accounted for over 99% of all TRI chemicals received in Delaware from all in-state and out-of-state TRI facilities. The size of these transfers to Delaware is only 8.5% of the total transfers shown in Table 15 on page 33, so more TRI waste goes out of the State than comes in.

Pollution Prevention/Reduction Programs in Delaware

Data for TRI reportable chemicals and other chemicals is becoming increasingly more available to the public. This data availability has focused public attention and awareness on the existence and quantity of these chemicals and on their management and possible reduction. Although EPCRA does not require a facility to reduce releases of chemicals reportable under its programs, many companies and facilities are aware of the public availability of the data in this and other EPCRA reports and have implemented programs to reduce or eliminate releases of these chemicals. These programs may take the form of efficiency improvements, reuse, recycle, energy and material recovery, or material substitutions. The benefits of these programs are reduced raw material and waste disposal costs and reduced risks associated with the toxic chemicals. Also, these reductions demonstrate corporate responsibility to the facility's neighbors and improve the corporate image with the public.

There are numerous programs within DNREC that impact the management of TRI chemicals through the issuance of permits or through other regulatory and non-regulatory activities. Most releases reported under TRI are also regulated through air emission, water discharge, and/or land disposal permits. Potential sources of toxics undergo technical reviews through which potential threats to the environment and to human health are reviewed and identified prior to issuance of a permit. For example, the Engineering and Compliance Branch in the Division of Air Quality enforces a provision in the Clean Air Act Amendments of 1990 that targets the control of hazardous air pollutants (HAPs). Nearly all HAPs are also reportable TRI chemicals. In addition, the Engineering and Compliance staff monitors TRI data to assess whether a facility complies with its air permits for TRI chemicals. Another example is the work performed by the Accidental Release Prevention (ARP) program. The ARP staff uses the TRI data to detect deficiencies at a facility that might result in an increased risk of an accidental release.

DNREC's Division of Air Quality has monitored ambient air quality at locations around the State. For more information, please refer to the Delaware Air Quality Report paragraph in the ***For Further Information*** section on page 49 of this report.

In 2006, Delaware promulgated 7 DE Admin Code 1146, Electric Generating Unit (EGU) Multi-Pollutant Regulation, to establish sulfur dioxide (SO_2), nitrogen oxides (NOx), and mercury (Hg) air emissions limitations for coal-fired and residual oil-fired EGUs located in Delaware. Within 7 DE Admin Code 1146 two phases of emissions limitations were established, with the first phase that became effective in 2009, and a more restrictive second phase of emissions limitations that became effective in January of 2013. Significant reductions in NOx, SO_2 and Hg emissions have been achieved by the Delaware EGUs subject to Delaware 7 DE Admin Code 1146, and full compliance with the regulation's more restrictive second phase emissions limitations for 2013 and related consent decrees have been achieved.

The reduction in NOx, SO_2, and mercury emissions is:

1. Reducing the impact of those emissions on public health;
2. Aiding in Delaware's attainment of the State and National Ambient Air Quality Standard (NAAQS) for ground level ozone and fine particulate matter;
3. Helping to address local scale fine particulate and mercury problems attributable to coal and residual oil-fired electric generating units;
4. Improving visibility and helping to satisfy Delaware's EGU-related haze obligations.

In order to promote pollution prevention (P2), the EPA has increased the prominence and accessibility of the P2 information reported in sections 8.10 and 8.11 of TRI Form R. Some companies reporting P2 information are now highlighted in the EPA's annual report: https://www.epa.gov/trinationalanalysis, and all P2 entries reported nationally are featured in the TRI P2 search tool: https://www3.epa.gov/enviro/facts/tri/p2.html. P2 data is also accessible at the corporate level through this tool. To learn more about this, visit: https://www.epa.gov/toxics-release-inventory-tri-program/pollution-prevention-p2-and-tri.

One Delaware facility that reported a waste reduction success in their TRI report for 2018 is Prince Minerals. Prince Minerals in New Castle is a supplier of colorants and additives to the brick industry, as well as complementary products to serve the foundry, glass, and refractory markets. They reported that waste material containing metal compounds, which was disposed of at a landfill in 2016, was beneficially reused at a Brownfields site in both 2017 and 2018. In 2018, 751 tons of this material, containing 94,428 pounds of manganese was reused at a Brownfields site.

National Perspective

The national 2018 TRI data was recently released by the EPA. Placing the 2018 Delaware reports alongside the 2018 EPA data yields some rankings that provide a perspective for Delaware in the national TRI picture. Changes in the 2018 final national values because of report additions or revisions may change these rankings.

TABLE 20
RANKING OF ON-SITE RELEASES FOR SELECT STATES

State	Rank, Based on Pounds	Total On-Site Release (Pounds)	Rank, Based on Release Per Person	Rank, Based on Pounds Release Per Square Mile
Alaska	1	971,512,000	1	9
Nevada	2	335,481,000	2	2
Utah	3	288,727,000	3	1
Texas	4	191,621,000	25	21
Delaware	42	6,170,000	26	4

On-site release totals are to the nearest 1000 pounds.

This data shows that Delaware ranks 42nd in the nation in total on-site releases by state for all TRI chemicals. This is 0.18% of the total on-site release amounts nationwide. Rankings can also be based on other criteria. Because Delaware has a small population (#45) and area (#49), releases are spread over fewer people and a smaller area, increasing the ranking on a per-person or per-square mile basis. Although Alaska reports, by far, had the highest amount of on-site releases, this state only received 217 reports from 28 facilities, not many more than Delaware's 195 reports from 60 facilities. Alaska reports are largely from mining operations, with over 893 million pounds (92% of the state total) reported released on-site for just two chemicals; lead compounds and zinc compounds.

Figure 25 shows the amounts of TRI on-site releases reported by four nearby states for 2014 through 2018. Of these five states, Pennsylvania reported the highest amount in on-site releases for 2018 at 34.8 million pounds, and Virginia reported the second highest at 28.3 million pounds. On-site releases for the region have generally trended downward over the 5 year span, although Delaware's numbers have increased slightly. Overall on-site releases for the 5 states are down 22.4% (23.1 million pounds) compared to 2014.

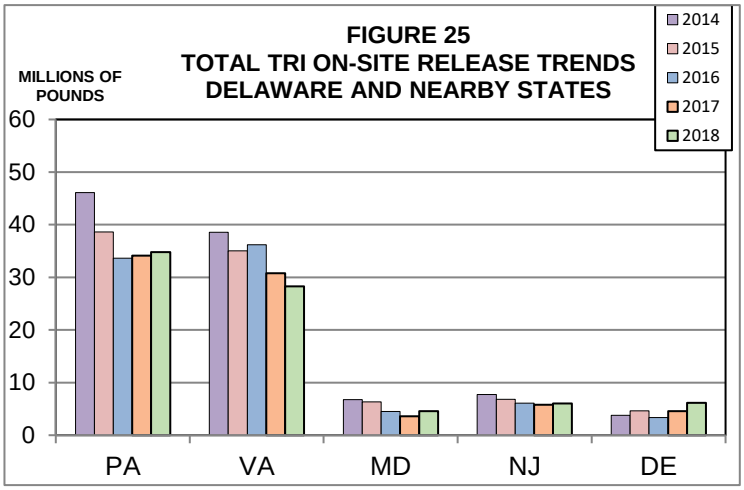


Table 21 compares releases from individual facilities nationally with releases from Delaware facilities. Nationally, 59 facilities had more **total on-site releases** than all the facilities in Delaware combined.

TABLE 21

SELECT FACILITY TOTAL ON-SITE RELEASES COMPARED TO DELAWARE

Facility, State	Rank	Total On-Site Release (Pounds) to the nearest thousand
Red Dog Operations, Alaska	1	885,683,000
Kennecott Copper Mine Smelter, Utah	2	229,203,000
Newmont Twin Creeks Mine, Nevada	3	99,775,000
All Facilities Combined, Delaware	Lower than #59	6,170,000

Seventy four facilities each reported over 5 million pounds released on-site for 2018.

Nationwide, 80 facilities each released more **dioxins on-site**, based on Toxicity Equivalent Weight (TEQ), than all the facilities in Delaware combined. The TEQ differentiates between the highly toxic and the less toxic dioxins and dioxin-like compounds in this group. See pages 23-24 of this report for a further explanation of TEQ. Table 22 shows the top three facilities in the nation compared to the Delaware total on-site release of dioxins.

TABLE 22

COMPARISON OF DIOXIN TOTALS FOR TOP 3 FACILITIES TO DELAWARE TOTAL

Facility, State	Rank	Toxicity Equivalent Weight (TEQ) On-Site Dioxin Release (Grams)
US Magnesium, LLC, Utah	1	84.46
US Ecology Texas, Inc., Texas	2	12.80
Real Alloy Recycling, KY	3	12.46
All Facilities Combined, Delaware	Lower than #80	0.13

For 2018, 27 facilities reported more than one gram of TEQ on-site dioxin release.

Nationwide, 241 facilities each released more **mercury and mercury compounds on-site** than all the facilities in Delaware combined. Table 23 shows the top three facilities in the nation compared to the Delaware total on-site release of mercury.

TABLE 23

COMPARISON OF MERCURY TOTALS FOR TOP 3 FACILITIES TO DELAWARE TOTAL

Facility, State	**Rank**	**Total On-Site Mercury Release (Pounds)**
Barrick Cortez, Inc., Nevada	1	592,201
Newmont Mining Corp. Twin Creeks, Nevada	2	561,762
Red Dog Operations, Alaska	3	441,260
All Facilities Combined, Delaware	Lower than #241	145

Delaware ranks 17th among the states based on **total waste** reported to TRI. Table 24 compares **total waste** from individual facilities nationally with releases from Delaware facilities. Nationwide, 6 facilities each reported more **total waste** in their TRI reports than all of the facilities in Delaware combined.

TABLE 24

COMPARISON OF TOTAL WASTE FOR TOP 3 FACILITIES TO DELAWARE TOTAL

Facility, State	**Rank**	**Total Waste (Pounds)**
AdvanSix Resins & Chemicals, Pennsylvania	1	3,737,519,237
Sabic Innovative Plastics, Alabama	2	2,048,079,395
Sabic Innovative Plastics, Indiana	3	1,642,748,464
All Facilities Combined, Delaware	Lower than #5	513,848,087

Some facilities in Delaware do rank near the top of the national rankings for specific categories. Relevant national rankings for facilities in Delaware for on-site releases and total waste reported are presented in the ***TRI Facility Profiles*** (see ***Access to TRI Files*** under the ***Further Information Section*** on page 49).

Nearby Facilities in Adjacent States

Some facilities, although not located in Delaware, may be important to the environment in Delaware. These facilities are located near our border and may release TRI chemicals, particularly to the air or water, which may migrate into Delaware. Table 25 on the next page is a listing of some nearby facilities with significant TRI release amounts. This data is from EPA's preliminary 2018 TRI data set, which was gathered in October 2019.

TABLE 25

2018 On-Site Releases From Nearby Facilities in Adjacent States

Facility (and ID number for map on next page)	State	Chemical	Media	Amount (Pounds)
Chemours Chambers Works, Deepwater 1 ★	New Jersey	Nitrate compounds	Water	514,312
National Refrigerants, Rosenhayn 2 ★	New Jersey	Chloro-difluoromethane	Air	92,346**
Paulsboro Refining, Paulsboro 3 ★	New Jersey	Hydrogen cyanide	Air	225,260**
Paulsboro Refining, Paulsboro	New Jersey	Nitrate compounds	Water	793,189
Paulsboro Refining, Paulsboro	New Jersey	Sulfuric acid	Air	83,714
AdvanSix Resins & Chemicals, Philadelphia 4 ★	Pennsylvania	Cumene	Air	61,609**
AdvanSix Resins & Chemicals, Philadelphia	Pennsylvania	Phenol	Air	64,908**
PES Refinery, Philadelphia 5 ★	Pennsylvania	Benzene	Air	61,681**
PES Refinery, Philadelphia	Pennsylvania	Hydrogen cyanide	Air	52,547
PES Refinery, Philadelphia	Pennsylvania	Sulfuric acid	Air	150,959
Arkema, Bristol 6 ★	Pennsylvania	Methyl Methacrylate	Air	32,750**
LSC Communications, Lancaster 7 ★	Pennsylvania	Toluene	Air	200,784**
Braskem America, Marcus Hook 8 ★	Pennsylvania	Propylene	Air	72,973**
Kimberly Clark, Chester 9 ★	Pennsylvania	Hydrochloric acid	Air	44,809**
Kimberly Clark, Chester	Pennsylvania	Sulfuric acid	Air	33,008
Monroe Energy, Trainer 10 ★	Pennsylvania	N-Hexane	Air	52,017**
Monroe Energy, Trainer	Pennsylvania	Xylene	Air	57,381**
Monroe Energy, Trainer	Pennsylvania	1,2,4-Trimethylbenzene	Air	55,003**
Grace Davison Curtis Bay Works, Baltimore 11 ★	Maryland	Ammonia Ammonia	Air Water	483,682** 27,242
Brandon Shores & Wagner, Baltimore 12 ★	Maryland	Ammonia	Air	79,197
Brandon Shores & Wagner, Baltimore	Maryland	Sulfuric Acid	Air	77,508
Salisbury Feed & Grain 13 ★	Maryland	N-Hexane	Air	271,471**
Alcore, Edgewood 14 ★	Maryland	Dichloromethane	Air	74,500***
Alcore, Edgewood	Maryland	Methanol	Air	35,740
Perdue Farms, Accomac 15 ★	Virginia	Hydrogen sulfide	Air	41,720**
Perdue Farms, Accomac	Virginia	Nitrate compounds	Water	546,110

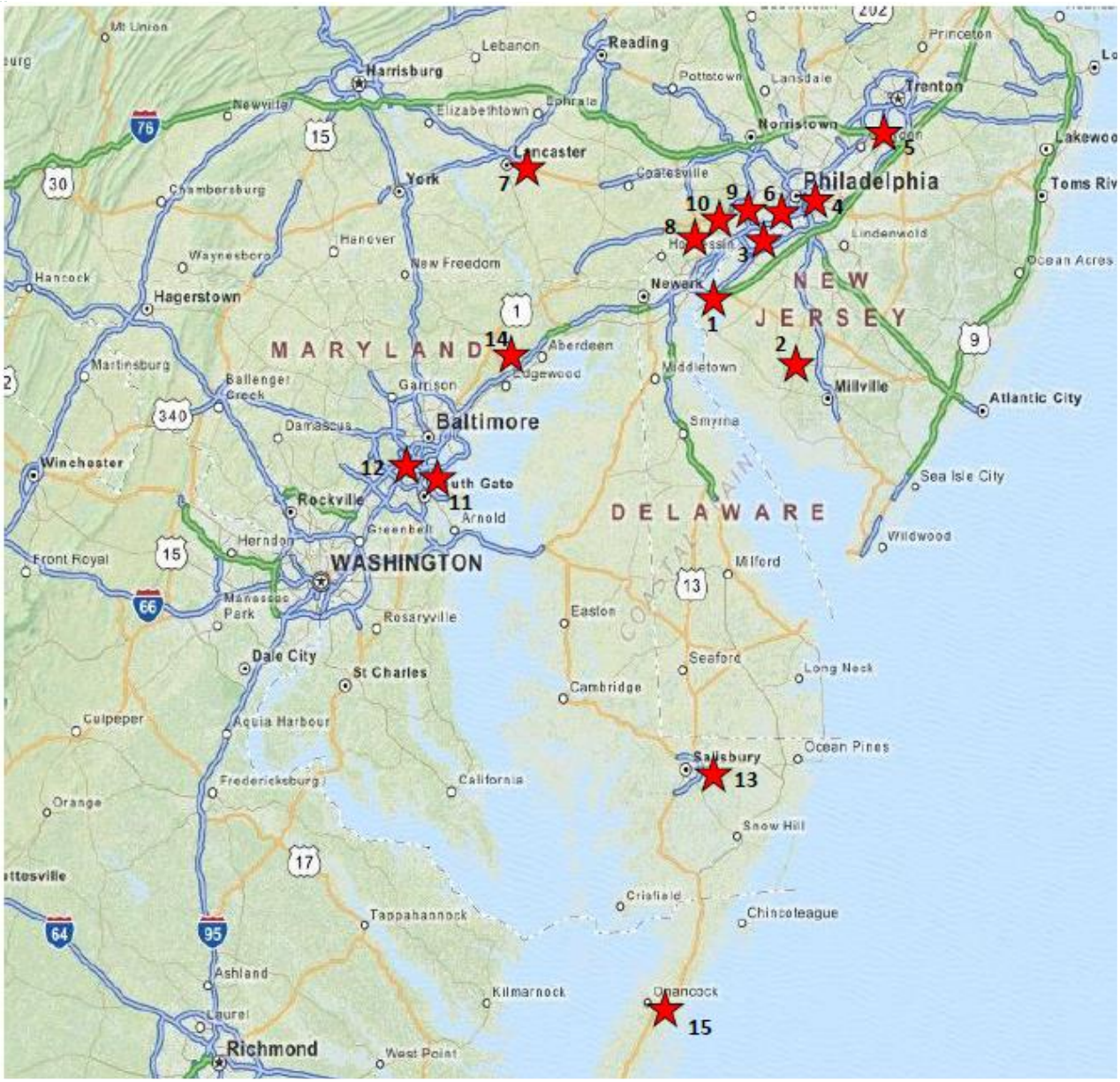
** Exceeds the Delaware State total for this chemical

*** Chemical not reported for 2018 in Delaware

As noted on pages 4-5, these amounts do not indicate the amount of human exposure. However, they do provide a comparison between releases in Delaware and some TRI chemicals released by nearby facilities in neighboring states.

Figure 26 shows the nearby facilities and their proximity to Delaware. Each star represents a facility location in the table above that reported an on-site release for a TRI chemical.

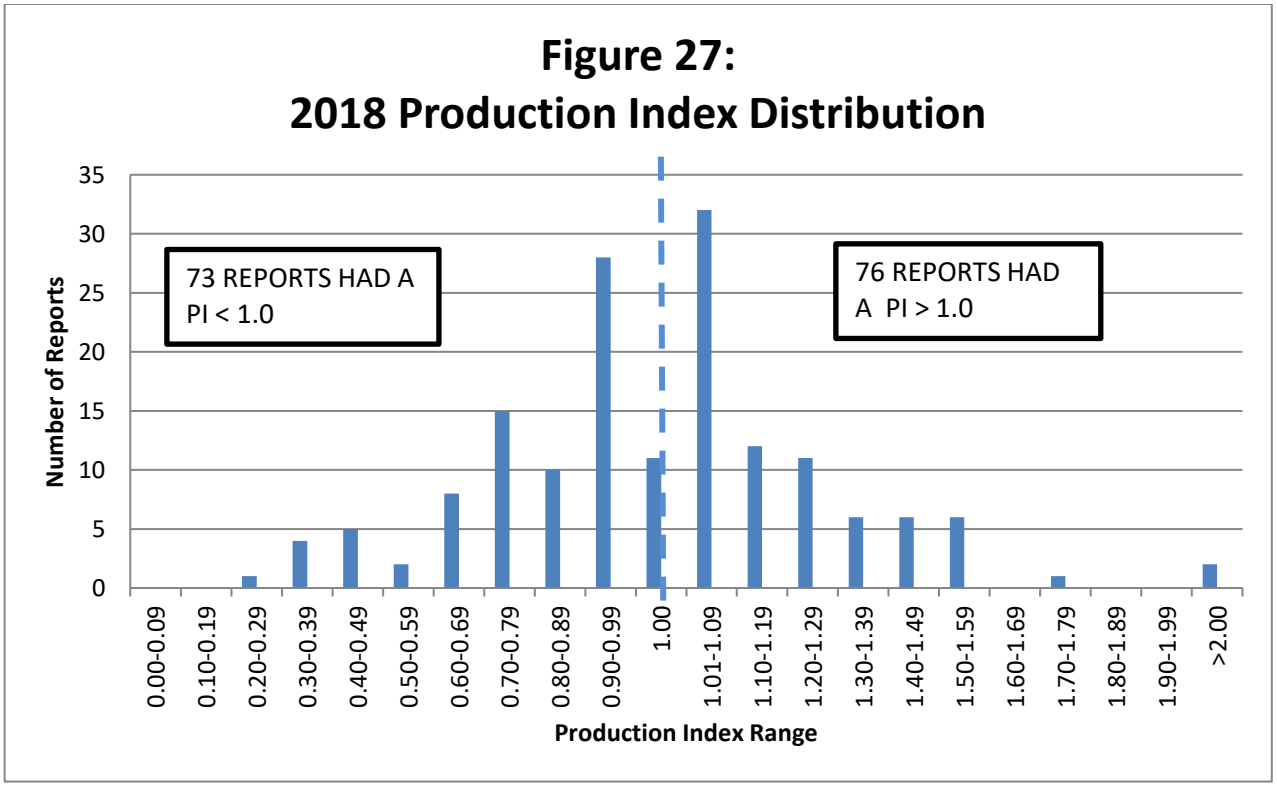
Figure 26
Facilities in Nearby States



TRI and the Economy

Facilities report a Production Index (PI) for each chemical. Along with TRI release and waste management data, this provides one way to estimate the impact of the economy, because the PI is the amount of production or activity directly associated with the demand for the chemical being reported. Some facilities, such as the power plants, can report the same PI for almost all of their chemicals, as they are directly related to the production of power. Other facilities, such as the ones in chemical manufacturing, report different PIs for different chemicals, as they are related more to the manufacture, process, or otherwise use of a specific chemical or line of chemicals. For some facilities, the determination of a PI is not precise, and therefore the PI may not be an exact indicator of production or chemical activity.

PI is reported as a number, representing the ratio of how production increased or decreased compared to the previous year. For example, a facility reporting an increase of 10% would report the PI as 1.10, while a facility reporting a decrease of 10%, would report the production as 90% of the previous year or a PI of 0.90. A facility having the same production level as the previous year would report the PI as 1.0. Figure 27 below, shows the distribution range of PIs reported. For 2018, of the 160 reports with PIs, 76 reported increases in production and 73 reported decreases. The remaining 11 reports had a 2018 production level equal to the previous year. The average PI reported was 1.047 or a 3% decrease compared to 2017's production level. Form A TRI reports do not provide PI information, so only Form R reports are included here.



FOR FURTHER INFORMATION

Access to the TRI Files - DNREC is responsible for collecting, processing, and distributing information submitted by Delaware facilities under the TRI program. This 2018 TRI report may be viewed at: https://dnrec.alpha.delaware.gov/waste-hazardous/emergency-response/community-right-to-know/tri/. TRI Facility Profiles for each reporting facility in Delaware, and a searchable database for TRI are also available at the same location. Information on TRI and other EPCRA programs is located at: https://dnrec.alpha.delaware.gov/waste-hazardous/emergency-response/community-right-to-know/.

TRI data is also available on the State of Delaware's open data portal at this link: https://data.delaware.gov/Energy-and-Environment/Toxics-Release-Inventory/9bws-2xkb/data

Information in the TRI searchable data base and open data portal are updated at least once a year to reflect revised or withdrawn TRI reports from prior years. These data bases may also reflect revisions to 2018 TRI reports which were are not included in this report because they were received after October 1, 2019.

The information submitted by facilities is available for review through the Freedom of Information Act (FIOA) process from DNREC's EPCRA Reporting Program located at 155 Commerce Way-Suite B, in Dover. Custom reports can also be generated from the database. For information on placing a request, call the TRI Coordinator at (302) 739-9405 during business hours. An on-line FOIA application is also available at: http://www.dnrec.delaware.gov/Info/Pages/FOIA.aspx

Chemical Data Fact Sheets - A two-page fact sheet is available for most TRI chemicals reported in Delaware and contains information on chemical characteristics, health hazards, and ecological effects. The two-page fact sheets (ToxFAQ's) are available upon request from DNREC's TRI program or available through the Agency for Toxic Substances and Disease Registry (ATSDR) at: http://www.atsdr.cdc.gov/toxfaqs/index.asp or from the New Jersey Department of Health at: http://web.doh.state.nj.us/rtkhsfs/indexFs.aspx

EPA's TRI Home Page - The TRI home page provides information on the many facets of the TRI program at the EPA, including a mapping tool, Q&A's, a link now to the 2017 national TRI data and early in 2019 year to the complete 2017 national analysis, a current list of reportable chemicals, state and federal program contacts, and various guidance documents available for downloading. This website has many links to other EPA and non-EPA sites associated with TRI: www.epa.gov/tri/.

TRI Reporting Forms – Reporting instructions, reporting guidance, and examples of the traditional paper reporting forms are at: https://ofmpub.epa.gov/apex/guideme_ext/f?p=104:1

Toxics Release Inventory National Analysis - The EPA's annual TRI report. It covers national information and provides a good perspective on how Delaware compares to other states: https://www.epa.gov/trinationalanalysis. The 2017 edition of this report will be available in January of 2019. It can also be obtained by calling the Federal EPCRA Information Hotline at 1-800-424-9346. Other searchable database programs such as Envirofacts, TRI.net, and TRI-CHIP are EPA-developed programs that provide public access to multiple environmental databases, including TRI. Links are available at

http://www2.epa.gov/toxics-release-inventory-tri-program/tri-data-and-tools for data about hazardous waste, water permits, drinking water, Superfund sites, air, water, toxics, and more.

Chemical Reporting Rule – The EPA has issued the final Chemical Data Reporting (CDR) Rule. The purpose of this program is to collect information from manufacturers and importers of chemical substances and to make that information available for use by EPA. The rule was enhanced for 2012 reporting. More information can be found at: http://www.epa.gov/oppt/cdr/index.html

Delaware Division of Public Health Cancer Rates and Causes - This site provides data and answers to many cancer-related questions: http://www.dhss.delaware.gov/dhss/dph/dpc/cancer.html

Right-to-Know Network (RTK NET) - Searchable nationwide TRI data is available through RTK NET. RTK NET was established by two non-profit organizations to provide access to TRI and chemical data, link TRI with other environmental data, and exchange information among public interest groups: www.rtknet.org

The Office of Pollution Prevention & Toxics - (OPPT) is a part of the EPA that:

- Promotes pollution prevention as the guiding principle for controlling industrial pollution;
- Promotes safer chemicals through a combination of regulatory and voluntary efforts;
- Promotes risk reduction so as to minimize exposure to existing substances such as lead, asbestos, dioxin, and polychlorinated biphenyls; and,
- Promotes public understanding of risks by providing understandable, accessible and complete information on chemical risks to the broadest audience possible.

International "TRI". The United States Toxics Release Inventory (TRI), the oldest and most comprehensive Pollutant Release and Transfer Register (PRTR) system in the world, is one of several similar programs established, or being established, by countries around the world. Industrial facilities in these countries are required to report their emissions and other waste management of toxic chemicals to databases in their respective countries. These databases are designed to track the quantities of chemicals that are released to the air, land or water, or transferred to another site for recycle, treatment or disposal. The term used internationally for these TRI-like systems is Pollutant Release and Transfer Register (PRTR). The EPA has a web site for PRTR, and it is http://www2.epa.gov/toxics-release-inventory-tri-program/tri-around-world. There are now over 50 countries participating in PRTR programs, and links to several international environmental agencies and programs, with more being developed each year.

Delaware Air Quality Report - The annual air quality report is prepared by the Analytical Support Group in the Air Quality Management Section of DNREC. This report presents data gathered from a statewide network of air monitoring stations, and includes analyses, trends, and other information regarding Delaware's ambient air quality. For more information, please call (302) 323-4542. This report is available on-line at:

https://dnrec.alpha.delaware.gov/air/quality/monitoring/

Delaware's Department of Natural Resources and Environmental Control has a variety of environmental information, including this report and other publications and reports, which are available at: http://www.dnrec.delaware.gov/info/pages/ELibrary.aspx. Environmental

Databases are available at: https://dnrec.alpha.delaware.gov/online-applications/. Notifications of releases in Delaware can be found at: Delaware Environmental Release Notification System (DERNS).

Other Delaware EPCRA Information - In addition to TRI, there are other provisions of the Emergency Planning and Community Right to Know Act (EPCRA), which provide information to the public as well as to local emergency planning and response organizations. Delaware has its own EPCRA statute, which established these provisions under State law. For additional information, visit: https://dnrec.alpha.delaware.gov/waste-hazardous/emergency-response/community-right-to-know/data-information/.

Questions or comments regarding the TRI program are welcome. Please direct questions, comments, or requests to:

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APPENDICES

2018

APPENDIX A

WHAT IS COMMUNITY RIGHT-TO-KNOW?

EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT

A dramatic and fatal accident involving the release of a large quantity of methyl isocyanate gas occurred in Bhopal, India on December 3, 1984. As a result of this release and similar, although less tragic, accidents that occurred in the United States, Congress enacted the Emergency Planning and Community Right to Know Act (EPCRA), as Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986. EPCRA requires certain facilities to report information about hazardous chemicals and substances at their facilities to Federal, state, and local authorities. The objective is to improve the ability of the facility and of local emergency response agencies to plan for and respond to chemical emergencies, and to give citizens information about chemicals present in their communities. Presidents have also issued Executive Orders to Federal agencies, which mandate their compliance with certain EPCRA requirements. In 1991, Delaware established its own EPCRA legislation that enhanced the Federal requirements.

EMERGENCY PLANNING

Each state was required to establish a State Emergency Response Commission (SERC) to oversee planning efforts. The SERC must appoint Local Emergency Planning Committees (LEPC), which in turn develop emergency response plans for their respective districts. In Delaware, the SERC is chaired by the Secretary of the Department of Public Safety. Emergency planning districts have been established in each county and for the City of Wilmington. Facilities having specifically identified Extremely Hazardous Substances above established threshold quantities are required to notify their LEPC. These facilities are the primary focus of planning activities.

EMERGENCY RELEASE NOTIFICATION

In the event of an accidental chemical release above an established amount, a facility is required to provide immediate notification of the release. A follow up written report is also required to provide details about the sequence of events, the actual response actions, and to identify any known or anticipated health risks associated with the release. The public may receive notification through the Environmental Release Notification System.

In response to Senate Bill 33, which became law in July 2001, the Department of Natural Resources and Environmental Control (DNREC) developed a system to allow Delawareans to learn promptly of releases or discharges of contaminants or pollutants that meet or exceed certain thresholds in their neighborhoods or throughout the state. When you register, you choose to be notified in one of three ways: By phone, by e-mail or by fax. You also can choose to be notified about releases from specific facilities or about all releases that occur in one or more zip codes throughout the state. Interested individuals may register for notification at: http://apps.dnrec.state.de.us/derns/pub/.

HAZARDOUS CHEMICAL REPORTING

Under U.S. Occupational Safety and Health Administration (OSHA) regulations, facilities are required to maintain a Safety Data Sheet (SDS) for each chemical on site. Under EPCRA, facilities are required to submit a list of their SDSs for hazardous chemicals on site above specific threshold amounts. This list must be updated as new chemicals are brought on site. In addition, facilities having such chemicals are required to file Hazardous Chemical Inventory Reports annually. These reports, also known as Tier II forms, can be filed on-line using Tier II

Manager™ and data is available immediately for use by the EPCRA Reporting Program and emergency planning and response agencies. The data provides information on the identity, hazards, amounts, and locations of reportable chemicals at the facility, as well as emergency contacts, and a site plan.

Fees are also collected based on the number and type of chemicals reported. The fees are primarily used to support operations of the LEPCs.

TOXICS RELEASE INVENTORY (TRI) REPORTING

Facilities covered under TRI are required to file annual reports contain on-site releases, off-site transfers, and on-site waste management activities related to their use of certain toxic chemicals. These reports can be filed electronically at the same time to EPA and DNREC using EPA's TRI-ME (TRI Made Easy) program. This data is compiled and made available to the public through this report and other means. For more information regarding TRI, please refer to the **Introduction** and **What is the Toxics Release Inventory?** sections contained in this report

RISK MANAGEMENT PLANS

Additional information regarding hazardous chemicals is available to the public due to the requirements contained in Title I, Section 112(r) of the Federal Clean Air Act Amendments of 1990. Section 112(r) requires that facilities handling substances with catastrophic potential submit a Risk Management Plan (RMP) that contains an executive summary, registration, off-site consequence analysis (OCA), five-year accident history, and a summary of their prevention and emergency response programs. The OCA consists of a "worst case" release scenario and an "alternative" release scenario. The "worst case" scenario estimates the area and populations affected by a catastrophic release. The 'worst case" scenario is a hypothetical, conservative modeling exercise. Emergency planners use the toxic "alternative" scenario as a more realistic modeling exercise.

The information contained in the RMP builds upon the right-to-know principles of EPCRA by making all of the information including the OCA and five-year accident history available to local communities, emergency planners, and other stakeholders. Concerned citizens or the media may ask facilities to explain the risk management programs that they use to prevent or minimize the consequence of a catastrophic release. EPA encourages this communication to reduce the risk. This is similar to the way public knowledge of chemical releases to the environment through the availability of TRI data has led reporting facilities to reduce their toxic releases. Because of security concerns, the RMP information is restricted. However, this information is available for Delaware facilities by contacting the Accidental Release Prevention Program (ARP) http://www.awm.delaware.gov/EPR/Pages/AccidentalReleasePrevention.aspx or by contacting the EPA reading room at: https://www.epa.gov/libraries.

In Delaware, the Extremely Hazardous Substances Risk Management Act first passed in 1988, and amended in 1998, adopted new federal guidelines that enhance the community right-to-know information. The Delaware Accidental Release Program (ARP) has been granted full authority by the US EPA to administer the program within DNREC, reviews the facility RMPs for accuracy and completeness and inspects facilities to ensure that appropriate accidental release prevention programs have been implemented. For more information on accidental release prevention in Delaware, please refer to the DNREC ARP website above.

APPENDIX B

FACILITY CONTACT INFORMATION

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(302) 286-2415

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AIR LIQUIDE ADVANCED SEPARATIONS
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ALLEN HARIM FOODS - HARBESON
18752 HARBESON ROAD
HARBESON, DE 19951
MICHAEL SAUSE
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ANGELA SHEPPARD
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ROBERTO NELSON
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CALPINE CORP. GARRISON ENERGY CENTER
450 GARRISON OAK DRIVE
DOVER, DE 19901
NORMA DUNN
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SEAN O. HISTED
(302) 324-8411

CRODA
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CHRIS BARNETT
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COLBY LANDISS
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DENTSPLY SIRONA WEST PLANT
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APPENDIX B

FACILITY CONTACT INFORMATION

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WILMINGTON, DE 19809
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MICHAEL THRASHER
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CHARLIE RAINES
(301) 322-6691

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124 VEPCO BOULEVARD
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HMA-HERITAGE CONCRETE - CHESWOLD
376 HOLLY OAK LANE
CHESWOLD, DE 19936
JOHN RICE
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HMA-HERITAGE CONCRETE – HEALD STREET
1100 HEALD STREET
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JOHN RICE
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APPENDIX B

FACILITY CONTACT INFORMATION

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DAVID KNOX
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ERIC SEWARD
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JOHNSON CONTROLS BATTERY PLANT
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MIDDLETOWN, DE 19709
STEPHEN GARRETT
(260) 740-9336

JOHNSON CONTROLS DISTRIBUTION CENTER
50 PATRIOT DR
MIDDLETOWN, DE 19709
TAMI KEMSKI
(302) 696-3209

JUSTIN TANKS
21413 CEDAR CREEK AVE
GEORGETOWN, DE 19947-6306
EDWARD M. SHORT, PRESIDENT
(302) 856-3521

KUEHNE
1645 RIVER RD
DELAWARE CITY, DE 19706
ALAN ROGERS
(302) 834-4557

MESSER LLC
6000 PHILADELPHIA PIKE
CLAYMONT, DE 19703
JEFFREY CHAVANNE
(610) 570-1098

METAL MASTERS
100 INDUSTRIAL BLVD
CLAYTON, DE 19938
RICHARD J. MURPHY
(302) 653-3087

MOUNTAIRE FARMS - FRANKFORD
11 DAISEY ST
FRANKFORD, DE 19945
CATHERINE BASSETT
(302) 934-3050

MOUNTAIRE FARMS - SELBYVILLE
HOOSIER ST & RAILROAD AVE
SELBYVILLE, DE 19975
CATHERINE BASSETT
(302) 934-3050

MOUNTAIRE FARMS OF DELAWARE
29106 JOHN J WILLIAMS HWY
MILLSBORO, DE 19966
CATHERINE BASSETT
(302) 934-3050

NATIONAL GUARD TRAINING SITE RANGE
1197 RIVER ROAD
NEW CASTLE, DE 19720
MICHAEL ZAPPATERRINI
(302) 326-7488

NORAMCO
500 SWEDES LANDING RD
WILMINGTON, DE 19801
ERIC HACHERL
(302) 888-4477

ORIENT CORP
111 PARK AVE
SEAFORD, DE 19973
DAVE CURRY
(302) 628-1300

OWEN STEEL COMPANY
813 S MARKET STREET
WILMINGTON, DE 19801
DAVID ZALESNE
(803) 251-7565

PERDUE BRIDGEVILLE
16447 ADAMS RD
BRIDGEVILLE, DE 19933
ANDREA STAUB
(410) 341-2755

PERDUE GEORGETOWN
20621 SAVANNAH RD
GEORGETOWN, DE 19947
ANDREA STAUB
(410) 341-2755

PERDUE MILFORD
255 N REHOBOTH BLVD
MILFORD, DE 19963
ANDREA STAUB
(410) 341-2755

PICTSWEET BRIDGEVILLE
18215 WESLEY CHURCH RD
BRIDGEVILLE, DE 19933
ALLEN WATTS
(731) 663-7600

PPG INDUSTRIES
1886 LYNNBURY WOODS RD
DOVER, DE 19904
KIMBERLY VANCE
(502) 802-5012

PRINCE MINERALS
301 PIGEON POINT RD
NEW CASTLE, DE 19720
MARY SIMPLER
(646) 747-4176

ROGERS CORP
1100 GOVERNOR LEA RD
BEAR, DE 19701
TIMOTHY GAUTHIER
(860) 779-5598

ROHM & HAAS B2, B3, B8
451 BELLEVUE RD
NEWARK, DE 19713
PETER PALENA
(302) 366-0500

ROHM & HAAS B5, B6
351 BELLEVUE RD
NEWARK, DE 19713
PETER PALENA
(302) 366-0500

ROHM & HAAS B7, B15
50 BELLEVUE RD
NEWARK, DE 19713
PETER PALENA
(302) 366-0500

SIMMONS BRIDGEVILLE
8141 SEASHORE HWY
BRIDGEVILLE, DE 19933
DONNY EPP
(479) 524-8151

APPENDIX B

FACILITY CONTACT INFORMATION

SPI PHARMA
40 CAPE HENLOPEN DR
LEWES, DE 19958-1196
JOHN CREIGHTON
(616) 283-8506

V&S DELAWARE GALVANIZING
511 CARROLL DRIVE
NEW CASTLE, DE 19720
IONUT ROIBU
(302) 322-1420

VEOLIA RED LION PLANT
766 GOVERVENOR LEA RD
DELAWARE CITY, DE 19706
DANIEL FRATTARELLI
(302) 834-5901

VP RACING FUELS
16 BROOKHILL DR
NEWARK, DE 19702-1301
SUSAN GRAY
(210) 635-7744

APPENDIX C

2018 ON-SITE RELEASES BY FACILITY AND CHEMICAL

FACILITY/CHEMICAL	FORM A	ON-SITE RELEASES TO AIR	TO WATER	TO LAND	TOTAL	OFF-SITE TRANSFERS	ON-SITE WASTE MANAGEMENT
AEARO TECHNOLOGIES LLC							
Diisocyanates	0	3	0	0	3	10,025	0
Toluene diisocyanate (mixed isomers)	0	5	0	0	5	1,418	0
AEARO TECHNOLOGIES LLC Total	**0**	**7**	**0**	**0**	**7**	**11,443**	**0**
AGILENT TECHNOLOGIES							
Acetonitrile	0	87	0	0	87	22,157	0
Methanol	0	1,776	0	0	1,776	57,420	0
Toluene	0	44	0	0	44	130,918	0
AGILENT TECHNOLOGIES Total	**0**	**1,907**	**0**	**0**	**1,907**	**210,495**	**0**
AIR LIQUIDE ADVANCED SEPARATIONS							
Cyclohexane	0	9,065	0	0	9,065	8,014	0
Methanol	0	8	0	0	8	91,027	2,882,537
N,N-Dimethylformamide	0	27	0	0	27	22,780	0
n-Hexane	0	10	0	0	10	0	2,397,027
N-Methyl-2-pyrrolidone	0	1,291	0	0	1,291	111,182	0
AIR LIQUIDE ADVANCED SEPARATIONS Total	**0**	**10,401**	**0**	**0**	**10,401**	**233,003**	**5,279,564**
ALLEN HARIM FARMS SEAFORD MILL							
Copper	1	0	0	0	0	0	0
Copper Compounds	1	0	0	0	0	0	0
Manganese	1	0	0	0	0	0	0
Manganese Compounds	1	0	0	0	0	0	0
Zinc Compounds	1	0	0	0	0	0	0
ALLEN HARIM FARMS SEAFORD MILL Total	**5**	**0**	**0**	**0**	**0**	**0**	**0**
ALLEN HARIM FOODS HARBESON							
Nitrate compounds	0	0	61,673	0	61,673	0	0
Peracetic acid	1	0	0	0	0	0	0
ALLEN HARIM FOODS HARBESON Total	**1**	**0**	**61,673**	**0**	**61,673**	**0**	**0**
AMICK FARMS							
Copper Compounds	1	0	0	0	0	0	0
Manganese Compounds	1	0	0	0	0	0	0
Zinc Compounds	1	0	0	0	0	0	0
AMICK FARMS Total	**3**	**0**	**0**	**0**	**0**	**0**	**0**

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APPENDIX C

2018 ON-SITE RELEASES BY FACILITY AND CHEMICAL

FACILITY/CHEMICAL	FORM A	ON-SITE RELEASES TO AIR	TO WATER	TO LAND	TOTAL	OFF-SITE TRANSFERS	ON-SITE WASTE MANAGEMENT
BALTIMORE AIRCOIL COMPANY							
Chromium Compounds	0	5	0	0	5	260,861	0
Cobalt Compounds	0	0	0	0	0	32,225	0
Copper Compounds	0	0	0	0	0	39,878	0
Manganese Compounds	0	5	0	0	5	119,020	0
Nickel Compounds	0	5	0	0	5	299,531	0
BALTIMORE AIRCOIL COMPANY Total	**0**	**15**	**0**	**0**	**15**	**751,515**	**0**
BASF COLORS AND EFFECTS USA LLC							
Aniline	0	22	0	0	22	20,042	1,091
Biphenyl	0	89	0	0	89	254,139	2,365
Cyclohexane	0	49	0	0	49	32,079	0
Methanol	0	28,226	0	0	28,226	393,446	1,054,103
Nitrate compounds	0	0	0	0	0	15,542	0
Nitric acid	0	0	0	0	0	0	15,793
N-Methyl-2-pyrrolidone	0	0	0	0	0	13,085	9
p-Chloroaniline	0	6	0	0	6	12,187	324
Xylene (mixed isomers)	0	960	0	0	960	461	0
BASF COLORS AND EFFECTS USA LLC Total	**0**	**29,352**	**0**	**0**	**29,352**	**740,980**	**1,073,685**
CALPINE CORP - GARRISON ENERGY CENTER							
Ammonia	0	5,080	0	0	5,080	0	0
CALPINE CORP - GARRISON ENERGY CENTER Total	**0**	**5,080**	**0**	**0**	**5,080**	**0**	**0**
COLOR WORKS PAINTING							
Manganese	0	0	0	0	0	740	0
COLOR WORKS PAINTING Total	**0**	**0**	**0**	**0**	**0**	**740**	**0**
CRODA							
Certain Glycol Ethers	0	1	0	0	1	2,799	0
Diethanolamine	0	7	0	0	7	21,988	0
Ethylene	0	19	0	0	19	0	0
Ethylene glycol	0	2	0	0	2	1,668	0
Ethylene oxide	0	4,886	0	0	4,886	0	541
Methanol	0	840	0	0	840	18,281	0
Naphthalene	0	1	0	0	1	3,397	0
n-Butyl alcohol	0	68	0	0	68	386	0
Nonylphenol	0	277	0	0	277	1,045	0
Propylene oxide	0	384	0	0	384	0	919
CRODA Total	**0**	**6,484**	**0**	**0**	**6,484**	**49,564**	**1,460**

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APPENDIX C

2018 ON-SITE RELEASES BY FACILITY AND CHEMICAL

FACILITY/CHEMICAL	FORM A	ON-SITE RELEASES TO AIR	TO WATER	TO LAND	TOTAL	OFF-SITE TRANSFERS	ON-SITE WASTE MANAGEMENT
DELAWARE CITY REFINERY							
1,2,4-Trimethylbenzene	0	965	5	0	970	0	79,442
1,3-Butadiene	0	274	0	0	274	0	0
2,4-Dimethylphenol	0	0	168	0	168	0	236,392
Ammonia	0	69,426	4,426	0	73,852	145	13,320,212
Anthracene	0	0	5	0	5	0	0
Asbestos (friable)	0	0	0	0	0	77,940	0
Benzene	0	4,736	10	0	4,746	13	514,199
Benzo(g,h,i)perylene	0	1	5	0	5	0	462
Carbon disulfide	0	1,443	0	0	1,443	0	4,546,053
Carbonyl sulfide	0	596	0	0	596	0	14,696,433
Cobalt	0	44	214	0	258	33	0
Creosote	0	13	0	76	89	562	0
Cresol (mixed isomers)	0	0	337	0	337	0	341,552
Cumene	0	334	5	0	339	0	4,221
Cyanide Compounds	0	0	148	0	148	0	14,687
Cyclohexane	0	1,882	5	0	1,887	12	9,095
Dioxin and Dioxin-like Compounds	0	0	0	0	0	0	0
Ethylbenzene	0	1,692	5	0	1,697	13	62,757
Ethylene	0	3,697	0	0	3,697	0	0
Ethylene glycol	0	0	192	0	192	0	18,990
Hydrochloric acid	0	225	0	0	225	0	102,009
Hydrogen cyanide	0	150,342	207	0	150,549	0	273,529
Hydrogen Sulfide	0	14,212	229	0	14,441	0	446,479,559
Lead Compounds	0	91	2	0	94	510	0
Mercury Compounds	0	87	2	0	88	0	0
Molybdenum trioxide	0	17	0	0	17	13	0
Naphthalene	0	2,163	5	0	2,168	0	13,305
n-Hexane	0	15,949	5	0	15,954	0	84,669
Nitrate compounds	0	0	5,098,700	0	5,098,700	0	0
Phenanthrene	0	3	5	0	8	0	40
Phenol	0	113	168	0	281	0	338,160
Polycyclic aromatic compounds	0	266	4	0	270	0	380
Propylene	0	4,010	0	0	4,010	0	0
Styrene	0	7	5	0	12	0	1,618
Sulfuric acid	0	273,190	0	0	273,190	0	0
Tetrachloroethylene	0	7	0	0	7	0	0
Toluene	0	8,886	5	0	8,891	37	242,604
Xylene (mixed isomers)	0	5,692	5	0	5,697	82	259,083
DELAWARE CITY REFINERY Total	**0**	**560,363**	**5,104,867**	**76**	**5,665,307**	**79,362**	**481,639,451**

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APPENDIX C

2018 ON-SITE RELEASES BY FACILITY AND CHEMICAL

FACILITY/CHEMICAL	FORM A	ON-SITE RELEASES TO AIR	TO WATER	TO LAND	TOTAL	OFF-SITE TRANSFERS	ON-SITE WASTE MANAGEMENT
DENTSPLY SIRONA MAIN PLANT							
Mercury	0	1	0	0	1	171	0
DENTSPLY SIRONA MAIN PLANT Total	**0**	**1**	**0**	**0**	**1**	**171**	**0**
DENTSPLY SIRONA WEST PLANT							
Methanol	0	1,983	0	0	1,983	8,224	0
Methyl methacrylate	0	3,795	0	0	3,795	177	0
DENTSPLY SIRONA WEST PLANT Total	**0**	**5,778**	**0**	**0**	**5,778**	**8,401**	**0**
DOVER AFB							
1,2,4-Trimethylbenzene	0	51	0	0	51	0	0
Cumene	0	51	0	0	51	0	0
Ethylbenzene	0	51	0	0	51	0	0
Naphthalene	0	51	0	0	51	0	0
Xylene (mixed isomers)	0	51	0	0	51	0	0
DOVER AFB Total	**0**	**255**	**0**	**0**	**255**	**0**	**0**
DUHADAWAY TOOL & DIE SHOP INC							
Chromium	0	0	0	0	0	10,401	0
Nickel	0	0	0	0	0	12,805	0
DUHADAWAY TOOL & DIE SHOP INC Total	**0**	**0**	**0**	**0**	**0**	**23,206**	**0**
DYK AUTOMOTIVE LLC							
Methanol	0	6,520	0	0	6,520	0	0
DYK AUTOMOTIVE LLC Total	**0**	**6,520**	**0**	**0**	**6,520**	**0**	**0**
EDGE MOOR/HAY ROAD ENERGY CENTERS							
Ammonia	0	10,160	2	0	10,162	132	0
Dioxin and Dioxin-like Compounds	0	0	0	0	0	0	0
Mercury	0	12	0	0	12	0	0
Polycyclic aromatic compounds	0	0	0	0	0	0	0
EDGE MOOR/HAY ROAD ENERGY CENTERS Total	**0**	**10,172**	**2**	**0**	**10,174**	**132**	**0**
FORMOSA PLASTICS							
Ammonia	0	3,600	0	0	3,600	0	7,200
Dioxin and Dioxin-like Compounds	0	0	0	0	0	0	0
Vinyl acetate	0	15,114	0	0	15,114	112	3,700
Vinyl chloride	0	22,740	1	0	22,741	221	134,600
FORMOSA PLASTICS Total	**0**	**41,454**	**1**	**0**	**41,455**	**333**	**145,500**

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APPENDIX C

2018 ON-SITE RELEASES BY FACILITY AND CHEMICAL

FACILITY/CHEMICAL	FORM A	ON-SITE RELEASES TO AIR	TO WATER	TO LAND	TOTAL	OFF-SITE TRANSFERS	ON-SITE WASTE MANAGEMENT
FUJIFILM							
Ethylene glycol	1	0	0	0	0	0	0
FUJIFILM Total	**1**	**0**	**0**	**0**	**0**	**0**	**0**
GAC SEAFORD							
1,2,4-Trimethylbenzene	1	0	0	0	0	0	0
GAC SEAFORD Total	**1**	**0**	**0**	**0**	**0**	**0**	**0**
GRIFFITH ENERGY SERVICES - CARL KING							
1,2,4-Trimethylbenzene	1	0	0	0	0	0	0
Naphthalene	1	0	0	0	0	0	0
Xylene (mixed isomers)	1	0	0	0	0	0	0
GRIFFITH ENERGY SERVICES - CARL KING Total	**3**	**0**	**0**	**0**	**0**	**0**	**0**
HANDYTUBE							
Chromium	0	0	0	0	0	35,287	0
Manganese	0	0	0	0	0	3,535	0
Nickel	0	0	0	0	0	35,211	0
Trichloroethylene	0	1,313	0	0	1,313	10,295	0
HANDYTUBE Total	**0**	**1,313**	**0**	**0**	**1,313**	**84,328**	**0**
HANESBRANDS							
Nitrate compounds	0	0	0	0	0	25,237	0
HANESBRANDS Total	**0**	**0**	**0**	**0**	**0**	**25,237**	**0**
HMA - HERITAGE CONCRETE BEAR							
Lead	0	0	0	6	6	0	0
HMA - HERITAGE CONCRETE BEAR Total	**0**	**0**	**0**	**6**	**6**	**0**	**0**
HMA - HERITAGE CONCRETE CHESWOLD							
Lead	0	0	0	5	5	0	0
HMA - HERITAGE CONCRETE CHESWOLD Total	**0**	**0**	**0**	**5**	**5**	**0**	**0**
HMA - HERITAGE CONCRETE HEALD STREET							
Lead	0	0	0	17	17	0	0
HMA - HERITAGE CONCRETE HEALD STREET Total	**0**	**0**	**0**	**17**	**17**	**0**	**0**
HMA - HERITAGE CONCRETE MIDDLETOWN							
Lead	0	0	0	8	8	0	0
HMA - HERITAGE CONCRETE MIDDLETOWN Total	**0**	**0**	**0**	**8**	**8**	**0**	**0**

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APPENDIX C

2018 ON-SITE RELEASES BY FACILITY AND CHEMICAL

FACILITY/CHEMICAL	FORM A	ON-SITE RELEASES TO AIR	TO WATER	TO LAND	TOTAL	OFF-SITE TRANSFERS	ON-SITE WASTE MANAGEMENT
HONEYWELL							
Boron trifluoride	0	358	0	0	358	0	70,754
Ethylene glycol	0	0	0	0	0	200	0
Hydrogen fluoride	0	544	0	0	544	0	91
Methanol	0	8	0	0	8	2,688	0
HONEYWELL Total	**0**	**910**	**0**	**0**	**910**	**2,888**	**70,845**
IKO							
Polycyclic aromatic compounds	0	0	0	0	0	148	551
IKO Total	**0**	**0**	**0**	**0**	**0**	**148**	**551**
INDIAN RIVER GENERATING STATION							
Ammonia	0	1,755	0	0	1,755	0	38,446
Barium Compounds	0	25	0	5,605	5,630	2	0
Hydrochloric acid	0	430	0	0	430	0	330,135
Hydrogen fluoride	0	511	0	0	511	0	37,936
Lead Compounds	0	10	0	462	472	1	0
Mercury Compounds	0	2	0	42	44	0	0
Sulfuric acid	0	850	0	0	850	0	479,362
INDIAN RIVER GENERATING STATION Total	**0**	**3,583**	**0**	**6,109**	**9,692**	**3**	**885,879**
INTERVET INC							
Mercury Compounds	0	0	0	0	0	71	0
INTERVET INC Total	**0**	**0**	**0**	**0**	**0**	**71**	**0**
JOHNSON CONTROLS BATTERY PLANT							
Antimony Compounds	0	0	0	0	0	17,120	0
Lead Compounds	0	26	8	0	33	4,183,816	0
JOHNSON CONTROLS BATTERY PLANT Total	**0**	**26**	**8**	**0**	**33**	**4,200,936**	**0**
JOHNSON CONTROLS DISTRIBUTION							
Antimony Compounds	0	0	0	0	0	14,505	0
Arsenic Compounds	0	0	0	0	0	893	0
Lead Compounds	0	0	0	0	0	3,540,173	0
JOHNSON CONTROLS DISTRIBUTION Total	**0**	**0**	**0**	**0**	**0**	**3,555,571**	**0**
JUSTIN TANKS							
Styrene	0	13,362	0	0	13,362	5,240	26,226
JUSTIN TANKS Total	**0**	**13,362**	**0**	**0**	**13,362**	**5,240**	**26,226**

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APPENDIX C

2018 ON-SITE RELEASES BY FACILITY AND CHEMICAL

FACILITY/CHEMICAL	FORM A	ON-SITE RELEASES TO AIR	TO WATER	TO LAND	TOTAL	OFF-SITE TRANSFERS	ON-SITE WASTE MANAGEMENT
KUEHNE							
Chlorine	0	18	0	0	18	0	0
KUEHNE Total	**0**	**18**	**0**	**0**	**18**	**0**	**0**
MESSER LLC							
Chlorodifluoromethane	1	0	0	0	0	0	0
MESSER LLC Total	**1**	**0**	**0**	**0**	**0**	**0**	**0**
METAL MASTERS							
Chromium	0	1	0	0	1	191,456	0
Nickel	0	1	0	0	1	69,339	0
METAL MASTERS Total	**0**	**1**	**0**	**0**	**1**	**260,795**	**0**
MOUNTAIRE FARMS - FRANKFORD MILL							
Copper Compounds	1	0	0	0	0	0	0
Manganese Compounds	1	0	0	0	0	0	0
Zinc Compounds	1	0	0	0	0	0	0
MOUNTAIRE FARMS - FRANKFORD MILL Total	**3**	**0**	**0**	**0**	**0**	**0**	**0**
MOUNTAIRE FARMS - SELBYVILLE PLANT							
Ammonia	0	12,928	6	0	12,934	7,888	17,200
Peracetic acid	0	596	0	0	596	0	324,671
MOUNTAIRE FARMS - SELBYVILLE PLANT Total	**0**	**13,524**	**6**	**0**	**13,530**	**7,888**	**341,871**
MOUNTAIRE FARMS OF DELAWARE							
Copper Compounds	1	0	0	0	0	0	0
Hydrogen Sulfide	0	15,367	0	0	15,367	0	182,140
Manganese Compounds	1	0	0	0	0	0	0
Peracetic acid	0	381	0	0	381	0	555,556
Zinc Compounds	1	0	0	0	0	0	0
MOUNTAIRE FARMS OF DELAWARE Total	**3**	**15,748**	**0**	**0**	**15,748**	**0**	**737,696**
NATIONAL GUARD TRAINING SITE RANGE							
Lead	0	0	0	7,816	7,816	0	0
NATIONAL GUARD TRAINING SITE RANGE Total	**0**	**0**	**0**	**7,816**	**7,816**	**0**	**0**
NORAMCO INC							
Methanol	0	50	0	0	50	63,614	0
n-Butyl alcohol	0	16	0	0	16	256,181	0
Toluene	0	227	0	0	227	163,129	0
NORAMCO INC Total	**0**	**293**	**0**	**0**	**293**	**482,924**	**0**

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FACILITY/CHEMICAL	FORM A	ON-SITE RELEASES TO AIR	TO WATER	TO LAND	TOTAL	OFF-SITE TRANSFERS	ON-SITE WASTE MANAGEMENT
ORIENT CORP							
Aniline	0	78	0	0	78	1,783	310,000
Diphenylamine	0	0	0	0	0	0	0
Nitrobenzene	0	2	0	0	2	0	0
ORIENT CORP Total	**0**	**80**	**0**	**0**	**80**	**1,783**	**310,000**
OWEN STEEL COMPANY							
Lead Compounds	0	0	0	0	0	321	0
Manganese Compounds	0	29	0	0	29	3,710	0
Nickel Compounds	0	1	0	0	1	8,120	0
OWEN STEEL COMPANY Total	**0**	**30**	**0**	**0**	**30**	**12,151**	**0**
PERDUE BRIDGEVILLE							
Chromium Compounds	1	0	0	0	0	0	0
Copper Compounds	1	0	0	0	0	0	0
Selenium Compounds	1	0	0	0	0	0	0
PERDUE BRIDGEVILLE Total	**3**	**0**	**0**	**0**	**0**	**0**	**0**
PERDUE GEORGETOWN							
Hydrogen Sulfide	0	109	0	0	109	0	82,354
Nitrate compounds	0	0	249,023	0	249,023	88	0
Peracetic acid	0	0	96	0	96	0	191,058
PERDUE GEORGETOWN Total	**0**	**109**	**249,119**	**0**	**249,228**	**88**	**273,412**
PERDUE MILFORD							
Peracetic acid	0	0	0	0	0	62	124,901
PERDUE MILFORD Total	**0**	**0**	**0**	**0**	**0**	**62**	**124,901**
PICTSWEET BRIDGEVILLE							
Ammonia	0	0	0	0	0	0	0
PICTSWEET BRIDGEVILLE Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PPG INDUSTRIES							
Certain Glycol Ethers	0	1	0	0	1	1,340	0
Ethylene glycol	0	0	0	0	0	2,860	0
N-Methyl-2-pyrrolidone	0	0	0	0	0	570	0
Zinc Compounds	0	35	0	0	35	2,950	0
PPG INDUSTRIES Total	**0**	**37**	**0**	**0**	**37**	**7,720**	**0**

Source: DNREC 2018 TRI Database, October, 2019
A "1" in the Form A column indicates a Form A report

All Amounts Are in Pounds

APPENDIX C

2018 ON-SITE RELEASES BY FACILITY AND CHEMICAL

FACILITY/CHEMICAL	FORM A	ON-SITE RELEASES TO AIR	TO WATER	TO LAND	TOTAL	OFF-SITE TRANSFERS	ON-SITE WASTE MANAGEMENT
PRINCE MINERALS LLC							
Barium Compounds	1	0	0	0	0	0	0
Manganese Compounds	0	2	0	0	2	0	0
Nickel Compounds	1	0	0	0	0	0	0
PRINCE MINERALS LLC Total	**2**	**2**	**0**	**0**	**2**	**0**	**0**
ROGERS CORP							
Copper	0	10	0	0	10	4,223	0
Ethylbenzene	0	500	0	0	500	1,000	19,000
Xylene (mixed isomers)	0	1,950	0	0	1,950	5,300	99,000
ROGERS CORP Total	**0**	**2,460**	**0**	**0**	**2,460**	**10,523**	**118,000**
ROHM & HAAS B2 B3 B8							
Diisocyanates	0	0	0	0	0	1,808	0
N,N-Dimethylformamide	0	4,468	0	0	4,468	528,474	4,571,245
ROHM & HAAS B2 B3 B8 Total	**0**	**4,468**	**0**	**0**	**4,468**	**530,282**	**4,571,245**
ROHM & HAAS B5 B6							
4,4'-Methylenebis(2-chloroaniline)	0	0	0	0	0	1,124	0
Diisocyanates	0	3	0	0	3	6,816	0
N-Methyl-2-pyrrolidone	0	2,113	0	0	2,113	43,191	0
ROHM & HAAS B5 B6 Total	**0**	**2,116**	**0**	**0**	**2,116**	**51,131**	**0**
ROHM & HAAS B7 B15							
4,4'-Methylenebis(2-chloroaniline)	0	0	0	0	0	621	0
N-Methyl-2-pyrrolidone	0	716	0	0	716	8,850	0
ROHM & HAAS B7 B15 Total	**0**	**716**	**0**	**0**	**716**	**9,471**	**0**
SIMMONS BRIDGEVILLE							
Nitrate compounds	0	0	0	0	0	80,372	0
SIMMONS BRIDGEVILLE Total	**0**	**0**	**0**	**0**	**0**	**80,372**	**0**
SPI PHARMA							
Chlorine	1	0	0	0	0	0	0
Nitric acid	1	0	0	0	0	0	0
SPI PHARMA Total	**2**	**0**	**0**	**0**	**0**	**0**	**0**
V&S DELAWARE GALVANIZING							
Lead	0	9	3	0	13	5,627	3,571
Zinc Compounds	0	561	354	0	915	210,926	418,960
V&S DELAWARE GALVANIZING Total	**0**	**570**	**357**	**0**	**928**	**216,553**	**422,531**

Source: DNREC 2018 TRI Database, October, 2019
A "1" in the Form A column indicates a Form A report

All Amounts Are in Pounds

APPENDIX C

2018 ON-SITE RELEASES BY FACILITY AND CHEMICAL

FACILITY/CHEMICAL	FORM A	ON-SITE RELEASES TO AIR	ON-SITE RELEASES TO WATER	ON-SITE RELEASES TO LAND	ON-SITE RELEASES TOTAL	OFF-SITE TRANSFERS	ON-SITE WASTE MANAGEMENT
VEOLIA - RED LION PLANT							
Hydrazine	0	0	0	0	0	0	0
Hydrazine sulfate	0	0	0	0	0	0	0
Hydrogen Sulfide	0	169	0	0	169	0	0
Sulfuric acid	0	2,398	0	0	2,398	0	0
VEOLIA - RED LION PLANT Total	**0**	**2,568**	**0**	**0**	**2,568**	**0**	**0**
VP RACING FUELS							
Toluene	1	0	0	0	0	0	0
VP RACING FUELS Total	**1**	**0**	**0**	**0**	**0**	**0**	**0**
STATE TOTALS	**29**	**739,722**	**5,416,033**	**14,037**	**6,169,792**	**11,655,509**	**496,022,818**

Source: DNREC 2018 TRI Database, October, 2019
A "1" in the Form A column indicates a Form A report

All Amounts Are in Pounds

APPENDIX D

2018 OFF-SITE TRANSFERS AND WASTE MANAGED ON-SITE BY FACILITY

	OFF SITE TRANSFERS						ON SITE WASTE MANAGEMENT			
	POTW	RECYCLE	ENERGY RECOVERY	TREATMENT	DISPOSAL	TOTAL	RECYCLE	ENERGY RECOVERY	TREATMENT	TOTAL
AEARO TECHNOLOGIES LLC										
Diisocyanates	0	0	0	10,025	0	10,025	0	0	0	0
Toluene diisocyanate (mixed isomers)	0	0	0	1,418	0	1,418	0	0	0	0
AEARO TECHNOLOGIES LLC Total	**0**	**0**	**0**	**11,443**	**0**	**11,443**	**0**	**0**	**0**	**0**
AGILENT TECHNOLOGIES										
Acetonitrile	0	0	22,157	0	0	22,157	0	0	0	0
Methanol	0	0	57,174	246	0	57,420	0	0	0	0
Toluene	0	0	130,258	660	0	130,918	0	0	0	0
AGILENT TECHNOLOGIES Total	**0**	**0**	**209,589**	**906**	**0**	**210,495**	**0**	**0**	**0**	**0**
AIR LIQUIDE ADVANCED SEPARATIONS										
Cyclohexane	0	0	8,014	0	0	8,014	0	0	0	0
Methanol	0	0	0	91,027	0	91,027	2,882,537	0	0	2,882,537
N,N-Dimethylformamide	18,300	0	4,480	0	0	22,780	0	0	0	0
n-Hexane	0	0	0	0	0	0	2,397,027	0	0	2,397,027
N-Methyl-2-pyrrolidone	92,612	0	18,570	0	0	111,182	0	0	0	0
AIR LIQUIDE ADVANCED SEPARATIONS Total	**110,912**	**0**	**31,064**	**91,027**	**0**	**233,003**	**5,279,564**	**0**	**0**	**5,279,564**
ALLEN HARIM FARMS SEAFORD MILL										
Copper	0	0	0	0	0	0	0	0	0	0
Copper Compounds	0	0	0	0	0	0	0	0	0	0
Manganese	0	0	0	0	0	0	0	0	0	0
Manganese Compounds	0	0	0	0	0	0	0	0	0	0
Zinc Compounds	0	0	0	0	0	0	0	0	0	0
ALLEN HARIM FARMS SEAFORD MILL Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
ALLEN HARIM FOODS HARBESON										
Nitrate compounds	0	0	0	0	0	0	0	0	0	0
Peracetic acid	0	0	0	0	0	0	0	0	0	0
ALLEN HARIM FOODS HARBESON Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
AMICK FARMS										
Copper Compounds	0	0	0	0	0	0	0	0	0	0
Manganese Compounds	0	0	0	0	0	0	0	0	0	0
Zinc Compounds	0	0	0	0	0	0	0	0	0	0
AMICK FARMS Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Source: DNREC 2018 TRI Database, October, 2019

All Amounts Are in Pounds

APPENDIX D

2018 OFF-SITE TRANSFERS AND WASTE MANAGED ON-SITE BY FACILITY

	OFF SITE TRANSFERS						ON SITE WASTE MANAGEMENT			
	POTW	RECYCLE	ENERGY RECOVERY	TREATMENT	DISPOSAL	TOTAL	RECYCLE	ENERGY RECOVERY	TREATMENT	TOTAL
BALTIMORE AIRCOIL COMPANY										
Cobalt Compounds	0	32,225	0	0	0	32,225	0	0	0	0
Copper Compounds	0	39,878	0	0	0	39,878	0	0	0	0
Manganese Compounds	0	119,020	0	0	0	119,020	0	0	0	0
Nickel Compounds	0	299,531	0	0	0	299,531	0	0	0	0
CHROMIUM COMPOUNDS2	0	260,861	0	0	0	260,861	0	0	0	0
BALTIMORE AIRCOIL COMPANY Total	**0**	**751,515**	**0**	**0**	**0**	**751,515**	**0**	**0**	**0**	**0**
BASF COLORS AND EFFECTS USA LLC										
Aniline	6,182	0	13,196	664	0	20,042	0	0	1,091	1,091
Biphenyl	15,391	0	202,095	36,653	0	254,139	0	0	2,365	2,365
Cyclohexane	0	32,079	0	0	0	32,079	0	0	0	0
Methanol	386,649	0	5,182	1,615	0	393,446	236,052	0	818,051	1,054,103
Nitrate compounds	15,542	0	0	0	0	15,542	0	0	0	0
Nitric acid	0	0	0	0	0	0	0	0	15,793	15,793
N-Methyl-2-pyrrolidone	9,764	0	3,321	0	0	13,085	0	0	9	9
p-Chloroaniline	2,700	0	9,433	54	0	12,187	0	0	324	324
Xylene (mixed isomers)	221	0	236	4	0	461	0	0	0	0
BASF COLORS AND EFFECTS USA LLC Total	**436,449**	**32,079**	**233,463**	**38,990**	**0**	**740,980**	**236,052**	**0**	**837,633**	**1,073,685**
CALPINE CORP - GARRISON ENERGY CENTER										
Ammonia	0	0	0	0	0	0	0	0	0	0
CALPINE CORP - GARRISON ENERGY CENTER Tota	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
COLOR WORKS PAINTING										
Manganese	0	740	0	0	0	740	0	0	0	0
COLOR WORKS PAINTING Total	**0**	**740**	**0**	**0**	**0**	**740**	**0**	**0**	**0**	**0**
CRODA										
Certain Glycol Ethers	2,794	0	0	5	0	2,799	0	0	0	0
Diethanolamine	21,986	0	0	2	0	21,988	0	0	0	0
Ethylene	0	0	0	0	0	0	0	0	0	0
Ethylene glycol	763	0	0	905	0	1,668	0	0	0	0
Ethylene oxide	0	0	0	0	0	0	0	0	541	541
Methanol	8,006	0	0	10,275	0	18,281	0	0	0	0
Naphthalene	1,327	0	0	2,070	0	3,397	0	0	0	0
n-Butyl alcohol	386	0	0	0	0	386	0	0	0	0
Propylene oxide	0	0	0	0	0	0	0	0	919	919
Nonylphenol	1,045	0	0	0	0	1,045	0	0	0	0
CRODA Total	**36,307**	**0**	**0**	**13,257**	**0**	**49,564**	**0**	**0**	**1,460**	**1,460**

Source: DNREC 2018 TRI Database, October, 2019

All Amounts Are in Pounds

APPENDIX D

2018 OFF-SITE TRANSFERS AND WASTE MANAGED ON-SITE BY FACILITY

	OFF SITE TRANSFERS						ON SITE WASTE MANAGEMENT			
	POTW	RECYCLE	ENERGY RECOVERY	TREATMENT	DISPOSAL	TOTAL	RECYCLE	ENERGY RECOVERY	TREATMENT	TOTAL
DELAWARE CITY REFINERY										
1,2,4-Trimethylbenzene	0	0	0	0	0	0	0	0	79,442	79,442
1,3-Butadiene	0	0	0	0	0	0	0	0	0	0
2,4-Dimethylphenol	0	0	0	0	0	0	0	0	236,392	236,392
Ammonia	0	0	0	0	145	145	0	13,218,310	101,902	13,320,212
Anthracene	0	0	0	0	0	0	0	0	0	0
Asbestos (friable)	0	0	0	0	77,940	77,940	0	0	0	0
Benzene	0	7	0	0	7	13	0	410,236	103,963	514,199
Benzo(g,h,i)perylene	0	0	0	0	0	0	0	0	462	462
Carbon disulfide	0	0	0	0	0	0	0	140,300	4,405,753	4,546,053
Carbonyl sulfide	0	0	0	0	0	0	0	0	14,696,433	14,696,433
Creosote	0	0	0	0	562	562	0	0	0	0
Cresol (mixed isomers)	0	0	0	0	0	0	0	24,092	317,460	341,552
Cumene	0	0	0	0	0	0	0	0	4,221	4,221
Cyanide Compounds	0	0	0	0	0	0	0	0	14,687	14,687
Cyclohexane	0	7	0	1	4	12	0	0	9,095	9,095
Dioxin and Dioxin-like Compounds	0	0	0	0	0	0	0	0	0	0
Ethylbenzene	0	9	0	2	3	13	0	0	62,757	62,757
Ethylene	0	0	0	0	0	0	0	0	0	0
Ethylene glycol	0	0	0	0	0	0	0	0	18,990	18,990
Hydrochloric acid	0	0	0	0	0	0	0	0	102,009	102,009
Hydrogen cyanide	0	0	0	0	0	0	0	0	273,529	273,529
Hydrogen Sulfide	0	0	0	0	0	0	0	0	446,479,559	446,479,559
Lead Compounds	0	483	0	0	27	510	0	0	0	0
Mercury Compounds	0	0	0	0	0	0	0	0	0	0
Molybdenum trioxide	0	12	0	0	1	13	0	0	0	0
Naphthalene	0	0	0	0	0	0	0	0	13,305	13,305
n-Hexane	0	0	0	0	0	0	0	0	84,669	84,669
Nitrate compounds	0	0	0	0	0	0	0	0	0	0
Phenanthrene	0	0	0	0	0	0	0	0	40	40
Phenol	0	0	0	0	0	0	0	61,435	276,725	338,160
Polycyclic aromatic compounds	0	0	0	0	0	0	0	0	380	380
Propylene	0	0	0	0	0	0	0	0	0	0
Styrene	0	0	0	0	0	0	0	0	1,618	1,618
Sulfuric acid	0	0	0	0	0	0	0	0	0	0
Tetrachloroethylene	0	0	0	0	0	0	0	0	0	0
Toluene	0	9	0	4	24	37	0	0	242,604	242,604
Xylene (mixed isomers)	0	23	0	10	49	82	0	0	259,083	259,083
Cobalt	0	32	0	0	0	33	0	0	0	0
DELAWARE CITY REFINERY Total	**0**	**584**	**0**	**16**	**78,762**	**79,362**	**0**	**13,854,373**	**467,785,078**	**481,639,451**

Source: DNREC 2018 TRI Database, October, 2019

All Amounts Are in Pounds

APPENDIX D

2018 OFF-SITE TRANSFERS AND WASTE MANAGED ON-SITE BY FACILITY

	OFF SITE TRANSFERS						ON SITE WASTE MANAGEMENT			
	POTW	RECYCLE	ENERGY RECOVERY	TREATMENT	DISPOSAL	TOTAL	RECYCLE	ENERGY RECOVERY	TREATMENT	TOTAL
DENTSPLY SIRONA MAIN PLANT										
Mercury	0	171	0	0	0	171	0	0	0	0
DENTSPLY SIRONA MAIN PLANT Total	**0**	**171**	**0**	**0**	**0**	**171**	**0**	**0**	**0**	**0**
DENTSPLY SIRONA WEST PLANT										
Methanol	68	0	8,156	0	0	8,224	0	0	0	0
Methyl methacrylate	58	0	119	0	0	177	0	0	0	0
DENTSPLY SIRONA WEST PLANT Total	**126**	**0**	**8,274**	**0**	**0**	**8,401**	**0**	**0**	**0**	**0**
DOVER AFB										
1,2,4-Trimethylbenzene	0	0	0	0	0	0	0	0	0	0
Cumene	0	0	0	0	0	0	0	0	0	0
Ethylbenzene	0	0	0	0	0	0	0	0	0	0
Naphthalene	0	0	0	0	0	0	0	0	0	0
Xylene (mixed isomers)	0	0	0	0	0	0	0	0	0	0
DOVER AFB Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
DUHADAWAY TOOL & DIE SHOP INC										
Chromium	0	10,298	0	0	103	10,401	0	0	0	0
Nickel	0	12,678	0	0	127	12,805	0	0	0	0
DUHADAWAY TOOL & DIE SHOP INC Total	**0**	**22,976**	**0**	**0**	**230**	**23,206**	**0**	**0**	**0**	**0**
DYK AUTOMOTIVE LLC										
Methanol	0	0	0	0	0	0	0	0	0	0
DYK AUTOMOTIVE LLC Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
EDGE MOOR/HAY ROAD ENERGY CENTERS										
Ammonia	132	0	0	0	0	132	0	0	0	0
Dioxin and Dioxin-like Compounds	0	0	0	0	0	0	0	0	0	0
Mercury	0	0	0	0	0	0	0	0	0	0
Polycyclic aromatic compounds	0	0	0	0	0	0	0	0	0	0
EDGE MOOR/HAY ROAD ENERGY CENTERS Total	**132**	**0**	**0**	**0**	**0**	**132**	**0**	**0**	**0**	**0**
FORMOSA PLASTICS										
Ammonia	0	0	0	0	0	0	0	0	7,200	7,200
Dioxin and Dioxin-like Compounds	0	0	0	0	0	0	0	0	0	0
Vinyl acetate	0	0	0	112	0	112	0	0	3,700	3,700
Vinyl chloride	0	0	43	179	0	221	0	0	134,600	134,600
FORMOSA PLASTICS Total	**0**	**0**	**43**	**291**	**0**	**333**	**0**	**0**	**145,500**	**145,500**

Source: DNREC 2018 TRI Database, October, 2019

All Amounts Are in Pounds

APPENDIX D

2018 OFF-SITE TRANSFERS AND WASTE MANAGED ON-SITE BY FACILITY

	OFF SITE TRANSFERS						ON SITE WASTE MANAGEMENT			
	POTW	RECYCLE	ENERGY RECOVERY	TREATMENT	DISPOSAL	TOTAL	RECYCLE	ENERGY RECOVERY	TREATMENT	TOTAL
FUJIFILM										
Ethylene glycol	0	0	0	0	0	0	0	0	0	0
FUJIFILM Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
GAC SEAFORD										
1,2,4-Trimethylbenzene	0	0	0	0	0	0	0	0	0	0
GAC SEAFORD Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
GRIFFITH ENERGY SERVICES - CARL KING										
1,2,4-Trimethylbenzene	0	0	0	0	0	0	0	0	0	0
Naphthalene	0	0	0	0	0	0	0	0	0	0
Xylene (mixed isomers)	0	0	0	0	0	0	0	0	0	0
GRIFFITH ENERGY SERVICES - CARL KING Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
HANDYTUBE										
Chromium	0	35,205	0	0	82	35,287	0	0	0	0
Manganese	0	3,528	0	0	7	3,535	0	0	0	0
Nickel	0	35,090	0	0	121	35,211	0	0	0	0
Trichloroethylene	0	0	0	10,295	0	10,295	0	0	0	0
HANDYTUBE Total	**0**	**73,823**	**0**	**10,295**	**210**	**84,328**	**0**	**0**	**0**	**0**
HANESBRANDS										
Nitrate compounds	25,237	0	0	0	0	25,237	0	0	0	0
HANESBRANDS Total	**25,237**	**0**	**0**	**0**	**0**	**25,237**	**0**	**0**	**0**	**0**
HMA - HERITAGE CONCRETE BEAR										
Lead	0	0	0	0	0	0	0	0	0	0
HMA - HERITAGE CONCRETE BEAR Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
HMA - HERITAGE CONCRETE CHESWOLD										
Lead	0	0	0	0	0	0	0	0	0	0
HMA - HERITAGE CONCRETE CHESWOLD Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
HMA - HERITAGE CONCRETE HEALD STREET										
Lead	0	0	0	0	0	0	0	0	0	0
HMA - HERITAGE CONCRETE HEALD STREET Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
HMA - HERITAGE CONCRETE MIDDLETOWN										
Lead	0	0	0	0	0	0	0	0	0	0
HMA - HERITAGE CONCRETE MIDDLETOWN Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Source: DNREC 2018 TRI Database, October, 2019

All Amounts Are in Pounds

APPENDIX D

2018 OFF-SITE TRANSFERS AND WASTE MANAGED ON-SITE BY FACILITY

	OFF SITE TRANSFERS						ON SITE WASTE MANAGEMENT			
	POTW	RECYCLE	ENERGY RECOVERY	TREATMENT	DISPOSAL	TOTAL	RECYCLE	ENERGY RECOVERY	TREATMENT	TOTAL
HONEYWELL										
Boron trifluoride	0	0	0	0	0	0	0	0	70,754	70,754
Ethylene glycol	0	0	200	0	0	200	0	0	0	0
Hydrogen fluoride	0	0	0	0	0	0	0	0	91	91
Methanol	80	0	2,560	48	0	2,688	0	0	0	0
HONEYWELL Total	**80**	**0**	**2,760**	**48**	**0**	**2,888**	**0**	**0**	**70,845**	**70,845**
IKO										
Polycyclic aromatic compounds	0	146	0	0	2	148	551	0	0	551
IKO Total	**0**	**146**	**0**	**0**	**2**	**148**	**551**	**0**	**0**	**551**
INDIAN RIVER GENERATING STATION										
Ammonia	0	0	0	0	0	0	0	0	38,446	38,446
Barium Compounds	0	0	0	0	2	2	0	0	0	0
Hydrochloric acid	0	0	0	0	0	0	0	0	330,135	330,135
Hydrogen fluoride	0	0	0	0	0	0	0	0	37,936	37,936
Lead Compounds	0	0	0	0	1	1	0	0	0	0
Mercury Compounds	0	0	0	0	0	0	0	0	0	0
Sulfuric acid	0	0	0	0	0	0	0	0	479,362	479,362
INDIAN RIVER GENERATING STATION Total	**0**	**0**	**0**	**0**	**3**	**3**	**0**	**0**	**885,879**	**885,879**
INTERVET INC										
Mercury Compounds	0	71	0	0	0	71	0	0	0	0
INTERVET INC Total	**0**	**71**	**0**	**0**	**0**	**71**	**0**	**0**	**0**	**0**
JOHNSON CONTROLS BATTERY PLANT										
Antimony Compounds	0	17,119	0	0	1	17,120	0	0	0	0
Lead Compounds	0	4,183,545	0	0	270	4,183,816	0	0	0	0
JOHNSON CONTROLS BATTERY PLANT Total	**0**	**4,200,665**	**0**	**0**	**271**	**4,200,936**	**0**	**0**	**0**	**0**
JOHNSON CONTROLS DISTRIBUTION										
Antimony Compounds	0	14,505	0	0	0	14,505	0	0	0	0
Arsenic Compounds	0	893	0	0	0	893	0	0	0	0
Lead Compounds	6	3,539,367	0	0	800	3,540,173	0	0	0	0
JOHNSON CONTROLS DISTRIBUTION Total	**6**	**3,554,765**	**0**	**0**	**800**	**3,555,571**	**0**	**0**	**0**	**0**
JUSTIN TANKS										
Styrene	0	0	0	5,240	0	5,240	26,226	0	0	26,226
JUSTIN TANKS Total	**0**	**0**	**0**	**5,240**	**0**	**5,240**	**26,226**	**0**	**0**	**26,226**

Source: DNREC 2018 TRI Database, October, 2019

All Amounts Are in Pounds

APPENDIX D

2018 OFF-SITE TRANSFERS AND WASTE MANAGED ON-SITE BY FACILITY

	OFF SITE TRANSFERS						ON SITE WASTE MANAGEMENT			
	POTW	RECYCLE	ENERGY RECOVERY	TREATMENT	DISPOSAL	TOTAL	RECYCLE	ENERGY RECOVERY	TREATMENT	TOTAL
KUEHNE										
Chlorine	0	0	0	0	0	0	0	0	0	0
KUEHNE Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
MESSER LLC										
Chlorodifluoromethane	0	0	0	0	0	0	0	0	0	0
MESSER LLC Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
METAL MASTERS										
Chromium	0	191,132	0	0	324	191,456	0	0	0	0
Nickel	0	69,236	0	0	103	69,339	0	0	0	0
METAL MASTERS Total	**0**	**260,368**	**0**	**0**	**427**	**260,795**	**0**	**0**	**0**	**0**
MOUNTAIRE FARMS - FRANKFORD MILL										
Copper Compounds	0	0	0	0	0	0	0	0	0	0
Manganese Compounds	0	0	0	0	0	0	0	0	0	0
Zinc Compounds	0	0	0	0	0	0	0	0	0	0
MOUNTAIRE FARMS - FRANKFORD MILL Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
MOUNTAIRE FARMS - SELBYVILLE PLANT										
Ammonia	6,094	0	0	0	1,794	7,888	0	0	17,200	17,200
Peracetic acid	0	0	0	0	0	0	0	0	324,671	324,671
MOUNTAIRE FARMS - SELBYVILLE PLANT Total	**6,094**	**0**	**0**	**0**	**1,794**	**7,888**	**0**	**0**	**341,871**	**341,871**
MOUNTAIRE FARMS OF DELAWARE										
Copper Compounds	0	0	0	0	0	0	0	0	0	0
Hydrogen Sulfide	0	0	0	0	0	0	0	0	182,140	182,140
Manganese Compounds	0	0	0	0	0	0	0	0	0	0
Peracetic acid	0	0	0	0	0	0	0	0	555,556	555,556
Zinc Compounds	0	0	0	0	0	0	0	0	0	0
MOUNTAIRE FARMS OF DELAWARE Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**737,696**	**737,696**
NATIONAL GUARD TRAINING SITE RANGE										
Lead	0	0	0	0	0	0	0	0	0	0
NATIONAL GUARD TRAINING SITE RANGE Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
NORAMCO INC										
Methanol	3,181	0	60,433	0	0	63,614	0	0	0	0
n-Butyl alcohol	12,809	0	243,372	0	0	256,181	0	0	0	0
Toluene	1,631	0	161,498	0	0	163,129	0	0	0	0
NORAMCO INC Total	**17,621**	**0**	**465,303**	**0**	**0**	**482,924**	**0**	**0**	**0**	**0**

Source: DNREC 2018 TRI Database, October, 2019

All Amounts Are in Pounds

APPENDIX D

2018 OFF-SITE TRANSFERS AND WASTE MANAGED ON-SITE BY FACILITY

	OFF SITE TRANSFERS						ON SITE WASTE MANAGEMENT			
	POTW	RECYCLE	ENERGY RECOVERY	TREATMENT	DISPOSAL	TOTAL	RECYCLE	ENERGY RECOVERY	TREATMENT	TOTAL
ORIENT CORP										
Aniline	1,700	0	0	0	83	1,783	190,000	0	120,000	310,000
Nitrobenzene	0	0	0	0	0	0	0	0	0	0
Diphenylamine	0	0	0	0	0	0	0	0	0	0
ORIENT CORP Total	**1,700**	**0**	**0**	**0**	**83**	**1,783**	**190,000**	**0**	**120,000**	**310,000**
OWEN STEEL COMPANY										
Lead Compounds	0	321	0	0	0	321	0	0	0	0
Manganese Compounds	0	3,710	0	0	0	3,710	0	0	0	0
Nickel Compounds	0	8,120	0	0	0	8,120	0	0	0	0
OWEN STEEL COMPANY Total	**0**	**12,151**	**0**	**0**	**0**	**12,151**	**0**	**0**	**0**	**0**
PERDUE BRIDGEVILLE										
Copper Compounds	0	0	0	0	0	0	0	0	0	0
CHROMIUM COMPOUNDS2	0	0	0	0	0	0	0	0	0	0
Selenium Compounds	0	0	0	0	0	0	0	0	0	0
PERDUE BRIDGEVILLE Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PERDUE GEORGETOWN										
Hydrogen Sulfide	0	0	0	0	0	0	0	0	82,354	82,354
Nitrate compounds	0	0	0	0	88	88	0	0	0	0
Peracetic acid	0	0	0	0	0	0	0	0	191,058	191,058
PERDUE GEORGETOWN Total	**0**	**0**	**0**	**0**	**88**	**88**	**0**	**0**	**273,412**	**273,412**
PERDUE MILFORD										
Peracetic acid	62	0	0	0	0	62	0	0	124,901	124,901
PERDUE MILFORD Total	**62**	**0**	**0**	**0**	**0**	**62**	**0**	**0**	**124,901**	**124,901**
PICTSWEET BRIDGEVILLE										
Ammonia	0	0	0	0	0	0	0	0	0	0
PICTSWEET BRIDGEVILLE Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PPG INDUSTRIES										
Certain Glycol Ethers	340	0	0	384	616	1,340	0	0	0	0
Ethylene glycol	995	0	0	62	1,803	2,860	0	0	0	0
N-Methyl-2-pyrrolidone	26	0	0	498	46	570	0	0	0	0
Zinc Compounds	774	0	0	0	2,176	2,950	0	0	0	0
PPG INDUSTRIES Total	**2,135**	**0**	**0**	**944**	**4,641**	**7,720**	**0**	**0**	**0**	**0**

Source: DNREC 2018 TRI Database, October, 2019

All Amounts Are in Pounds

APPENDIX D

2018 OFF-SITE TRANSFERS AND WASTE MANAGED ON-SITE BY FACILITY

	OFF SITE TRANSFERS						ON SITE WASTE MANAGEMENT			
	POTW	RECYCLE	ENERGY RECOVERY	TREATMENT	DISPOSAL	TOTAL	RECYCLE	ENERGY RECOVERY	TREATMENT	TOTAL
PRINCE MINERALS LLC										
Barium Compounds	0	0	0	0	0	0	0	0	0	0
Manganese Compounds	0	0	0	0	0	0	0	0	0	0
Nickel Compounds	0	0	0	0	0	0	0	0	0	0
PRINCE MINERALS LLC Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
ROGERS CORP										
Copper	18	4,200	0	0	5	4,223	0	0	0	0
Ethylbenzene	0	0	0	1,000	0	1,000	0	0	19,000	19,000
Xylene (mixed isomers)	0	0	0	5,300	0	5,300	0	0	99,000	99,000
ROGERS CORP Total	**18**	**4,200**	**0**	**6,300**	**5**	**10,523**	**0**	**0**	**118,000**	**118,000**
ROHM & HAAS B2 B3 B8										
Diisocyanates	0	0	0	1,808	0	1,808	0	0	0	0
N,N-Dimethylformamide	223,036	0	260,438	0	45,000	528,474	4,570,797	0	448	4,571,245
ROHM & HAAS B2 B3 B8 Total	**223,036**	**0**	**260,438**	**1,808**	**45,000**	**530,282**	**4,570,797**	**0**	**448**	**4,571,245**
ROHM & HAAS B5 B6										
4,4'-Methylenebis(2-chloroaniline)	0	0	0	1,124	0	1,124	0	0	0	0
Diisocyanates	0	0	0	6,816	0	6,816	0	0	0	0
N-Methyl-2-pyrrolidone	0	38,166	0	896	4,129	43,191	0	0	0	0
ROHM & HAAS B5 B6 Total	**0**	**38,166**	**0**	**8,836**	**4,129**	**51,131**	**0**	**0**	**0**	**0**
ROHM & HAAS B7 B15										
4,4'-Methylenebis(2-chloroaniline)	0	0	0	621	0	621	0	0	0	0
N-Methyl-2-pyrrolidone	0	7,695	0	299	856	8,850	0	0	0	0
ROHM & HAAS B7 B15 Total	**0**	**7,695**	**0**	**920**	**856**	**9,471**	**0**	**0**	**0**	**0**
SIMMONS BRIDGEVILLE										
Nitrate compounds	80,372	0	0	0	0	80,372	0	0	0	0
SIMMONS BRIDGEVILLE Total	**80,372**	**0**	**0**	**0**	**0**	**80,372**	**0**	**0**	**0**	**0**
SPI PHARMA										
Chlorine	0	0	0	0	0	0	0	0	0	0
Nitric acid	0	0	0	0	0	0	0	0	0	0
SPI PHARMA Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
V&S DELAWARE GALVANIZING										
Lead	0	5,297	0	0	330	5,627	3,571	0	0	3,571
Zinc Compounds	0	161,183	0	0	49,743	210,926	418,960	0	0	418,960
V&S DELAWARE GALVANIZING Total	**0**	**166,480**	**0**	**0**	**50,073**	**216,553**	**422,531**	**0**	**0**	**422,531**

Source: DNREC 2018 TRI Database, October, 2019

All Amounts Are in Pounds

APPENDIX D

2018 OFF-SITE TRANSFERS AND WASTE MANAGED ON-SITE BY FACILITY

	OFF SITE TRANSFERS						ON SITE WASTE MANAGEMENT			
	POTW	RECYCLE	ENERGY RECOVERY	TREATMENT	DISPOSAL	TOTAL	RECYCLE	ENERGY RECOVERY	TREATMENT	TOTAL
VEOLIA - RED LION PLANT										
Hydrazine	0	0	0	0	0	0	0	0	0	0
Hydrazine sulfate	0	0	0	0	0	0	0	0	0	0
Hydrogen Sulfide	0	0	0	0	0	0	0	0	0	0
Sulfuric acid	0	0	0	0	0	0	0	0	0	0
VEOLIA - RED LION PLANT Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
VP RACING FUELS										
Toluene	0	0	0	0	0	0	0	0	0	0
VP RACING FUELS Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
STATE TOTALS	**940,287**	**9,126,594**	**1,210,933**	**190,320**	**187,375**	**11,655,509**	**10,725,721**	**13,854,373**	**471,442,723**	**496,022,818**

Source: DNREC 2018 TRI Database, October, 2019

All Amounts Are in Pounds

APPENDIX E

2018 ON-SITE RELEASE SUMMARY BY FACILITY

FACILITY - RANKED BY TOTAL ON-SITE RELEASE	ON-SITE RELEASES				TRANSFERS	ON-SITE WASTE MGMT.
	TO AIR	TO WATER	TO LAND	TOTAL	OFF-SITE	
DELAWARE CITY REFINERY	560,363	5,104,867	76	5,665,307	79,362	481,639,451
PERDUE GEORGETOWN	109	249,119	0	249,228	88	273,412
ALLEN HARIM FOODS HARBESON	0	61,673	0	61,673	0	0
FORMOSA PLASTICS	41,454	1	0	41,455	333	145,500
BASF COLORS AND EFFECTS USA LLC	29,352	0	0	29,352	740,980	1,073,685
MOUNTAIRE FARMS OF DELAWARE	15,748	0	0	15,748	0	737,696
MOUNTAIRE FARMS - SELBYVILLE PLANT	13,524	6	0	13,530	7,888	341,871
JUSTIN TANKS	13,362	0	0	13,362	5,240	26,226
AIR LIQUIDE ADVANCED SEPARATIONS	10,401	0	0	10,401	233,003	5,279,564
EDGE MOOR/HAY ROAD ENERGY CENTERS	10,172	2	0	10,174	132	0
INDIAN RIVER GENERATING STATION	3,583	0	6,109	9,692	3	885,879
NATIONAL GUARD TRAINING SITE RANGE	0	0	7,816	7,816	0	0
DYK AUTOMOTIVE LLC	6,520	0	0	6,520	0	0
CRODA	6,484	0	0	6,484	49,564	1,460
DENTSPLY SIRONA WEST PLANT	5,778	0	0	5,778	8,401	0
CALPINE CORP - GARRISON ENERGY CENTE	5,080	0	0	5,080	0	0
ROHM & HAAS B2 B3 B8	4,468	0	0	4,468	530,282	4,571,245
VEOLIA - RED LION PLANT	2,568	0	0	2,568	0	0
ROGERS CORP	2,460	0	0	2,460	10,523	118,000
ROHM & HAAS B5 B6	2,116	0	0	2,116	51,131	0
AGILENT TECHNOLOGIES	1,907	0	0	1,907	210,495	0
HANDYTUBE	1,313	0	0	1,313	84,328	0
V&S DELAWARE GALVANIZING	570	357	0	928	216,553	422,531
HONEYWELL	910	0	0	910	2,888	70,845
ROHM & HAAS B7 B15	716	0	0	716	9,471	0
NORAMCO INC	293	0	0	293	482,924	0
DOVER AFB	255	0	0	255	0	0
ORIENT CORP	80	0	0	80	1,783	310,000
PPG INDUSTRIES	37	0	0	37	7,720	0
JOHNSON CONTROLS BATTERY PLANT	26	8	0	33	4,200,936	0
OWEN STEEL COMPANY	30	0	0	30	12,151	0
KUEHNE	18	0	0	18	0	0
HMA - HERITAGE CONCRETE HEALD STREET	0	0	17	17	0	0
BALTIMORE AIRCOIL COMPANY	15	0	0	15	751,515	0
HMA - HERITAGE CONCRETE MIDDLETOWN	0	0	8	8	0	0
AEARO TECHNOLOGIES LLC	7	0	0	7	11,443	0
HMA - HERITAGE CONCRETE BEAR	0	0	6	6	0	0
HMA - HERITAGE CONCRETE CHESWOLD	0	0	5	5	0	0
PRINCE MINERALS LLC	2	0	0	2	0	0
METAL MASTERS	1	0	0	1	260,795	0
DENTSPLY SIRONA MAIN PLANT	1	0	0	1	171	0
IKO	0	0	0	0	148	551

Source: DNREC 2018 TRI Database, October, 2019
All amounts are in pounds

APPENDIX E

2018 ON-SITE RELEASE SUMMARY BY FACILITY

FACILITY - RANKED BY TOTAL ON-SITE RELEASE	ON-SITE RELEASES				TRANSFERS	ON-SITE WASTE MGMT.
	TO AIR	TO WATER	TO LAND	TOTAL	OFF-SITE	
VP RACING FUELS	0	0	0	0	0	0
GRIFFITH ENERGY SERVICES - CARL KING	0	0	0	0	0	0
ALLEN HARIM FARMS SEAFORD MILL	0	0	0	0	0	0
DUHADAWAY TOOL & DIE SHOP INC	0	0	0	0	23,206	0
MESSER LLC	0	0	0	0	0	0
HANESBRANDS	0	0	0	0	25,237	0
FUJIFILM	0	0	0	0	0	0
PERDUE BRIDGEVILLE	0	0	0	0	0	0
JOHNSON CONTROLS DISTRIBUTION	0	0	0	0	3,555,571	0
GAC SEAFORD	0	0	0	0	0	0
SIMMONS BRIDGEVILLE	0	0	0	0	80,372	0
AMICK FARMS	0	0	0	0	0	0
SPI PHARMA	0	0	0	0	0	0
PERDUE MILFORD	0	0	0	0	62	124,901
INTERVET INC	0	0	0	0	71	0
COLOR WORKS PAINTING	0	0	0	0	740	0
MOUNTAIRE FARMS - FRANKFORD MILL	0	0	0	0	0	0
PICTSWEET BRIDGEVILLE	0	0	0	0	0	0
Grand Total	**739,722**	**5,416,033**	**14,037**	**6,169,792**	**11,655,509**	**496,022,818**

Source: DNREC 2018 TRI Database, October, 2019
All amounts are in pounds

APPENDIX F

2018 ON-SITE RELEASES BY CHEMICAL AND FACILITY

FACILITY/CHEMICAL	FORM A	ON-SITE RELEASES TO AIR	TO WATER	TO LAND	TOTAL	OFF-SITE TRANSFERS	ON-SITE WASTE MANAGEMENT
1,2,4-Trimethylbenzene							
DELAWARE CITY REFINERY	0	965	5	0	970	0	79442
DOVER AFB	0	51	0	0	51	0	0
GAC SEAFORD	1	0	0	0	0	0	0
GRIFFITH ENERGY SERVICES - CARL KING	1	0	0	0	0	0	0
1,2,4-Trimethylbenzene Total	**2**	**1,016**	**5**	**0**	**1,021**	**0**	**79,442**
1,3-Butadiene							
DELAWARE CITY REFINERY	0	274	0	0	274	0	0
1,3-Butadiene Total	**0**	**274**	**0**	**0**	**274**	**0**	**0**
2,4-Dimethylphenol							
DELAWARE CITY REFINERY	0	0	168	0	168	0	236392
2,4-Dimethylphenol Total	**0**	**0**	**168**	**0**	**168**	**0**	**236,392**
4,4'-Methylenebis(2-chloroaniline)							
ROHM & HAAS B5 B6	0	0	0	0	0	1124	0
ROHM & HAAS B7 B15	0	0	0	0	0	621	0
4,4'-Methylenebis(2-chloroaniline) Total	**0**	**0**	**0**	**0**	**0**	**1,745**	**0**
Acetonitrile							
AGILENT TECHNOLOGIES	0	87	0	0	87	22157	0
Acetonitrile Total	**0**	**87**	**0**	**0**	**87**	**22,157**	**0**
Ammonia							
CALPINE CORP - GARRISON ENERGY CENTER	0	5080	0	0	5080	0	0
DELAWARE CITY REFINERY	0	69426	4426	0	73852	145	13320212
EDGE MOOR/HAY ROAD ENERGY CENTERS	0	10160	2	0	10162	132	0
FORMOSA PLASTICS	0	3600	0	0	3600	0	7200
INDIAN RIVER GENERATING STATION	0	1755	0	0	1755	0	38446
MOUNTAIRE FARMS - SELBYVILLE PLANT	0	12928	6	0	12934	7888	17200
PICTSWEET BRIDGEVILLE	0	0	0	0	0	0	0
Ammonia Total	**0**	**102,949**	**4,434**	**0**	**107,383**	**8,165**	**13,383,058**
Aniline							
BASF COLORS AND EFFECTS USA LLC	0	22	0	0	22	20042	1091
ORIENT CORP	0	78	0	0	78	1783	310000
Aniline Total	**0**	**100**	**0**	**0**	**100**	**21,825**	**311,091**
Anthracene							
DELAWARE CITY REFINERY	0	0	5	0	5	0	0
Anthracene Total	**0**	**0**	**5**	**0**	**5**	**0**	**0**

Source: DNREC 2018 TRI Database, October, 2019
A "1" in the Form A column indicates a Form A report

All Amounts Are in Pounds

APPENDIX F

2018 ON-SITE RELEASES BY CHEMICAL AND FACILITY

FACILITY/CHEMICAL	FORM A	ON-SITE RELEASES TO AIR	TO WATER	TO LAND	TOTAL	OFF-SITE TRANSFERS	ON-SITE WASTE MANAGEMENT
Antimony Compounds							
JOHNSON CONTROLS BATTERY PLANT	0	0	0	0	0	17120	0
JOHNSON CONTROLS DISTRIBUTION	0	0	0	0	0	14505	0
Antimony Compounds Total	**0**	**0**	**0**	**0**	**0**	**31,625**	**0**
Arsenic Compounds							
JOHNSON CONTROLS DISTRIBUTION	0	0	0	0	0	893	0
Arsenic Compounds Total	**0**	**0**	**0**	**0**	**0**	**893**	**0**
Asbestos (friable)							
DELAWARE CITY REFINERY	0	0	0	0	0	77940	0
Asbestos (friable) Total	**0**	**0**	**0**	**0**	**0**	**77,940**	**0**
Barium Compounds							
INDIAN RIVER GENERATING STATION	0	25	0	5605	5630	2	0
PRINCE MINERALS LLC	1	0	0	0	0	0	0
Barium Compounds Total	**1**	**25**	**0**	**5,605**	**5,630**	**2**	**0**
Benzene							
DELAWARE CITY REFINERY	0	4736	10	0	4746	13	514199
Benzene Total	**0**	**4,736**	**10**	**0**	**4,746**	**13**	**514,199**
Benzo(g,h,i)perylene							
DELAWARE CITY REFINERY	0	1	5	0	5	0	462
Benzo(g,h,i)perylene Total	**0**	**1**	**5**	**0**	**5**	**0**	**462**
Biphenyl							
BASF COLORS AND EFFECTS USA LLC	0	89	0	0	89	254139	2365
Biphenyl Total	**0**	**89**	**0**	**0**	**89**	**254,139**	**2,365**
Boron trifluoride							
HONEYWELL	0	358	0	0	358	0	70754
Boron trifluoride Total	**0**	**358**	**0**	**0**	**358**	**0**	**70,754**
Carbon disulfide							
DELAWARE CITY REFINERY	0	1443	0	0	1443	0	4546053
Carbon disulfide Total	**0**	**1,443**	**0**	**0**	**1,443**	**0**	**4,546,053**
Carbonyl sulfide							
DELAWARE CITY REFINERY	0	596	0	0	596	0	14696433
Carbonyl sulfide Total	**0**	**596**	**0**	**0**	**596**	**0**	**14,696,433**

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APPENDIX F

2018 ON-SITE RELEASES BY CHEMICAL AND FACILITY

FACILITY/CHEMICAL	FORM A	ON-SITE RELEASES TO AIR	ON-SITE RELEASES TO WATER	ON-SITE RELEASES TO LAND	ON-SITE RELEASES TOTAL	OFF-SITE TRANSFERS	ON-SITE WASTE MANAGEMENT
Certain Glycol Ethers							
CRODA	0	1	0	0	1	2799	0
PPG INDUSTRIES	0	1	0	0	1	1340	0
Certain Glycol Ethers Total	**0**	**2**	**0**	**0**	**2**	**4,139**	**0**
Chlorine							
KUEHNE	0	18	0	0	18	0	0
SPI PHARMA	1	0	0	0	0	0	0
Chlorine Total	**1**	**18**	**0**	**0**	**18**	**0**	**0**
Chlorodifluoromethane							
MESSER LLC	1	0	0	0	0	0	0
Chlorodifluoromethane Total	**1**	**0**	**0**	**0**	**0**	**0**	**0**
Chromium							
DUHADAWAY TOOL & DIE SHOP INC	0	0	0	0	0	10401	0
HANDYTUBE	0	0	0	0	0	35287	0
METAL MASTERS	0	1	0	0	1	191456	0
Chromium Total	**0**	**1**	**0**	**0**	**1**	**237,144**	**0**
Chromium Compounds							
BALTIMORE AIRCOIL COMPANY	0	5	0	0	5	260861	0
PERDUE BRIDGEVILLE	1	0	0	0	0	0	0
Chromium Compounds Total	**1**	**5**	**0**	**0**	**5**	**260,861**	**0**
Cobalt							
DELAWARE CITY REFINERY	0	44	214	0	258	33	0
Cobalt Total	**0**	**44**	**214**	**0**	**258**	**33**	**0**
Cobalt Compounds							
BALTIMORE AIRCOIL COMPANY	0	0	0	0	0	32225	0
Cobalt Compounds Total	**0**	**0**	**0**	**0**	**0**	**32,225**	**0**
Copper							
ALLEN HARIM FARMS SEAFORD MILL	1	0	0	0	0	0	0
ROGERS CORP	0	10	0	0	10	4223	0
Copper Total	**1**	**10**	**0**	**0**	**10**	**4,223**	**0**

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2018 ON-SITE RELEASES BY CHEMICAL AND FACILITY

FACILITY/CHEMICAL	FORM A	ON-SITE RELEASES TO AIR	TO WATER	TO LAND	TOTAL	OFF-SITE TRANSFERS	ON-SITE WASTE MANAGEMENT
Copper Compounds							
ALLEN HARIM FARMS SEAFORD MILL	1	0	0	0	0	0	0
AMICK FARMS	1	0	0	0	0	0	0
BALTIMORE AIRCOIL COMPANY	0	0	0	0	0	39878	0
MOUNTAIRE FARMS - FRANKFORD MILL	1	0	0	0	0	0	0
MOUNTAIRE FARMS OF DELAWARE	1	0	0	0	0	0	0
PERDUE BRIDGEVILLE	1	0	0	0	0	0	0
Copper Compounds Total	**5**	**0**	**0**	**0**	**0**	**39,878**	**0**
Creosote							
DELAWARE CITY REFINERY	0	13	0	76	89	562	0
Creosote Total	**0**	**13**	**0**	**76**	**89**	**562**	**0**
Cresol (mixed isomers)							
DELAWARE CITY REFINERY	0	0	337	0	337	0	341552
Cresol (mixed isomers) Total	**0**	**0**	**337**	**0**	**337**	**0**	**341,552**
Cumene							
DELAWARE CITY REFINERY	0	334	5	0	339	0	4221
DOVER AFB	0	51	0	0	51	0	0
Cumene Total	**0**	**385**	**5**	**0**	**390**	**0**	**4,221**
Cyanide Compounds							
DELAWARE CITY REFINERY	0	0	148	0	148	0	14687
Cyanide Compounds Total	**0**	**0**	**148**	**0**	**148**	**0**	**14,687**
Cyclohexane							
AIR LIQUIDE ADVANCED SEPARATIONS	0	9065	0	0	9065	8014	0
BASF COLORS AND EFFECTS USA LLC	0	49	0	0	49	32079	0
DELAWARE CITY REFINERY	0	1882	5	0	1887	12	9095
Cyclohexane Total	**0**	**10,996**	**5**	**0**	**11,001**	**40,105**	**9,095**
Diethanolamine							
CRODA	0	7	0	0	7	21988	0
Diethanolamine Total	**0**	**7**	**0**	**0**	**7**	**21,988**	**0**
Diisocyanates							
AEARO TECHNOLOGIES LLC	0	3	0	0	3	10025	0
ROHM & HAAS B2 B3 B8	0	0	0	0	0	1808	0
ROHM & HAAS B5 B6	0	3	0	0	3	6816	0
Diisocyanates Total	**0**	**6**	**0**	**0**	**6**	**18,649**	**0**

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FACILITY/CHEMICAL	FORM A	ON-SITE RELEASES TO AIR	ON-SITE RELEASES TO WATER	ON-SITE RELEASES TO LAND	ON-SITE RELEASES TOTAL	OFF-SITE TRANSFERS	ON-SITE WASTE MANAGEMENT
Dioxin and Dioxin-like Compounds							
DELAWARE CITY REFINERY	0	0	0	0	0	0	0
EDGE MOOR/HAY ROAD ENERGY CENTERS	0	0	0	0	0	0	0
FORMOSA PLASTICS	0	0	0	0	0	0	0
Dioxin and Dioxin-like Compounds Total	**0.000000**	**0.005495**	**0.000000**	**0.000000**	**0.005495**	**0.000232**	**0.001268**
Diphenylamine							
ORIENT CORP	0	0	0	0	0	0	0
Diphenylamine Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Ethylbenzene							
DELAWARE CITY REFINERY	0	1692	5	0	1697	13	62757
DOVER AFB	0	51	0	0	51	0	0
ROGERS CORP	0	500	0	0	500	1000	19000
Ethylbenzene Total	**0**	**2,243**	**5**	**0**	**2,248**	**1,013**	**81,757**
Ethylene							
CRODA	0	19	0	0	19	0	0
DELAWARE CITY REFINERY	0	3697	0	0	3697	0	0
Ethylene Total	**0**	**3,716**	**0**	**0**	**3,716**	**0**	**0**
Ethylene glycol							
CRODA	0	2	0	0	2	1668	0
DELAWARE CITY REFINERY	0	0	192	0	192	0	18990
FUJIFILM	1	0	0	0	0	0	0
HONEYWELL	0	0	0	0	0	200	0
PPG INDUSTRIES	0	0	0	0	0	2860	0
Ethylene glycol Total	**1**	**2**	**192**	**0**	**194**	**4,728**	**18,990**
Ethylene oxide							
CRODA	0	4886	0	0	4886	0	541
Ethylene oxide Total	**0**	**4,886**	**0**	**0**	**4,886**	**0**	**541**
Hydrazine							
VEOLIA - RED LION PLANT	0	0	0	0	0	0	0
Hydrazine Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Hydrazine sulfate							
VEOLIA - RED LION PLANT	0	0	0	0	0	0	0
Hydrazine sulfate Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**

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APPENDIX F

2018 ON-SITE RELEASES BY CHEMICAL AND FACILITY

FACILITY/CHEMICAL	FORM A	ON-SITE RELEASES TO AIR	TO WATER	TO LAND	TOTAL	OFF-SITE TRANSFERS	ON-SITE WASTE MANAGEMENT
Hydrochloric acid							
DELAWARE CITY REFINERY	0	225	0	0	225	0	102009
INDIAN RIVER GENERATING STATION	0	430	0	0	430	0	330135
Hydrochloric acid Total	**0**	**655**	**0**	**0**	**655**	**0**	**432,144**
Hydrogen cyanide							
DELAWARE CITY REFINERY	0	150342	207	0	150549	0	273529
Hydrogen cyanide Total	**0**	**150,342**	**207**	**0**	**150,549**	**0**	**273,529**
Hydrogen fluoride							
HONEYWELL	0	544	0	0	544	0	91
INDIAN RIVER GENERATING STATION	0	511	0	0	511	0	37936
Hydrogen fluoride Total	**0**	**1,055**	**0**	**0**	**1,055**	**0**	**38,027**
Hydrogen Sulfide							
DELAWARE CITY REFINERY	0	14212	229	0	14441	0	446479559
MOUNTAIRE FARMS OF DELAWARE	0	15367	0	0	15367	0	182140
PERDUE GEORGETOWN	0	109	0	0	109	0	82354
VEOLIA - RED LION PLANT	0	169	0	0	169	0	0
Hydrogen Sulfide Total	**0**	**29,857**	**229**	**0**	**30,086**	**0**	**446,744,053**
Lead							
HMA - HERITAGE CONCRETE BEAR	0	0	0	6	6	0	0
HMA - HERITAGE CONCRETE CHESWOLD	0	0	0	5	5	0	0
HMA - HERITAGE CONCRETE HEALD STREET	0	0	0	17	17	0	0
HMA - HERITAGE CONCRETE MIDDLETOWN	0	0	0	8	8	0	0
NATIONAL GUARD TRAINING SITE RANGE	0	0	0	7816	7816	0	0
V&S DELAWARE GALVANIZING	0	9	3	0	13	5627	3571
Lead Total	**0**	**9**	**3**	**7,852**	**7,864**	**5,627**	**3,571**
Lead Compounds							
DELAWARE CITY REFINERY	0	91	2	0	94	510	0
INDIAN RIVER GENERATING STATION	0	10	0	462	472	1	0
JOHNSON CONTROLS BATTERY PLANT	0	26	8	0	33	4183816	0
JOHNSON CONTROLS DISTRIBUTION	0	0	0	0	0	3540173	0
OWEN STEEL COMPANY	0	0	0	0	0	321	0
Lead Compounds Total	**0**	**127**	**10**	**462**	**599**	**7,724,821**	**0**
Manganese							
ALLEN HARIM FARMS SEAFORD MILL	1	0	0	0	0	0	0
COLOR WORKS PAINTING	0	0	0	0	0	740	0
HANDYTUBE	0	0	0	0	0	3535	0
Manganese Total	**1**	**0**	**0**	**0**	**0**	**4,275**	**0**

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2018 ON-SITE RELEASES BY CHEMICAL AND FACILITY

FACILITY/CHEMICAL	FORM A	ON-SITE RELEASES TO AIR	TO WATER	TO LAND	TOTAL	OFF-SITE TRANSFERS	ON-SITE WASTE MANAGEMENT
Manganese Compounds							
ALLEN HARIM FARMS SEAFORD MILL	1	0	0	0	0	0	0
AMICK FARMS	1	0	0	0	0	0	0
BALTIMORE AIRCOIL COMPANY	0	5	0	0	5	119020	0
MOUNTAIRE FARMS - FRANKFORD MILL	1	0	0	0	0	0	0
MOUNTAIRE FARMS OF DELAWARE	1	0	0	0	0	0	0
OWEN STEEL COMPANY	0	29	0	0	29	3710	0
PRINCE MINERALS LLC	0	2	0	0	2	0	0
Manganese Compounds Total	**4**	**36**	**0**	**0**	**36**	**122,730**	**0**
Mercury							
DENTSPLY SIRONA MAIN PLANT	0	1	0	0	1	171	0
EDGE MOOR/HAY ROAD ENERGY CENTERS	0	12	0	0	12	0	0
Mercury Total	**0.0000**	**12.4800**	**0.0100**	**0.0000**	**12.4900**	**170.6800**	**0.0000**
Mercury Compounds							
DELAWARE CITY REFINERY	0	87	2	0	88	0	0
INDIAN RIVER GENERATING STATION	0	2	0	42	44	0	0
INTERVET INC	0	0	0	0	0	71	0
Mercury Compounds Total	**0.0000**	**88.5300**	**1.5300**	**42.3000**	**132.3600**	**71.8049**	**0.0000**
Methanol							
AGILENT TECHNOLOGIES	0	1776	0	0	1776	57420	0
AIR LIQUIDE ADVANCED SEPARATIONS	0	8	0	0	8	91027	2882537
BASF COLORS AND EFFECTS USA LLC	0	28226	0	0	28226	393446	1054103
CRODA	0	840	0	0	840	18281	0
DENTSPLY SIRONA WEST PLANT	0	1983	0	0	1983	8224	0
DYK AUTOMOTIVE LLC	0	6520	0	0	6520	0	0
HONEYWELL	0	8	0	0	8	2688	0
NORAMCO INC	0	50	0	0	50	63614	0
Methanol Total	**0**	**39,411**	**0**	**0**	**39,411**	**634,699**	**3,936,640**
Methyl methacrylate							
DENTSPLY SIRONA WEST PLANT	0	3795	0	0	3795	177	0
Methyl methacrylate Total	**0**	**3,795**	**0**	**0**	**3,795**	**177**	**0**
Molybdenum trioxide							
DELAWARE CITY REFINERY	0	17	0	0	17	13	0
Molybdenum trioxide Total	**0**	**17**	**0**	**0**	**17**	**13**	**0**
N,N-Dimethylformamide							
AIR LIQUIDE ADVANCED SEPARATIONS	0	27	0	0	27	22780	0
ROHM & HAAS B2 B3 B8	0	4468	0	0	4468	528474	4571245
N,N-Dimethylformamide Total	**0**	**4,495**	**0**	**0**	**4,495**	**551,254**	**4,571,245**

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Naphthalene							
CRODA	0	1	0	0	1	3397	0
DELAWARE CITY REFINERY	0	2163	5	0	2168	0	13305
DOVER AFB	0	51	0	0	51	0	0
GRIFFITH ENERGY SERVICES - CARL KING	1	0	0	0	0	0	0
Naphthalene Total	**1**	**2,215**	**5**	**0**	**2,220**	**3,397**	**13,305**
n-Butyl alcohol							
CRODA	0	68	0	0	68	386	0
NORAMCO INC	0	16	0	0	16	256181	0
n-Butyl alcohol Total	**0**	**84**	**0**	**0**	**84**	**256,567**	**0**
n-Hexane							
AIR LIQUIDE ADVANCED SEPARATIONS	0	10	0	0	10	0	2397027
DELAWARE CITY REFINERY	0	15949	5	0	15954	0	84669
n-Hexane Total	**0**	**15,959**	**5**	**0**	**15,964**	**0**	**2,481,696**
Nickel							
DUHADAWAY TOOL & DIE SHOP INC	0	0	0	0	0	12805	0
HANDYTUBE	0	0	0	0	0	35211	0
METAL MASTERS	0	1	0	0	1	69339	0
Nickel Total	**0**	**1**	**0**	**0**	**1**	**117,355**	**0**
Nickel Compounds							
BALTIMORE AIRCOIL COMPANY	0	5	0	0	5	299531	0
OWEN STEEL COMPANY	0	1	0	0	1	8120	0
PRINCE MINERALS LLC	1	0	0	0	0	0	0
Nickel Compounds Total	**1**	**6**	**0**	**0**	**6**	**307,651**	**0**
Nitrate compounds							
ALLEN HARIM FOODS HARBESON	0	0	61673	0	61673	0	0
BASF COLORS AND EFFECTS USA LLC	0	0	0	0	0	15542	0
DELAWARE CITY REFINERY	0	0	5098700	0	5098700	0	0
HANESBRANDS	0	0	0	0	0	25237	0
PERDUE GEORGETOWN	0	0	249023	0	249023	88	0
SIMMONS BRIDGEVILLE	0	0	0	0	0	80372	0
Nitrate compounds Total	**0**	**0**	**5,409,396**	**0**	**5,409,396**	**121,239**	**0**
Nitric acid							
BASF COLORS AND EFFECTS USA LLC	0	0	0	0	0	0	15793
SPI PHARMA	1	0	0	0	0	0	0
Nitric acid Total	**1**	**0**	**0**	**0**	**0**	**0**	**15,793**

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Nitrobenzene							
ORIENT CORP	0	2	0	0	2	0	0
Nitrobenzene Total	**0**	**2**	**0**	**0**	**2**	**0**	**0**
N-Methyl-2-pyrrolidone							
AIR LIQUIDE ADVANCED SEPARATIONS	0	1291	0	0	1291	111182	0
BASF COLORS AND EFFECTS USA LLC	0	0	0	0	0	13085	9
PPG INDUSTRIES	0	0	0	0	0	570	0
ROHM & HAAS B5 B6	0	2113	0	0	2113	43191	0
ROHM & HAAS B7 B15	0	716	0	0	716	8850	0
N-Methyl-2-pyrrolidone Total	**0**	**4,120**	**0**	**0**	**4,120**	**176,878**	**9**
Nonylphenol							
CRODA	0	277	0	0	277	1045	0
Nonylphenol Total	**0**	**277**	**0**	**0**	**277**	**1,045**	**0**
p-Chloroaniline							
BASF COLORS AND EFFECTS USA LLC	0	6	0	0	6	12187	324
p-Chloroaniline Total	**0**	**6**	**0**	**0**	**6**	**12,187**	**324**
Peracetic acid							
ALLEN HARIM FOODS HARBESON	1	0	0	0	0	0	0
MOUNTAIRE FARMS - SELBYVILLE PLANT	0	596	0	0	596	0	324671
MOUNTAIRE FARMS OF DELAWARE	0	381	0	0	381	0	555556
PERDUE GEORGETOWN	0	0	96	0	96	0	191058
PERDUE MILFORD	0	0	0	0	0	62	124901
Peracetic acid Total	**1**	**977**	**96**	**0**	**1,073**	**62**	**1,196,186**
Phenanthrene							
DELAWARE CITY REFINERY	0	3	5	0	8	0	40
Phenanthrene Total	**0**	**3**	**5**	**0**	**8**	**0**	**40**
Phenol							
DELAWARE CITY REFINERY	0	113	168	0	281	0	338160
Phenol Total	**0**	**113**	**168**	**0**	**281**	**0**	**338,160**
Polycyclic aromatic compounds							
DELAWARE CITY REFINERY	0	266	4	0	270	0	380
EDGE MOOR/HAY ROAD ENERGY CENTERS	0	0	0	0	0	0	0
IKO	0	0	0	0	0	148	551
Polycyclic aromatic compounds Total	**0**	**267**	**4**	**0**	**271**	**148**	**931**

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Propylene							
DELAWARE CITY REFINERY	0	4010	0	0	4010	0	0
Propylene Total	**0**	**4,010**	**0**	**0**	**4,010**	**0**	**0**
Propylene oxide							
CRODA	0	384	0	0	384	0	919
Propylene oxide Total	**0**	**384**	**0**	**0**	**384**	**0**	**919**
Selenium Compounds							
PERDUE BRIDGEVILLE	1	0	0	0	0	0	0
Selenium Compounds Total	**1**	**0**	**0**	**0**	**0**	**0**	**0**
Styrene							
DELAWARE CITY REFINERY	0	7	5	0	12	0	1618
JUSTIN TANKS	0	13362	0	0	13362	5240	26226
Styrene Total	**0**	**13,369**	**5**	**0**	**13,374**	**5,240**	**27,844**
Sulfuric acid							
DELAWARE CITY REFINERY	0	273190	0	0	273190	0	0
INDIAN RIVER GENERATING STATION	0	850	0	0	850	0	479362
VEOLIA - RED LION PLANT	0	2398	0	0	2398	0	0
Sulfuric acid Total	**0**	**276,438**	**0**	**0**	**276,438**	**0**	**479,362**
Tetrachloroethylene							
DELAWARE CITY REFINERY	0	7	0	0	7	0	0
Tetrachloroethylene Total	**0**	**7**	**0**	**0**	**7**	**0**	**0**
Toluene							
AGILENT TECHNOLOGIES	0	44	0	0	44	130918	0
DELAWARE CITY REFINERY	0	8886	5	0	8891	37	242604
NORAMCO INC	0	227	0	0	227	163129	0
VP RACING FUELS	1	0	0	0	0	0	0
Toluene Total	**1**	**9,157**	**5**	**0**	**9,162**	**294,084**	**242,604**
Toluene diisocyanate (mixed isomers)							
AEARO TECHNOLOGIES LLC	0	5	0	0	5	1418	0
Toluene diisocyanate (mixed isomers) Total	**0**	**5**	**0**	**0**	**5**	**1,418**	**0**
Trichloroethylene							
HANDYTUBE	0	1313	0	0	1313	10295	0
Trichloroethylene Total	**0**	**1,313**	**0**	**0**	**1,313**	**10,295**	**0**

Source: DNREC 2018 TRI Database, October, 2019
A "1" in the Form A column indicates a Form A report

All Amounts Are in Pounds

APPENDIX F

2018 ON-SITE RELEASES BY CHEMICAL AND FACILITY

FACILITY/CHEMICAL	FORM A	ON-SITE RELEASES TO AIR	TO WATER	TO LAND	TOTAL	OFF-SITE TRANSFERS	ON-SITE WASTE MANAGEMENT
Vinyl acetate							
FORMOSA PLASTICS	0	15114	0	0	15114	112	3700
Vinyl acetate Total	**0**	**15,114**	**0**	**0**	**15,114**	**112**	**3,700**
Vinyl chloride							
FORMOSA PLASTICS	0	22740	1	0	22741	221	134600
Vinyl chloride Total	**0**	**22,740**	**1**	**0**	**22,741**	**221**	**134,600**
Xylene (mixed isomers)							
BASF COLORS AND EFFECTS USA LLC	0	960	0	0	960	461	0
DELAWARE CITY REFINERY	0	5692	5	0	5697	82	259083
DOVER AFB	0	51	0	0	51	0	0
GRIFFITH ENERGY SERVICES - CARL KING	1	0	0	0	0	0	0
ROGERS CORP	0	1950	0	0	1950	5300	99000
Xylene (mixed isomers) Total	**1**	**8,653**	**5**	**0**	**8,658**	**5,843**	**358,083**
Zinc Compounds							
ALLEN HARIM FARMS SEAFORD MILL	1	0	0	0	0	0	0
AMICK FARMS	1	0	0	0	0	0	0
MOUNTAIRE FARMS - FRANKFORD MILL	1	0	0	0	0	0	0
MOUNTAIRE FARMS OF DELAWARE	1	0	0	0	0	0	0
PPG INDUSTRIES	0	35	0	0	35	2950	0
V&S DELAWARE GALVANIZING	0	561	354	0	915	210926	418960
Zinc Compounds Total	**4**	**596**	**354**	**0**	**950**	**213,876**	**418,960**
Grand Total	**29**	**739,722**	**5,416,033**	**14,037**	**6,169,792**	**11,655,509**	**496,022,818**

Source: DNREC 2018 TRI Database, October, 2019
A "1" in the Form A column indicates a Form A report

All Amounts Are in Pounds

APPENDIX G

2018 OFF-SITE TRANSFERS AND WASTE MANAGED ON-SITE BY CHEMICAL

	OFF SITE TRANSFERS						ON SITE WASTE MANAGEMENT			
CHEMICAL/FACILITY	POTW	RECYCLE	ENERGY RECOVERY	TREATMENT	DISPOSAL	TOTAL	RECYCLE	ENERGY RECOVERY	TREATMENT	TOTAL
1,2,4-Trimethylbenzene										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	79,442	79,442
DOVER AFB	0	0	0	0	0	0	0	0	0	0
GAC SEAFORD	0	0	0	0	0	0	0	0	0	0
GRIFFITH ENERGY SERVICES - CARL KING	0	0	0	0	0	0	0	0	0	0
1,2,4-Trimethylbenzene Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**79,442**	**79,442**
1,3-Butadiene										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	0	0
1,3-Butadiene Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2,4-Dimethylphenol										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	236,392	236,392
2,4-Dimethylphenol Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**236,392**	**236,392**
4,4'-Methylenebis(2-chloroaniline)										
ROHM & HAAS B5 B6	0	0	0	1,124	0	1,124	0	0	0	0
ROHM & HAAS B7 B15	0	0	0	621	0	621	0	0	0	0
4,4'-Methylenebis(2-chloroaniline) Total	**0**	**0**	**0**	**1,745**	**0**	**1,745**	**0**	**0**	**0**	**0**
Acetonitrile										
AGILENT TECHNOLOGIES	0	0	22,157	0	0	22,157	0	0	0	0
Acetonitrile Total	**0**	**0**	**22,157**	**0**	**0**	**22,157**	**0**	**0**	**0**	**0**
Ammonia										
CALPINE CORP - GARRISON ENERGY CENTEI	0	0	0	0	0	0	0	0	0	0
DELAWARE CITY REFINERY	0	0	0	0	145	145	0	13,218,310	101,902	13,320,212
EDGE MOOR/HAY ROAD ENERGY CENTERS	132	0	0	0	0	132	0	0	0	0
FORMOSA PLASTICS	0	0	0	0	0	0	0	0	7,200	7,200
INDIAN RIVER GENERATING STATION	0	0	0	0	0	0	0	0	38,446	38,446
MOUNTAIRE FARMS - SELBYVILLE PLANT	6,094	0	0	0	1,794	7,888	0	0	17,200	17,200
PICTSWEET BRIDGEVILLE	0	0	0	0	0	0	0	0	0	0
Ammonia Total	**6,226**	**0**	**0**	**0**	**1,939**	**8,165**	**0**	**13,218,310**	**164,748**	**13,383,058**
Aniline										
BASF COLORS AND EFFECTS USA LLC	6,182	0	13,196	664	0	20,042	0	0	1,091	1,091
ORIENT CORP	1,700	0	0	0	83	1,783	190,000	0	120,000	310,000
Aniline Total	**7,882**	**0**	**13,196**	**664**	**83**	**21,825**	**190,000**	**0**	**121,091**	**311,091**
Anthracene										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	0	0
Anthracene Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Source: DNREC 2018 TRI Database, October, 2019

All Amounts Are in Pounds

APPENDIX G

2018 OFF-SITE TRANSFERS AND WASTE MANAGED ON-SITE BY CHEMICAL

	OFF SITE TRANSFERS						ON SITE WASTE MANAGEMENT			
CHEMICAL/FACILITY	POTW	RECYCLE	ENERGY RECOVERY	TREATMENT	DISPOSAL	TOTAL	RECYCLE	ENERGY RECOVERY	TREATMENT	TOTAL
Antimony Compounds										
JOHNSON CONTROLS BATTERY PLANT	0	17,119	0	0	1	17,120	0	0	0	0
JOHNSON CONTROLS DISTRIBUTION	0	14,505	0	0	0	14,505	0	0	0	0
Antimony Compounds Total	**0**	**31,624**	**0**	**0**	**1**	**31,625**	**0**	**0**	**0**	**0**
Arsenic Compounds										
JOHNSON CONTROLS DISTRIBUTION	0	893	0	0	0	893	0	0	0	0
Arsenic Compounds Total	**0**	**893**	**0**	**0**	**0**	**893**	**0**	**0**	**0**	**0**
Asbestos (friable)										
DELAWARE CITY REFINERY	0	0	0	0	77,940	77,940	0	0	0	0
Asbestos (friable) Total	**0**	**0**	**0**	**0**	**77,940**	**77,940**	**0**	**0**	**0**	**0**
Barium Compounds										
INDIAN RIVER GENERATING STATION	0	0	0	0	2	2	0	0	0	0
PRINCE MINERALS LLC	0	0	0	0	0	0	0	0	0	0
Barium Compounds Total	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**
Benzene										
DELAWARE CITY REFINERY	0	7	0	0	7	13	0	410,236	103,963	514,199
Benzene Total	**0**	**7**	**0**	**0**	**7**	**13**	**0**	**410,236**	**103,963**	**514,199**
Benzo(g,h,i)perylene										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	462	462
Benzo(g,h,i)perylene Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**462**	**462**
Biphenyl										
BASF COLORS AND EFFECTS USA LLC	15,391	0	202,095	36,653	0	254,139	0	0	2,365	2,365
Biphenyl Total	**15,391**	**0**	**202,095**	**36,653**	**0**	**254,139**	**0**	**0**	**2,365**	**2,365**
Boron trifluoride										
HONEYWELL	0	0	0	0	0	0	0	0	70,754	70,754
Boron trifluoride Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**70,754**	**70,754**
Carbon disulfide										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	140,300	4,405,753	4,546,053
Carbon disulfide Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**140,300**	**4,405,753**	**4,546,053**
Carbonyl sulfide										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	14,696,433	14,696,433
Carbonyl sulfide Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**14,696,433**	**14,696,433**

Source: DNREC 2018 TRI Database, October, 2019

All Amounts Are in Pounds

APPENDIX G

2018 OFF-SITE TRANSFERS AND WASTE MANAGED ON-SITE BY CHEMICAL

	OFF SITE TRANSFERS						ON SITE WASTE MANAGEMENT			
CHEMICAL/FACILITY	POTW	RECYCLE	ENERGY RECOVERY	TREATMENT	DISPOSAL	TOTAL	RECYCLE	ENERGY RECOVERY	TREATMENT	TOTAL
Certain Glycol Ethers										
CRODA	2,794	0	0	5	0	2,799	0	0	0	0
PPG INDUSTRIES	340	0	0	384	616	1,340	0	0	0	0
Certain Glycol Ethers Total	**3,134**	**0**	**0**	**389**	**616**	**4,139**	**0**	**0**	**0**	**0**
Chlorine										
KUEHNE	0	0	0	0	0	0	0	0	0	0
SPI PHARMA	0	0	0	0	0	0	0	0	0	0
Chlorine Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Chlorodifluoromethane										
MESSER LLC	0	0	0	0	0	0	0	0	0	0
Chlorodifluoromethane Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Chromium										
DUHADAWAY TOOL & DIE SHOP INC	0	10,298	0	0	103	10,401	0	0	0	0
HANDYTUBE	0	35,205	0	0	82	35,287	0	0	0	0
METAL MASTERS	0	191,132	0	0	324	191,456	0	0	0	0
Chromium Total	**0**	**236,635**	**0**	**0**	**509**	**237,144**	**0**	**0**	**0**	**0**
Chromium Compounds										
BALTIMORE AIRCOIL COMPANY	0	260,861	0	0	0	260,861	0	0	0	0
PERDUE BRIDGEVILLE	0	0	0	0	0	0	0	0	0	0
Chromium Compounds Total	**0**	**260,861**	**0**	**0**	**0**	**260,861**	**0**	**0**	**0**	**0**
Cobalt										
DELAWARE CITY REFINERY	0	32	0	0	0	33	0	0	0	0
Cobalt Total	**0**	**32**	**0**	**0**	**0**	**33**	**0**	**0**	**0**	**0**
Cobalt Compounds										
BALTIMORE AIRCOIL COMPANY	0	32,225	0	0	0	32,225	0	0	0	0
Cobalt Compounds Total	**0**	**32,225**	**0**	**0**	**0**	**32,225**	**0**	**0**	**0**	**0**
Copper										
ALLEN HARIM FARMS SEAFORD MILL	0	0	0	0	0	0	0	0	0	0
ROGERS CORP	18	4,200	0	0	5	4,223	0	0	0	0
Copper Total	**18**	**4,200**	**0**	**0**	**5**	**4,223**	**0**	**0**	**0**	**0**

Source: DNREC 2018 TRI Database, October, 2019

All Amounts Are in Pounds

APPENDIX G

2018 OFF-SITE TRANSFERS AND WASTE MANAGED ON-SITE BY CHEMICAL

	OFF SITE TRANSFERS						ON SITE WASTE MANAGEMENT			
CHEMICAL/FACILITY	POTW	RECYCLE	ENERGY RECOVERY	TREATMENT	DISPOSAL	TOTAL	RECYCLE	ENERGY RECOVERY	TREATMENT	TOTAL
Copper Compounds										
ALLEN HARIM FARMS SEAFORD MILL	0	0	0	0	0	0	0	0	0	0
AMICK FARMS	0	0	0	0	0	0	0	0	0	0
BALTIMORE AIRCOIL COMPANY	0	39,878	0	0	0	39,878	0	0	0	0
MOUNTAIRE FARMS - FRANKFORD MILL	0	0	0	0	0	0	0	0	0	0
MOUNTAIRE FARMS OF DELAWARE	0	0	0	0	0	0	0	0	0	0
PERDUE BRIDGEVILLE	0	0	0	0	0	0	0	0	0	0
Copper Compounds Total	**0**	**39,878**	**0**	**0**	**0**	**39,878**	**0**	**0**	**0**	**0**
Creosote										
DELAWARE CITY REFINERY	0	0	0	0	562	562	0	0	0	0
Creosote Total	**0**	**0**	**0**	**0**	**562**	**562**	**0**	**0**	**0**	**0**
Cresol (mixed isomers)										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	24,092	317,460	341,552
Cresol (mixed isomers) Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**24,092**	**317,460**	**341,552**
Cumene										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	4,221	4,221
DOVER AFB	0	0	0	0	0	0	0	0	0	0
Cumene Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4,221**	**4,221**
Cyanide Compounds										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	14,687	14,687
Cyanide Compounds Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**14,687**	**14,687**
Cyclohexane										
AIR LIQUIDE ADVANCED SEPARATIONS	0	0	8,014	0	0	8,014	0	0	0	0
BASF COLORS AND EFFECTS USA LLC	0	32,079	0	0	0	32,079	0	0	0	0
DELAWARE CITY REFINERY	0	7	0	1	4	12	0	0	9,095	9,095
Cyclohexane Total	**0**	**32,086**	**8,014**	**1**	**4**	**40,105**	**0**	**0**	**9,095**	**9,095**
Diethanolamine										
CRODA	21,986	0	0	2	0	21,988	0	0	0	0
Diethanolamine Total	**21,986**	**0**	**0**	**2**	**0**	**21,988**	**0**	**0**	**0**	**0**
Diisocyanates										
AEARO TECHNOLOGIES LLC	0	0	0	10,025	0	10,025	0	0	0	0
ROHM & HAAS B2 B3 B8	0	0	0	1,808	0	1,808	0	0	0	0
ROHM & HAAS B5 B6	0	0	0	6,816	0	6,816	0	0	0	0
Diisocyanates Total	**0**	**0**	**0**	**18,649**	**0**	**18,649**	**0**	**0**	**0**	**0**

Source: DNREC 2018 TRI Database, October, 2019

All Amounts Are in Pounds

APPENDIX G

2018 OFF-SITE TRANSFERS AND WASTE MANAGED ON-SITE BY CHEMICAL

	OFF SITE TRANSFERS						ON SITE WASTE MANAGEMENT			
CHEMICAL/FACILITY	POTW	RECYCLE	ENERGY RECOVERY	TREATMENT	DISPOSAL	TOTAL	RECYCLE	ENERGY RECOVERY	TREATMENT	TOTAL
Dioxin and Dioxin-like Compounds										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	0	0
EDGE MOOR/HAY ROAD ENERGY CENTERS	0	0	0	0	0	0	0	0	0	0
FORMOSA PLASTICS	0	0	0	0	0	0	0	0	0	0
Dioxin and Dioxin-like Compounds Total	**0**	**0.000000**	**0.000000**	**0.000000**	**0.000232**	**0.000232**	**0.000000**	**0.000000**	**0.001268**	**0.001268**
Diphenylamine										
ORIENT CORP	0	0	0	0	0	0	0	0	0	0
Diphenylamine Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Ethylbenzene										
DELAWARE CITY REFINERY	0	9	0	2	3	13	0	0	62,757	62,757
DOVER AFB	0	0	0	0	0	0	0	0	0	0
ROGERS CORP	0	0	0	1,000	0	1,000	0	0	19,000	19,000
Ethylbenzene Total	**0**	**9**	**0**	**1,002**	**3**	**1,013**	**0**	**0**	**81,757**	**81,757**
Ethylene										
CRODA	0	0	0	0	0	0	0	0	0	0
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	0	0
Ethylene Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Ethylene glycol										
CRODA	763	0	0	905	0	1,668	0	0	0	0
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	18,990	18,990
FUJIFILM	0	0	0	0	0	0	0	0	0	0
HONEYWELL	0	0	200	0	0	200	0	0	0	0
PPG INDUSTRIES	995	0	0	62	1,803	2,860	0	0	0	0
Ethylene glycol Total	**1,758**	**0**	**200**	**967**	**1,803**	**4,728**	**0**	**0**	**18,990**	**18,990**
Ethylene oxide										
CRODA	0	0	0	0	0	0	0	0	541	541
Ethylene oxide Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**541**	**541**
Hydrazine										
VEOLIA - RED LION PLANT	0	0	0	0	0	0	0	0	0	0
Hydrazine Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Hydrazine sulfate										
VEOLIA - RED LION PLANT	0	0	0	0	0	0	0	0	0	0
Hydrazine sulfate Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Source: DNREC 2018 TRI Database, October, 2019

All Amounts Are in Pounds

APPENDIX G

2018 OFF-SITE TRANSFERS AND WASTE MANAGED ON-SITE BY CHEMICAL

	OFF SITE TRANSFERS						ON SITE WASTE MANAGEMENT			
CHEMICAL/FACILITY	POTW	RECYCLE	ENERGY RECOVERY	TREATMENT	DISPOSAL	TOTAL	RECYCLE	ENERGY RECOVERY	TREATMENT	TOTAL
Hydrochloric acid										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	102,009	102,009
INDIAN RIVER GENERATING STATION	0	0	0	0	0	0	0	0	330,135	330,135
Hydrochloric acid Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**432,144**	**432,144**
Hydrogen cyanide										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	273,529	273,529
Hydrogen cyanide Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**273,529**	**273,529**
Hydrogen fluoride										
HONEYWELL	0	0	0	0	0	0	0	0	91	91
INDIAN RIVER GENERATING STATION	0	0	0	0	0	0	0	0	37,936	37,936
Hydrogen fluoride Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**38,027**	**38,027**
Hydrogen Sulfide										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	446,479,559	446,479,559
MOUNTAIRE FARMS OF DELAWARE	0	0	0	0	0	0	0	0	182,140	182,140
PERDUE GEORGETOWN	0	0	0	0	0	0	0	0	82,354	82,354
VEOLIA - RED LION PLANT	0	0	0	0	0	0	0	0	0	0
Hydrogen Sulfide Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**446,744,053**	**446,744,053**
Lead										
HMA - HERITAGE CONCRETE BEAR	0	0	0	0	0	0	0	0	0	0
HMA - HERITAGE CONCRETE CHESWOLD	0	0	0	0	0	0	0	0	0	0
HMA - HERITAGE CONCRETE HEALD STREET	0	0	0	0	0	0	0	0	0	0
HMA - HERITAGE CONCRETE MIDDLETOWN	0	0	0	0	0	0	0	0	0	0
NATIONAL GUARD TRAINING SITE RANGE	0	0	0	0	0	0	0	0	0	0
V&S DELAWARE GALVANIZING	0	5,297	0	0	330	5,627	3,571	0	0	3,571
Lead Total	**0**	**5,297**	**0**	**0**	**330**	**5,627**	**3,571**	**0**	**0**	**3,571**
Lead Compounds										
DELAWARE CITY REFINERY	0	483	0	0	27	510	0	0	0	0
INDIAN RIVER GENERATING STATION	0	0	0	0	1	1	0	0	0	0
JOHNSON CONTROLS BATTERY PLANT	0	4,183,545	0	0	270	4,183,816	0	0	0	0
JOHNSON CONTROLS DISTRIBUTION	6	3,539,367	0	0	800	3,540,173	0	0	0	0
OWEN STEEL COMPANY	0	321	0	0	0	321	0	0	0	0
Lead Compounds Total	**6**	**7,723,717**	**0**	**0**	**1,098**	**7,724,821**	**0**	**0**	**0**	**0**
Manganese										
ALLEN HARIM FARMS SEAFORD MILL	0	0	0	0	0	0	0	0	0	0
COLOR WORKS PAINTING	0	740	0	0	0	740	0	0	0	0
HANDYTUBE	0	3,528	0	0	7	3,535	0	0	0	0
Manganese Total	**0**	**4,268**	**0**	**0**	**7**	**4,275**	**0**	**0**	**0**	**0**

Source: DNREC 2018 TRI Database, October, 2019

All Amounts Are in Pounds

APPENDIX G

2018 OFF-SITE TRANSFERS AND WASTE MANAGED ON-SITE BY CHEMICAL

	OFF SITE TRANSFERS						ON SITE WASTE MANAGEMENT			
CHEMICAL/FACILITY	POTW	RECYCLE	ENERGY RECOVERY	TREATMENT	DISPOSAL	TOTAL	RECYCLE	ENERGY RECOVERY	TREATMENT	TOTAL
Manganese Compounds										
ALLEN HARIM FARMS SEAFORD MILL	0	0	0	0	0	0	0	0	0	0
AMICK FARMS	0	0	0	0	0	0	0	0	0	0
BALTIMORE AIRCOIL COMPANY	0	119,020	0	0	0	119,020	0	0	0	0
MOUNTAIRE FARMS - FRANKFORD MILL	0	0	0	0	0	0	0	0	0	0
MOUNTAIRE FARMS OF DELAWARE	0	0	0	0	0	0	0	0	0	0
OWEN STEEL COMPANY	0	3,710	0	0	0	3,710	0	0	0	0
PRINCE MINERALS LLC	0	0	0	0	0	0	0	0	0	0
Manganese Compounds Total	**0**	**122,730**	**0**	**0**	**0**	**122,730**	**0**	**0**	**0**	**0**
Mercury										
DENTSPLY SIRONA MAIN PLANT	0	171	0	0	0	171	0	0	0	0
EDGE MOOR/HAY ROAD ENERGY CENTERS	0	0	0	0	0	0	0	0	0	0
Mercury Total	**0**	**170.5800**	**0.0000**	**0.0000**	**0.0000**	**170.6800**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
Mercury Compounds										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	0	0
INDIAN RIVER GENERATING STATION	0	0	0	0	0	0	0	0	0	0
INTERVET INC	0	71	0	0	0	71	0	0	0	0
Mercury Compounds Total	**0**	**71.3900**	**0.0000**	**0.0000**	**0.4149**	**71.8049**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
Methanol										
AGILENT TECHNOLOGIES	0	0	57,174	246	0	57,420	0	0	0	0
AIR LIQUIDE ADVANCED SEPARATIONS	0	0	0	91,027	0	91,027	2,882,537	0	0	2,882,537
BASF COLORS AND EFFECTS USA LLC	386,649	0	5,182	1,615	0	393,446	236,052	0	818,051	1,054,103
CRODA	8,006	0	0	10,275	0	18,281	0	0	0	0
DENTSPLY SIRONA WEST PLANT	68	0	8,156	0	0	8,224	0	0	0	0
DYK AUTOMOTIVE LLC	0	0	0	0	0	0	0	0	0	0
HONEYWELL	80	0	2,560	48	0	2,688	0	0	0	0
NORAMCO INC	3,181	0	60,433	0	0	63,614	0	0	0	0
Methanol Total	**397,984**	**0**	**133,504**	**103,211**	**0**	**634,699**	**3,118,589**	**0**	**818,051**	**3,936,640**
Methyl methacrylate										
DENTSPLY SIRONA WEST PLANT	58	0	119	0	0	177	0	0	0	0
Methyl methacrylate Total	**58**	**0**	**119**	**0**	**0**	**177**	**0**	**0**	**0**	**0**
Molybdenum trioxide										
DELAWARE CITY REFINERY	0	12	0	0	1	13	0	0	0	0
Molybdenum trioxide Total	**0**	**12**	**0**	**0**	**1**	**13**	**0**	**0**	**0**	**0**
N,N-Dimethylformamide										
AIR LIQUIDE ADVANCED SEPARATIONS	18,300	0	4,480	0	0	22,780	0	0	0	0
ROHM & HAAS B2 B3 B8	223,036	0	260,438	0	45,000	528,474	4,570,797	0	448	4,571,245
N,N-Dimethylformamide Total	**241,336**	**0**	**264,918**	**0**	**45,000**	**551,254**	**4,570,797**	**0**	**448**	**4,571,245**

Source: DNREC 2018 TRI Database, October, 2019

All Amounts Are in Pounds

APPENDIX G

2018 OFF-SITE TRANSFERS AND WASTE MANAGED ON-SITE BY CHEMICAL

	OFF SITE TRANSFERS						ON SITE WASTE MANAGEMENT			
CHEMICAL/FACILITY	POTW	RECYCLE	ENERGY RECOVERY	TREATMENT	DISPOSAL	TOTAL	RECYCLE	ENERGY RECOVERY	TREATMENT	TOTAL
Naphthalene										
CRODA	1,327	0	0	2,070	0	3,397	0	0	0	0
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	13,305	13,305
DOVER AFB	0	0	0	0	0	0	0	0	0	0
GRIFFITH ENERGY SERVICES - CARL KING	0	0	0	0	0	0	0	0	0	0
Naphthalene Total	**1,327**	**0**	**0**	**2,070**	**0**	**3,397**	**0**	**0**	**13,305**	**13,305**
n-Butyl alcohol										
CRODA	386	0	0	0	0	386	0	0	0	0
NORAMCO INC	12,809	0	243,372	0	0	256,181	0	0	0	0
n-Butyl alcohol Total	**13,195**	**0**	**243,372**	**0**	**0**	**256,567**	**0**	**0**	**0**	**0**
n-Hexane										
AIR LIQUIDE ADVANCED SEPARATIONS	0	0	0	0	0	0	2,397,027	0	0	2,397,027
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	84,669	84,669
n-Hexane Total	**0**	**0**	**0**	**0**	**0**	**0**	**2,397,027**	**0**	**84,669**	**2,481,696**
Nickel										
DUHADAWAY TOOL & DIE SHOP INC	0	12,678	0	0	127	12,805	0	0	0	0
HANDYTUBE	0	35,090	0	0	121	35,211	0	0	0	0
METAL MASTERS	0	69,236	0	0	103	69,339	0	0	0	0
Nickel Total	**0**	**117,004**	**0**	**0**	**351**	**117,355**	**0**	**0**	**0**	**0**
Nickel Compounds										
BALTIMORE AIRCOIL COMPANY	0	299,531	0	0	0	299,531	0	0	0	0
OWEN STEEL COMPANY	0	8,120	0	0	0	8,120	0	0	0	0
PRINCE MINERALS LLC	0	0	0	0	0	0	0	0	0	0
Nickel Compounds Total	**0**	**307,651**	**0**	**0**	**0**	**307,651**	**0**	**0**	**0**	**0**
Nitrate compounds										
ALLEN HARIM FOODS HARBESON	0	0	0	0	0	0	0	0	0	0
BASF COLORS AND EFFECTS USA LLC	15,542	0	0	0	0	15,542	0	0	0	0
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	0	0
HANESBRANDS	25,237	0	0	0	0	25,237	0	0	0	0
PERDUE GEORGETOWN	0	0	0	0	88	88	0	0	0	0
SIMMONS BRIDGEVILLE	80,372	0	0	0	0	80,372	0	0	0	0
Nitrate compounds Total	**121,151**	**0**	**0**	**0**	**88**	**121,239**	**0**	**0**	**0**	**0**
Nitric acid										
BASF COLORS AND EFFECTS USA LLC	0	0	0	0	0	0	0	0	15,793	15,793
SPI PHARMA	0	0	0	0	0	0	0	0	0	0
Nitric acid Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**15,793**	**15,793**

Source: DNREC 2018 TRI Database, October, 2019

All Amounts Are in Pounds

APPENDIX G

2018 OFF-SITE TRANSFERS AND WASTE MANAGED ON-SITE BY CHEMICAL

	OFF SITE TRANSFERS						ON SITE WASTE MANAGEMENT			
CHEMICAL/FACILITY	POTW	RECYCLE	ENERGY RECOVERY	TREATMENT	DISPOSAL	TOTAL	RECYCLE	ENERGY RECOVERY	TREATMENT	TOTAL
Nitrobenzene										
ORIENT CORP	0	0	0	0	0	0	0	0	0	0
Nitrobenzene Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
N-Methyl-2-pyrrolidone										
AIR LIQUIDE ADVANCED SEPARATIONS	92,612	0	18,570	0	0	111,182	0	0	0	0
BASF COLORS AND EFFECTS USA LLC	9,764	0	3,321	0	0	13,085	0	0	9	9
PPG INDUSTRIES	26	0	0	498	46	570	0	0	0	0
ROHM & HAAS B5 B6	0	38,166	0	896	4,129	43,191	0	0	0	0
ROHM & HAAS B7 B15	0	7,695	0	299	856	8,850	0	0	0	0
N-Methyl-2-pyrrolidone Total	**102,402**	**45,861**	**21,891**	**1,693**	**5,031**	**176,878**	**0**	**0**	**9**	**9**
Nonylphenol										
CRODA	1,045	0	0	0	0	1,045	0	0	0	0
Nonylphenol Total	**1,045**	**0**	**0**	**0**	**0**	**1,045**	**0**	**0**	**0**	**0**
p-Chloroaniline										
BASF COLORS AND EFFECTS USA LLC	2,700	0	9,433	54	0	12,187	0	0	324	324
p-Chloroaniline Total	**2,700**	**0**	**9,433**	**54**	**0**	**12,187**	**0**	**0**	**324**	**324**
Peracetic acid										
ALLEN HARIM FOODS HARBESON	0	0	0	0	0	0	0	0	0	0
MOUNTAIRE FARMS - SELBYVILLE PLANT	0	0	0	0	0	0	0	0	324,671	324,671
MOUNTAIRE FARMS OF DELAWARE	0	0	0	0	0	0	0	0	555,556	555,556
PERDUE GEORGETOWN	0	0	0	0	0	0	0	0	191,058	191,058
PERDUE MILFORD	62	0	0	0	0	62	0	0	124,901	124,901
Peracetic acid Total	**62**	**0**	**0**	**0**	**0**	**62**	**0**	**0**	**1,196,186**	**1,196,186**
Phenanthrene										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	40	40
Phenanthrene Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**40**	**40**
Phenol										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	61,435	276,725	338,160
Phenol Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**61,435**	**276,725**	**338,160**
Polycyclic aromatic compounds										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	380	380
EDGE MOOR/HAY ROAD ENERGY CENTERS	0	0	0	0	0	0	0	0	0	0
IKO	0	146	0	0	2	148	551	0	0	551
Polycyclic aromatic compounds Total	**0**	**146**	**0**	**0**	**2**	**148**	**551**	**0**	**380**	**931**

Source: DNREC 2018 TRI Database, October, 2019

All Amounts Are in Pounds

APPENDIX G

2018 OFF-SITE TRANSFERS AND WASTE MANAGED ON-SITE BY CHEMICAL

	OFF SITE TRANSFERS						ON SITE WASTE MANAGEMENT			
CHEMICAL/FACILITY	POTW	RECYCLE	ENERGY RECOVERY	TREATMENT	DISPOSAL	TOTAL	RECYCLE	ENERGY RECOVERY	TREATMENT	TOTAL
Propylene										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	0	0
Propylene Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Propylene oxide										
CRODA	0	0	0	0	0	0	0	0	919	919
Propylene oxide Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**919**	**919**
Selenium Compounds										
PERDUE BRIDGEVILLE	0	0	0	0	0	0	0	0	0	0
Selenium Compounds Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Styrene										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	1,618	1,618
JUSTIN TANKS	0	0	0	5,240	0	5,240	26,226	0	0	26,226
Styrene Total	**0**	**0**	**0**	**5,240**	**0**	**5,240**	**26,226**	**0**	**1,618**	**27,844**
Sulfuric acid										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	0	0
INDIAN RIVER GENERATING STATION	0	0	0	0	0	0	0	0	479,362	479,362
VEOLIA - RED LION PLANT	0	0	0	0	0	0	0	0	0	0
Sulfuric acid Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**479,362**	**479,362**
Tetrachloroethylene										
DELAWARE CITY REFINERY	0	0	0	0	0	0	0	0	0	0
Tetrachloroethylene Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Toluene										
AGILENT TECHNOLOGIES	0	0	130,258	660	0	130,918	0	0	0	0
DELAWARE CITY REFINERY	0	9	0	4	24	37	0	0	242,604	242,604
NORAMCO INC	1,631	0	161,498	0	0	163,129	0	0	0	0
VP RACING FUELS	0	0	0	0	0	0	0	0	0	0
Toluene Total	**1,631**	**9**	**291,756**	**664**	**24**	**294,084**	**0**	**0**	**242,604**	**242,604**
Toluene diisocyanate (mixed isomers)										
AEARO TECHNOLOGIES LLC	0	0	0	1,418	0	1,418	0	0	0	0
Toluene diisocyanate (mixed isomers) Total	**0**	**0**	**0**	**1,418**	**0**	**1,418**	**0**	**0**	**0**	**0**
Trichloroethylene										
HANDYTUBE	0	0	0	10,295	0	10,295	0	0	0	0
Trichloroethylene Total	**0**	**0**	**0**	**10,295**	**0**	**10,295**	**0**	**0**	**0**	**0**

Source: DNREC 2018 TRI Database, October, 2019

All Amounts Are in Pounds

APPENDIX G

2018 OFF-SITE TRANSFERS AND WASTE MANAGED ON-SITE BY CHEMICAL

	OFF SITE TRANSFERS						ON SITE WASTE MANAGEMENT			
CHEMICAL/FACILITY	POTW	RECYCLE	ENERGY RECOVERY	TREATMENT	DISPOSAL	TOTAL	RECYCLE	ENERGY RECOVERY	TREATMENT	TOTAL
Vinyl acetate										
FORMOSA PLASTICS	0	0	0	112	0	112	0	0	3,700	3,700
Vinyl acetate Total	**0**	**0**	**0**	**112**	**0**	**112**	**0**	**0**	**3,700**	**3,700**
Vinyl chloride										
FORMOSA PLASTICS	0	0	43	179	0	221	0	0	134,600	134,600
Vinyl chloride Total	**0**	**0**	**43**	**179**	**0**	**221**	**0**	**0**	**134,600**	**134,600**
Xylene (mixed isomers)										
BASF COLORS AND EFFECTS USA LLC	221	0	236	4	0	461	0	0	0	0
DELAWARE CITY REFINERY	0	23	0	10	49	82	0	0	259,083	259,083
DOVER AFB	0	0	0	0	0	0	0	0	0	0
GRIFFITH ENERGY SERVICES - CARL KING	0	0	0	0	0	0	0	0	0	0
ROGERS CORP	0	0	0	5,300	0	5,300	0	0	99,000	99,000
Xylene (mixed isomers) Total	**221**	**23**	**236**	**5,314**	**49**	**5,843**	**0**	**0**	**358,083**	**358,083**
Zinc Compounds										
ALLEN HARIM FARMS SEAFORD MILL	0	0	0	0	0	0	0	0	0	0
AMICK FARMS	0	0	0	0	0	0	0	0	0	0
MOUNTAIRE FARMS - FRANKFORD MILL	0	0	0	0	0	0	0	0	0	0
MOUNTAIRE FARMS OF DELAWARE	0	0	0	0	0	0	0	0	0	0
PPG INDUSTRIES	774	0	0	0	2,176	2,950	0	0	0	0
V&S DELAWARE GALVANIZING	0	161,183	0	0	49,743	210,926	418,960	0	0	418,960
Zinc Compounds Total	**774**	**161,183**	**0**	**0**	**51,919**	**213,876**	**418,960**	**0**	**0**	**418,960**
STATE TOTALS	**940,287**	**9,126,594**	**1,210,933**	**190,320**	**187,375**	**11,655,509**	**10,725,721**	**13,854,373**	**471,442,723**	**496,022,818**

Source: DNREC 2018 TRI Database, October, 2019

All Amounts Are in Pounds

APPENDIX H

2018 ON-SITE RELEASE SUMMARY BY CHEMICAL

CHEMICAL - RANKED BY TOTAL ON-SITE RELEASE	ON-SITE RELEASES TO AIR	TO WATER	TO LAND	TOTAL	TRANSFERS OFF-SITE	ON-SITE WASTE MGMT.
Nitrate compounds	0	5,409,396	0	5,409,396	121,239	0
Sulfuric acid	276,438	0	0	276,438	0	479,362
Hydrogen cyanide	150,342	207	0	150,549	0	273,529
Ammonia	102,949	4,434	0	107,383	8,165	13,383,058
Methanol	39,411	0	0	39,411	634,699	3,936,640
Hydrogen Sulfide	29,857	229	0	30,086	0	446,744,053
Vinyl chloride	22,740	1	0	22,741	221	134,600
n-Hexane	15,959	5	0	15,964	0	2,481,696
Vinyl acetate	15,114	0	0	15,114	112	3,700
Styrene	13,369	5	0	13,374	5,240	27,844
Cyclohexane	10,996	5	0	11,001	40,105	9,095
Toluene	9,157	5	0	9,162	294,084	242,604
Xylene (mixed isomers)	8,653	5	0	8,658	5,843	358,083
Lead	9	3	7,852	7,864	5,627	3,571
Barium Compounds	25	0	5,605	5,630	2	0
Ethylene oxide	4,886	0	0	4,886	0	541
Benzene	4,736	10	0	4,746	13	514,199
N,N-Dimethylformamide	4,495	0	0	4,495	551,254	4,571,245
N-Methyl-2-pyrrolidone	4,120	0	0	4,120	176,878	9
Propylene	4,010	0	0	4,010	0	0
Methyl methacrylate	3,795	0	0	3,795	177	0
Ethylene	3,716	0	0	3,716	0	0
Ethylbenzene	2,243	5	0	2,248	1,013	81,757
Naphthalene	2,215	5	0	2,220	3,397	13,305
Carbon disulfide	1,443	0	0	1,443	0	4,546,053
Trichloroethylene	1,313	0	0	1,313	10,295	0
Peracetic acid	977	96	0	1,073	62	1,196,186
Hydrogen fluoride	1,055	0	0	1,055	0	38,027
1,2,4-Trimethylbenzene	1,016	5	0	1,021	0	79,442
Zinc Compounds	596	354	0	950	213,876	418,960
Hydrochloric acid	655	0	0	655	0	432,144
Lead Compounds	127	10	462	599	7,724,821	0
Carbonyl sulfide	596	0	0	596	0	14,696,433
Cumene	385	5	0	390	0	4,221
Propylene oxide	384	0	0	384	0	919
Boron trifluoride	358	0	0	358	0	70,754
Cresol (mixed isomers)	0	337	0	337	0	341,552
Phenol	113	168	0	281	0	338,160
Nonylphenol	277	0	0	277	1,045	0
1,3-Butadiene	274	0	0	274	0	0
Polycyclic aromatic compounds	267	4	0	271	148	931
Cobalt	44	214	0	258	33	0
Ethylene glycol	2	192	0	194	4,728	18,990
2,4-Dimethylphenol	0	168	0	168	0	236,392
Cyanide Compounds	0	148	0	148	0	14,687
Mercury Compounds	88.5300	1.5300	42.3000	132.3600	71.8049	0.0000
Aniline	100	0	0	100	21,825	311,091
Creosote	13	0	76	89	562	0
Biphenyl	89	0	0	89	254,107	2,365
Acetonitrile	87	0	0	87	22,157	0
n-Butyl alcohol	84	0	0	84	256,567	0

Source: DNREC 2018 TRI Database, October, 2019 All amounts are in pounds

APPENDIX H

2018 ON-SITE RELEASE SUMMARY BY CHEMICAL

CHEMICAL - RANKED BY TOTAL ON-SITE RELEASE	ON-SITE RELEASES TO AIR	TO WATER	TO LAND	TOTAL	TRANSFERS OFF-SITE	ON-SITE WASTE MGMT.
Manganese Compounds	36	0	0	36	122,730	0
Chlorine	18	0	0	18	0	0
Molybdenum trioxide	17	0	0	17	13	0
Mercury	12.4800	0.0100	0.0000	12.4900	170.6800	0.0000
Copper	10	0	0	10	4,223	0
Phenanthrene	3	5	0	8	0	40
Tetrachloroethylene	7	0	0	7	0	0
Diethanolamine	7	0	0	7	21,988	0
p-Chloroaniline	6	0	0	6	12,187	324
Diisocyanates	6	0	0	6	18,649	0
Nickel Compounds	6	0	0	6	307,651	0
Anthracene	0	5	0	5	0	0
Benzo(g,h,i)perylene	1	5	0	5	0	462
Chromium Compounds	5	0	0	5	260,861	0
Toluene diisocyanate (mixed isomers)	5	0	0	5	1,418	0
Certain Glycol Ethers	2	0	0	2	4,139	0
Nitrobenzene	2	0	0	2	0	0
Chromium	1	0	0	1	237,144	0
Nickel	1	0	0	1	117,355	0
Hydrazine sulfate	0	0	0	0	0	0
4,4'-Methylenebis(2-chloroaniline)	0	0	0	0	1,745	0
Dioxin and Dioxin-like Compounds	0.005495	0.000000	0.000000	0.005495	0.000232	0.001268
Arsenic Compounds	0	0	0	0	893	0
Chlorodifluoromethane	0	0	0	0	0	0
Nitric acid	0	0	0	0	0	15,793
Hydrazine	0	0	0	0	0	0
Cobalt Compounds	0	0	0	0	32,225	0
Asbestos (friable)	0	0	0	0	77,940	0
Diphenylamine	0	0	0	0	0	0
Selenium Compounds	0	0	0	0	0	0
Antimony Compounds	0	0	0	0	31,625	0
Copper Compounds	0	0	0	0	39,878	0
STATE TOTALS	**739,722**	**5,416,033**	**14,037**	**6,169,792**	**11,655,477**	**496,022,818**

All amounts are in pounds

Source: DNREC 2018 TRI Database, October, 2019

APPENDIX I

2018 PBT RELEASE AND TRANSFER DETAIL

PBT CHEMICAL / FACILITY	ON-SITE RELEASES AIR	WATER	LAND	TOTAL	TRANSFERS OFF SITE	ON-SITE WASTE MGMT.
Benzo(g,h,i)perylene						
DELAWARE CITY REFINERY	0.75	4.66	0.00	5.41	0.00	462.00
Benzo(g,h,i)perylene Total	**0.75**	**4.66**	**0.00**	**5.41**	**0.00**	**462.00**
Dioxin and Dioxin-like Compounds						
DELAWARE CITY REFINERY	0.00	0.00	0.00	0.00	0.00	0.00
EDGE MOOR/HAY ROAD ENERGY CENTERS	0.00	0.00	0.00	0.00	0.00	0.00
FORMOSA PLASTICS	0.00	0.00	0.00	0.00	0.00	0.00
Dioxin and Dioxin-like Compounds Total	**0.005495**	**0.000000**	**0.000000**	**0.005495**	**0.0002**	**0.001268**
Lead						
HMA - HERITAGE CONCRETE BEAR	0.00	0.00	5.81	5.81	0.00	0.00
HMA - HERITAGE CONCRETE CHESWOLD	0.00	0.00	4.71	4.71	0.00	0.00
HMA - HERITAGE CONCRETE HEALD STREET	0.00	0.00	16.99	16.99	0.00	0.00
HMA - HERITAGE CONCRETE MIDDLETOWN	0.00	0.00	7.86	7.86	0.00	0.00
NATIONAL GUARD TRAINING SITE RANGE	0.00	0.00	7,816.30	7,816.30	0.00	0.00
V&S DELAWARE GALVANIZING	9.30	3.40	0.00	12.70	5,627.00	3,571.00
Lead Total	**9.31**	**3.40**	**7,851.67**	**7,864.38**	**5,627.00**	**3,571.00**
Lead Compounds						
DELAWARE CITY REFINERY	91.23	2.45	0.00	93.68	510.44	0.00
INDIAN RIVER GENERATING STATION	10.20	0.00	462.00	472.20	0.60	0.00
JOHNSON CONTROLS BATTERY PLANT	25.60	7.80	0.00	33.40	4,183,815.50	0.00
JOHNSON CONTROLS DISTRIBUTION	0.00	0.00	0.00	0.00	3,540,173.00	0.00
OWEN STEEL COMPANY	0.00	0.00	0.00	0.00	321.00	0.00
Lead Compounds Total	**127.03**	**10.25**	**462.00**	**599.28**	**7,724,820.54**	**0.00**
Mercury						
DENTSPLY SIRONA MAIN PLANT	0.68	0.00	0.00	0.68	170.58	0.00
EDGE MOOR/HAY ROAD ENERGY CENTERS	11.80	0.01	0.00	11.81	0.10	0.00
Mercury Total	**12.4800**	**0.0100**	**0.0000**	**12.4900**	**170.6800**	**0.0000**
Mercury Compounds						
DELAWARE CITY REFINERY	86.93	1.53	0.00	88.46	0.40	0.00
INDIAN RIVER GENERATING STATION	1.60	0.00	42.30	43.90	0.00	0.00
INTERVET INC	0.00	0.00	0.00	0.00	71.41	0.00
Mercury Compounds Total	**88.5300**	**1.5300**	**42.3000**	**132.3600**	**71.8049**	**0.0000**
Polycyclic aromatic compounds						
DELAWARE CITY REFINERY	266.30	3.84	0.00	270.14	0.00	380.00
EDGE MOOR/HAY ROAD ENERGY CENTERS	0.20	0.16	0.00	0.36	0.00	0.00
IKO	0.10	0.00	0.00	0.10	148.10	551.20
Polycyclic aromatic compounds Total	**266.60**	**4.00**	**0.00**	**270.60**	**148.10**	**931.20**
STATE PBT TOTALS	**504.70**	**23.85**	**8,355.97**	**8,884.52**	**7,730,838.13**	**4,964.20**

Source: DNREC TRI 2017 Database, October 2018.
All Amounts are in Pounds.

APPENDIX J

2018 CARCINOGEN RELEASE AND TRANSFER DETAIL

CARCINOGEN / FACILITY	TOTAL ON-SITE RELEASES AIR	WATER	LAND	TOTAL	TRANSFERS OFF SITE	ON-SITE WASTE MGMT.
1,3-Butadiene						
DELAWARE CITY REFINERY	274.00	0.00	0.00	274.00	0.00	0.00
1,3-Butadiene Total	**274.00**	**0.00**	**0.00**	**274.00**	**0.00**	**0.00**
4,4'-Methylenebis(2-chloroaniline)						
ROHM & HAAS B5 B6	0.04	0.00	0.00	0.04	1,124.00	0.00
ROHM & HAAS B7 B15	0.04	0.00	0.00	0.04	621.00	0.00
4,4'-Methylenebis(2-chloroaniline) Total	**0.07**	**0.00**	**0.00**	**0.07**	**1,745.00**	**0.00**
Arsenic Compounds						
JOHNSON CONTROLS DISTRIBUTION	0.00	0.00	0.00	0.00	892.60	0.00
Arsenic Compounds Total	**0.00**	**0.00**	**0.00**	**0.00**	**892.60**	**0.00**
Asbestos (friable)						
DELAWARE CITY REFINERY	0.00	0.00	0.00	0.00	77,940.00	0.00
Asbestos (friable) Total	**0.00**	**0.00**	**0.00**	**0.00**	**77,940.00**	**0.00**
Benzene						
DELAWARE CITY REFINERY	4,736.00	10.37	0.00	4,746.37	13.28	514,199.00
Benzene Total	**4,736.00**	**10.37**	**0.00**	**4,746.37**	**13.28**	**514,199.00**
Chromium Compounds						
BALTIMORE AIRCOIL COMPANY	5.00	0.00	0.00	5.00	260,861.00	0.00
PERDUE BRIDGEVILLE	0.00	0.00	0.00	0.00	0.00	0.00
Chromium Compounds Total	**5.00**	**0.00**	**0.00**	**5.00**	**260,861.00**	**0.00**
Cobalt Compounds						
BALTIMORE AIRCOIL COMPANY	0.00	0.00	0.00	0.00	32,225.00	0.00
Cobalt Compounds Total	**0.00**	**0.00**	**0.00**	**0.00**	**32,225.00**	**0.00**
Creosote						
DELAWARE CITY REFINERY	13.00	0.00	76.00	89.00	562.00	0.00
Creosote Total	**13.00**	**0.00**	**76.00**	**89.00**	**562.00**	**0.00**
Cumene						
DELAWARE CITY REFINERY	334.00	5.00	0.00	339.00	0.00	4,221.00
DOVER AFB	51.00	0.00	0.00	51.00	0.00	0.00
Cumene Total	**385.00**	**5.00**	**0.00**	**390.00**	**0.00**	**4,221.00**
Ethylbenzene						
DELAWARE CITY REFINERY	1,692.00	5.00	0.00	1,697.00	13.07	62,757.00
DOVER AFB	51.00	0.00	0.00	51.00	0.00	0.00
ROGERS CORP	500.00	0.00	0.00	500.00	1,000.00	19,000.00
Ethylbenzene Total	**2,243.00**	**5.00**	**0.00**	**2,248.00**	**1,013.07**	**81,757.00**
Ethylene oxide						
CRODA	4,886.00	0.00	0.00	4,886.00	0.00	541.00
Ethylene oxide Total	**4,886.00**	**0.00**	**0.00**	**4,886.00**	**0.00**	**541.00**
Hydrazine						
VEOLIA - RED LION PLANT	0.00	0.00	0.00	0.00	0.00	0.00
Hydrazine Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Hydrazine sulfate						
VEOLIA - RED LION PLANT	0.12	0.00	0.00	0.12	0.00	0.00
Hydrazine sulfate Total	**0.12**	**0.00**	**0.00**	**0.12**	**0.00**	**0.00**
Lead						
HMA - HERITAGE CONCRETE BEAR	0.00	0.00	5.81	5.81	0.00	0.00
HMA - HERITAGE CONCRETE CHESWOLD	0.00	0.00	4.71	4.71	0.00	0.00
HMA - HERITAGE CONCRETE HEALD STREET	0.00	0.00	16.99	16.99	0.00	0.00
HMA - HERITAGE CONCRETE MIDDLETOWN	0.00	0.00	7.86	7.86	0.00	0.00
NATIONAL GUARD TRAINING SITE RANGE	0.00	0.00	7,816.30	7,816.30	0.00	0.00
V&S DELAWARE GALVANIZING	9.30	3.40	0.00	12.70	5,627.00	3,571.00
Lead Total	**9.31**	**3.40**	**7,851.67**	**7,864.38**	**5,627.00**	**3,571.00**
Lead Compounds						
DELAWARE CITY REFINERY	91.23	2.45	0.00	93.68	510.44	0.00
INDIAN RIVER GENERATING STATION	10.20	0.00	462.00	472.20	0.60	0.00
JOHNSON CONTROLS BATTERY PLANT	25.60	7.80	0.00	33.40	4,183,815.50	0.00
JOHNSON CONTROLS DISTRIBUTION	0.00	0.00	0.00	0.00	3,540,173.00	0.00
OWEN STEEL COMPANY	0.00	0.00	0.00	0.00	321.00	0.00
Lead Compounds Total	**127.03**	**10.25**	**462.00**	**599.28**	**7,724,820.54**	**0.00**
Naphthalene						
CRODA	1.46	0.00	0.00	1.46	3,397.00	0.00
DELAWARE CITY REFINERY	2,163.00	5.00	0.00	2,168.00	0.02	13,305.00
DOVER AFB	51.00	0.00	0.00	51.00	0.00	0.00
GRIFFITH ENERGY SERVICES - CARL KING	0.00	0.00	0.00	0.00	0.00	0.00
Naphthalene Total	**2,215.46**	**5.00**	**0.00**	**2,220.46**	**3,397.02**	**13,305.00**

Source: DNREC 2018 TRI Database, October 2019
All amounts are in pounds

APPENDIX J

2018 CARCINOGEN RELEASE AND TRANSFER DETAIL

CARCINOGEN / FACILITY	TOTAL ON-SITE RELEASES AIR	WATER	LAND	TOTAL	TRANSFERS OFF SITE	ON-SITE WASTE MGMT.
Nickel						
DUHADAWAY TOOL & DIE SHOP INC	0.00	0.00	0.00	0.00	12,805.00	0.00
HANDYTUBE	0.00	0.00	0.00	0.00	35,211.00	0.00
METAL MASTERS	0.50	0.00	0.00	0.50	69,339.00	0.00
Nickel Total	**0.50**	**0.00**	**0.00**	**0.50**	**117,355.00**	**0.00**
Nickel Compounds						
BALTIMORE AIRCOIL COMPANY	5.00	0.00	0.00	5.00	299,531.00	0.00
OWEN STEEL COMPANY	0.90	0.00	0.00	0.90	8,120.00	0.00
PRINCE MINERALS LLC	0.00	0.00	0.00	0.00	0.00	0.00
Nickel Compounds Total	**5.90**	**0.00**	**0.00**	**5.90**	**307,651.00**	**0.00**
Nitrobenzene						
ORIENT CORP	2.00	0.00	0.00	2.00	0.00	0.00
Nitrobenzene Total	**2.00**	**0.00**	**0.00**	**2.00**	**0.00**	**0.00**
p-Chloroaniline						
BASF COLORS AND EFFECTS USA LLC	6.00	0.00	0.00	6.00	12,187.18	324.00
p-Chloroaniline Total	**6.00**	**0.00**	**0.00**	**6.00**	**12,187.18**	**324.00**
Polycyclic aromatic compounds						
DELAWARE CITY REFINERY	266.30	3.84	0.00	270.14	0.00	380.00
EDGE MOOR/HAY ROAD ENERGY CENTERS	0.20	0.16	0.00	0.36	0.00	0.00
IKO	0.10	0.00	0.00	0.10	148.10	551.20
Polycyclic aromatic compounds Total	**266.60**	**4.00**	**0.00**	**270.60**	**148.10**	**931.20**
Propylene oxide						
CRODA	384.00	0.00	0.00	384.00	0.00	919.00
Propylene oxide Total	**384.00**	**0.00**	**0.00**	**384.00**	**0.00**	**919.00**
Styrene						
DELAWARE CITY REFINERY	6.90	5.00	0.00	11.90	0.00	1,618.00
JUSTIN TANKS	13,362.00	0.00	0.00	13,362.00	5,240.00	26,226.00
Styrene Total	**13,368.90**	**5.00**	**0.00**	**13,373.90**	**5,240.00**	**27,844.00**
Tetrachloroethylene						
DELAWARE CITY REFINERY	6.60	0.00	0.00	6.60	0.00	0.00
Tetrachloroethylene Total	**6.60**	**0.00**	**0.00**	**6.60**	**0.00**	**0.00**
Toluene diisocyanate (mixed isomers)						
AEARO TECHNOLOGIES LLC	4.77	0.00	0.00	4.77	1,418.00	0.00
Toluene diisocyanate (mixed isomers) Total	**4.77**	**0.00**	**0.00**	**4.77**	**1,418.00**	**0.00**
Trichloroethylene						
HANDYTUBE	1,313.00	0.00	0.00	1,313.00	10,295.00	0.00
Trichloroethylene Total	**1,313.00**	**0.00**	**0.00**	**1,313.00**	**10,295.00**	**0.00**
Vinyl acetate						
FORMOSA PLASTICS	15,114.00	0.00	0.00	15,114.00	112.10	3,700.00
Vinyl acetate Total	**15,114.00**	**0.00**	**0.00**	**15,114.00**	**112.10**	**3,700.00**
Vinyl chloride						
FORMOSA PLASTICS	22,740.00	1.00	0.00	22,741.00	221.17	134,600.00
Vinyl chloride Total	**22,740.00**	**1.00**	**0.00**	**22,741.00**	**221.17**	**134,600.00**
STATE TOTAL	**68,106**	**49**	**8,390**	**76,545**	**8,563,724**	**785,912**

Source: DNREC 2018 TRI Database, October 2019
All amounts are in pounds

Sample Form R
For Reporting year 2018

Form Approved OMB Number: 2025-0009
Approval Expires: 10/31/2021 **Page 1 of 6**

EPA United States Environmental Protection Agency

FORM R

Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986, also Known as Title III of the Superfund Amendments and Reauthorization Act

TRI Facility ID Number

Toxic Chemical, Category, or Generic Name

Complete form online via TRI-MEweb. For a trade secret submission, send completed forms to TRI Reporting Center, P. O. Box 10163, Fairfax, VA 22038. The annual public burden related to the Form R is estimated to average 35.71 hours per response for a facility filing a report on one chemical. See the Reporting Forms and Instructions for more information on submissions and the Paperwork Reduction Act.

This section only applies if you are revising or withdrawing a previously submitted form, otherwise leave blank.	**Revision (Enter up to two code(s))**	**Withdrawal (Enter up to two code(s))**
	☐ ☐	☐ ☐

IMPORTANT: See instructions to determine when "Not Applicable (NA)" boxes should be checked.

PART I. FACILITY IDENTIFICATION INFORMATION

SECTION 1. REPORTING YEAR _____

SECTION 2. TRADE SECRET INFORMATION

2.1	Are you claiming the toxic chemical identified on page 2 as a trade secret? ☐ Yes (Answer question 2.2; attach substantiation forms) ☐ No (Do not answer 2.2; go to Section 3)	**2.2**	Is this copy ☐ Sanitized ☐ Unsanitized (Answer only if "Yes" in 2.1)

SECTION 3. CERTIFICATION (Important: Read and sign after completing all form sections.)

I hereby certify that I have reviewed the attached documents and that, to the best of my knowledge and belief, the submitted information is true and complete and that the amounts and values in this report are accurate based on reasonable estimates using data available to the preparers of this report.

Name and official title of owner/operator or senior management official:	Signature:	Date signed:

SECTION 4. FACILITY IDENTIFICATION

4.1	Facility or Establishment Name	TRI Facility ID Number	BIA Code			
	Physical Street Address	Mailing Address (if different from physical street address)				
	City/County/State/ZIP Code	City/State/ZIP Code	Country (Non-US)			
4.2	This report contains information for: (Important: Check a or b; check c or d if applicable)	a. ☐ An entire facility	b. ☐ Part of a facility	c. ☐ A federal facility	d. ☐ GOCO	
4.3	Technical Contact Name	Telephone Number (include area code and ext.)				
	Email Address					
4.4	Public Contact Name	Telephone Number (include area code and ext.)				
	Email Address					
4.5	NAICS Code(s) (6 digits)	Primary a.	b.	c.	d.	e. f.
4.6	Dun & Bradstreet Number(s) (9 digits)	a.				
		b.				

SECTION 5. Parent Company Information

5.1	Name of U.S. Parent Company (for TRI Reporting purposes)		No U.S. Parent Company (for TRI Reporting purposes) ☐
5.2	Parent Company's Dun & Bradstreet Number	NA ☐	

EPA Form 9350 -1 (Rev. 10/2018). Previous editions are obsolete.

DO NOT SUBMIT TO EPA

Sample Form R
For Reporting year 2018

Form Approved OMB Number: 2025-0009
Approval Expires: 10/31/2021 **Page 2 of 6**

FORM R

Part II. CHEMICAL-SPECIFIC INFORMATION

TRI Facility ID Number

Toxic Chemical, Category, or Generic Name

SECTION 1. TOXIC CHEMICAL IDENTITY
(Important: DO NOT complete this section if you are reporting a mixture component in Section 2 below.)

1.1	CAS Number (Important: Enter only one number exactly as it appears on the Section 313 list. Enter category code if reporting a chemical category.)
1.2	Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.)
1.3	Generic Chemical Name (Important: Complete only if Part I, Section 2.1 is checked "Yes". Generic Name must be structurally descriptive.)

SECTION 2. MIXTURE COMPONENT IDENTITY **(Important: DO NOT complete this section if you completed Section 1.)**

2.1	Generic Chemical Name Provided by Supplier (Important: Maximum of 70 characters, including numbers, letters, spaces, and punctuation.)

SECTION 3. ACTIVITIES AND USES OF THE TOXIC CHEMICAL AT THE FACILITY
(Important: Check all that apply.)

3.1 Manufacture the toxic chemical:	3.2 Process the toxic chemical:	3.3 Otherwise use the toxic chemical:
a. ☐ Produce b. ☐ Import If Produce or Import c. ☐ For on-site use/processing d. ☐ For sale/distribution e. ☐ As a byproduct f. ☐ As an impurity	a. ☐ As a reactant b. ☐ As a formulation component c. ☐ As an article component d. ☐ Repackaging e. ☐ As an impurity f. ☐ Recycling ☐ ☐ ☐ ☐ ☐ Enter 4-digit code(s) from instruction package	a. ☐ As a chemical processing aid b. ☐ As a manufacturing aid c. ☐ Ancillary or other use ☐ ☐ ☐ ☐ Enter 4-digit code(s) from instruction package

SECTION 4. MAXIMUM AMOUNT OF THE TOXIC CHEMICAL ON-SITE AT ANY TIME DURING THE CALENDAR YEAR

4.1	☐ (Enter two-digit code from instruction package.)	

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM ON-SITE

			A. Total Release (pounds/year*) (Enter a range code** or estimate)	B. Basis of Estimate (Enter code)	C. Percent from Stormwater
5.1	Fugitive or non-point air emissions	NA ☐			
5.2	Stack or point air emissions	NA ☐			
5.3	Discharges to receiving streams or water bodies (Enter one name per box)	NA ☐			
	Stream or Water Body Name	Reach Code (optional)			
5.3.1					
5.3.2					

If additional pages of Part II, Section 3.2 and 3.3 are attached, indicate the total number of pages in this box ☐
and indicate the Part II, Section 3.2 and 3.3 page number in this box. ☐ (Example: 1, 2, 3, etc.)
If additional pages of Part II, Section 5.3 are attached, indicate the total number of pages in this box ☐
and indicate the Part II, Section 5.3 page number in this box. ☐ (Example: 1, 2, 3, etc.)

EPA form 9350 -1 (Rev. 10/2018). Previous editions are obsolete.

*For Dioxin or Dioxin-like compounds, report in grams/year.
**Range Codes: A= 1-10 pounds; B= 11-499 pounds; C= 500-999 pounds.

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Sample Form R
For Reporting year 2018

Form Approved OMB Number: 2025-0009
Approval Expires: 10/31/2021 **Page 3 of 6**

FORM R

Part II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI Facility ID Number

Toxic Chemical, Category, or Generic Name

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM ON-SITE (continued)

		NA	A. Total Release (pounds/year*) (Enter a range code*** or estimate)	B. Basis of Estimate (Enter code)
5.4-5.5	Disposal to land on-site			
5.4.1	Class I Underground Injection Wells	☐		
5.4.2	Class II-V Underground Injection Wells	☐		
5.5.1A	RCRA Subtitle C landfills	☐		
5.5.1B	Other landfills	☐		
5.5.2	Land treatment/application farming	☐		
5.5.3A	RCRA Subtitle C surface impoundments	☐		
5.5.3B	Other surface impoundments	☐		
5.5.4	Other disposal	☐		

Optional Waste Rock Piles Information
You may check this box if your Section 5.5 quantities include "waste rock piles." ☐ Enter quantity of "waste rock piles" (pounds/year*)

SECTION 6. TRANSFER(S) OF THE TOXIC CHEMICAL IN WASTES TO OFF-SITE LOCATIONS

6.1 DISCHARGES TO PUBLICLY OWNED TREATMENT WORKS (POTWs) NA ☐

6.1.___ POTW Name

POTW Address

City | County | State | ZIP

A. Quantity Transferred to this POTW (pounds/year*) (Enter range code***or estimate)	B. Basis of Estimate (Enter code)	C. Disposal/Treatment (Enter code)
1.	**1.**	**1. P**
2.	**2.**	**2. P**
3.	**3.**	**3. P**

If additional pages of Part II, Section 6.1 are attached, indicate the total number of pages in this box ☐
and indicate the Part II, Section 6.1 page number in this box. ☐ (Example: 1, 2, 3, etc.)

SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS NA ☐

6.2.___ Off-Site EPA Identification Number (RCRA ID No.)

Off-Site Location Name:

Off-Site Address:

City | County | State | ZIP | Country (non-US)

Is this location under control of reporting facility or parent company? ☐ Yes ☐ No

EPA form 9350 -1 (Rev. 10/2018). Previous editions are obsolete.

*For Dioxin or Dioxin-like compounds, report in grams/year.
***Range Codes: A= 1-10 pounds; B= 11-499 pounds; C= 500-999 pounds.

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TOXICS RELEASE INVENTORY

Sample Form R
For Reporting year 2018

Form Approved OMB Number: 2025-0009
Approval Expires: 10/31/2021 **Page 4 of 6**

FORM R **Part II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)**	TRI Facility ID Number Toxic Chemical, Category, or Generic Name

SECTION 6.2. TRANSFERS TO OTHER OFF-SITE LOCATION (CONTINUED)

A. Total Transfer (pounds/year*) (Enter a range code*** or estimate)	**B. Basis of Estimate** (Enter code)	**C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery** (Enter code)
1.	**1.**	**1. M**
2.	**2.**	**2. M**
3.	**3.**	**3. M**

6.2____ Off-Site EPA Identification Number (RCRA ID No.)

Off-Site Location Name:

Off-Site Address:

City		County		State		ZIP		Country (non-US)	

Is this location under control of reporting facility or parent company? ☐ Yes ☐ No

A. Total Transfer (pounds/year*) (Enter a range code*** or estimate)	**B. Basis of Estimate** (Enter code)	**C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery** (Enter code)
1.	**1.**	**1. M**
2.	**2.**	**2. M**
3.	**3.**	**3. M**

SECTION 7A. ON-SITE WASTE TREATMENT METHODS AND EFFICIENCY

☐ Not Applicable (NA) - Check here if no on-site waste treatment method is applied to any waste stream containing the toxic chemical or chemical category.

a. General Waste Stream (Enter code)	b. Waste Treatment Method(s) Sequence (Enter 3- or 4-character code(s))						c. Waste Treatment Efficiency (Enter 2 character code)
7A.1a	**7A.1b**		1		2		**7A.1c**
	3		4		5		
	6		7		8		
7A.2a	**7A.2b**		1		2		**7A.2c**
	3		4		5		
	6		7		8		
7A.3a	**7A.3b**		1		2		**7A.3c**
	3		4		5		
	6		7		8		
7A.4a	**7A.4b**		1		2		**7A.4c**
	3		4		5		
	6		7		8		
7A.5a	**7A.5b**		1		2		**7A.5c**
	3		4		5		
	6		7		8		

If additional pages of Part II, Section 6.2/7.A are attached, indicate the total number of pages in this ☐ box and indicate the Part II, Section 6.2/7.A page number in this box. ☐ (Example: 1, 2, 3, etc.)

EPA form 9350 -1 (Rev. 10/2018). Previous editions are obsolete.

*For Dioxin or Dioxin-like compounds, report in grams/year.
***Range Codes: A= 1-10 pounds; B= 11-499 pounds; C= 500-999 pounds.

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Sample Form R
For Reporting year 2018

Form Approved OMB Number: 2025-0009
Approval Expires: 10/31/2021 **Page 5 of 6**

FORM R

Part II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI Facility ID Number

Toxic Chemical, Category, or Generic Name

SECTION 7B. ON-SITE ENERGY RECOVERY PROCESSES

☐ NA Check here if no on-site energy recovery is applied to any waste stream containing the toxic chemical or chemical category.

Energy Recovery Methods (Enter 3-character code(s))

1 ☐ 2 ☐ 3 ☐

SECTION 7C. ON-SITE RECYLING PROCESSES

☐ NA Check here if no on-site recycling is applied to any waste stream containing the toxic chemical or chemical category.

Recycling Methods (Enter 3-character code(s))

1. ☐ 2. ☐ 3. ☐

SECTION 8. SOURCE REDUCTION AND WASTE MANAGEMENT

		Column A Prior Year (pounds/year*)	Column B Current Reporting Year (pounds/year*)	Column C Following Year (pounds/year*)	Column D Second Following Year (pounds/year*)
8.1 – 8.7 Production-Related Waste Managed					
8.1a	Total on-site disposal to Class I Underground Injection Wells, RCRA Subtitle C landfills, and other landfills				
8.1b	Total other on-site disposal or other releases				
8.1c	Total off-site disposal to Class I Underground Injection Wells, RCRA Subtitle C landfills, and other landfills				
8.1d	Total other off-site disposal or other releases				
8.2	Quantity used for energy recovery on-site				
8.3	Quantity used for energy recovery off-site				
8.4	Quantity recycled on-site				
8.5	Quantity recycled off-site				
8.6	Quantity treated on-site				
8.7	Quantity treated off-site				
8.8	Non-Production-Related Waste Managed***				
8.9	☐ Production ratio or ☐ Activity ratio (select one and enter value to the right)				
8.10	Did your facility engage in any newly implemented source reduction activities for this chemical during the reporting year? If so, complete the following section; if not, check NA. **NA** ☐				

	Source Reduction Activities (Enter code(s))	Methods to Identify Activity (Enter code(s))			Estimated annual reduction (Enter code(s)) (optional)
8.10.1		**a.**	**b.**	**c.**	**d.**
8.10.2		**a.**	**b.**	**c.**	**d.**
8.10.3		**a.**	**b.**	**c.**	**d.**
8.10.4		**a.**	**b.**	**c.**	**d.**

EPA form 9350 -1 (Rev. 10/2018). Previous editions are obsolete.

*For Dioxin or Dioxin-like compounds, report in grams/year.

***Includes quantities released to the environment or transferred off-site as a result of remedial actions, catastrophic events, or other one-time events not associated with production processes

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Sample Form R
For Reporting year 2018

Form Approved OMB Number: 2025-0009
Approval Expires: 10/31/2021

FORM R Part II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)	TRI Facility ID Number Toxic Chemical, Category, or Generic Name

SECTION 8.11. DISPOSAL OR OTHER RELEASES, SOURCE REDUCTION, AND RECYCLING ACTIVITIES

8.11	If you wish to submit additional optional information on source reduction, recycling, or pollution control activities, provide it here.

SECTION 9. MISCELLANEOUS INFORMATION

9.1	If you wish to submit any miscellaneous, additional, or optional information regarding your Form R submission, provide it here.

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Sample Form A Page 1
For Reporting year 2018

Form Approved OMB Number: 2025-0009
Approval Expires: 10/31/2021

EPA United States Environmental Protection Agency

TOXICS RELEASE INVENTORY FORM A

Complete form online via TRI-MEweb. For a trade secret submission, send completed forms to TRI Reporting Center, P. O. Box 10163, Fairfax, VA 22038. The annual public burden related to the Form A is estimated to average 21.96 hours per response for a facility filing a report on one chemical. See the Reporting Forms and Instructions for more information on submissions and the Paperwork Reduction Act.	TRI Facility ID Number

This section only applies if you are revising or withdrawing a previously submitted form, otherwise leave blank.	**Revision (Enter up to two code(s))**	**Withdrawal (Enter up to two code(s))**

IMPORTANT: See instructions to determine when "Not Applicable (NA)" boxes should be checked.

PART I. FACILITY IDENTIFICATION INFORMATION

SECTION 1. REPORTING YEAR _____

SECTION 2. TRADE SECRET INFORMATION

2.1	Are you claiming the toxic chemical identified on page 2 as a trade secret? ☐ Yes (Answer question 2.2; attach substantiation forms) ☐ No (Do not answer 2.2; go to Section 3)	**2.2**	Is this copy ☐ Sanitized ☐ Unsanitized (Answer only if "Yes" in 2.1)

SECTION 3. CERTIFICATION (Important: Read and sign after completing all form sections.)

I hereby certify that to the best of my knowledge and belief, for each toxic chemical listed in this statement, the annual reportable amount as defined in 40 CFR 372.27(a), did not exceed 500 pounds for this reporting year and that the chemical was manufactured, processed, or otherwise used in an amount not exceeding 1 million pounds during this reporting year.

Name and official title of owner/operator or senior management official:	Signature:	Date signed:

SECTION 4. FACILITY IDENTIFICATION

4.1	Facility or Establishment Name	TRI Facility ID Number	BIA Code
	Physical Street Address	Mailing Address (if different from physical street address)	
	City/County/State/ZIP Code	City/State/ZIP Code	Country (Non-US)
4.2	This report contains information for: (Important: Check c or d if applicable)	c. ☐ A Federal Facility	d. ☐ GOCO
4.3	Technical Contact Name		Telephone Number (include area code and ext.)
	Email Address		
4.4	Public Contact Name		Telephone Number (include area code and ext.)
	Email Address		

4.5	NAICS Code(s) (6 digits)	Primary a.	b.	c.	d.	e.	f.
4.6	Dun & Bradstreet Number(s) (9 digits)	a.					
		b.					

SECTION 5. PARENT COMPANY INFORMATION

5.1	Name of U.S. Parent Company (for TRI Reporting purposes)		No U.S. Parent Company (for TRI Reporting purposes) ☐
5.2	Parent Company's Dun & Bradstreet Number	NA ☐	

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EPA Form 9350 -2 (Rev. 10/2018). Previous editions are obsolete.

Sample Form A Page 2
For Reporting year 2018

Form Approved OMB Number: 2025-009
Approval Expires: 10/31/2021

Page 2 of 2

EPA FORM A PART II. CHEMICAL IDENTIFICATION Do not use this form for reporting PBT chemicals, including Dioxin and Dioxin-like Compounds*	TRI Facility ID Number

SECTION 1. TOXIC CHEMICAL IDENTITY	**Report____of ___**
1.1	CAS Number (Important: Enter only one number exactly as it appears on the Section 313 list. Enter category code if reporting a chemical category.)
1.2	Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.)
1.3	Generic Chemical Name (Important: Complete only if Part 1, Section 2.1 is checked "Yes". Generic Name must be structurally descriptive.)
SECTION 2. MIXTURE COMPONENT IDENTITY (Important: DO NOT complete this section if you completed Section 1 above)	
2.1	Generic Chemical Name Provided by Supplier (Important: Maximum of 70 characters, including numbers, letters, spaces, and punctuation.)
SECTION 9.2. OPTIONAL POLLUTION PREVENTION AND ADDITIONAL INFORMATION FOR THIS TOXIC CHEMICAL	
9.2	If you wish to provide optional chemical specific pollution prevention or additional information, provide it here.

SECTION 1. TOXIC CHEMICAL IDENTITY	**Report____of ___**
1.1	CAS Number (Important: Enter only one number exactly as it appears on the Section 313 list. Enter category code if reporting a chemical category.)
1.2	Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.)
1.3	Generic Chemical Name (Important: Complete only if Part 1, Section 2.1 is checked "Yes". Generic Name must be structurally descriptive.)
SECTION 2. MIXTURE COMPONENT IDENTITY (Important: DO NOT complete this section if you completed Section 1 above)	
2.1	Generic Chemical Name Provided by Supplier (Important: Maximum of 70 characters, including numbers, letters, spaces, and punctuation.)
SECTION 9.2. OPTIONAL POLLUTION PREVENTION AND ADDITIONAL INFORMATION FOR THIS TOXIC CHEMICAL	
9.2	If you wish to provide optional chemical specific pollution prevention or additional information, provide it here.

*See the TRI Reporting Forms and Instructions manual for the list of PBT Chemicals (including Dioxin and Dioxin-like Compounds)

EPA Form 9350 -2 (Rev. 10/2018). Previous editions are obsolete.

(Make additional copies of this page, if needed)

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Form Approved OMB Number: 2025-0009
Approval Expires: 10/31/2021

EPA United States

TRI Facility ID Number

FORM R Schedule 1

PART II. CHEMICAL-SPECIFIC INFORMATION (continued)

SECTION 5. QUANTITY OF DIOXIN AND DIOXIN-LIKE COMPOUNDS ENTERING EACH ENVIRONMENTAL MEDIUM ON-SITE

	5.1	NA		5.2	NA		5.3	Discharges to receiving streams or water bodies (Enter data for one stream or water body per box)	NA	
	Fugitive or non-point air emissions			Stack or point air emissions			5.3.1		5.3.2	5.3.3
D. Mass (grams) of each compound in the category (1-17)										
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										

If additional pages of Section 5.3 are attached, indicate the total number of pages in this box ☐
and indicate the Section 5.3 page number in this box (Example: 1, 2, 3, etc.) ☐

See the Reporting Forms and Instructions for information on submissions and the Paperwork Reduction Act.

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TRI TOXICS RELEASE INVENTORY

Form Approved OMB Number: 2025-0009
Approval Expires: 10/31/2021

FORM R Schedule 1
PART II. CHEMICAL-SPECIFIC INFORMATION (continued)

TRI Facility ID Number

SECTION 5. QUANTITY OF DIOXIN AND DIOXIN-LIKE COMPOUNDS ENTERING EACH ENVIRONMENTAL MEDIUM ON-SITE

		5.4 – 5.5 Disposal to land on-site							
		5.4.1 NA	5.4.2 NA	5.5.1.A NA	5.5.1.B NA	5.5.2 NA	5.5.3.A NA	5.5.3.B NA	5.5.4 NA
		Class I Underground Injection Wells	Class II-V Underground Injection Wells	RCRA Subtitle C landfills	Other landfills	Land treatment/ application farming	RCRA Subtitle C surface impoundments	Other surface impoundments	Other disposal
C. Mass (grams) of each compound in the category (1-17)	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								
	11								
	12								
	13								
	14								
	15								
	16								
	17								

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Form Approved OMB Number: 2025-009
Approval Expires: 10/31/2021

FORM R Schedule 1
PART II. CHEMICAL-SPECIFIC INFORMATION (continued)

TRI Facility ID Number

SECTION 6. TRANSFERS OF DIOXIN AND DIOXIN-LIKE COMPOUNDS IN WASTES TO OFF-SITE LOCATIONS

6.1. DISCHARGES TO PUBLICLY OWNED TREATMENT WORKS (POTWs) NA ☐

6.1 ___	D. Mass (grams) of Each Compound in the Category (1-17)								
1.	1	2	3	4	5	6	7	8	
9	10	11	12	13	14	15	16	17	
2.	1	2	3	4	5	6	7	8	
9	10	11	12	13	14	15	16	17	
3.	1	2	3	4	5	6	7	8	
9	10	11	12	13	14	15	16	17	

6.1 ___	D. Mass (grams) of Each Compound in the Category (1-17)								
1.	1	2	3	4	5	6	7	8	
9	10	11	12	13	14	15	16	17	
2.	1	2	3	4	5	6	7	8	
9	10	11	12	13	14	15	16	17	
3.	1	2	3	4	5	6	7	8	
9	10	11	12	13	14	15	16	17	

6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS NA ☐

6.2 ___	D. Mass (grams) of Each Compound in the Category (1-17)								
1.	1	2	3	4	5	6	7	8	
9	10	11	12	13	14	15	16	17	
2.	1	2	3	4	5	6	7	8	
9	10	11	12	13	14	15	16	17	
3.	1	2	3	4	5	6	7	8	
9	10	11	12	13	14	15	16	17	

6.2 ___	D. Mass (grams) of Each Compound in the Category (1-17)								
1.	1	2	3	4	5	6	7	8	
9	10	11	12	13	14	15	16	17	
2.	1	2	3	4	5	6	7	8	
9	10	11	12	13	14	15	16	17	
3.	1	2	3	4	5	6	7	8	
9	10	11	12	13	14	15	16	17	

If additional pages of Section 6.1 or 6.2 are attached, indicate the total number of pages in this box ☐

and indicate the Section 6.1 or 6.2 page number in this box ☐ **(Example: 1, 2, 3, etc.)**

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TRI TOXICS RELEASE INVENTORY

Form Approved OMB Number: 2025-009
Approval Expires: 10/31/2021

FORM R Schedule 1
PART II. CHEMICAL-SPECIFIC INFORMATION (continued)

TRI Facility ID Number

SECTIONS 8.1-8.8. WASTE MANAGEMENT QUANTITIES FOR DIOXIN AND DIOXIN-LIKE COMPOUNDS (current year only)

Column f. Mass (grams) of each compound in the category (1-17)	8.1-8.7 Production-related waste managed										8.8 Non-production related waste managed*
	8.1a Total on-site disposal to Class 1 Underground Injection Wells, RCRA Subtitle C landfills, and other landfills	8.1b Total other on-site disposal or other releases	8.1c Total off-site disposal to Class 1 Underground Injection Wells, RCRA Subtitle C landfills, and other landfills	8.1d Total other off-site disposal or other releases	8.2 Quantity used for energy recovery on-site	8.3 Quantity used for energy recovery off-site	8.4 Quantity recycled on-site	8.5 Quantity recycled off-site	8.6 Quantity treated on-site	8.7 Quantity treated off-site	
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											

*Includes quantities released to the environment or transferred off-site as a result of remedial actions, catastrophic events, or other one-time events not associated with production processes.

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EPCRA Reporting Program
Emergency Response and Strategic Services Section, DNREC
155 Commerce Way, Suite B
Dover, DE 19904
(302) 739-9405

The Department of Natural Resources and Environmental Control
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and the diversity of its workforce.

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