State of Utah
Department of Environmental Quality

Utah Toxic Release Inventory Reporting Year 2016 Data Summary Report

December 2017

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EXECUTIVE SUMMARY

Introduction

Under Section 313 of the federal Emergency Planning and Community Right-to-Know Act (EPCRA) the Toxic Release Inventory (TRI) is a compilation of data submitted by certain facilities subject to the reporting requirements of EPCRA. TRI data provides select information for a finite list of chemicals defined by the statute concerning releases and transfers into the environment and the transfers of chemicals to other off-site facilities for final disposition. Section 313 requires a facility to submit TRI data to the U.S. Environmental Protection Agency (EPA) and the State Hazardous Chemical Emergency Response Commission (SERC). This report is a summary of the data submitted to the Utah Department of Environmental Quality (DEQ) in its role as a member of the SERC for Reporting Year (RY) 2016. TRI information includes only selected industrial sectors using larger volumes of certain listed chemicals. Therefore, TRI data may only include a relatively small portion of all chemical releases of environmental significance. TRI data can be used to provide basic information on the types and volumes of waste and emissions at a facility, but the data must be used with other concentration, migration, environmental target, and exposure information to assess the relative level of human health or environmental risk.

Beginning in 2002, EPA made preliminary TRI data available via the internet. Persons interested may query data using a variety of query tools to retrieve multiple facility data across multiple years of reporting. In 2002 EPA began publishing state fact sheets which provide a summary of TRI data for each state.

Beginning with RY 2006, Utah started participating in the State Data Exchange (SDX) Network-National Environment Information Exchange Network. This partnership provides DEQ the mechanism to receive TRI data directly from EPA, and beginning with RY 2006 SDX is the exclusive source of TRI data for the State of Utah. Data is transmitted electronically to a state server where it is permanently retained.

It is traditionally the practice of EPA to "freeze"[1] TRI data several months after the annual July 1st submission deadline. TRI data including revision data may be submitted by a facility at any time during the calendar year. Data is then processed dynamically at the EPA Data Processing Center and transmitted in real-time to the Utah data-server. DEQ does not freeze the Utah data set. Information offered in this report reflects the presentation of all data within the DEQ data management system received at the time this summary report was prepared.

For RY 2016, EPA received a total of 858 chemical submission forms, 784 Form-R submissions and 74 Form-A submissions, from 173 facilities.[2]

[1] Freeze – TRI data submissions or revisions submitted after the date on which EPA sets a freeze on the dataset are not used in the final statistical calculations published in the annual EPA TRI report.
[2] From TRI Explorer (www.epa.gov/triexplorer) accessed November 20, 2017.

This report presents data submitted from facilities that are subject to the TRI reporting criteria for releases that occurred for the reporting year of January 1 to December 31, 2016. The deadline for reporting this data was July 1, 2017.

The Wasatch Front is defined to include Davis, Salt Lake, Utah and Weber counties. The distribution of facilities in these counties for RY 2016 is: Davis, 20; Salt Lake, 59; Utah, 18; and Weber, 20. The Wasatch Front accounts for about 68% of all facilities in Utah reporting under the TRI program and about 55% of all chemical submissions. Nine facilities from Tooele County reported to the TRI program for RY 2015. These facilities submitted a total of 162 chemical reports or about 20% of all chemical reports submissions statewide.

Duplicate Amounts Reduction Calculation

EPA incorporates a correction calculation for data that has been "double-counted." Double-counting occurs when a facility (Facility A) reports off-site disposal or off-site transfers of wastes that were conveyed to another facility (Facility B) and Facility B reports the received wastes under on-site disposal. Double counting is the term applied by EPA to amounts of waste that have effectively been reported two times. [3] The Utah system was modified to perform a similar correction calculation beginning with RY 2010 data and totals related to select categories (e.g. total off-site transfers) now show more consistent values with those reported by EPA since RY 2010.

Excluded Data

Several logistical issues exist that prevent the Utah system from matching the EPA data set exactly. At the present time there are several facility data files that cannot be loaded into the Utah system. These facilities exist as pairs where each facility of the pair is related. Each facility of the pair submits TRI separately; however, each paired facility submits under the same TRI Facility Identification number. The Utah system does not currently accommodate this circumstance and as a result of this conflict, the data submitted by these facilities cannot be loaded into the DEQ data management system.

EPA publishes TRI data available on the internet for all past reporting years. EPA data can be viewed here: http://www.epa.gov/toxics-release-inventory-tri-program. These datasets serve as an independent source to cross-check past years. This is useful because facilities may submit data revisions at any time for past years which may affect the statistics. The latest reporting year data is made available after release of the TRI National Analysis report.

Variations in Data Values in this Report

Calculations for state-wide releases were made using significant figures provided in the data received from the data exchange (SDX). However, some of the state-wide release amounts and corresponding percentages in this data summary report have been rounded off for the

[3] Older Fact Sheets (e.g. 2004-2006) included a statement which described steps taken to avoid double counting. EPA has since changed the presentation and format of fact sheets from pdf to an online, web-based format. Older fact sheets containing this statement are no longer readily available.

sake of simplicity. As a result, slight discrepancies in some values and percentages presented in this report should be expected.

Total Releases

Total on-site and off-site release amounts reported by all facilities reporting TRI in Utah for the current reporting year increased by 18.7% from 227.6 million pounds in RY 2015 to 270.2 million pounds for RY 2016 showing a net increase of about 42.6 million pounds.

Releases to Air (on-site)

Total TRI releases to air reported by Utah facilities for RY 2016 decreased by 19.3% from 8.3 million pounds to 6.7 million pounds showing a decrease of about 1.6 million pounds. Chemicals reported in the largest quantities were hydrochloric acid (aerosol forms only) and chlorine (reported at 2.6 million pounds and 2.2 million pounds, respectively).

Releases to Land (on-site)

For the current report year, total chemical releases to land increased by 19.7%. Total releases to land increased from 216.6 million pounds to 259.2 million pounds resulting in a net increase of about 42.6 million pounds. The largest quantities reported were for metals compounds of lead, copper, zinc, arsenic, and barium.

Releases to land reported by the Kennecott Mine Concentrator & Power Plant facility increased from 164 million pounds in RY 2015 to 201 million pounds in RY 2016, an increase of approximately 22.6%. Kennecott's Smelter and Refinery facility reported an increase of approximately 12.8% from 42.2 million pounds in RY 2015 to 47.6 million pounds in RY 2016. The Energy Solutions LLC facility releases to land increased from 2.2 million pounds in RY 2015 to 2.8 million pounds in RY 2016, an increase of approximately 27.3%.

Kennecott facilities comprise the largest single-source quantity reported for releases to land. The combined releases reported by Kennecott facilities for releases to land show an increase of 20.5%, from 206.4 million pounds in RY 2015 to 248.8 million pounds for RY 2016. More details about the Kennecott facilities are presented below.

Releases to Surface Water (on-site)

Total releases to surface water increased by 5.45%, from approximately 110,000 pounds to about 116,000 pounds. Chevron Products Company is the largest contributor to this category of reporting. Chevron reported a total release of 103,000 pounds, which is approximately 88.8% of the total for all releases to surface waters for this reporting year. Nitrate compounds comprised the single largest fraction of chemicals released. At 102,276 pounds, nitrate compounds comprised approximately 88.1% of the total amount by weight of chemicals released to surface waters. Chevron Products Company reported approximately 101,276 pounds of nitrate compounds.

The total release to surface water reported by two Kennecott facilities (Mine Concentrator and Power Plant, and the Smelter & Refinery) was approximately 11,000 pounds for a variety of TRI chemicals representing about 9.5% of the total statewide release to surface water. The majority of the chemicals reported in releases to surface water by Kennecott facilities are metals compounds. The aggregate amounts reported from Chevron and the two Kennecott facilities comprise about 98% of the total quantities released to surface waters statewide.

Transfers to POTWs

Publicly Owned Treatment Works (POTWs) are wastewater treatment plants. Transfers reported to POTWs decreased by 6.7% from 1.5 million pounds down to about 1.4 million pounds showing a decrease of about 190,000 pounds. Nitrate compounds constitute about 78.7% of the total chemicals transferred to POTWs. The remaining percentages of chemicals transferred to POTWs are comprised of nitric acid (7.7%), ammonia (6.7%), toluene (2%), and glycol ethers (1.8%). A combination of metal compounds and organic chemicals make up the remaining percentage.

TRI-reported releases to POTWs do not include information concerning the rate of release or concentrations of chemicals in the release. However, state and federal law requires industrial facilities with wastewater flows exceeding federally established chemical concentrations to operate industrial pretreatment equipment to reduce such concentrations below harmful levels before discharging to the POTWs.

Total Off-site Transfers

Transfers of TRI chemicals to "other off-site" locations are transfers to facilities other than POTWs. Often these facilities include chemical recyclers and waste disposal sites. The amount of chemicals reported transferred off-site increased by 0.96% from 20.8 million pounds to 21 million pounds. Metal compounds (zinc), copper, and nitrate compounds topped the list of chemicals transferred off-site.

Persistent Bioaccumulative Toxic (PBT) Chemicals – Dioxin & Dioxin-Like Compounds

The total amount of PBT dioxin & dioxin-like compounds reported increased 43% from 19,360.70 grams in RY 2015 to 27,702.05 grams for RY 2016. This is an increase of 8,341.35 grams. The total on-site release amount reported by all facilities is 27,052.24 grams. The distribution of on-site releases by media is 27,036.56 grams to land, 15.66 grams to air; and 0.01 grams to water. Total off-site release reported is 649.81 grams.

The total release amount reported by US Magnesium for dioxin and dioxin-like chemicals on-site and off-site is 27,678.34 grams. The total amount reported by US Magnesium comprises 99.9% of the total amount of dioxin and dioxin-like compounds released by all facilities.

ABOUT THE TRI PROGRAM

What is the Toxic Release Inventory?

The Toxic Release Inventory (TRI) is a database providing information about releases of certain TRI program-specific chemicals and chemical categories into the environment, and transfers to off-site facilities by facilities that manufacture, process, or otherwise use EPCRA Section 313 chemicals. Nationally, a facility subject to EPCRA reports TRI information annually to the EPA and to the state in which it is located. The Utah Hazardous Chemical Emergency Response Commission, more commonly known as the SERC, was established under Utah Code §53-2a-701. The Utah Department of Environmental Quality acts on behalf of the SERC to administer the EPCRA program in Utah and manage all associated data submitted by facilities subject to the reporting requirements of EPCRA. TRI data must be submitted annually by July 1 for the previous calendar year. This report is a summary of data submitted to the DEQ via the EPA for EPCRA Reporting Year RY 2016.

Who Must Report to TRI?

A facility must report TRI information to the EPA and SERC if it:

- Conducts operations within specified Standard Industrial Classification (SIC) Codes or North American Industrial Classification System (NAICS) codes;
- Has 10 or more full-time employees (or equivalent); and
- Manufactures or processes more than 25,000 pounds or uses more than 10,000 pounds of any TRI listed chemical during the calendar year.

TRI data only includes reports from manufacturing facilities, federally owned facilities, coal mining, metal mining, electrical generation facilities combusting coal or oil, hazardous waste disposal, wholesale bulk petroleum distribution, chemical wholesale distribution, and solvent recycling.

What Type of Information Must Be Reported?

A facility must report the:

- Amount of each listed chemical released to the air, water, or soil;
- Amount of each listed chemical transferred off-site or sent to a wastewater treatment plant;
- Amount of each listed chemical recycled, treated, or disposed; and,
- A facility's pollution reduction activities.

What Types of Chemicals are Subject to Reporting?

There are over 600 chemicals and chemical categories subject to reporting under TRI based on acute or chronic human health or environmental effects. TRI program specific chemicals are listed under Title 40 of the Code of Federal Regulations Part 372. For additional information on chemicals subject to reporting under TRI, visit EPA's website at http://www.epa.gov/toxics-release-inventory-tri-program/tri-listed-chemicals. Changes

promulgated by the EPA to the TRI program, (i.e., additions or deletions of TRI program chemicals or chemical categories) are published in the Federal Register and updated as needed in the Code of Federal Regulations.

What Are the Benefits and Uses of TRI Data?

TRI data can be used in a variety of ways as described below:

- The public can use TRI data to identify potential concerns in a specific geographic location.
- Government agencies can use TRI data to evaluate environmental programs and establish regulatory priorities.
- The data can be used to provide basic information on the types and volumes of waste being generated or managed at a facility and, in conjunction with other data, can be utilized to study and identify potential hazards to public health or the environment.
- Industry can use TRI data to establish release reduction targets and document release reduction progress.
- TRI data may be reviewed and downloaded from http://www.epa.gov/toxics-release-inventory-tri-program/tri-data-and-tools.

What Are the Limitations of the TRI Data?

Not All Toxic Releases/Transfers Are Reported. Only a few sectors of industry are currently required to submit TRI reports. Thus, only a portion of all chemical releases or transfers are included in the inventory. Additionally, the list of chemicals for which reporting is required is not inclusive of all chemicals known to have significant public health or environmental impact.

Reported Release/Transfer Totals Usually Are Based on Estimations Only. No special monitoring is required to calculate emission or transfer totals. Reported data is often based on estimations.

Smaller Release Totals Are Reported as Ranges, Not Exact Numbers. If a chemical release or transfer estimate was below 1,000 pounds, companies are allowed to report ranges of 1-10, 11-499, and 500-999 pounds. In such cases, the mid-point of the range was entered into Utah's database. These estimations may, therefore, be above or below the actual amount.

Year to Year Comparison of Statewide TRI Totals. The TRI list of chemicals requiring reporting, and the methods used for estimating emissions have changed significantly throughout the history of the TRI reporting program. Furthermore, a facility may satisfy the program reporting threshold requirement for some years and not others. A facility may also submit revisions at any time for prior years. These activities will alter the totals for the impacted reporting category and report year. Release totals will change perhaps across multiple report years as a result of the revisions and make the interpretation and comparison of release numbers seem less consistent to the general public.

What Cautions Should Be Used in Interpreting TRI Data?

TRI Reports Releases, Not Exposures. Release estimates alone are not sufficient to determine exposure, risk of exposure, or calculate potential adverse human health or environmental effects.

TRI Does Not Report Concentrations. TRI emission totals do not include information on the concentration of chemicals in air, water, or wastes placed on land. A large release may be a large volume at low concentration. Conversely, a small release in volume may have a relatively high concentration and be more toxic than a larger release.

TRI Releases Are Often Permitted by State or Federal Law. TRI releases are often permitted by state or federal environmental agencies after an evaluation has concluded the release will not adversely affect human health or the environment.

Changes to the Regulations

There were several changes made for reporting year 2016. One new chemical, 1-bromopropane, was added and EPA introduced enhancements to TRI-MEweb. One new chemical category for hexabromocyclododecane (HBCD) was also added, facilities that meet TRI reporting thresholds for HBCD should begin collecting release information on January 1, 2017, for reporting forms due July 1, 2018. Changes for reporting year 2016 can be reviewed online at EPA's TRI website at: http://www.epa.gov/toxics-release-inventory-tri-program/reporting-tri-facilities.

How Can the Public Obtain TRI Information?

National TRI information can be obtained from the EPA website www.epa.gov/tri.

TRI information for Utah can be obtained as noted above or by submitting a written GRAMA (Government Records Access Management Act) request to:

Utah Division of Environmental Response and Remediation
195 North 1950 West, 1st Floor
P.O. Box 144840
Salt Lake City, Utah 84114-4840

Or e-mail a completed GRAMA request form to *errgrama@utah.gov*

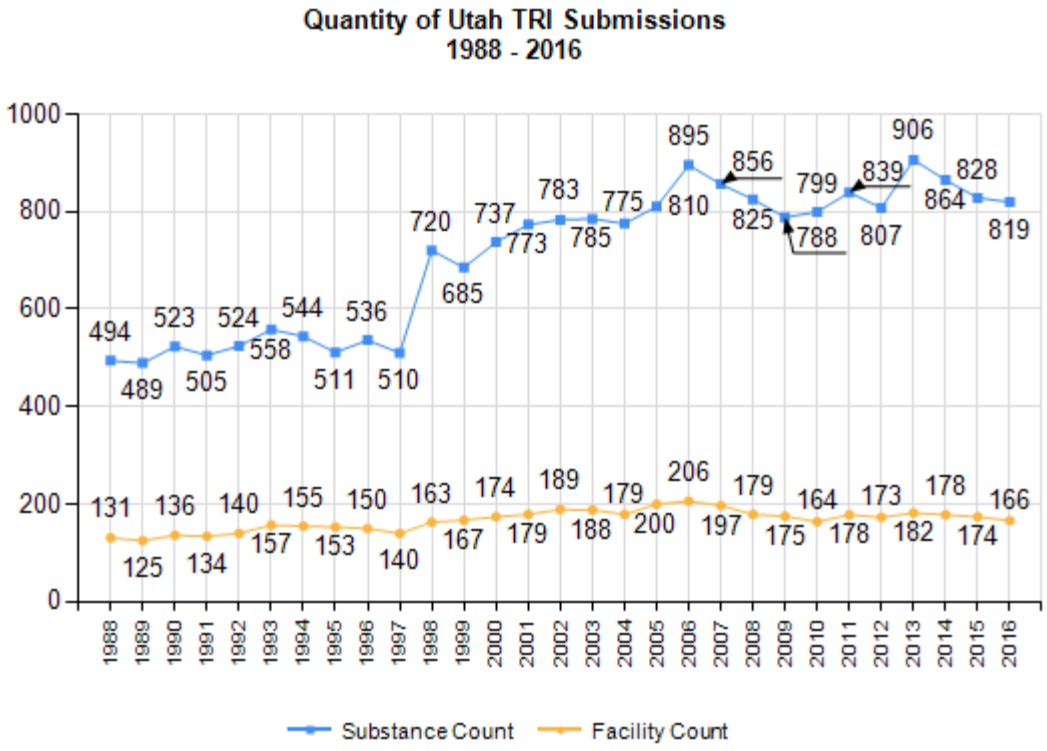
A customer may choose to have pages copied by a DERR employee at a cost of $0.25 per single-sided page. Pages copied by the customer are $0.05 per single-sided page with the first 10 pages free. Specialized computer summaries are available for a fee charged at an hourly rate. Most specialized reports require less than one hour's time to create. Please call UDEQ (801-536-4100) for current hourly rates for these services.

RELEASE DETAILS: FIGURES AND TABLES ILLUSTRATING RY 2016 TRI DATA

The following pages contain the relevant figures and tables that summarize the TRI data for RY 2016. These figures and tables are compilations made from the data submitted by various facilities in Utah. Data are presented under headings that describe general categories discussed in this report.

GENERAL STATISTICS

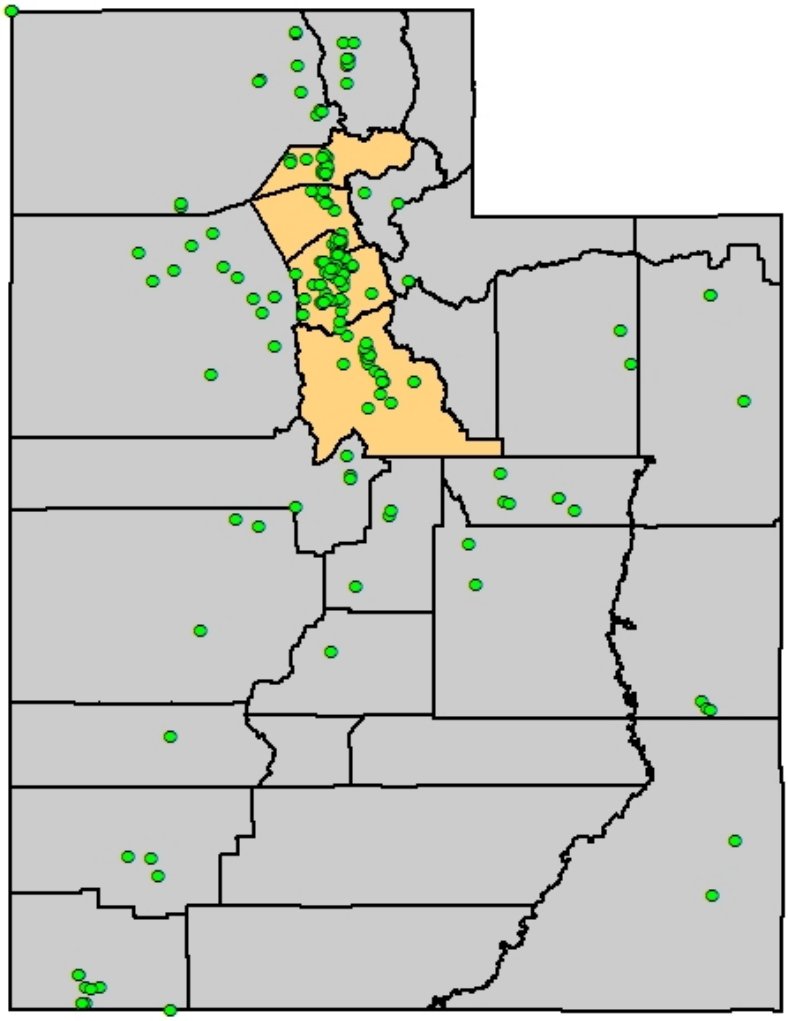
FIGURE 1



Facility Locations

Each facility reports the coordinate data in latitude and longitude as part of the TRI submission. Figure 2 shows the geographic distribution of TRI reporting facilities across Utah. For purposes of reporting, the Wasatch Front is comprised of Davis, Salt Lake, Utah and Weber Counties. For RY 2016, facilities along the Wasatch Front comprised 68% of all facilities reporting in Utah.

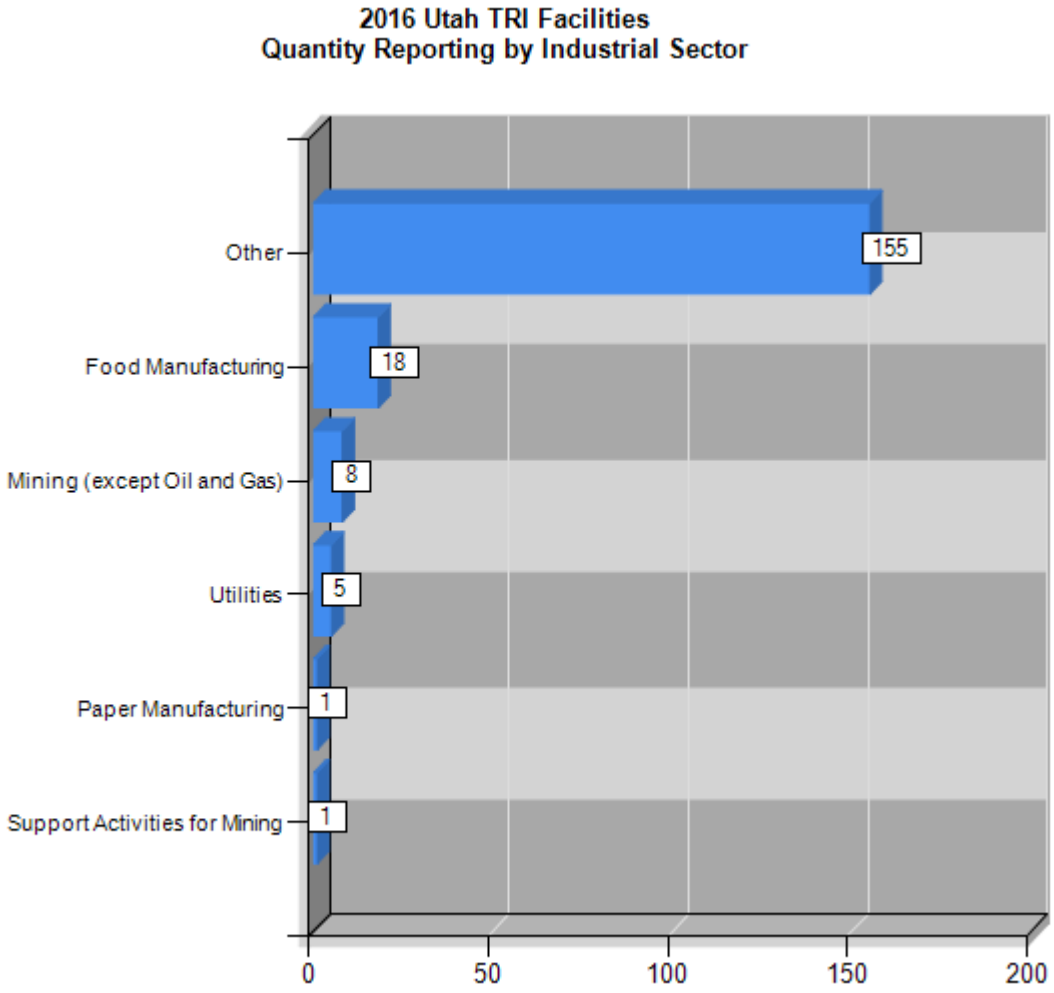
FIGURE 2
Utah 2016 TRI Facility Locations & Wasatch Front



Industrial Sectors

Figure 3 shows a breakdown of industrial sectors reporting TRI data.

FIGURE 3



Additional industrial sectors (but not all) that comprise the "Other" category include: Petroleum and coal products manufacturing; chemical manufacturing; plastics and rubber products manufacturing; nonmetallic mineral product manufacturing; primary metal manufacturing; fabricated metal product manufacturing; machinery manufacturing; computer and electronic product manufacturing; electrical equipment; appliance and component manufacturing; transportation equipment manufacturing; miscellaneous manufacturing; merchant wholesalers; durable goods; non-durable goods; administrative support services; waste management and remediation services; national security; and international affairs.

TOTAL RELEASES

Figures 4 and 5 and Tables 1-4 relate to total TRI releases in Utah.

FIGURE 4

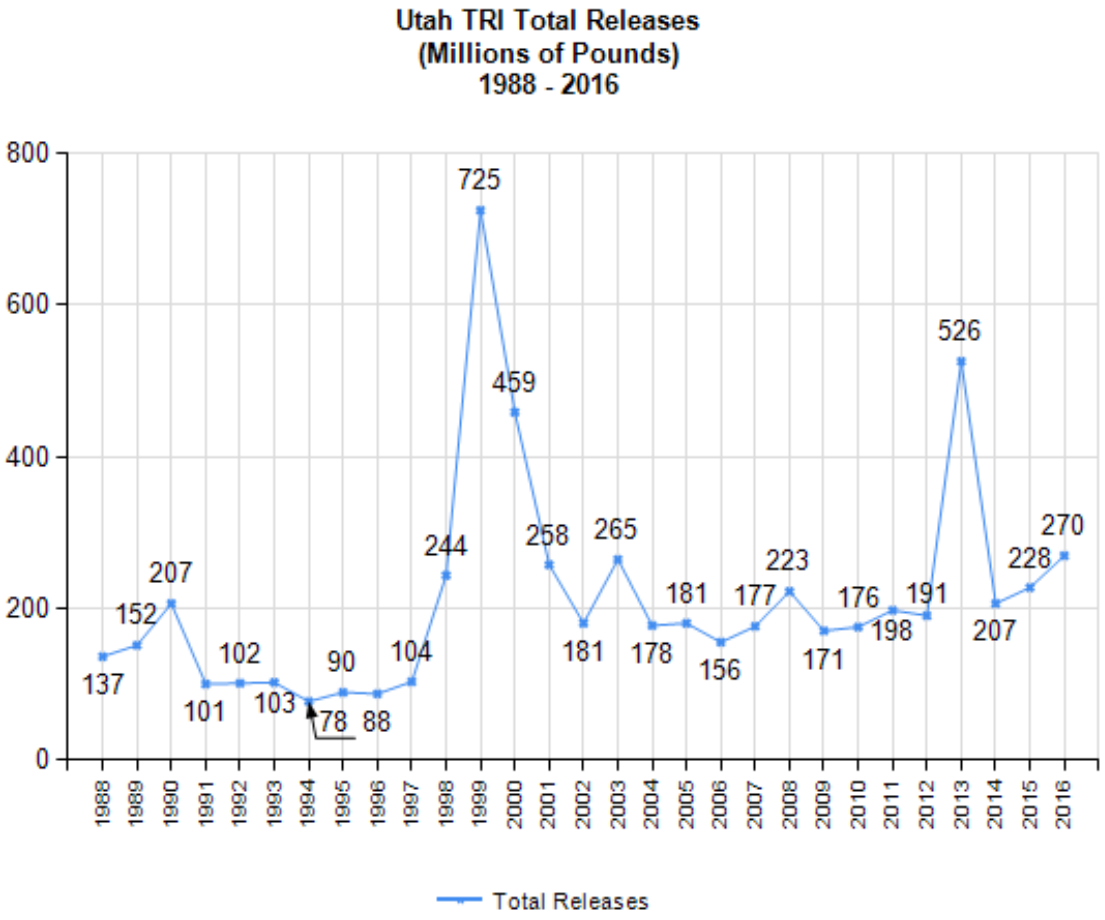


TABLE 1

TOP 10 FACILITIES
Total On-site and Off-site Releases

	Facility Name	Pounds/Year
1	KENNECOTT UTAH COPPER MINE, CONCENTRATORS, & POWER PLANT	201,228,087
2	KENNECOTT UTAH COPPER SMELTER & REFINERY	47,702,542
3	US MAGNESIUM, LLC	4,192,704
4	ENERGY SOLUTIONS LLC	2,799,433
5	CLEAN HARBORS ARAGONITE, LLC.	2,388,358
6	CLEAN HARBORS GRASSY MOUNTAIN LLC	2,179,110
7	NUCOR STEEL -A DIVISION OF NUCOR CORPORATION	1,343,547
8	PACIFICORP HUNTER PLANT	1,283,998
9	BRUSH RESOURCES INC, MILL	1,158,162
10	INTERMOUNTAIN POWER GENERATING STATION	906,021

TABLE 2

Top 10 Chemicals - Total On-site and Off-site Chemical Releases
(Reported in an amount equal to or greater than 1 million pounds)

	Chemical Name	Pounds/Year
1	Lead Compounds	165,546,619
2	Copper Compounds	64,839,998
3	Zinc Compounds	17,868,524
4	Arsenic Compounds	3,082,144
5	Hydrochloric acid	2,579,482
6	Chlorine	2,201,293
7	Barium Compounds	1,910,518
8	Chromium Compounds	1,895,792
9	Ammonia	1,643,256
10	Manganese Compounds	1,015,133

TABLE 3

Top 10 Facilities - Total On-site Releases
(Equal to or greater than 1/2 million pounds)

	Facility Name	Pounds/Year
1	KENNECOTT UTAH COPPER MINE, CONCENTRATORS, & POWER PLANT	201,224,942
2	KENNECOTT UTAH COPPER SMELTER & REFINERY	47,702,283
3	US MAGNESIUM, LLC	4,192,700
4	ENERGY SOLUTIONS LLC	2,799,433
5	CLEAN HARBORS GRASSY MOUNTAIN LLC	2,178,820
6	PACIFICORP HUNTER PLANT	1,283,880
7	BRUSH RESOURCES INC, MILL	1,158,161
8	INTERMOUNTAIN POWER GENERATING STATION	906,021
9	PACIFICORP - HUNTINGTON PLANT	773,462
10	WESTERN ZIRCONIUM	628,598

TABLE 4

Top 10 Chemicals - Total On-site Chemical Releases

	Chemical Name	Pounds/Year
1	Lead Compounds	165,173,381
2	Copper Compounds	64,823,709
3	Zinc Compounds	16,408,244
4	Arsenic Compounds	3,082,132
5	Hydrochloric acid	2,579,482
6	Chlorine	2,201,293
7	Barium Compounds	1,701,046
8	Chromium Compounds	1,652,335
9	Ammonia	1,617,018
10	Nitrate compounds	839,860

RELEASES TO AIR

Figures 5 and 6 and Tables 5 and 6 relate to total releases to air.

FIGURE 5

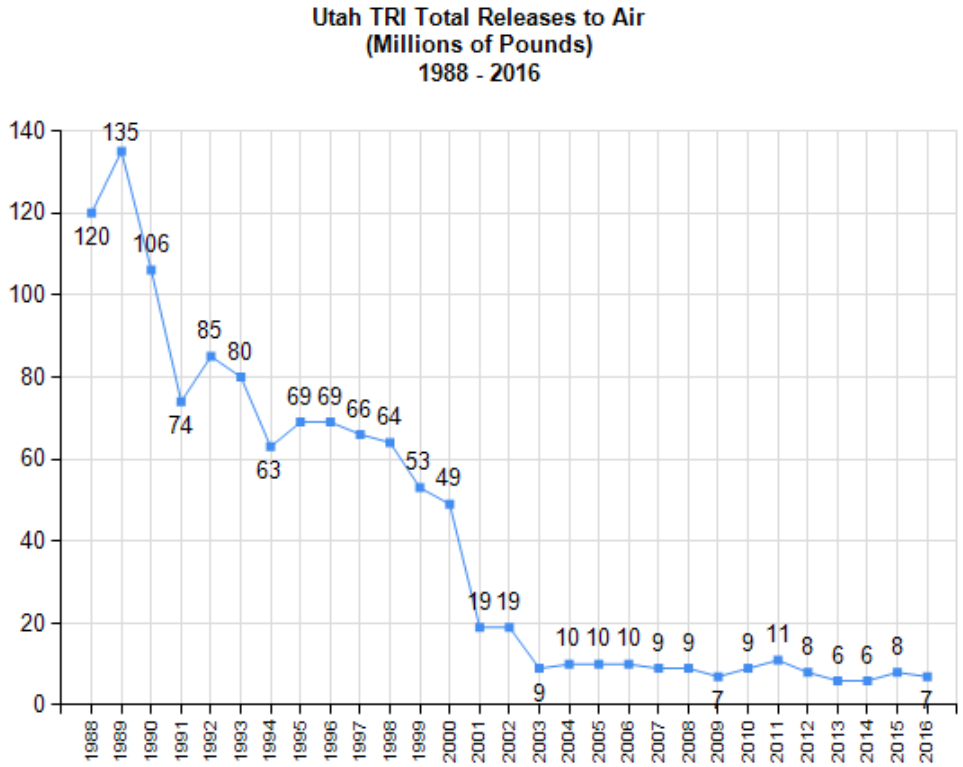


TABLE 5

Top 10 Facilities - Total Releases to Air

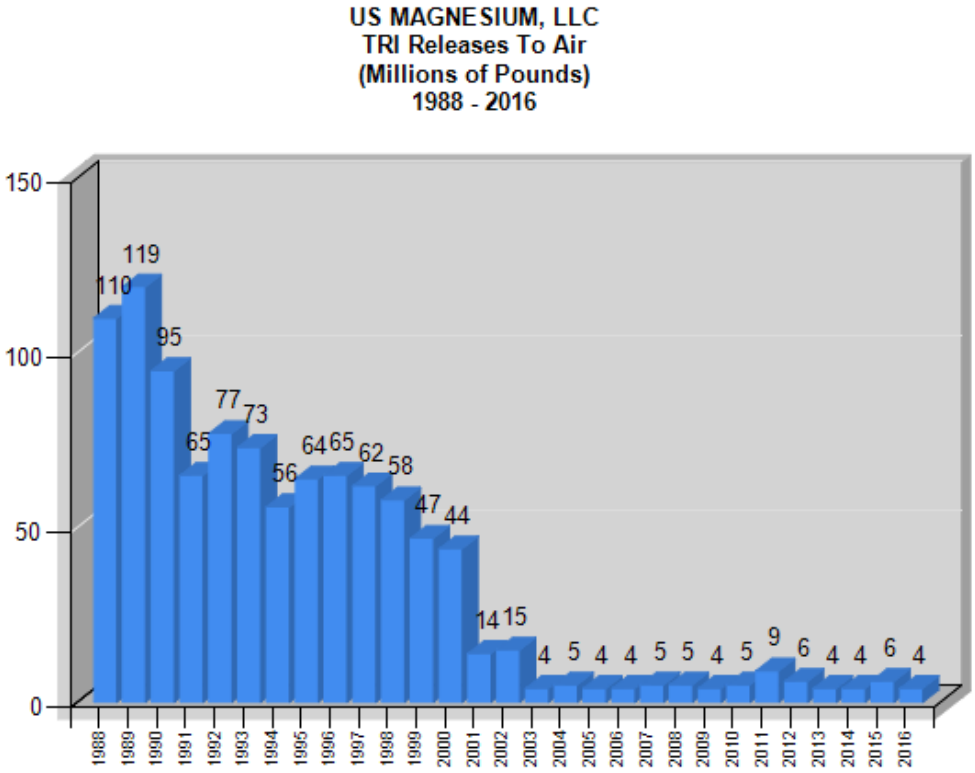
	Facility Name	Pounds/Year
1	US MAGNESIUM, LLC	4,187,667
2	HEXCEL CORPORATION	356,120
3	ATK THIOKOL, PROMONTORY	316,010
4	HOLLY REFINING & MARKETING COM PANY-WOODS CROSS	200,500
5	TESORO REFINING AND MARKETING COMPANY	198,593
6	BRUSH RESOURCES INC, MILL	187,375
7	CHEVRON PRODUCTS COMPANY- SALT LAKE REFINERY	113,028
8	KENNECOTT UTAH COPPER SMELTER & REFINERY	100,502
9	U.S. ARMY DUGWAY PROVING GROUND	98,440
10	U.S. DOD USAF OGDEN AIR LOGIST ICS CENTER	94,222

TABLE 6

Top 10 Chemicals - Total Releases to Air

	Chemical Name	Pounds/Year
1	Hydrochloric acid	2,579,482
2	Chlorine	2,201,293
3	Ammonia	598,791
4	Hydrogen cyanide	277,532
5	Sulfuric acid	159,129
6	Hexane	121,407
7	Toluene	95,284
8	Hydrofluoric acid	75,310
9	Methylene chloride	72,297
10	Hydrogen sulfide	63,783

FIGURE 6



RELEASES TO LAND

Tables 7-12 and Figures 7-10 relate to releases to land.

TABLE 7

Top 10 Facilities - Total Releases to Land

	Facility Name	Pounds/Year
1	KENNECOTT UTAH COPPER MINE, CONCENTRATORS, & POWER PLANT	201,213,797
2	KENNECOTT UTAH COPPER SMELTER & REFINERY	47,595,419
3	ENERGY SOLUTIONS LLC	2,799,433
4	CLEAN HARBORS GRASSY MOUNTAIN LLC	2,178,720
5	PACIFICORP HUNTER PLANT	1,234,149
6	BRUSH RESOURCES INC, MILL	970,777
7	INTERMOUNTAIN POWER GENERATING STATION	814,127
8	PACIFICORP - HUNTINGTON PLANT	741,092
9	WESTERN ZIRCONIUM	620,488
10	NUCOR STEEL -A DIVISION OF NUCOR CORPORATION	441,324

TABLE 8

Top 10 Chemicals - Total Releases to Land

	Chemical Name	Pounds/Year
1	Lead Compounds	165,159,632
2	Copper Compounds	64,790,794
3	Zinc Compounds	16,393,909
4	Arsenic Compounds	3,077,995
5	Barium Compounds	1,699,241
6	Chromium Compounds	1,649,114
7	Ammonia	1,015,597
8	Aluminum oxide	799,328
9	Manganese Compounds	794,798
10	Nickel Compounds	781,162

Mining

Four mining facilities reported under the TRI program for RY 2016:

- Brush Resources, Inc., Mill;
- Kennecott Utah Copper Mine, Concentrators & Power Plant;
- Kennecott Utah Copper Smelter & Refinery;
- Lisbon Valley Mining Co LLC; and

Kennecott Facilities

Kennecott Utah Copper operates through two facilities:

- Mine, Concentrators & Power Plant (MCPP); and
- Smelter & Refinery (S&R).

Primary operations for mining facilities include gold ore, copper ore and nickel ore mining, smelting and refining. The MCPP is one of the world's largest open pit mines. KUC conducts extensive mining, milling, smelting, and refining operations in western Salt Lake County. The MCPP facility extracts millions of tons of overburden, waste rock, and ore during annual operations. Ore is concentrated and transported by pipeline to the smelter, which produces copper and gold. Sulfuric acid is also produced during the process.

The MCPP reported an increase of approximately 22.5% in releases to land for RY 2015 compared to RY 2016. The Smelter and Refinery facility reported an increase of approximately 12.8% which is primarily due to variations in reportable chemical concentrations in the concentrate feed processed at the Smelter & Refinery. The change in

concentrate feed concentrations resulted in an increased release to land from slag tails at the tailings impoundment.

It is important to note that Kennecott is reporting under the guidance provided by the EPA, which defines a “release” to land as including the placement of mining residuals that contain trace amounts of TRI constituents into a secure and permitted tailings impoundment. These properly managed tailings are required to be reported as “releases”, even though the tailings impoundment is specifically sited, engineered, constructed, and permitted to prevent an actual release to the environment.

The trend of releases to land reported by Kennecott’s Barney’s Canyon Mine facility, which is in the process of closing down operations, generally do not show significant changes in past reporting years since 2002. Barney’s Canyon Mine reporting in report year 2013 showed an exception. For RY 2013, the facility reported releases of 193 million pounds due to a “one-time only” event in which the heap leach pad material was placed in closure. This figure contributed significantly to the aggregate totals reported by Kennecott facilities for that report year. Since RY 2014 Barney’s Canyon Mine has not had similar events to report, and releases for RY 2015 were consistent with the lower values of years prior to RY 2013. This facility is regulated by the Utah Division of Water Quality and the Utah Division of Oil, Gas and Mining under their respective groundwater protection and reclamation authorities. Under these programs the facility is undergoing closure and the development of long term water management under a plan formulated beginning in 2014 and approved in 2015-2016.

FIGURE 7

KENNECOTT UTAH COPPER MINE, CONCENTRATORS, & POWER PLANT
TRI Releases To Land
(Millions of Pounds)
1988 - 2016

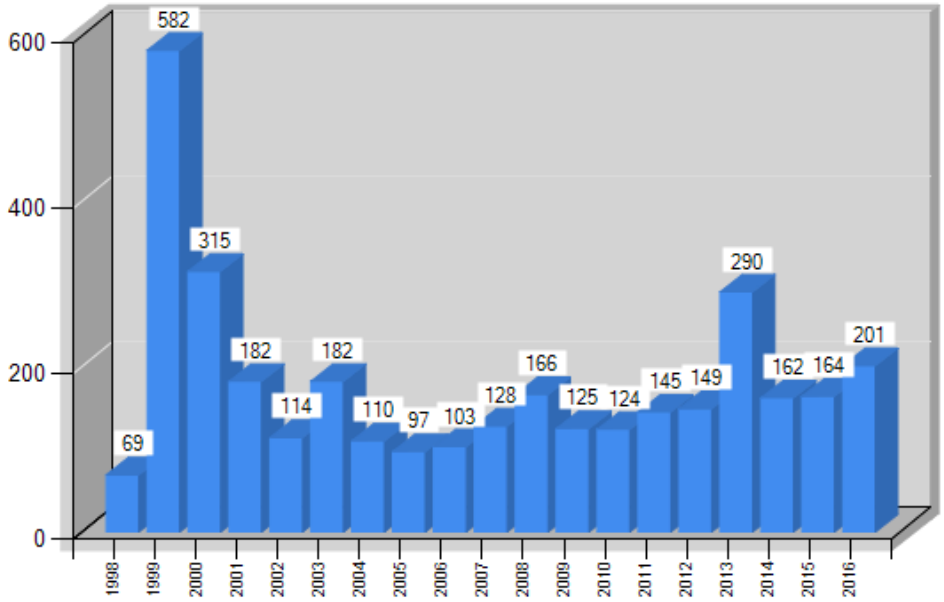
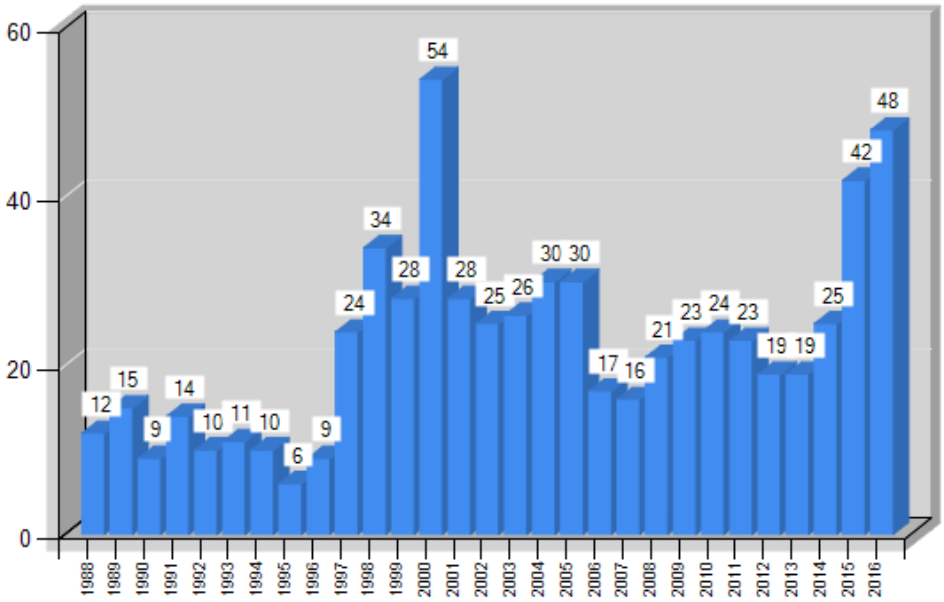


FIGURE 8

KENNECOTT UTAH COPPER SMELTER & REFINERY
TRI Releases To Land
(Millions of Pounds)
1988 - 2016



Waste Disposal Facilities

TABLE 9

Waste Disposal Facility Releases to Land

	Facility Name	Pounds/Year
1	ENERGY SOLUTIONS LLC	2,799,433
2	CLEAN HARBORS GRASSY MOUNTAIN LLC	2,178,720

The Clean Harbors Aragonite facility is also a Treatment, Storage and Disposal (TSD) facility. It does not appear in Table 9 because all chemical quantities are reported as off-site transfers and off-site releases.

TABLE 10

Top 10 Chemicals - Releases to Land
From Waste Disposal Facilities

	Chemical Name	Pounds/Year
1	Copper Compounds	981,991
2	Aluminum oxide	799,328
3	Chromium Compounds	776,559
4	Asbestos	703,363
5	Polychlorinated Biphenyls (PCBs)	635,448
6	Nickel Compounds	388,448
7	Lead Compounds	373,205
8	Zinc Compounds	91,388
9	Sodium dimethyldithiocarbamate	54,000
10	Lead	42,860

FIGURE 9

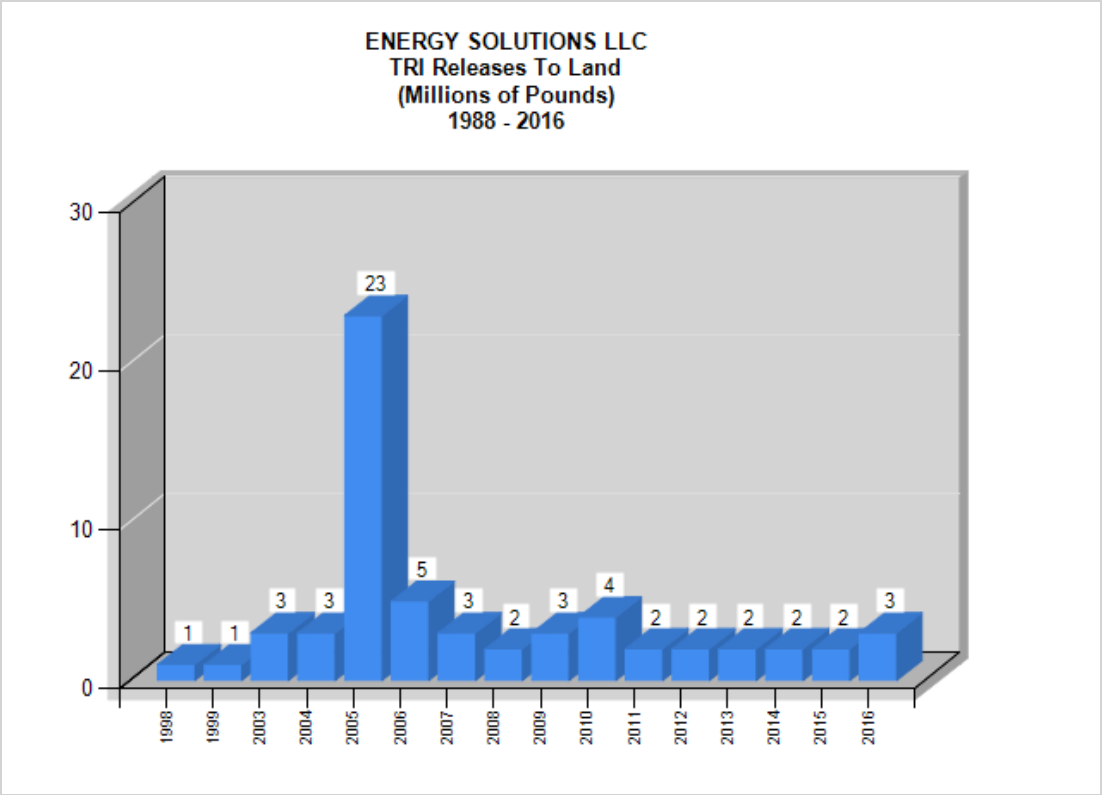
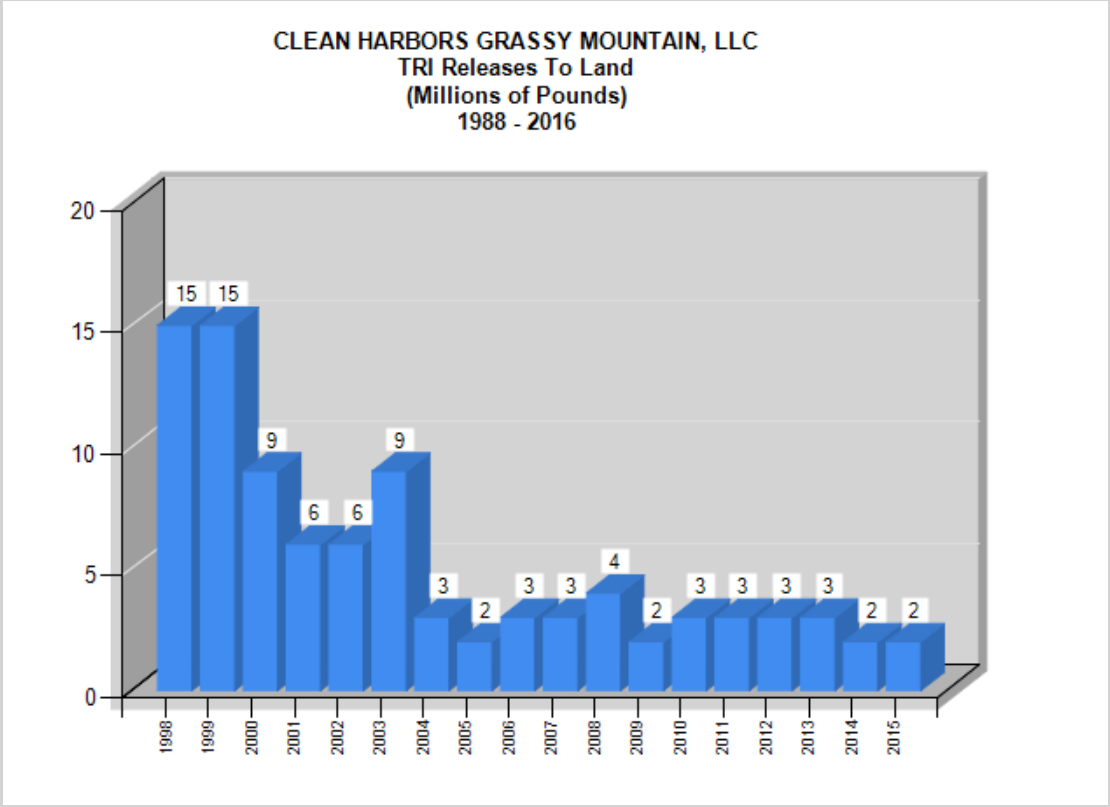


FIGURE 10



Electric Utilities

TABLE 11

Coal-Fired Electric Utility Releases to Land by Facility

	Facility Name	Pounds/Year
1	PACIFICORP HUNTER PLANT	1,234,149
2	INTERMOUNTAIN POWER GENERATING STATION	814,127
3	PACIFICORP - HUNTINGTON PLANT	741,092
4	SUNNYSIDE COGENERATION ASSOCIATES	14,943

TABLE 12

Top 10 Chemical Releases to Land
From Coal-Fired Electric Utilities

	Chemical Name	Pounds/Year
1	Barium Compounds	1,527,057
2	Manganese Compounds	345,886
3	Chromium Compounds	267,140
4	Zinc Compounds	153,077
5	Nickel Compounds	150,982
6	Vanadium Compounds	116,720
7	Copper Compounds	115,300
8	Lead Compounds	64,3840
9	Arsenic Compounds	23,100
10	Lead	14,860

RELEASES TO SURFACE WATER

Tables 13 and 14 relate to releases to surface water.

TABLE 13

Top 10 Facility Releases to Surface Water

	Facility Name	Pounds/Year
1	CHEVRON PRODUCTS COMPANY- SALT LAKE REFINERY	103,040
2	KENNECOTT UTAH COPPER SMELTER & REFINERY	6,362
3	KENNECOTT UTAH COPPER MINE, CONCENTRATORS, & POWER PLANT	4,667
4	HEXCEL CORPORATION	1,280
5	VALMONT COATINGS - INTERMOUNTAIN GALVANIZING	460
6	NUCOR STEEL -A DIVISION OF NUCOR CORPORATION	260
7	UNIVERSAL INDUSTRIAL SALES INC	17
8	TELEFLEX DEFENSE SYSTEMS	15
9	RUBBER ENGINEERING	14
10	GSC FOUNDRIES	11

TABLE 14

Top 10 Chemical Releases to Surface Water

	Chemical Name	Pounds/Year
1	Nitrate compounds	102,276
2	Ammonia	2,621
3	Zinc Compounds	2,212
4	Nickel Compounds	1,179
5	Chromium Compounds	1,035
6	Manganese Compounds	1,008
7	Antimony Compounds	1,000
8	Silver Compounds	1,000
9	Copper Compounds	895
10	Cresol(s)	500

TRANSFERS TO PUBLICLY OWNED TREATMENT WORKS (POTWs)

Tables 15 and 16 relate to transfers to POTWs

TABLE 15

Top 10 Facility Transfers to POTWs

	Facility Name	Pounds/Year
1	DANNON COMPANY, THE	259,522
2	JOHNSON MATTHEY	175,468
3	MICRON TECHNOLOGY, INC. - LEHI DIVISION	157,000
4	TYCO PRINTED CIRCUIT GROUP, LP ., LOGAN DIVISION	143,296
5	EASTON TECHNICAL PRODUCTS	127,952
6	SCHREIBER FOODS, INC.	113,986
7	NESTLE USA - PREPARED FOODS DIVISION, INC.	81,280
8	FUTURA INDUSTRIES	64,837
9	MEADOW GOLD DAIRY	51,868
10	TESORO REFINING AND MARKETING COMPANY	42,225

TABLE 16

Top 10 Chemicals Transferred to POTWs

	Chemical Name	Pounds/Year
1	Nitrate compounds	1,069,996
2	Nitric acid	104,756
3	Ammonia	90,513
4	Toluene	26,302
5	Glycol Ethers	24,179
6	Xylene (mixed)	12,724
7	Benzene	12,647
8	Hydrogen sulfide	5,928
9	Zinc Compounds	5,118
10	Cumene	3,300

UTAH FACILITY TRANSFERS TO OTHER OFF-SITE LOCATIONS

Tables 17 and 18 and Figures 11-13 relate to off-site chemical transfers.

TABLE 17

Top 10 Facilities Transferring Chemicals Off-site

	Facility Name	Pounds/Year
1	NUCOR STEEL -A DIVISION OF NUCOR CORPORATION	9,276,468
2	CLEAN HARBORS ARAGONITE, LLC.	3,361,141
3	CERROWIRE & CABLE CO.	2,003,084
4	PACIFIC STATES CAST IRON PIPE COMPANY	558,785
5	PETERSEN INC.	434,922
6	HEXCEL CORPORATION	421,665
7	TYCO PRINTED CIRCUIT GROUP, LP ., LOGAN DIVISION	382,000
8	ELKAY WEST	369,022
9	JOHNSON MATTHEY	281,532
10	UNIVERSAL INDUSTRIAL SALES INC	271,882

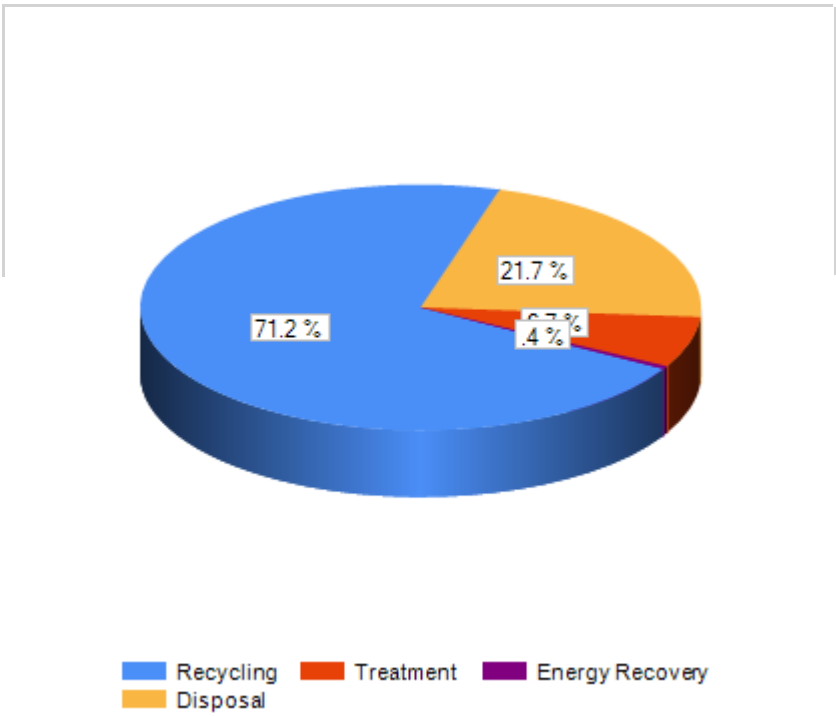
TABLE 18

Top 10 Chemicals Transferred to Off-site Facilities

	Chemical Name	Pounds/Year
1	Zinc Compounds	9,168,267
2	Copper	2,174,554
3	Nitrate compounds	1,149,847
4	Manganese Compounds	904,305
5	Chromium	792,758
6	Lead Compounds	661,385
7	Nickel	514,011
8	Copper Compounds	472,409
9	Chromium Compounds	389,399
10	Manganese	287,109

FIGURE 11

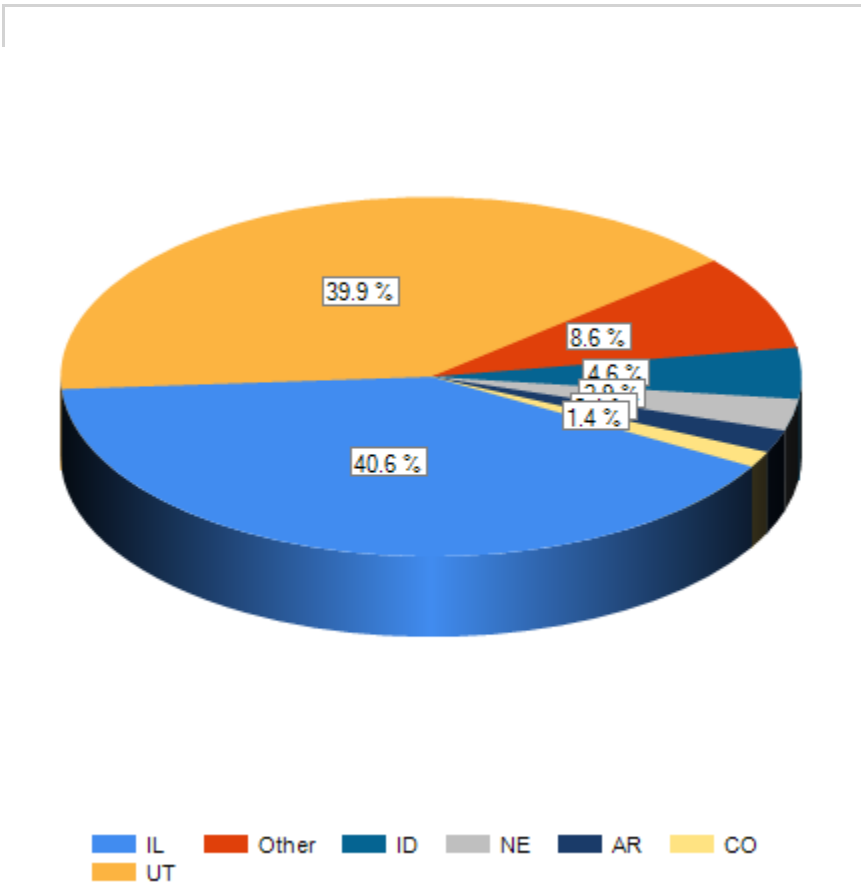
Utah 2016 TRI Chemical Transfers
by Final Disposition Type



Disposition	
Recycling	71.2 %
Disposal	21.7 %
Treatment	6.7 %
Energy Recovery	.4 %

Figure 12

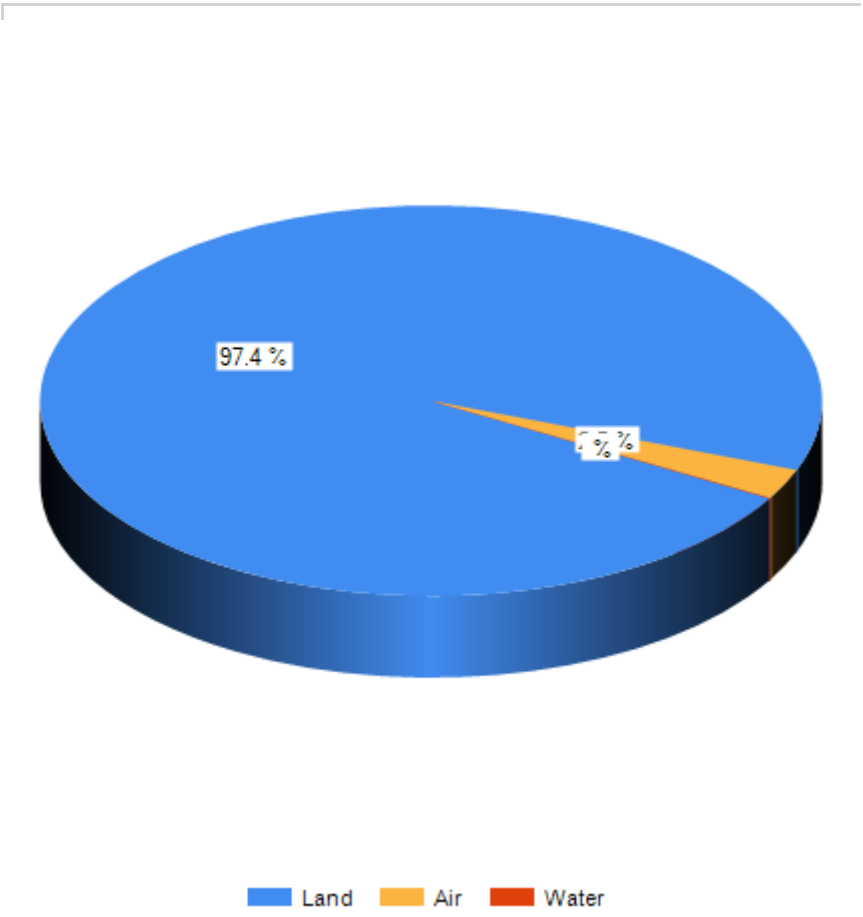
2016 Utah TRI Chemicals Transferred
to Other States



State	
IL	40.6 %
UT	39.9 %
Other	8.6 %
ID	4.6 %
NE	2.9 %
AR	2.1 %
CO	1.4 %

Figure 13

Utah 2016 TRI Total On-site Releases By Media



Media	
Land	97.4 %
Air	2.5 %
Water	%

PERSISTENT BIOACCUMULATIVE TOXIC (PBT) CHEMICALS

Table 19 reports PBT releases.

TABLE 19

Facilities Reporting PBT
Dioxin and Dioxin-like Compound Releases
(Units in Grams)

		ONSITE				OFFSITE	
	Facility	Total Water	Total Air	Total Land	Subtotal Releases	Offsite	Grand Total
1	US MAGNESIUM, LLC	0.00	10.30	27031.91	27,042.21	636.13	27678.34
2	WESTERN ZIRCONIUM	0.00	0.00	0.11	0.11	13.68	13.79
3	INTERMOUNTAIN POWER GENERATING STATION	0.00	1.32	4.54	5.86	0.00	5.86
4	PACIFICORP HUNTER PLANT	0.00	1.46	0.00	1.46	0.00	1.46
5	PACIFICORP - HUNTINGTON PLANT	0.00	0.96	0.00	0.96	0.00	0.96
6	SUNNYSIDE COGENERATION ASSOCIATES	0.00	0.54	0.00	0.54	0.00	0.54
7	KENNECOTT UTAH COPPER MINE, CONCENTRATORS, & POWER PLANT	0.00	0.44	0.00	0.44	0.00	0.44
8	ASH GROVE CEMENT COMPANY	0.00	0.26	0.00	0.26	0.00	0.26
9	CLEAN HARBORS ARAGONITE, LLC.	0.00	0.20	0.00	0.20	0.00	0.20
10	TESORO REFINING AND MARKETING COMPANY	0.00	0.11	0.00	0.11	0.00	0.11
11	HOLCIM (US) INC., DEVIL'S SLIDE PLANT	0.00	0.06	0.00	0.06	0.00	0.06
12	CHEVRON PRODUCTS COMPANY- SALT LAKE REFINERY	0.01	0.00	0.00	0.01	0.00	0.01
13	THE PROCTER & GAMBLE PAPER PRODUCTS COMPANY	0.00	0.00	0.00	0.00	0.00	0.00
	Totals	**0.01**	**15.66**	**27036.56**	**27,052.24**	**649.81**	**27702.05**

The GraymontWestern US Inc. facility is part of a facility related pair as explained above in the section of this report titled *Excluded Data.* Graymont was not included in the statistics presented in this report. Graymont reported total aggregate releases of dioxin and dioxin-like compounds at 0.199 grams.

SUMMARY

Total state-wide release amounts and corresponding percentages presented within this TRI annual report have been rounded for simplicity. As a result of either basing calculations on raw data (which is not provided in this report), or of rounding to whole numbers, various total and percentage values presented may not correspond exactly to each other, or to the tables or figures within this report. In addition, the number of significant figures was increased when it was considered beneficial to show a difference between reporting year data values.

Trends recognized in the Toxic Release Inventory data for RY 2016 may be summarized as follows:

- *Total On-site and Off-site Releases* increased by 18.7%, from 227.6 million pounds to 270.2 million pounds, an increase of about 42.6 million pounds

- *Total Releases to Air* decreased by 19.3% from 8.3 million pounds to 6.7 million pounds showing a decrease of about 1.6 million pounds. Chemicals ranked first and second for quantities released to air were hydrochloric acid (aerosol forms only) and chlorine respectively.

- *Total Releases to Land* statewide increased by 19.6% from 216.6 million pounds to 259.2 million pounds for a total increase of 42.6 million pounds. The Kennecott Mine Concentrators and Power Plant facility reported a 22.6% increase from last year, while the Kennecott Smelter and Refinery facility reported a 12.8% increase. Kennecott releases represent about 95.9 % of the total releases to land reported state-wide.

- *Total Releases to Surfaces Water* increased by 5.45% from approximately 110,000 pounds in RY 2015 to about 116,000 pounds in the current reporting year. Nitrate compounds comprise about 88.1% of total releases to surface waters.

- *Total Transfers to Publicly Owned Treatment Works* decreased by 6.7% from 1.5 million pounds to about 1.4 million pounds. Nitrate compounds comprised about 78.7% of all chemicals transferred to POTWs.

- *Transfers Off-site* to treatment, storage & disposal facilities increased by 0.96% from 20.8 million pounds to 21 million pounds. These facilities typically include chemical recyclers and waste disposal facilities.

- The most notable persistent bioaccumulative toxic (PBT) chemicals category is dioxin and dioxin-like compounds. Dioxin and dioxin-like compounds are unique in that they comprise the only chemical/chemical category in the TRI program in which the releases

are reported in grams. Total releases of PBT chemicals, dioxin and dioxin-like compounds, increased by 43% from 19,360.70 grams in RY 2015 to 27,702.05 grams in the current report year.

- The total release amount reported by US Magnesium for dioxin and dioxin-like chemicals on-site and off-site is 27,678.34 grams. This amount comprises 99.9% of the total amount released by all facilities in Utah.

- Total on-site releases to land, air and water were 27,036.56 grams, 15.66 grams, and 0.01 grams, respectively, for a total on-site release amount of 27,052.24 grams. The total off-site release reported was 649.81 grams. On-site releases to land constitute 97.6% of the total on-site and off-site amounts reported.