

Oklahoma



Toxic



Release



Inventory



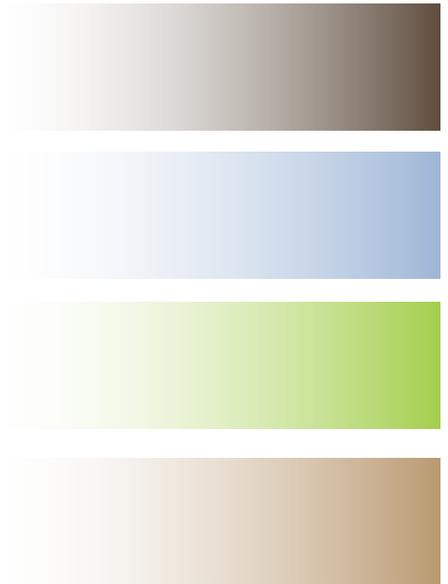
Oklahoma Department of Environmental Quality

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Executive Summary

The 2007 Toxics Release Inventory indicates environmental releases of toxic chemicals relative to total toxic wastes produced in Oklahoma continue to trend downward. TRI reports provide information on legal emissions, transfers, treatment and reuse of approximately 650 toxic chemicals used in the manufacture or processing of a wide variety of products. Covered industries include manufacturing, coal-fired electric power generation, commercial hazardous waste disposal, solvent recovery and bulk petroleum terminals. Facilities in these categories also must have the equivalent of at least 10 full time employees and use one or more listed toxic chemicals at or above specified thresholds.

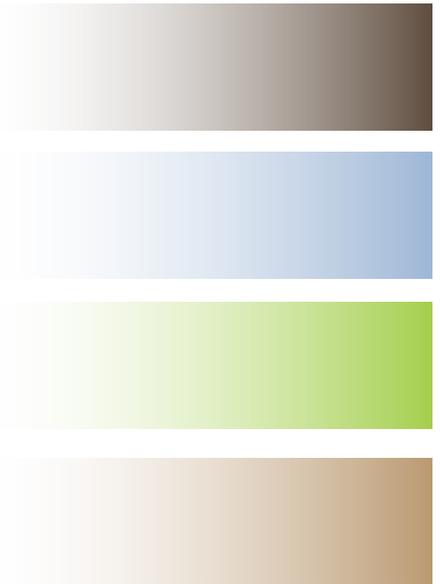
Releases and transfers of chemicals used in the State are regulated under permits issued by state and federal agencies. Releases are the quantities of chemical emissions emitted directly to air, water, onto land or into deep underground injection wells. Transfers are the quantities of chemicals discharged into public sewers and those removed to off-site landfills or other disposal facilities. Reuse is the sum of reportable chemicals recycled on- and off-site plus quantities consumed in energy recovery operations. Treatment includes both on-site and off-site measures that neutralize or destroy the toxic chemicals or substantially decrease their deleterious effects. The total of

the quantities of each of these activities-- releases, transfers, reuse and treatment, sets the value for total production related wastes generated in the State in 2007.

Oklahoma companies reported 27.3 million pounds released in 2007. Reuse, primarily on-site recycling and energy recovery, increased from 2000 to 2007 by 34.4 million pounds, an increase of 28 percent. Over 45 million pounds of chemicals were treated, and 4.9 million pounds of chemicals were transferred off-site for proper disposal. The total of these numbers sets the quantity of Total Production Related Wastes at 211.5 million pounds in the State for 2007.

Expansions in the program since 1994 both doubled the number of reportable chemicals and also required additional industries to report, making reductions even more significant. Enacted for Reporting Year 2000, the Persistent, Bioaccumulative, and Toxic (PBT) rule greatly lowered reporting thresholds for TRI chemicals with these characteristics. Chemicals classified as PBT possess the potential to seriously impact the environment and are tracked at significantly lower levels under the new requirements. The total for all releases of PBT chemicals was 914,425 pounds in 2007 or less than four percent of total releases Statewide.

DEQ has compiled TRI information for over 20 years and this is the ninth summary report.



Background

In 1984, a release of deadly methyl isocyanate gas in Bhopal, India resulted in the deaths of thousands living near a chemical plant. Soon after, a serious, although not fatal, chemical release occurred at a similar plant in West Virginia. These incidents emphasized the need for communities to be informed of hazardous materials in their midst and to plan for possible chemical emergencies. In response, the United States Congress passed Title III of the Superfund Amendments and Reauthorization Act (SARA), also known as Emergency Planning and Community Right-to-Know Act (EPCRA) on October 16, 1986. The fundamental purposes of SARA Title III are to provide the public with information about toxic chemicals used and stored within communities, thereby raising public awareness of potential chemical hazards, and to encourage local planning for chemical emergencies. Section 313 of SARA Title III, known as the Toxics Release Inventory (TRI), requires covered industries that manufacture, process or otherwise use any of over 600 listed toxic chemicals to annually report releases and waste management of these chemicals to the Environmental Protection Agency (EPA) and to states. Also, under Section 312, the Hazardous Chemical Inventory (Tier II), sites storing certain hazardous chemicals or materials must report to states, first responders and Local Emergency Planning Committees (LEPCs) once a year. By mandate,

data contained in the TRI and Tier II are available to the public.

Facilities covered by TRI report total quantities of wastes generated, released, transferred for disposal, treated and reused. Releases of listed chemicals are reported according to the media into which they enter: air, water, land or underground injection. The Pollution Prevention Act of 1990 requires additional data to be reported describing waste streams and measures taken to reduce the quantities of reportable chemicals used. This addition to TRI reporting underscores the importance of pollution prevention and encourages development and implementation of measures for reducing toxic wastes. Since 1991, TRI has contained information on the re-use of chemicals, including quantities recycled or combusted for energy recovery along with methods used for reducing the volume of toxic chemicals used. Treatment numbers reported include both on-site and off-site treatments to neutralize or reduce the effects of specific chemicals. The total of release, transfer, treatment and re-use numbers yields a value for the total production-related wastes generated annually.

Tier II reports describe chemical storage, including information on the type and location of storage containers and the maximum and average quantities stored. Reports are filed with the state, appropriate LEPCs, and local fire departments. Beginning with the 2006

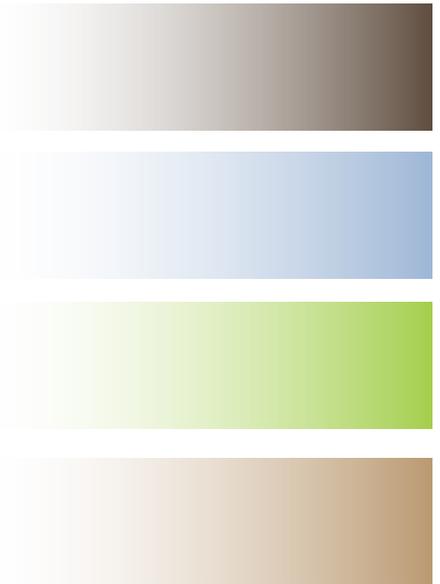
data, DEQ mandated on-line submission of Tier II data and offered grants to LEPCs that disseminate the information for their respective counties to responding fire departments.

Oklahoma industries covered by TRI are required to report annually to the EPA and to DEQ. However, with the event of the State Data Exchange Network and a resultant Memorandum of Agreement between EPA and DEQ, Oklahoma facilities file TRI reports with EPA which then shares the reports with DEQ via the Data Exchange Node. Beginning with Reporting Year 2006, reporting facilities in Oklahoma need to file once per year with the EPA only in order to be in compliance. DEQ compiles and maintains a TRI database, reconciles it to the EPA database, responds to requests for TRI information, provides technical support to reporters, analyzes the data and publishes a summary. In 2008, DEQ received and processed 1,248 reports from 324 facilities for the 2007 reporting year. Because the intent of TRI is to provide information for the public, it frequently is the first set of data supplied to and examined by citizens or citizen groups in the resolution of complaints against a specific facility. Schools, hospitals and others frequently use the information in determining site selections. TRI data is used as an indicator of the progress facilities or industries achieve in waste reduction, and the dissemination of TRI data can encourage dialogue between

citizens and industries. Trends in TRI data frequently serve as markers for the progress of environmental programs.

Similarly, DEQ receives Tier II reports from across Oklahoma and constructs a database yearly; however, EPA does not receive Tier II forms and therefore does not maintain a database. For RY 2007, DEQ received 40,378 Tier II forms, 1,314 of those describing storage of a chemical designated as an Extremely Hazardous Substance (EHS).

TRI data describe use, releases, waste management and pollution prevention activities for individual chemicals and Tier II reports storage of hazardous chemicals and materials. The information generated by these programs is available from the DEQ for use by emergency managers, fire departments, LEPCs, emergency medical services, law enforcement and the general public. Local organizations then can use the data to identify potential chemical hazards and prepare for chemical emergencies. This information also allows for faster and more efficient responses. Additional copies of this report or more in depth information about TRI or Tier II reporting or other EPCRA programs may be obtained by contacting the Oklahoma DEQ Customer Services Division/SARA Title III Programs at 405-702-1000 or at 1-800-869-1400 or by visiting the DEQ website at: <http://www.deq.state.ok.us/CSDnew/saratitleiii/index.htm>



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TRI Reporting Requirements

A plant, factory or other facility is subject to TRI and must annually report releases, transfers and waste management activities if it meets all three of the following criteria:

- Is included in one of the covered North American Industrial Classification System (NAICS) codes. (Table A);
- Has ten or more full-time employees (or the equivalent 20,000 hours per year);
- Manufactures, imports, processes or otherwise uses any of 643 listed toxic chemicals or chemical categories in quantities greater than the specified thresholds. The threshold quantity for toxic chemicals manufactured, imported or processed is 25,000 pounds over the calendar year. For other uses, the threshold quantity is 10,000 pounds over the calendar year, with the exception of PBTs. (See Persistent, Bioaccumulative and Toxic Chemicals, below)

Facilities required to report to TRI engaged primarily in a wide range of manufacturing activities. Additional industries linked to manufacturing were added for 1998 including fossil fuel electricity generation plants, hazardous waste treatment, storage and disposal site, bulk petroleum terminals, chemical wholesalers and some mining activities are required to report under the program. Initially, covered industries were listed by Standard Industrial Classification

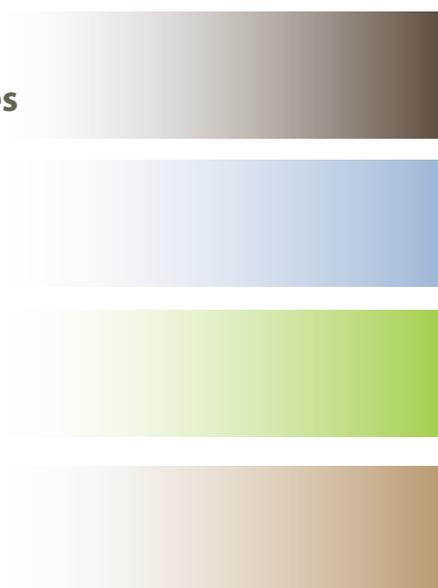
(SIC) codes; however, 2007 is the second year for facilities to be identified and report using NAICS codes. All industrial sectors operating under former SIC codes are included in the currently covered NAICS codes.

A facility may need to report if it used one or more of the listed chemicals, even if it had no chemical releases, as reporting thresholds are based on the quantities of chemicals manufactured, processed or otherwise used rather than discharges or emissions. The abbreviated Form A Certification Statement may be used for reporting if the total quantity manufactured, processed or otherwise used is less than 1 million pounds, the Annual Reportable Amount (the sum of Section 8 of Form R) is less than 5,000 pounds and the total released is less than 5,000 pounds and the total quantity released is less than 2,000 pounds of the Annual Reportable Amount.

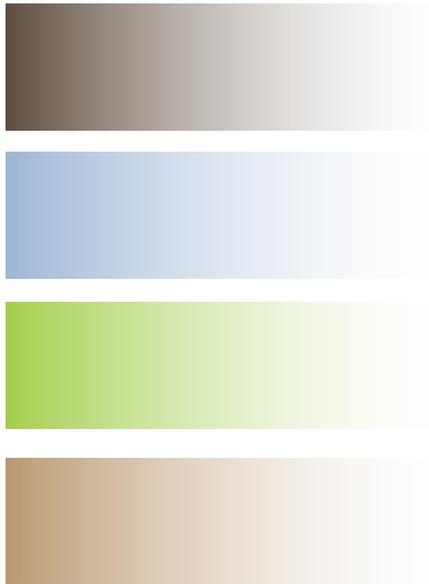
Exemptions to the reporting requirements for Section 313 are designed to reduce the burden associated with comparatively small quantities of chemicals used and are applicable in limited circumstances. The de minimis concentration exemption applies if the chemical comprises less than 1 percent (<1%) of a mixture, even though the total quantity of the chemical exceeds the reporting threshold. However, for TRI listed chemicals also classified by the Occupational Safety and Health Administration (OSHA) as carcinogenic, the de

Table A - Industries Subject to 313 Reporting, by NAICS Codes

NAICS	Industrial Group
111998	All Other Misc. Crop Farming
211112	Natural Gas Liquid Extraction
212111	Bituminous Coal & Lignite Surface Mining
212112	Bituminous Coal & Underground Mining
212113	Anthracite mining
212221	Gold Ore Mining
212222	Silver Ore Mining
212231	Lead Ore & Zinc Ore Mining
212234	Copper Ore & Nickel Mining
212229	Other Metal Ore Mining
212324	Kaolin and Ball Clay Mining
212325	Mining
212393	Other Chemical & Fertilizer Mining
212399	All Other Nonmerallic Mineral Mining
221111	Hydroelectric Power Generation
221112	Fossil Fuel Electric Power Generation
221113	Nuclear Electric Power Generation
221119	Other electric Power Generation
221121	Electric bulk Pwer Transmission Control
221122	Electric Power Distribution
311---	Food Manufacturing
312---	Beverage & Tobacco Manufacturing
313---	Textile Mills
314---	Textile Product Mills
315---	Apparel Manufacturing
316---	Leather and Allied Products
321---	Wood Products
322---	Paper Manufacturing
323---	Printing & Related Activities
324---	Petroleum & Coal Products
325---	Chemical Manufacturing
326---	Plastics & Rubber Products
327---	Nonmetallic Mineral Products
331---	Primary Metal Manufacturing
332---	Fabricated Metal Products
333---	Machinery Manufacturing
334---	Computer & Electronic Products
335---	Electrical Equipment, Appliances & Components
336---	Transportation Equipment Manufacturing
337---	Furniture & Related Products
339---	Misc. Manufacturing
424690	Chemical & Allied Products Wholesalers
424710	Petroleum Bulk Stations & Terminals
425110	Business to Business Electronics
425120	Wholesale Trade Agents & Brokers
488390	Other Support Activities for Water Transportation
511110	Newspaper Publishers
511120	Periodical Publishers
511130	Book Publishers
511140	Directory and Mailing List Publishers
511191	Greeting Card Publishers
511199	All Other Publishers
512220	Integrated Record Production/Distribution
512230	Music Publishers
516110	Internet Publishing & Broadcasting
541710	Research & Development in Science & Engineering
562112	Hazardous Waste Collection
562211	Hazardous Waste Treatment and Disposal
562212	Solid Waste Landfill
562213	Solid Waste Combustors & Incinerators
562219	Nonhazardous Waste Treatment & Disposal
562920	Materials Recovery Facilities
811490	Pleasure Boat Building & Repair
928110	National Security



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de minimis concentration drops to less than 0.1 percent (<0.1%). The de minimis concentration exemption applies only to those chemicals manufactured, and does not apply to reportable chemicals that are processed or otherwise used. Owners of leased property may not be required to report to TRI, nor are the majority of activities in analytical laboratories. Toxic chemicals that are parts of the structural components of a facility as well as chemicals used for janitorial or facility maintenance are exempted from reporting even if quantities used would exceed threshold requirements. Freon in air conditioners used solely for employee comfort is exempt from TRI reporting, as is chlorine used to treat on-site potable water. Other exemptions for personal use may apply. Reportable chemicals taken into a facility from the environment are exempt, for example, any quantities of reportable chemicals in intake water. Chemicals contained in materials used to maintain or refuel motor vehicles need not be reported provided the vehicles are used only by the facility. The article exemption applies to any item already manufactured before

reaching a facility and whose end use is more or less dependent on the shape or design of the item. The article must not be significantly modified and no 313 chemicals are released during the normal processing or otherwise use of the item while at the reporting facility. For additional information about the article exemption and other exemptions, general TRI reporting and threshold quantities, contact the EPA Region 6, the Oklahoma DEQ, or visit the following website: <http://epa.gov/tri/>

Reporting Year 2000 was the first year for implementation of the rule for Persistent, Bioaccumulative and Toxic (PBT) chemicals, and 2001 was the first year the Final Rule for lead was in effect. Thresholds for PBT's are far lower and no distinction is made between the reporting thresholds for manufacture, process or otherwise use. The de minimis concentration exemption does not apply to reporting of PBTs. A table listing PBT chemicals and a more detailed description of the program is included in the section "TRI Persistent, Bioaccumulative and Toxic Chemicals" in this report.

Limitations of TRI Data

TRI provides information on over 600 specific toxic chemicals released and managed at or above thresholds by covered facilities. As such, TRI is the most comprehensive overview available on chemicals used by industries. Responsible use of this information can enable the public to identify and better understand potential chemical hazards in their communities. From there, citizens can delineate plans of action in the event of chemical emergencies and work with industry and government to reduce toxic releases. However, there are limitations to consider when using TRI data.

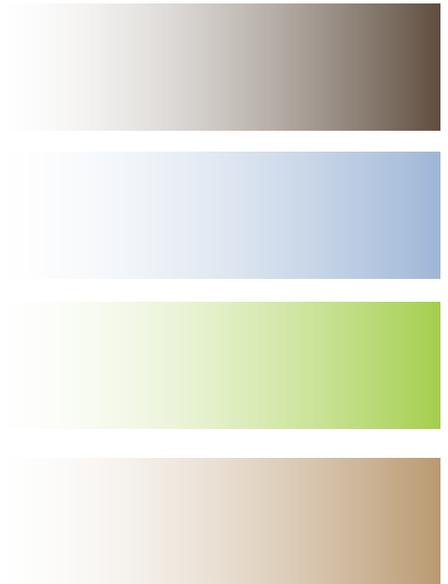
The majority of releases as well as other activities reported in TRI are regulated by state or federal permits. Transfers to off-site locations for treatment, storage or disposal also are regulated, as are on-site disposals. For example, sites permitted under Resource Conservation and Recovery Act (RCRA) Subtitle C are strictly regulated and monitored to insure that human exposure and impact to the environment are minimal. Prior to 1998, only manufacturing facilities were required to report to the TRI. While the addition of seven industrial categories expanded TRI reporting to make it more representative, not all sources of toxic materials are covered. For example, neither transportation emissions nor releases from oil and gas production or small facilities are reported.

TRI expanded for RY 1995 to double the number of covered

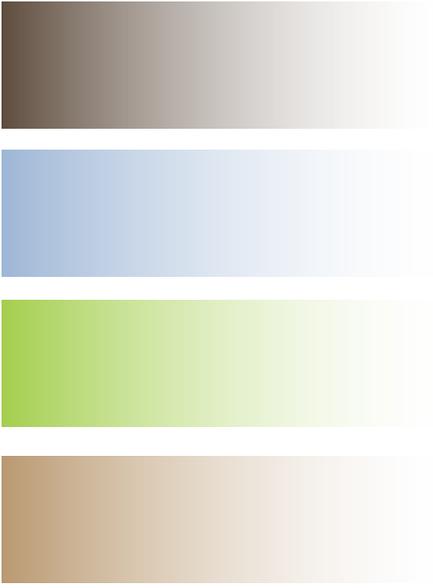
chemicals or chemical groups. At present, 643 chemicals or chemical groups known to impact human health, the environment or both are reportable. As extensive as the current list is, it does not include every toxic chemical used in industry. It should not be construed that all TRI releases have direct deleterious effects. Chemicals reportable under TRI vary greatly in individual toxicity and persistence in the environment. For example, the release of a small quantity of a highly toxic material whose usage may fall below the reporting threshold could pose a more serious health or environmental hazard than a large release of a less toxic chemical. The rule for PBT is an initial step in addressing these variabilities. (see "Chemicals Reported in 2007", below) TRI reporting requirements are based on the quantities of chemicals manufactured, processed or otherwise used and facility classifications, rather than on the quantities of chemicals released. For example, a facility may not trip a threshold for reporting and yet have a substantial release of a reportable chemical within a calendar year. Although total usage determinations are necessary to establish the need to report, total usage itself is not reported.

The different media into which toxic chemicals are released greatly affects both exposure levels and the means of exposure (inhalation, dermal absorption or ingestion). For example, disposal to underground injection wells are reported as a releases even

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TRI
2007



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though the potential impact on public health or the environment is minimal. Quantities in the TRI database are totals for a given year, and peak concentrations or accidental discharges are not specifically sited. Therefore, health assessments or environmental risks/exposures based solely on TRI data are not valid.

Facilities are required to base values reported on monitoring data when available. However, if actual process data are not available, reports can be based on published emission factors and approved estimate techniques. In fact, much of the TRI data are derived from approved estimates. EPA publishes estimation guidance although several techniques may be used. Variations between similar facilities may result from differences in technologies at the facilities or the use of different estimation methodologies. A facility's production level may change from year to year consequently effecting the quantities of chemicals handled. Productivity ratios are included by facilities each reporting year and these ratios can be used for normalizing year-to-year comparisons of quantities released or managed; however,

this assumes a direct linear relationship between production levels and wastes generated, which is not always accurate. For example, total wastes may fall as productivity improves due to waste reduction or improved process efficiency. Additionally, productivity ratios do not take into account chemical releases resulting from any remedial action or one-time event. These factors also must be considered when reviewing TRI data.

Continued expansions in reporting, such as the increase in the number of reportable chemicals, the addition of industrial categories, and the implementation of the PBT Rule reflect efforts to build TRI into an increasingly comprehensive database. Changes in the program, however, necessitate that the data be viewed judiciously when making comparisons from year to year or facility to facility. Many of the chemical releases and waste management reported in the TRI are permitted under State programs, and data from these regulatory programs should provide additional information to clarify citizens about toxic chemicals in the environment.

2007 TRI Overview

Fifty-one of 77 Oklahoma counties contain at least one industrial facility that meets the requirements for TRI reporting. A total of 324 facilities reported for 2007. (Figure 1)

Of the 51 counties with at least one reporting facility, only six counties had total TRI releases exceeding 1 million pounds. These include the major metropolitan areas of Oklahoma City and Tulsa, counties accessing the Port of Catoosa and counties with wood processing/paper manufacturing facilities, nitrogen fertilizer plants or major treatment, storage and disposal sites. Information on releases and waste management in individual counties is found in Table B.

Total production related wastes were 211.4 million pounds in 2007, as reported under TRI. (Figure 2) According to the TRI data, over 84.7 percent of industrial wastes in Oklahoma were managed through reuse and treatment. (Figure 3)

For 2007 Oklahoma companies reported:

- 27.3 million pounds released
- 5.0 million pounds transferred for disposal
- 133.7 million pounds reused
- 45.4 million pounds treated

Total releases were:

- 15.3 million pounds released to air
- 8.3 million pounds released to land including permitted landfills
- 3,400 pounds disposed in underground injection wells

- 3.5 million pounds discharged to surface waters.
- 246,800 pounds of one time releases (Figure 4)

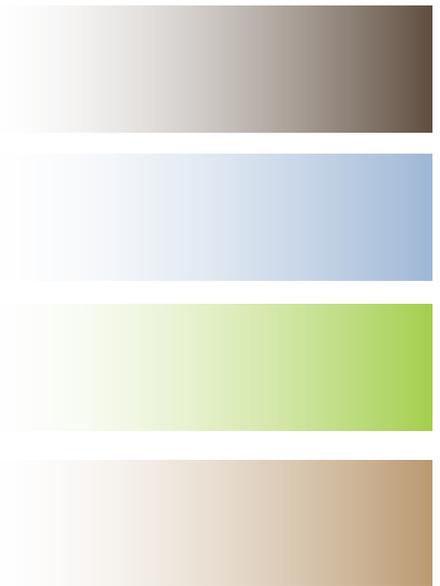
Releases

Total on-site releases include all discharges to air, land, water or underground injection wells of any TRI reportable chemicals that occur within a facility's property lines. Permitted, non-permitted and accidental releases are reported. Oklahoma companies reported 27.3 million pounds released in 2007, a slight increase over the total for 2006 but a decrease of over 28 percent in the last ten years, when new industrial categories were added for 1998. (Figure 5) On-site releases accounted for only 12.9 percent of the Total Production Related Wastes (TPRW) managed in 2007 in Oklahoma.

The largest total annual releases reported along with the medium into which the releases occurred are listed in Table C.

Total air releases are the sum of permitted stack releases and fugitive air releases, and also can be considered point source or non-point source emissions respectively. Fugitive emissions result largely from the natural volatility of some chemical compounds and are defined as any air releases that do not go through a confined air stream. Evaporation, equipment leaks or releases from building ventilation systems are possible sources of fugitive releases. Stack air releases occur through confined air streams such as stacks, ducts

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TRI
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Figure 2

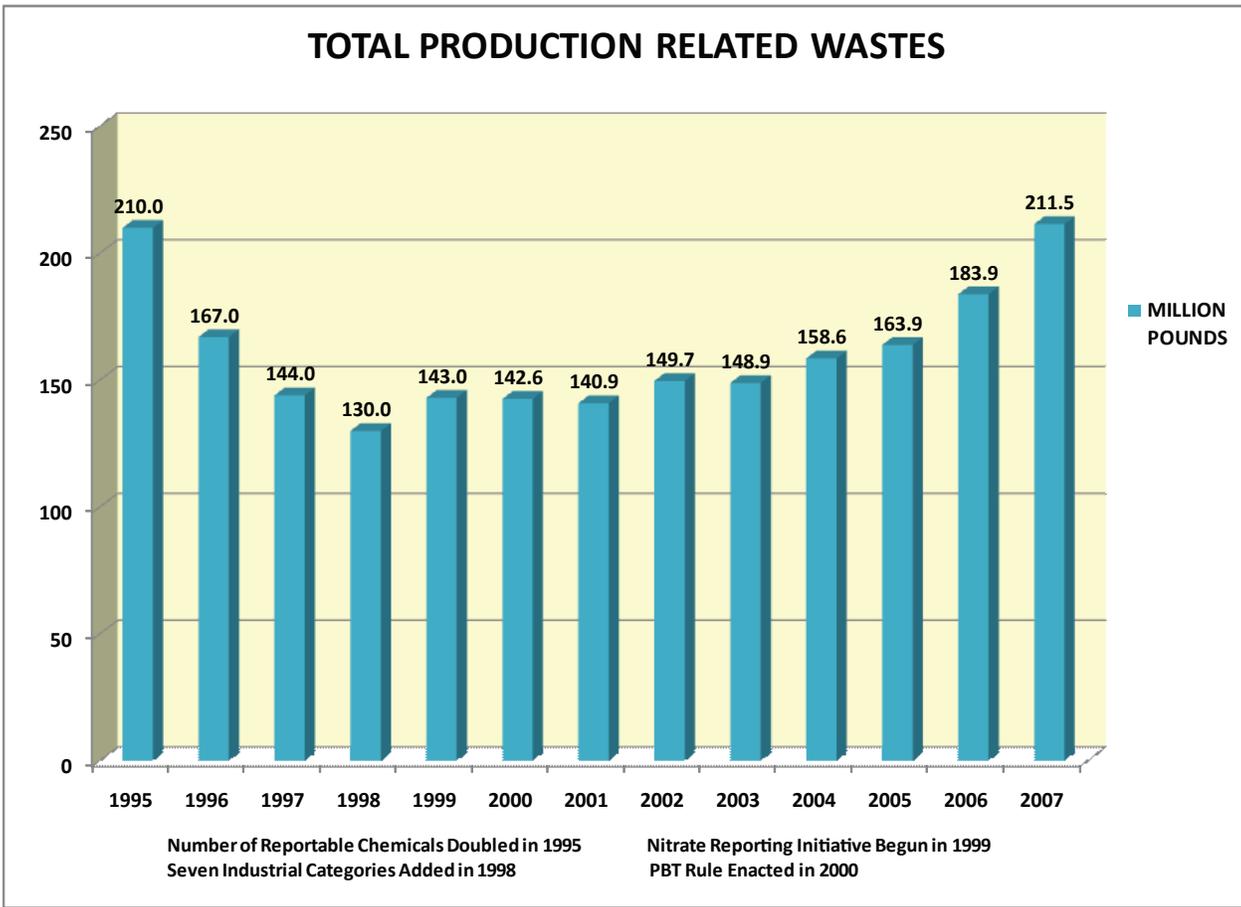


Figure 3

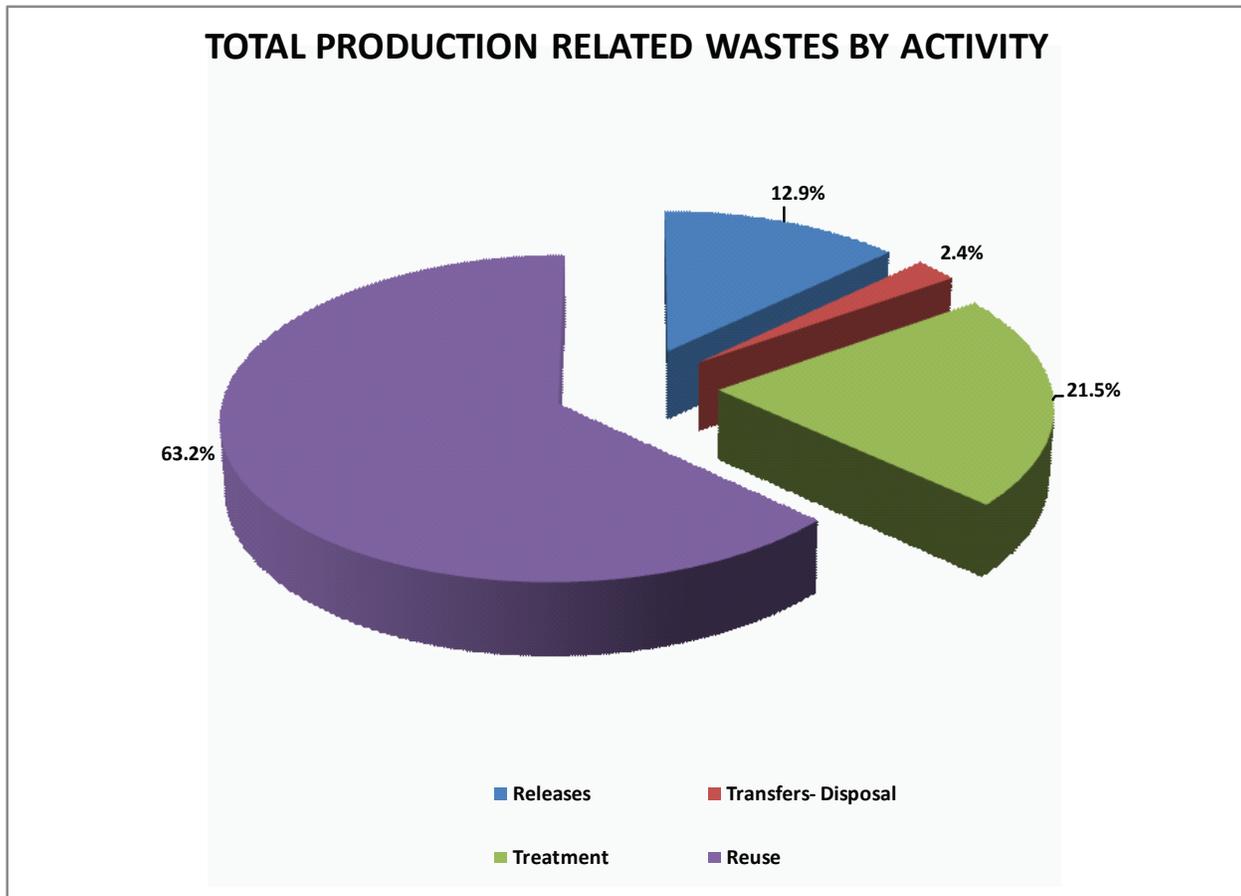


Table B

COUNTY	# FAC.	AIR	LAND	INJECTION	WATER	ONE TIME	TOT. ON-SITE RELS.	TRANS. DISPOSAL
Adair	2	11	0	0	0	0	11	0
Alfalfa	0	0	0	0	0	0	0	0
Atoka	0	0	0	0	0	0	0	0
Beaver	0	0	0	0	0	0	0	0
Beckham	0	0	0	0	0	0	0	0
Blaine	1	0	0	0	0	0	0	0
Bryan	2	67,819	0	0	0	0	67,819	0
Caddo	0	0	0	0	0	0	0	0
Canadian	8	78,405	0	0	30	354	78,789	2,009
Carter	6	207,698	0	0	110,176	0	317,874	183,484
Cherokee	2	169	0	0	0	0	169	0
Choctaw	1	258,971	245,353	0	0	0	504,324	0
Cimarron	0	0	0	0	0	0	0	0
Cleveland	3	12,176	0	0	10	0	12,186	6,940
Coal	0	0	0	0	0	0	0	0
Comanche	4	37,702	333,523	0	1,123	0	372,348	77,997
Cotton	0	0	0	0	0	0	0	0
Craig	1	131	0	0	0	0	131	0
Creek	13	9,209	6,498	4	0	0	15,711	438,389
Custer	5	39,384	0	0	0	0	39,384	7,989
Delaware	0	0	0	0	0	0	0	0
Dewey	0	0	0	0	0	0	0	0
Ellis	0	0	0	0	0	0	0	0
Garfield	5	2,533,783	5	0	795,162	0	3,328,950	2
Garvin	1	137,237	1,290	0	7,698	0	146,225	29,868
Grady	4	43,235	0	0	0	0	43,235	76
Grant	0	0	0	0	0	0	0	0
Greer	0	0	0	0	0	0	0	0
Harmon	0	0	0	0	0	0	0	0
Harper	0	0	0	0	0	0	0	0
Haskell	0	0	0	0	0	0	0	0
Hughes	1	0	0	0	0	0	0	0
Jackson	0	0	0	0	0	0	0	0
Jefferson	1	11,506	0	0	0	0	0	0
Johnston	0	0	0	0	0	0	0	0
Kay	12	460,230	6,173	0	691	0	467,094	53,652
Kingfisher	2	29,437	0	0	0	2	29,439	0
Kiowa	0	0	0	0	0	0	0	0
Latimer	1	0	0	0	0	0	0	0
LeFlore	3	267,700	0	0	0	0	267,700	664,007
Lincoln	1	1,500	4,000	0	0	0	5,500	0
Logan	0	0	0	0	0	0	0	0
Love	0	0	0	0	0	0	0	0
Major	1	191	3,137,363	0	0	0	3,137,554	0
Marshall	3	2,034	2,440	0	0	0	4,474	26,317
Mayes	13	189,710	780,687	0	1,515,273	38,200	2,523,870	218,419
McClain	0	0	0	0	0	0	0	0
McCurtain	7	3,215,128	398,477	0	664,915	152,070	4,430,590	29,615
McIntosh	1	0	0	0	0	0	0	0
Murray	0	0	0	0	0	0	0	0
Muskogee	10	799,026	17,146	0	20,267	0	836,439	141,071
Noble	3	262,016	0	0	2,460	0	264,476	34,822
Nowata	2	0	0	0	0	0	0	0
Ofuskee	0	0	0	0	0	0	0	0
Oklahoma	47	694,426	244	0	17	565	695,252	79,408
Okmulgee	2	0	0	0	9,088	0	9,088	45
Osage	1	1,013,900	0	1,300	0	0	1,015,200	800
Ottawa	5	244,113	0	0	0	0	244,113	0
Pawnee	0	0	0	0	0	0	0	0
Payne	4	126,229	0	0	23	0	126,252	159,140
Pittsburg	2	9,968	442,405	0	0	54,417	506,790	43,865
Pontotoc	2	66,500	26,270	0	0	0	92,770	0
Pottawatomie	7	76,931	0	0	0	0	76,931	8,984
Pushmataha	1	5	0	0	0	0	5	1,690
Roger Mills	0	0	0	0	0	0	0	0
Rogers	22	2,776,741	775,063	0	195,151	1,200	3,748,155	229,210
Seminole	4	105,670	0	0	0	0	105,670	0
Sequoyah	2	60,305	8,684	0	244	0	69,233	0
Stephens	4	0	0	0	0	0	0	75
Texas	3	0	0	0	0	0	0	12
Tillman	1	0	0	0	0	0	0	52,023
Tulsa	82	731,860	2,002,976	250	115,849	0	2,850,935	2,045,128
Wagoner	5	125	0	0	5	0	130	22,952
Washington	5	2,475	0	1,450	17	1	3,943	562,893
Washita	0	0	0	0	0	0	0	0
Woods	2	7,100	0	0	0	0	7,100	0
Woodward	4	729,580	73,260	0	70,000	0	872,840	627

TOT. ENERGY REC.	TOT. RECYCLING	TOTAL REUSE	TREATMENT	POTW TREAT.	TOT. TREATMENT	TPRW
0	0	0	0	0	0	11
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	75,946	75,946	0	0	0	143,765
0	0	0	0	0	0	0
167,776	494,107	661,883	126,180	57,885	327,826	1,070,507
5,793,688	292,376	6,086,064	5,748,381	4	5,748,385	12,335,807
0	0	0	0	0	0	169
0	0	0	0	0	0	504,324
0	0	0	0	0	0	0
0	262,455	262,455	0	0	0	281,581
0	0	0	0	0	0	0
0	299,453	299,453	22,514	4,466	26,980	776,778
0	0	0	0	0	0	0
0	9,425	9,425	0	0	0	9,556
0	613,321	613,321	0	0	0	1,067,421
0	56,700	56,700	245,234	0	245,234	349,307
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
730,000	4,425,000	5,155,000	960,000	0	960,000	9,943,952
28,387,110	26,834	28,413,944	732,554	0	732,554	29,822,377
0	98,863	98,863	0	0	0	43,311
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	142,174	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
11,260	98,713	109,973	3,685,927	1,019	3,686,946	4,317,665
0	192,615	192,615	0	0	0	222,054
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	724,635
0	0	0	4,000	0	4,000	4,000
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	83,816	0	83,816	3,221,370
0	4,493	4,493	0	0	0	30,810
688,408	5,563,884	6,252,292	14,775,425	8	14,775,433	23,770,006
0	0	0	0	0	0	0
46	13,950	13,996	10,178,991	5	10,178,996	14,959,136
0	0	0	0	0	0	21,915
0	0	0	0	0	0	0
0	775,730	775,730	771,498	0	771,498	2,524,738
29,441	22,988	52,429	354,052	0	354,052	705,839
0	0	0	0	0	0	0
0	0	0	0	0	0	0
257,443	16,391,216	16,648,659	491,662	25,204	516,866	17,940,185
0	38,345	38,345	0	0	0	48,082
2,012,600	34,483,200	36,495,800	0	0	0	37,511,000
0	15,133	15,133	158,207	39,105	197,312	380,777
0	0	0	0	0	0	0
5,804	932,900	938,704	71,226	9,368	80,594	1,295,322
0	1,405,951	1,405,951	652,900	0	652,900	2,609,506
0	17,534	17,534	316,138	0	316,138	426,442
0	247,701	247,701	257,996	5,030	263,026	596,642
4,800	0	4,800	0	0	0	6,490
0	0	0	0	0	0	0
6,150	16,381,367	16,387,517	2,769,114	22,095	2,791,209	23,156,091
164,750	0	0	0	0	0	270,420
1,757	0	1,757	54,340	0	0	124,330
30,000	1,553,798	1,583,798	0	0	0	1,583,798
0	0	0	177,000	177,000	354,000	354,012
0	0	0	0	0	0	52,023
3,144,231	6,052,682	9,196,913	2,222,196	1,178	2,223,374	16,316,350
0	158,710	158,710	0	0	0	181,792
0	78,816	78,816	8	200	208	645,860
0	0	0	0	0	0	0
0	0	0	0	0	0	7,100
122,500	711,781	834,281	191,000	0	191,000	1,898,748

Figure 4

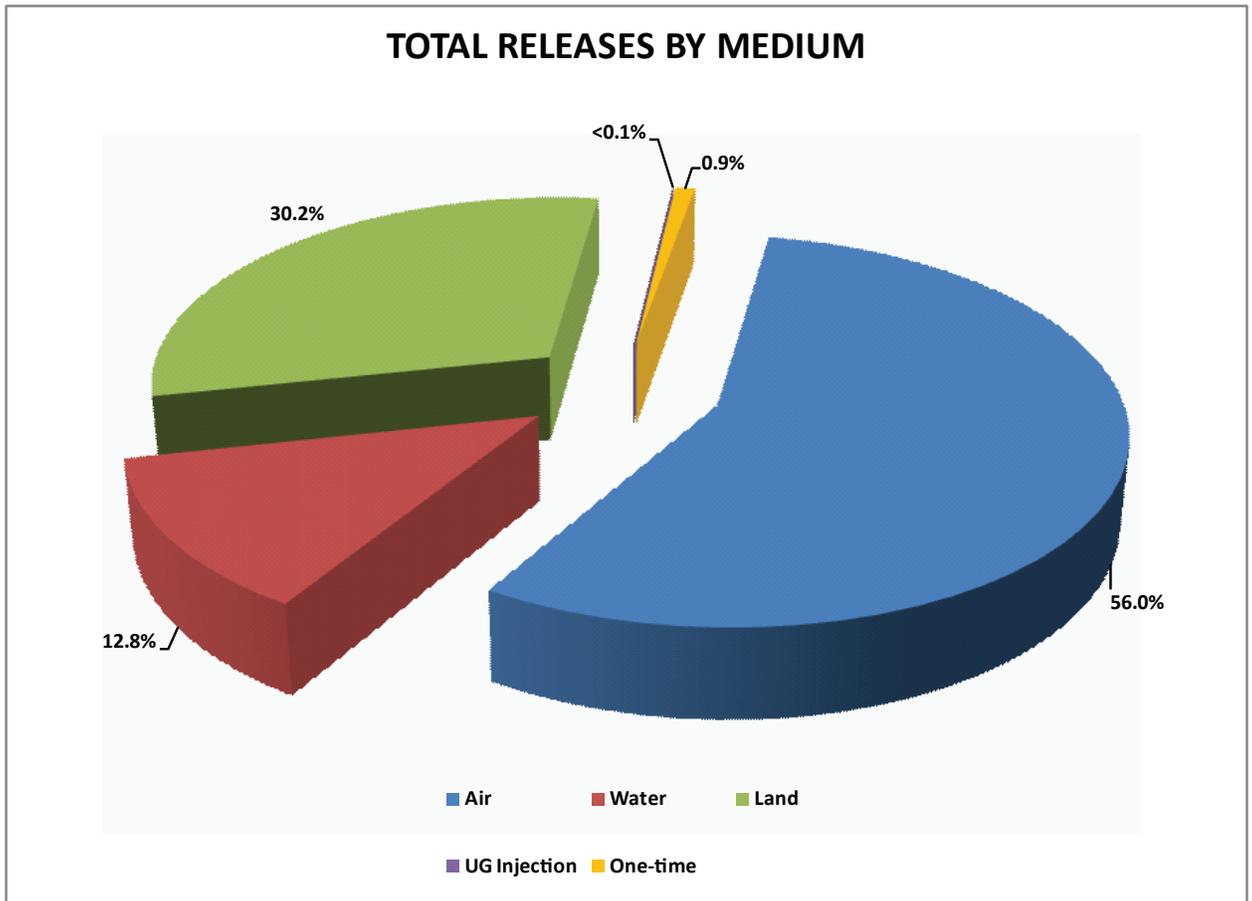


Figure 5

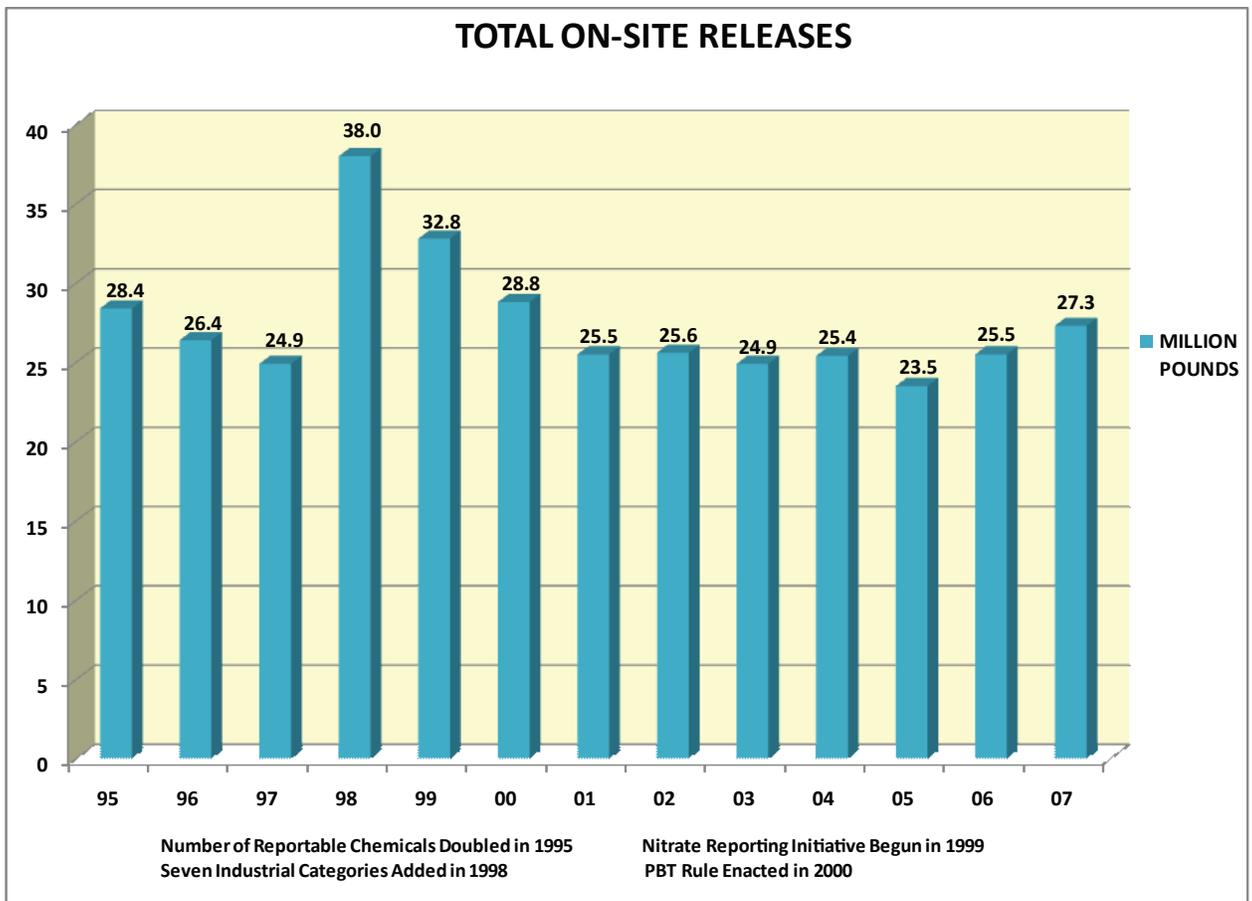


Table C - 50 Largest Total Annual Releases Reported

FACILITY	COUNTY	CHEMICAL	ON-SITE RELEASE, lbs.	ON-SITE RELEASE MEDIUM
WEYERHAEUSER CO	McCurtain	Methanol	2,525,132	Air
KOCH NITROGEN COMPANY	Garfield	Ammonia	2,511,905	Air
TERRA NITROGEN, L.P., VERDIGRI S PLANT	Rogers	Ammonia	2,384,500	Air
PERMA-FIX ENVIRONMENTAL SERVICES	Tulsa	Nitric acid	2,000,000	Land
PRYOR, SOLAE	Mayes	Nitrate Compounds	1,496,182	Water
KOCH NITROGEN COMPANY	Garfield	Nitrate Compounds	804,000	Water
TERRA INTERNATIONAL	Woodward	Ammonia	694,000	Air
BAKER PETROLITE	Osage	Toluene	651,300	Air
GRAND RIVER DAM	Mayes	Barium Compounds	644,172	Land
AUTHORITY COAL FIRED COMPLEX NORTHEASTERN STATION POWER PLANT	Rogers	Barium Compounds	605,210	Land
TYSON FOODS- BROKEN BOW	McCurtain	Nitrate compounds	600,924	Water
CLEAN HARBORS LONE MOUNTAIN LLC	Major	Lead Compounds	522,394	Land
CLEAN HARBORS LONE MOUNTAIN LLC	Major	Chromium Cmpds except chromite ore from the Transvaal	350,222	Land
BAKER PETROLITE	Osage	Ethylene	332,700	Air
GEORGIA-PACIFIC CONSUMER PRODUCTS	Muskogee	Hydrochloric acid "Acid Aerosols"	280,000	Air
U.S. ARMY FORT SILL SILL	Comanche	Copper	250,408	Land
MCALESTER ARMY AMMUNITION PLANT	Pittsburg	Copper	243,830	Land
WEYERHAEUSER CO	McCurtain	Ammonia	231,507	Air
MUSKOGEE GENERATING STATION	Muskogee	Hydrogen fluoride	230,000	Air
CLEAN HARBORS LONE MOUNTAIN LLC	Major	Zinc Compounds	228,081	Land
CLEAN HARBORS LONE MOUNTAIN LLC	Major	Ethylene glycol	226,118	Land
TRACKER MARINE LLC	Ottawa	Styrene	223,640	Air
WESTERN FARMERS ELECTRIC COOP	Choctaw	Barium Compounds	223,302	Land
WEYERHAEUSER CO	McCurtain	Manganese Compounds	211,634	Land
CLEAN HARBORS LONE MOUNTAIN LLC	Major	Chromium	203,465	Land
CLEAN HARBORS LONE MOUNTAIN LLC	Major	Lead	200,733	Land
AES SHADY POINT LLC	Le Flore	Hydrochloric acid "Acid Aerosols"	190,000	Air
MCALESTER ARMY AMMUNITION PLANT	Pittsburg	Zinc (fume or dust)	187,820	Land
TERRA NITROGEN, VERDIGRIS PLANT	Rogers	Nitrate compounds	180,250	Water
OGE- SOONER GENERATING STATION	Noble	Hydrogen fluoride	180,000	Air
WESTERN FARMERS ELECTRIC COOP	Choctaw	Hydrogen fluoride	177,832	Air
CLEAN HARBORS LONE MOUNTAIN LLC	Major	Nitrate compounds	169,978	Land
WEYERHAEUSER CO	McCurtain	Barium Compounds	164,590	Land
CLEAN HARBORS LONE MOUNTAIN LLC	Major	Manganese	163,940	Land
CLEAN HARBORS LONE MOUNTAIN LLC	Major	Copper	145,248	Land
PRODUCERS COOPERATIVE OIL MILL	Oklahoma	n-Hexane	132,200	Air
TERRA NITROGEN, L.P., VERDIGRIS PLANT	Rogers	Methanol	131,750	Air
CLEAN HARBORS LONE MOUNTAIN LLC	Major	Nickel Compounds	121,634	Land
REXAM BEVERAGE CAN CO OKLAHOMA CITY PLANT	Oklahoma	Certain Glycol Ethers	117,145	Air
NORTHEASTERN STATION POWER PLANT	Rogers	Hydrogen fluoride	110,000	Air
TERRA INTERNATIONAL	Woodward	Nitrate compounds	100,510	Land
QUAD GRAPHICS, OKLAHOMA CITY	Oklahoma	Toluene	100,500	Air
SUNOCO, INC. (R&M) TULSA REFINERY	Tulsa	Nitrate Compounds	96,548	Water
VALERO REFINING CO- ARDMORE REFINERY	Tulsa	Nitrate compounds	91,020	Water
ACME BRICK CO TULSA PLANT	Tulsa	Hydrogen fluoride	88,728	Air
U.S. ARMY FORT SILL	Comanche	Lead	83,115	Land
DOMINANCE INDUSTRIES	McCurtain	Formaldehyde	77,985	Air
CLEAN HARBORS LONE MOUNTAIN LLC	Major	Asbestos (friable)	72,780	Land
WESTERN FARMERS ELECTRIC COOP	Choctaw	Hydrochloric acid "Acid Aerosols"	72,046	Air
SINCLAIR TULSA REFINERY	Tulsa	Sulfuric acid - "Acid Aerosols"	72,000	Air
		80% of total releases	21,902,978	

Figure 6

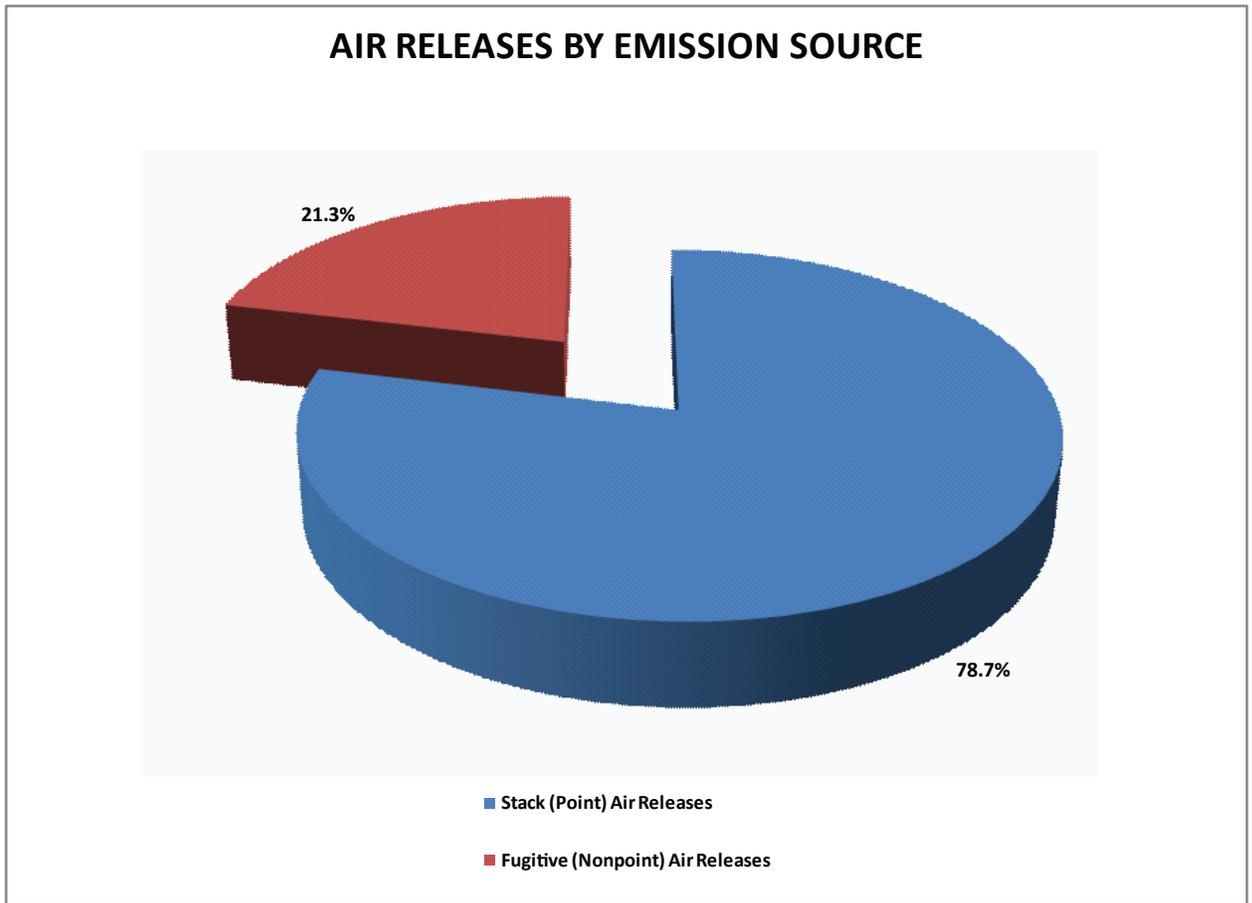
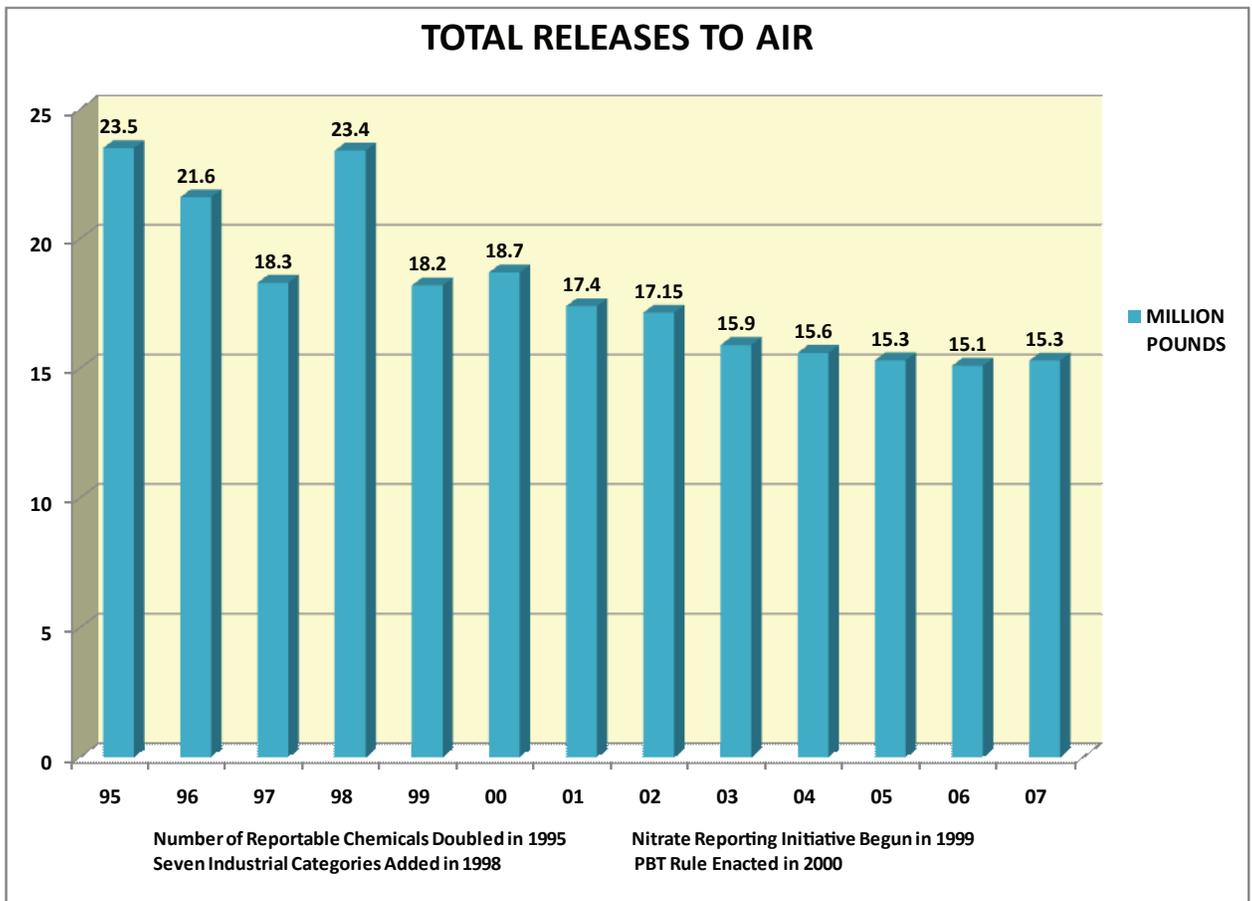


Figure 7



Total on-site releases to land include surface impoundments, land application, use of permitted landfills or other releases to land within the boundaries of a facility. A significant increase in the numbers reported for total land releases also occurred for RY 1998 when industrial waste handlers permitted under RCRA Subtitle C were required to report to TRI for the first time. (Figure 8) Disposal by this type of facility accounted for 11.5 percent of total releases in 2007 (see Facilities Reporting in 2007) and over 38 percent of all land releases. (Figure 9) Additionally, Oklahoma Treatment, Storage, and Disposal (TSD) facilities receive transfers from both in-state and out-of-state sites for managed disposal of toxic wastes. Transfers made from in-state facilities to in-state TSD result in a “double counting effect”, first as off-site transfers for disposal then as releases to RCRA Subtitle C landfills and surface impoundments.

Disposals to deep underground injection wells are considered as releases under TRI; however, this type of waste management has an extremely low potential for human exposure or contact with the environment. The effects of large facilities on TRI reporting are seen in the numbers for releases to permitted underground injection wells. While the overall trend for releases to this medium also continues to decline, the drastic reductions seen in 2001, 2002, 2005, 2006 and 2007 resulted

from changes in the business of a single facility. (Figure 10)

A dramatic increase in reported releases to surface waters began with the 2000 data as a result of EPA’s Nitrate Reporting Initiative, a reinterpretation of the reporting of aqueous nitrate compounds. Specifically, the Nitrate Initiative addressed the under or non-reporting of water dissociable nitrates. The resultant increase in surface water releases represented an improvement in reporting accuracy rather than an actual increase in the quantities released. (Figure 11) Two of the five industries in the state reporting the largest total surface water releases, nitrogenous fertilizer producers and soybean mills, also report the majority of nitrate compounds releases. For 2007, 136 facilities reported discharges into Oklahoma streams and rivers.

Transfers

Transfers to off-site facilities for disposal increased slightly from 2006 to 2007. The current figures however are roughly the same as those reported for 1998 when TRI reporting expanded by doubling the number of reportable chemicals. (Figure 12) Only 16.1 percent of post production wastes managed off-site were transfers for disposal. In 2007, the majority of off-site transfers, 57 percent, were managed in landfills other than RCRA Subtitle C landfills (Figure 13) Releases to Publicly Owned Treatment Works (POTW)

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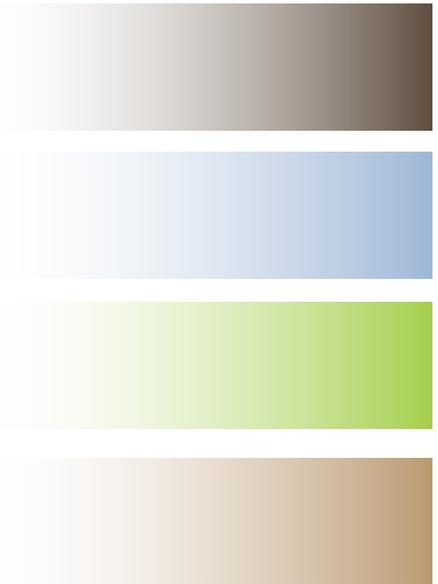


Figure 8

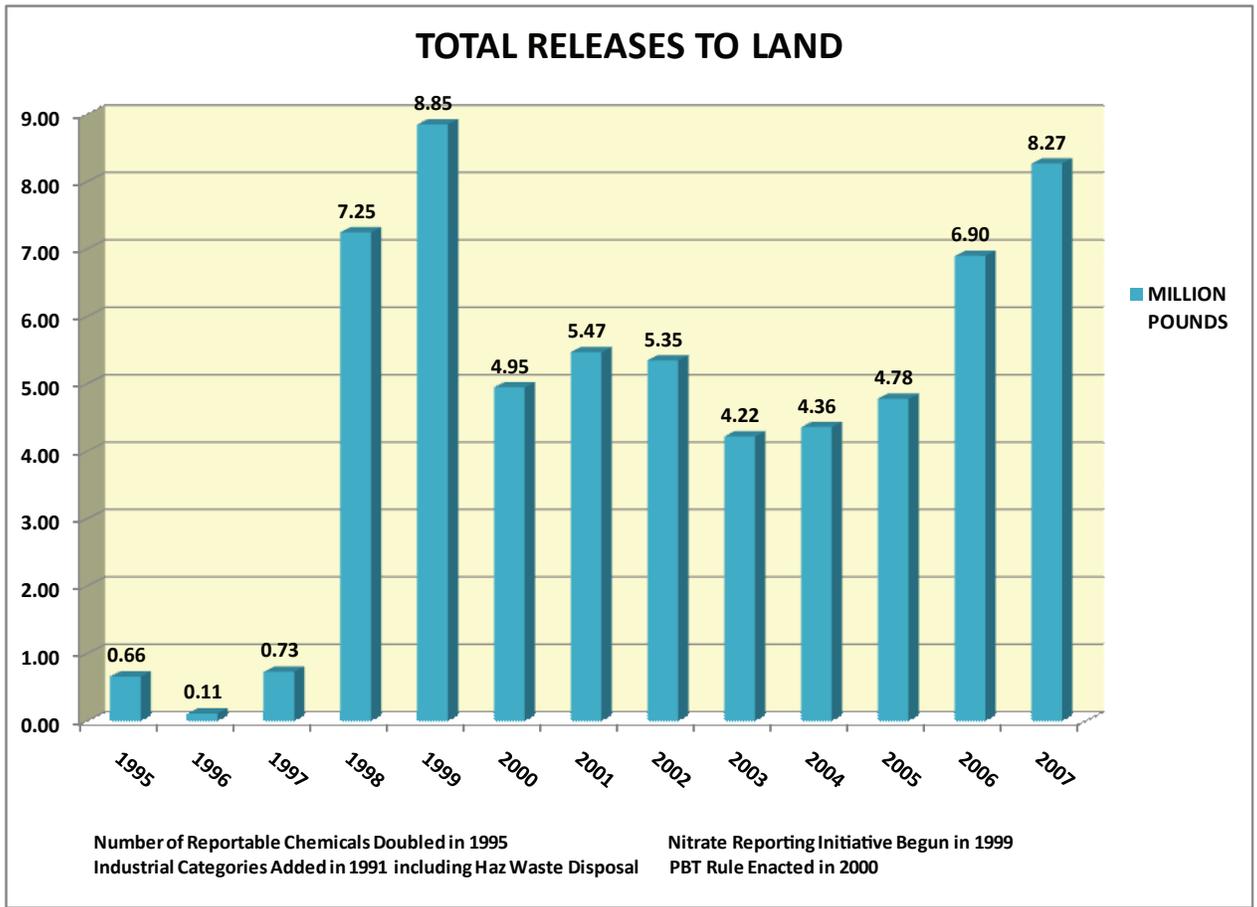


Figure 9

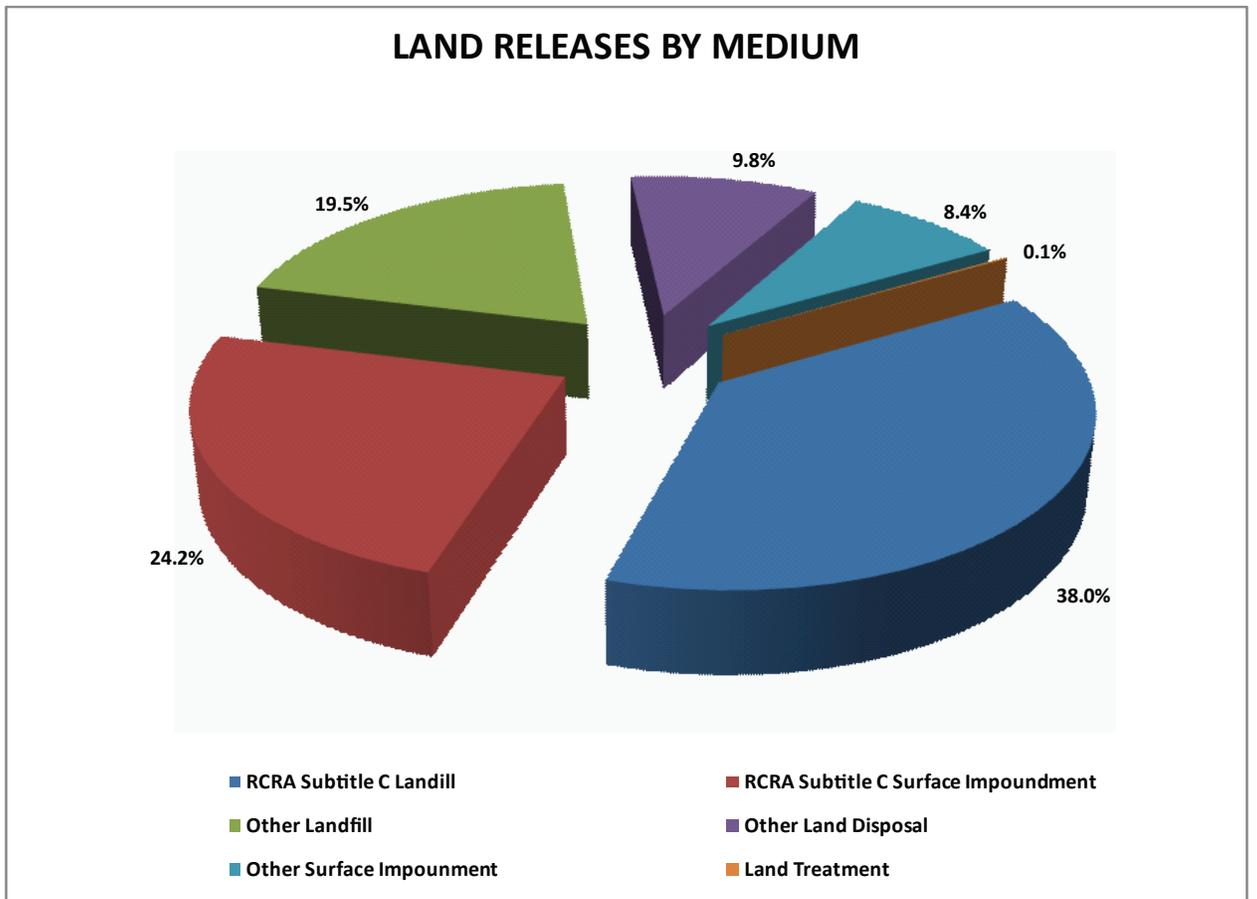


Figure 10

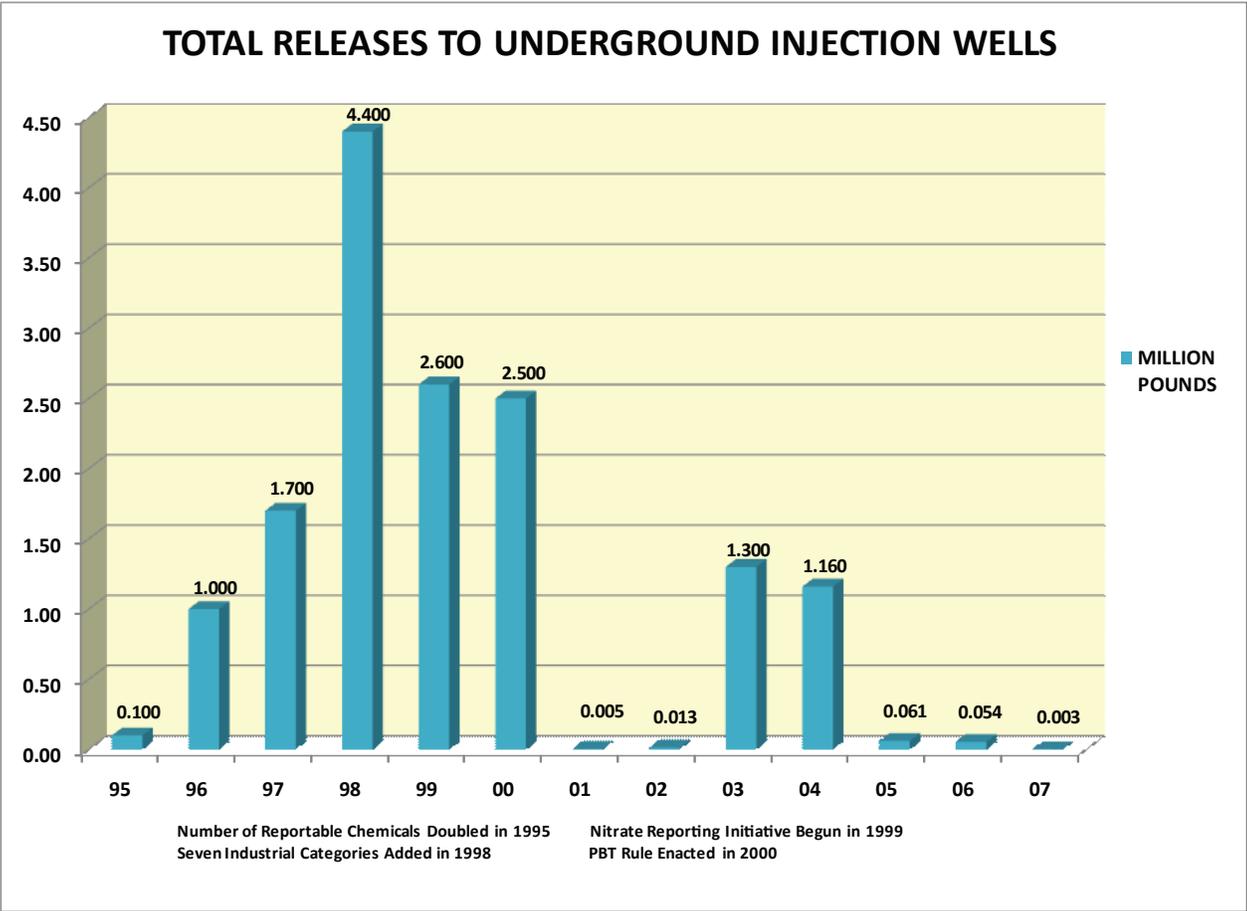


Figure 11

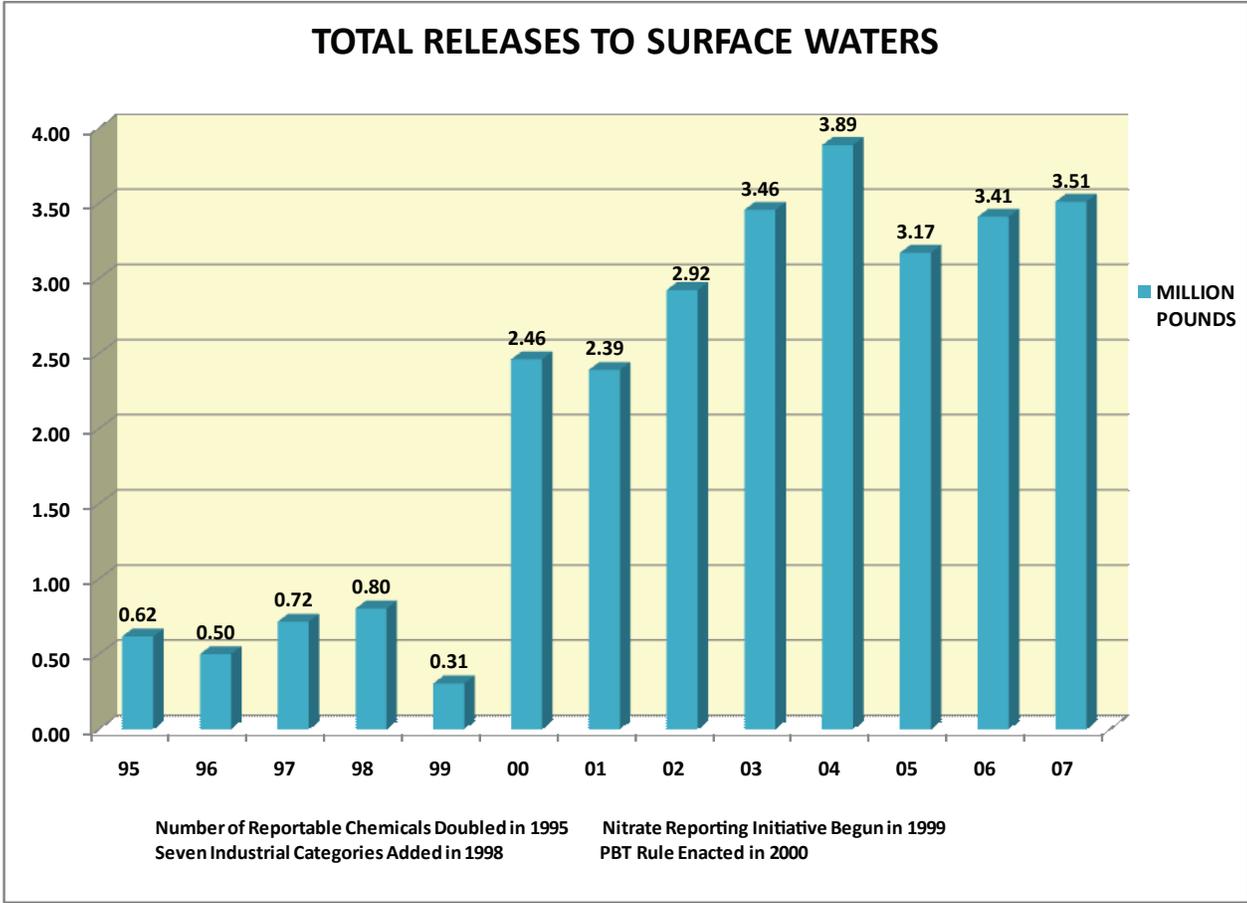


Figure 12

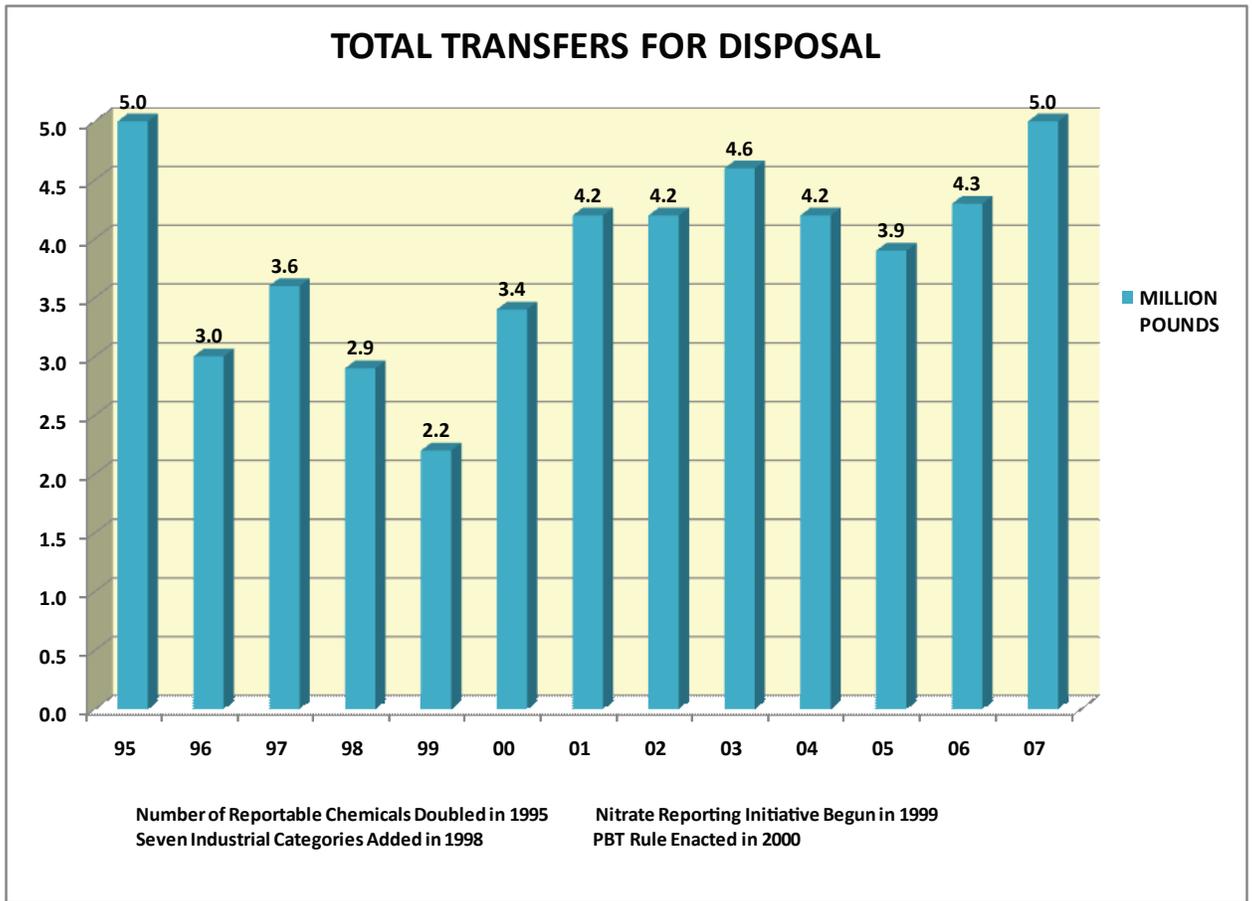
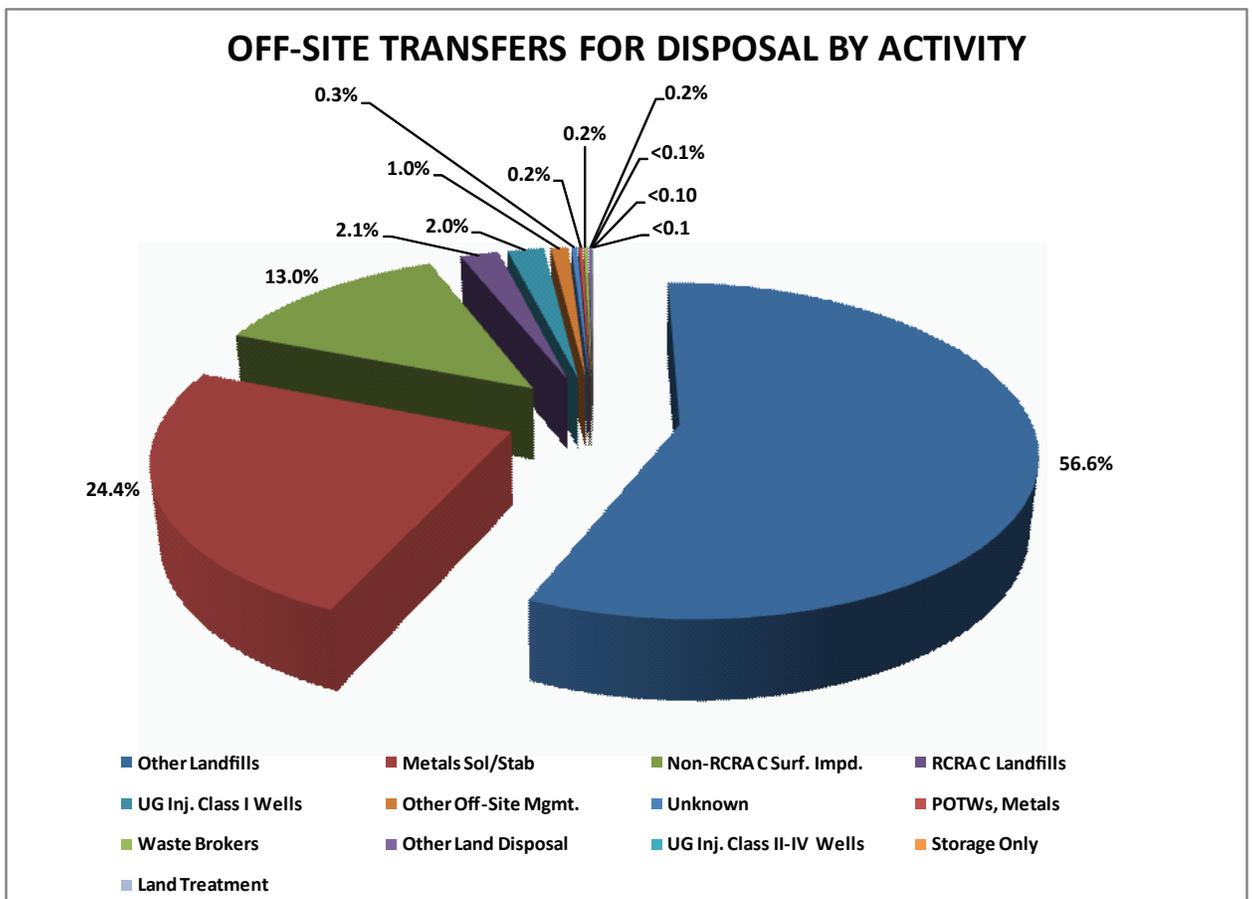


Figure 13



consist of water discharges made into sanitary drains and sewers that then are received and treated by wastewater treatment plants. These are counted chiefly as transfers for treatment (see Treatment, below) with the exception of wastewater containing metals and metal compounds, which are counted as transfers for disposal. Transfers to POTW of metals and metal compounds account for only 0.1 percent of all transfers for disposal in 2007.

Reuse

Total reuse as defined by TRI is the sum of recycling and energy recovery both on- and off-site. Reuse in Oklahoma was reported as 133.7 million pounds in 2007. (Figure 14) Over 63 percent of reported total production related wastes were managed through reuse, and 79.9 percent of wastes of wastes managed off-site were reused. (Figure 15) DEQ's Pollution Prevention Program established and maintains a waste exchange list that promotes the use, reuse, or recycling of industrial waste streams. This type of reuse not only reduces the quantities of toxic chemicals that ultimately find their way into the environment, but also reduces the need to manufacture some of these chemicals, thus eliminating other potential wastes.

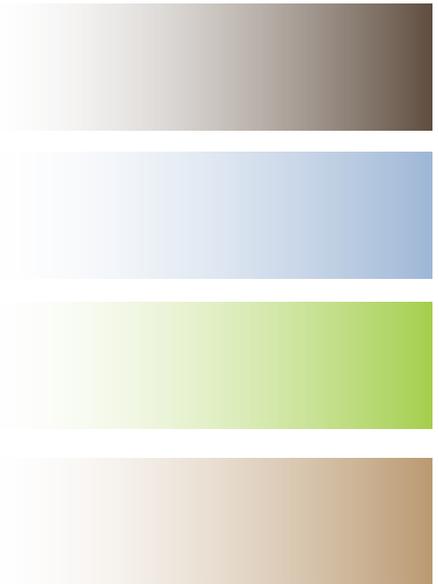
Treatment

Post-production treatment, both on- and off-site, neutralizes or destroys toxic chemicals

in the waste stream. Some method of on-site treatment frequently is required before wastes can be discharged or transferred for disposal. Common examples of this are the neutralization of spent acids in aqueous wastes and on-site microbial degradation of organic compounds in bio-retention ponds. Municipalities generally require acid neutralization as pretreatment prior to discharge into sanitary sewers. Nitrate compounds formed by the neutralization of nitric acid were a particular focus of EPA's Nitrate Initiative. As a result, quantities reported for transfers to POTWs also rose significantly in 1999. Nitrate compounds formed by the neutralization of nitric acid and previously disposed to underground injection wells accounted for a substantial portion of the increases nonmetal POTW transfers in 2001 and 2003. (Figure 16) Total treatment in the state decreased by 9.5 million pounds in 2007, (Figure 17). The majority of treatment, 97.3 percent, occurred on-site. Industrial waste handlers were responsible for the majority of off-site treatment and disposal of toxic wastes. As with on-site treatment, off-site treatment frequently is a requirement prior to disposal.

In 2007, 85.3 percent of production wastes were managed on-site. On-site reuse and on-site treatment minimize the need to transport toxics for disposal or off-site reuse,

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TRI
2007

Figure 14

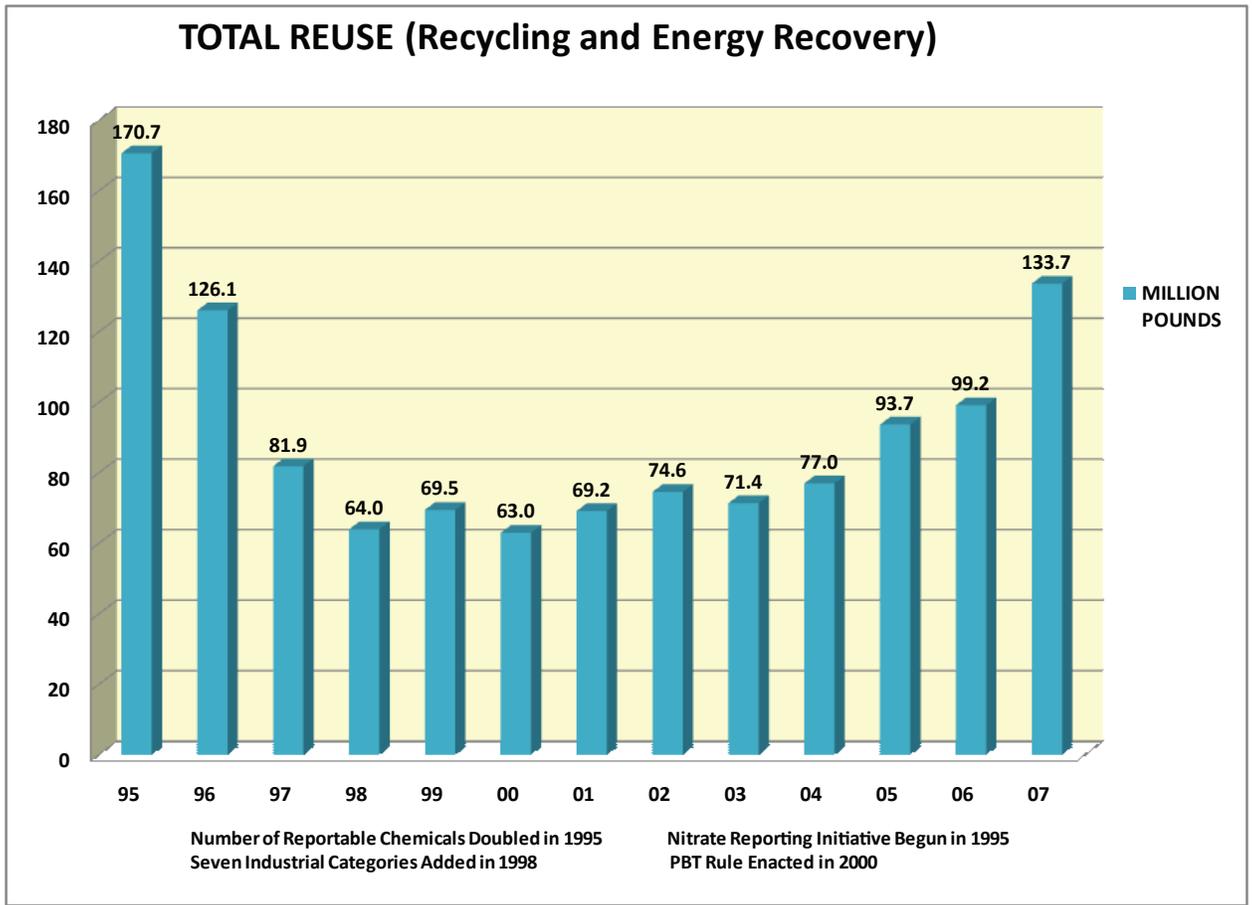


Figure 15

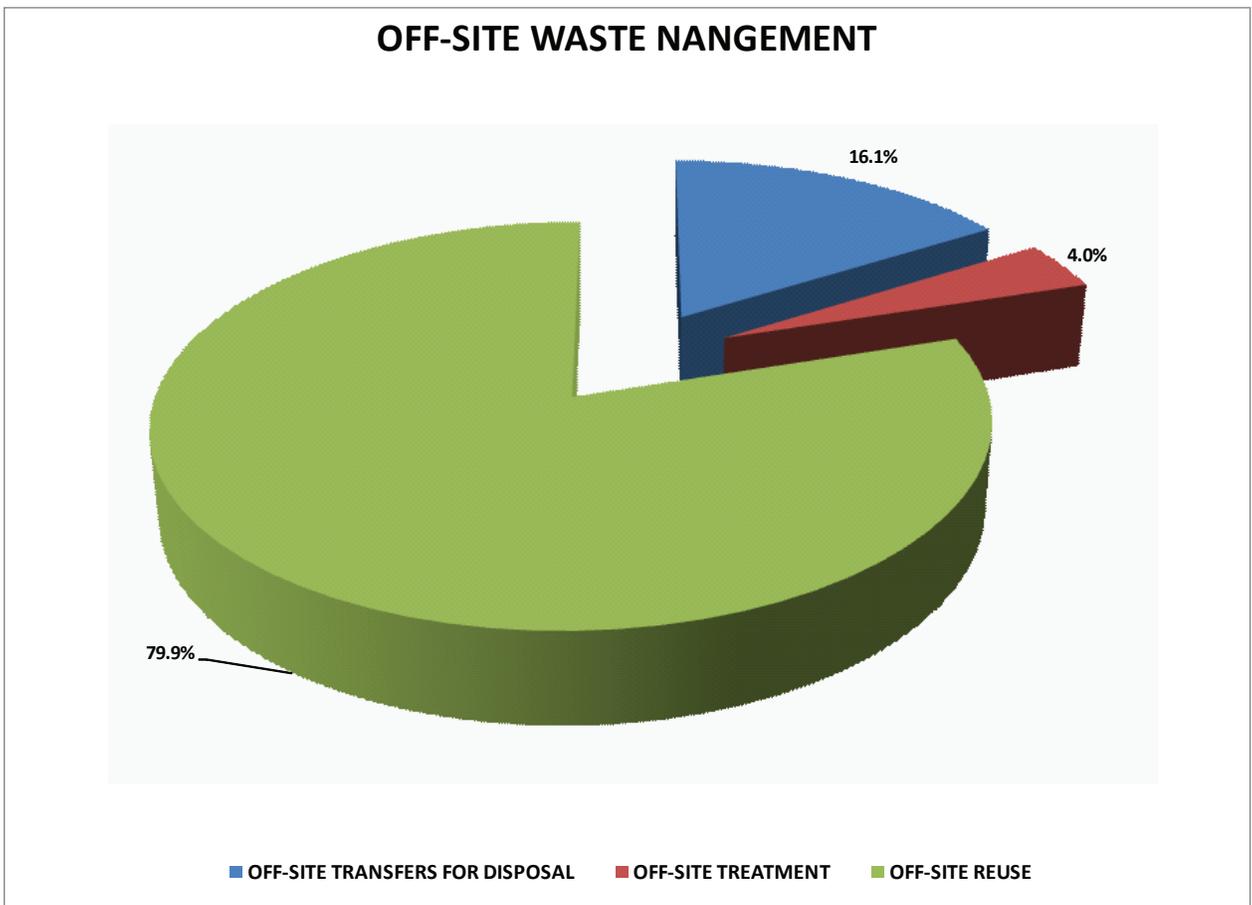


Figure 16

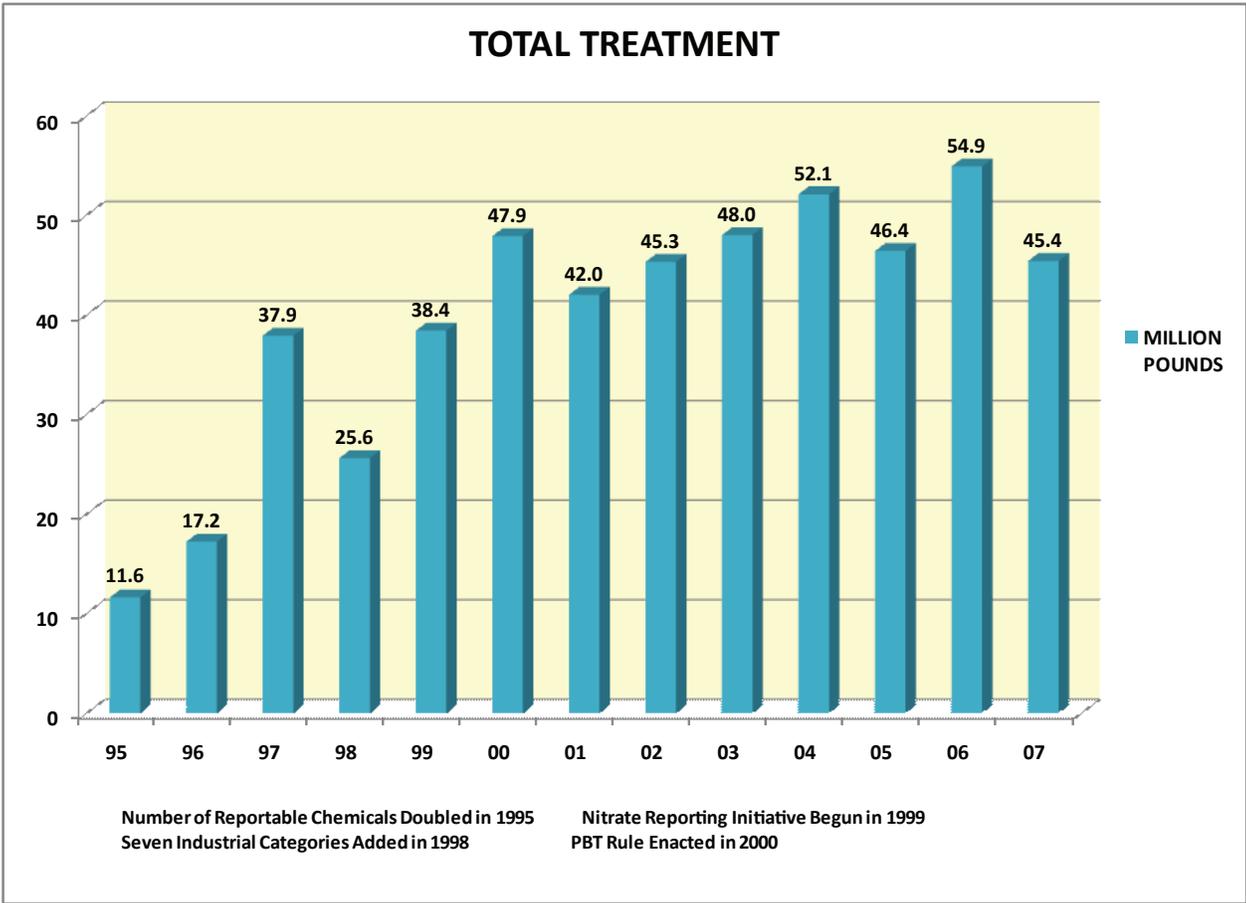


Figure 17

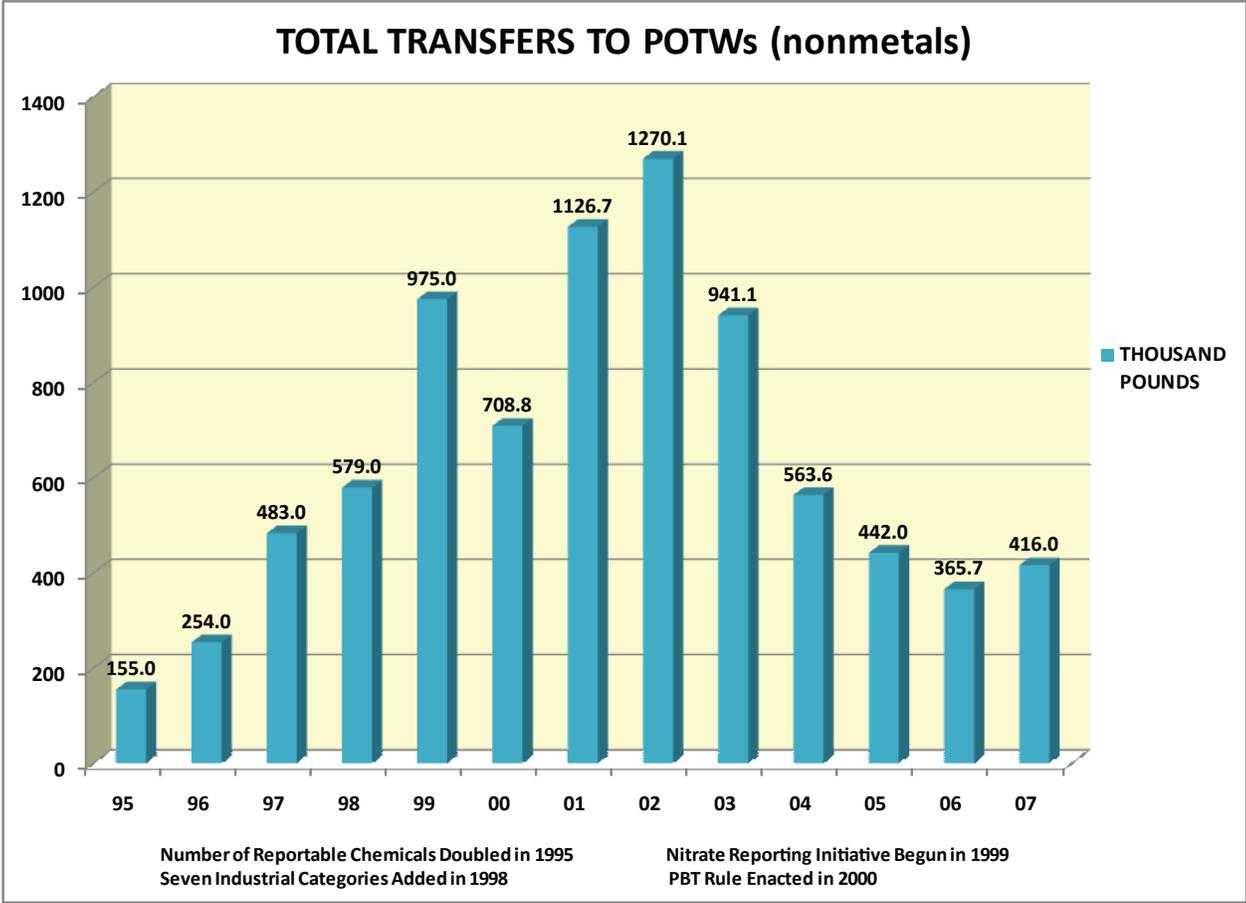


Figure 18

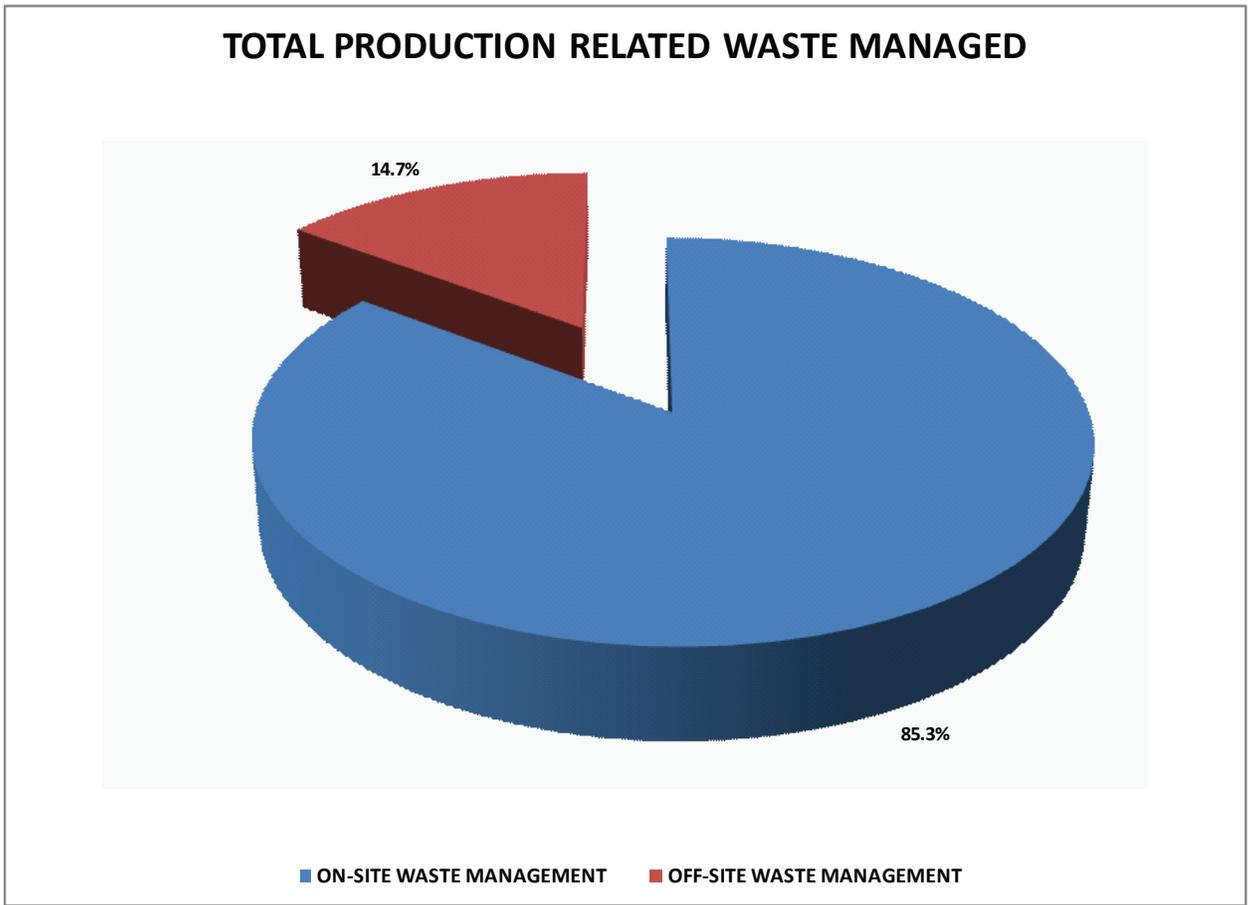
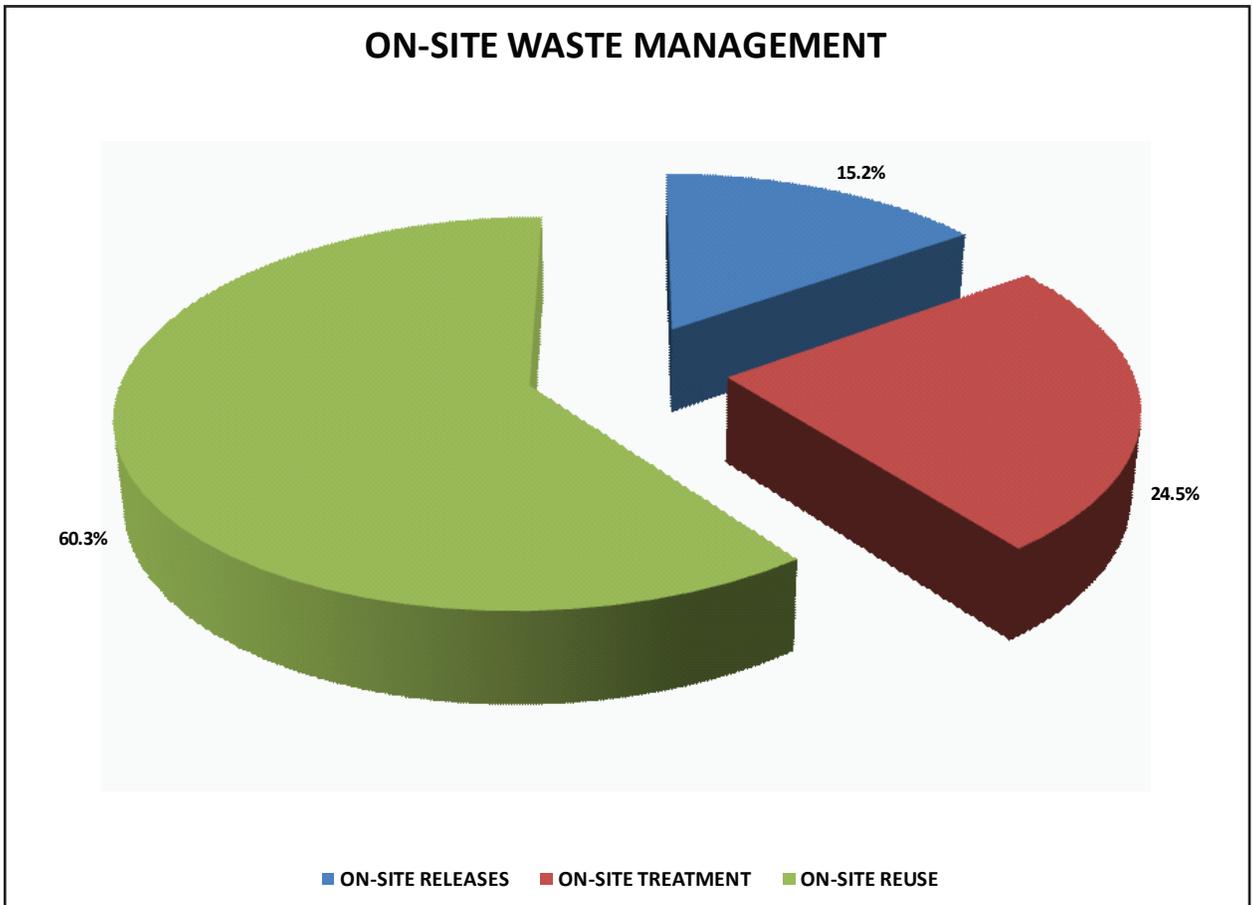


Figure 19



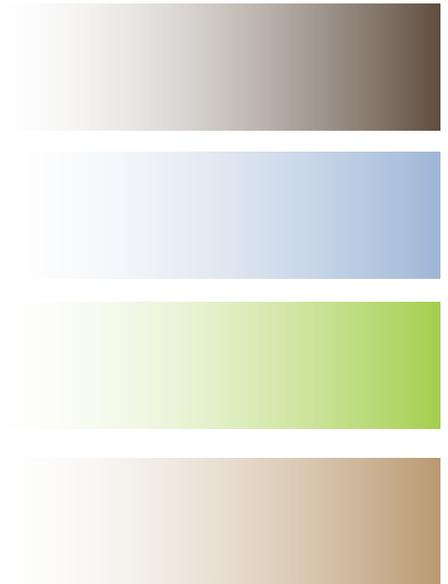
decreasing exposure risks due to transportation related incidents. (Figure 18) On-site waste management along with voluntary reductions in the quantity and toxicity of chemicals used are important means through which DEQ and industries across Oklahoma are working together to reduce the total volume of toxic chemicals managed in the State. Of the 211.4 million pounds of TPRW reported for 2007, only 2.4 percent of these were transferred off-site for disposal.

TRI looks at the total picture of releases and transfers as well as reuse activities and treatment. Analysis of the data can be used as an index of the success of prevention and reduction measures. Often states report a reduction in total wastes while reporting a corresponding increase in off-site disposals, essentially transferring toxic wastes from one location to another rather than management through reuse, treatment or reductions in wastes or process chemicals. Oklahoma continues

to see its total releases as percentages of TPRW diminish along with a decrease in off-site transfers. Releases relative to TPRW decreased six percent in the past six years, and in 2007, releases accounted for only 15.2 percent of on-site waste management. (Figure 19)

TRI data can be used for targeting facilities, industries or specific chemicals for pollution prevention efforts. The 2007 Oklahoma TRI data reflect the continued success of voluntary programs sponsored by DEQ and cooperation from industries.

DEQ provides assistance to businesses wanting to reduce the overall volume of toxic chemicals used and also offers strategies for the best reuse techniques. For additional information and business assistance regarding pollution prevention and source reduction measures, contact the DEQ Land Protection Division/ Pollution Prevention Programs at 405-702-5100 or 1-800-869-1400, or visit the DEQ website at: <http://www.deq.state.ok.us/LPDnew/p2index.htm>



TRI
2007

2007 Tier II Overview

The owners or operators of all facilities or sites that store hazardous substances on-site must submit Tier II (EPCRA 312) reports annually for each hazardous material stored. Forms are submitted to DEQ acting as the agent of the Oklahoma Hazardous Materials Emergency Response Commission (OHMERC), and also to the appropriate Local Emergency Planning Committee (LEPC), and to responding fire departments. Tier II forms require specific information describing the quantities and locations of hazardous substances as defined under the OSHA Hazard Communications Standard, which states that a hazardous chemical or substance is any substance for which a facility must maintain a Material Safety Data Sheet (MSDS). Additionally, a chemical or substance is reportable if the material is present on the site for at least 25 continuous hours within a calendar year in a quantity that equals or exceeds the reporting threshold. Within the same program, EPA lists over 250 materials as Extremely Hazardous Substances (EHS), and specifies a threshold planning quantity (TPQ) for each. For an EHS the threshold for Tier II reporting is either the TPQ or 500 pounds whichever is lower. The reporting threshold for all other covered substances is 10,000 pounds. Tier II reports also provide the name and address of the owner or operator and two emergency contacts that can be used by emergency responders

24 hours a day. Tier II reports are due annually each March 1st.

Beginning with reporting for 2006, DEQ required all Tier II reports in Oklahoma to be submitted online. Additionally, the agency entered into agreements with LEPCs and emergency managers which state the agency will provide the annual reports filed under Section 312 to the LEPC or emergency manager who then agrees to provide the responding fire departments within the appropriate county. This allows Oklahoma Tier II reporters to file once per year with DEQ only rather than also with the LEPC and fire departments. At the same time DEQ provides a grant generated by Tier II fees to LEPCs who enter into this agreement.

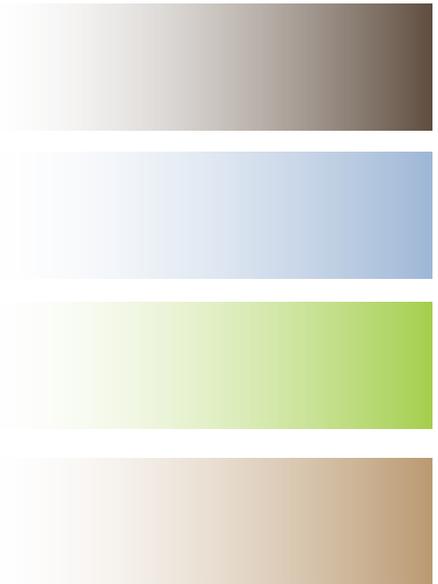
Over 36,000 of the 40,702 Tier II reports submitted for 2007 were from oil and natural gas sites which include tank batteries as well as production sites. (Table D) There is a direct correlation between total number of Tier II sites and the number of oil and gas sites required to report under 312 which is based in the State's energy production industries. (Figure 20) Over 28 billion pounds of crude oil and over 867 million pounds of compressed natural gas were reported stored in Oklahoma in 2007. By comparison, DEQ received 1,314 reports from sites storing one or more Extremely Hazardous Substances.

Initially there would seem to be little connection between the quantities of

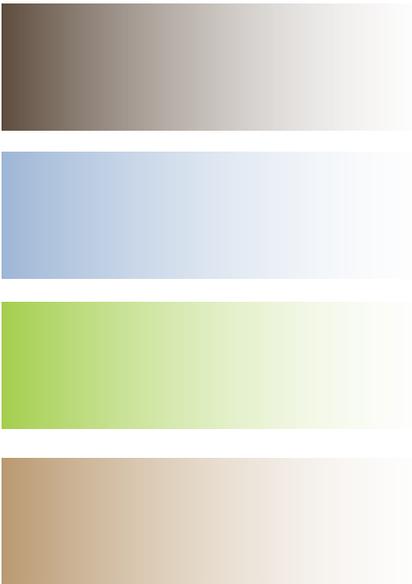
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Table D - TIER II County Totals

County	Total Tier II Reports	Oil & Gas Reports	EHS Facilities
	40,378	36,116	1,314
TULSA	529	70	218
OKLAHOMA	946	544	168
GARFIELD	1,158	1,081	40
CANADIAN	1,544	1,443	36
ROGERS	128	30	36
COMANCHE	222	134	34
CREEK	639	554	29
CUSTER	1,231	1,153	26
ROGER MILLS	1,962	1,904	25
GRADY	1,532	1,349	25
CLEVELAND	236	175	25
MUSKOGEE	116	44	25
PITTSBURG	608	545	24
KAY	211	147	24
MAYES	56	3	22
TEXAS	916	886	21
CARTER	822	763	21
LEFLORE	262	221	20
WAGONER	53	18	20
BLAINE	1,065	1,040	19
WASHITA	661	630	19
BEAVER	2,180	1,892	18
WASHINGTON	130	84	17
PAYNE	356	288	16
POTTAWATOMIE	454	391	15
KINGFISHER	1,529	1,489	14
SEMINOLE	701	663	13
GRANT	443	414	13
JACKSON	29	9	13
OTTAWA	24	0	13
GARVIN	1,332	1,066	12
CADDO	1,159	1,084	12
CRAIG	91	64	12
MAJOR	2,441	2,409	11
MCCURTAIN	31	0	11
WOODWARD	1,540	1,504	10
STEPHENS	1,153	1,110	10
OSAGE	572	499	10
OKMULGEE	146	121	10
CIMARRON	97	83	10
BECKHAM	744	700	9
MCCLAIN	618	557	9
LINCOLN	577	544	9
NOBLE	470	446	9
SEQUOYAH	69	51	9
DEWEY	979	949	8
LOGAN	687	655	8
COTTON	45	34	8
TILLMAN	31	13	8
WOODS	1,253	1,228	7
KIOWA	98	82	7
NOWATA	315	304	6
DELAWARE	24	0	6
CHEROKEE	18	0	6
ELLIS	1,089	1,062	5
PONTOTOC	517	492	5
PAWNEE	155	141	5
LOVE	129	117	5
MURRAY	40	23	5
BRYAN	39	21	5
ADAIR	18	0	5
CHOCTAW	13	0	5
GREER	11	2	5
ALFALFA	424	410	4
HASKELL	216	206	4
LATIMER	191	165	4
MARSHALL	77	61	4
ATOKA	75	59	4
PUSHMATAHA	43	31	4
HUGHES	435	413	3
COAL	348	335	3
MCINTOSH	87	74	3
JOHNSTON	13	1	3
HARMON	10	6	3
OKFUSKEE	244	231	2
HARPER	935	770	1
JEFFERSON	36	29	1
TOTAL	40,378	36,116	1,314



TIER II 2007

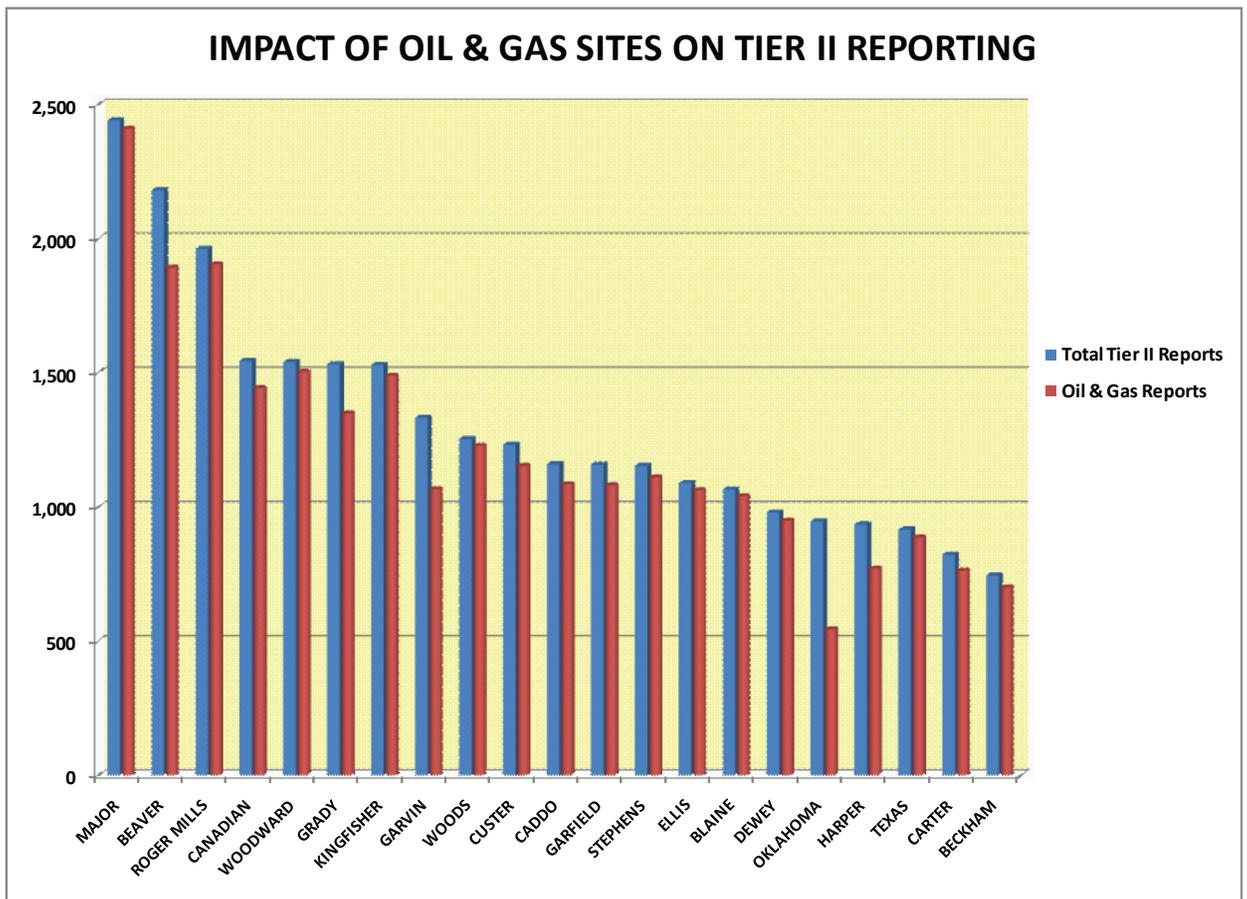


stored materials as reported to Tier II and total reported releases under TRI. However in comparisons between counties ranked according the greatest volumes of Extremely Hazardous Substances stored and counties with the most TRI chemicals released, all six counties reporting over 1 million pounds of releases are among the ten counties with the most EHS chemicals reported. Not all of the more than 250 Extremely

Hazardous Substances are found on the list of over 600 chemicals reportable under TRI; however, sufficient numbers of chemicals are common to both lists and therefore both programs. While TRI and Tier II satisfy different intentions under the statutes, facilities reporting under both provide a great deal of chemical information to address public concerns and also to be used for emergency planning. (see Chemicals Reported in 2007)

Figure 20

TRI 2007



Facilities Reported in 2007

For 2007, 324 Oklahoma facilities reported to TRI, operating under 129 North American Industrial Classification System (NAICS) codes. EPA expanded TRI in reporting year 1998 with the addition of seven industrial categories. The added categories, initially listed under Standard Industrial Classification codes, are linked to manufacturing by providing power, managing products, managing wastes, or providing limited raw materials for the manufacturing sector.

Manufacturing facilities continue to be the majority of TRI reporters in the State, comprising 298 of 324 facilities reporting for 2007. However, the industries added for 1998 continued to impact the data for Oklahoma. Coal-fired electrical plants and commercial hazardous waste management facilities permitted under RCRA Subtitle C are two of the categories added for 1998 and together accounted for over 30 percent of all on-site releases in Oklahoma for 2007. Eight of the 25 facilities with the largest total on-site releases reported the first time for under the 1998 changes although all were operational prior to 1998.

The 25 facilities with largest total on-site releases produced 90 percent of releases reported for 2007. (Table E) However, six of these facilities also ranked among the top 25 facilities for reuse of toxic chemicals. The 25 facilities practicing the greatest volume of recycling and energy recovery accounted for 94.2 percent of

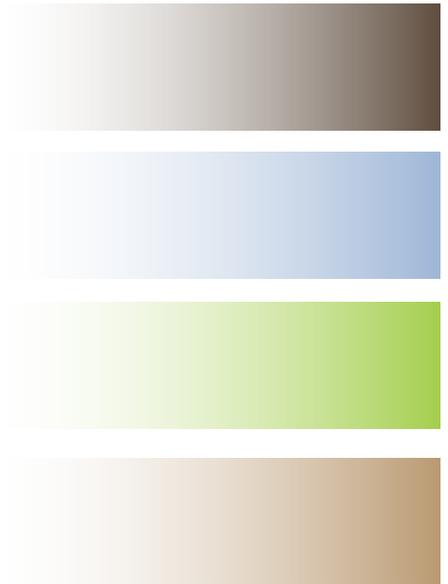
total reuse in 2007. (Table F) Among these facilities as with the overall numbers for reuse, the majority of recycling and energy recovery 81.4 percent, occurred on-site. Chemicals reused on-site do not leave the boundaries of the facility.

Together the ten industrial classifications reporting the largest on-site releases account for 89.5 percent of reportable releases in the State, (Figure 21), A brief discussion of industries reporting over one million pounds total releases follows.

Nitrogenous Fertilizers Production- NAICS 325311 (SIC 2873)

The use of chemical fertilizers essential to Oklahoma's agricultural base is not covered under TRI; however, the manufacture of these chemicals and the precursors used to produce them are reportable. TRI Facilities manufacturing nitrogenous fertilizers were the largest source of on-site releases in 2007. These facilities produce hydrogen and nitrogen gases from methane (natural gas), then through a catalytic process produce ammonia that is condensed to anhydrous ammonia and finally oxidized to form ammonium nitrate. Methanol is a secondary product of this process. Ammonia accounts for over 81 percent of all TRI chemicals released by this industry. Nitrogen fertilizers production is also the second largest source of nitrate compounds releases in the State.

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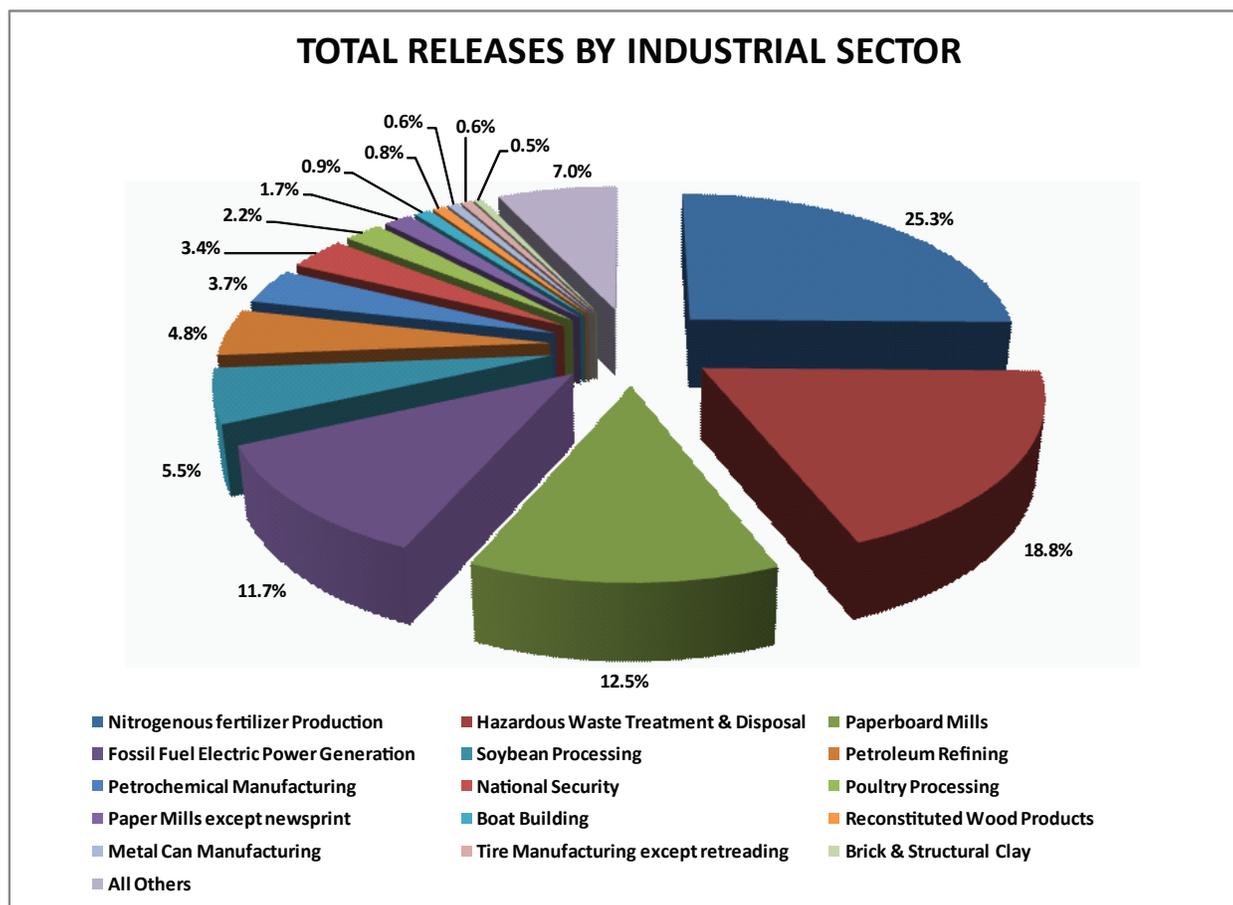
Table E - 25 Facilities with Largest Total Releases

RANK	FACILITY	COUNTY	NAICS CODE	INDUSTRIAL CLASSIFICATION	TOTAL ON-SITE RELEASES, lbs.
1	WEYERHAEUSER CO	McCurtain	322130	Paperboard Mill	3,406,964
2	KOCH NITROGEN COMPANY	Garfield	325311	Nitrogenous Fertilizer Production	3,328,710
3	CLEAN HARBORS LONE MOUNTAIN LLC	Major	562211	Hazardous Waste Treatment & Disposal	3,137,554
4	TERRA NITROGEN, L.P., VERDIGRI S PLANT	Rogers	325311	Nitrogenous Fertilizer Production	2,701,000
5	PERMA-FIX ENVIRONMENTAL SERVICES	Tulsa	562211	Hazardous Waste Treatment & Disposal	2,000,750
6	PRYOR, SOLAE	Mayes	311222	Soybean Processing	1,515,347
7	BAKER PETROLITE	Osage	325110	Petrochemical Manufacturing	1,015,200
8	NORTHEASTERN STATION POWER PLANT	Rogers	221112	Fossil Fuel Electric Power Generation	944,473
9	GRAND RIVER DAM AUTHORITY COAL FIRED COMPLEX	Mayes	221112	Fossil Fuel Electric Power Generation	879,767
10	TERRA INTERNATIONAL	Woodward	325311	Nitrogenous Fertilizer Production	866,310
11	TYSON FOODS- BROKEN BOW	McCurtain	311615	Poultry Processing	601,029
12	WESTERN FARMERS ELECTRIC COOP	Choctaw	221122	Fossil Fuel Electric Power Generation	504,324
13	GEORGIA-PACIFIC CONSUMER PRODUCTS	Muskogee	322121	Paper Mill	453,675
14	MCALISTER ARMY AMMUNITION PLANT	Pittsburg	928110	National Security	452,373
15	CONOCO PHILLIPS PONCA CITY REFINERY	Kay	324110	Petroleum Refining	367,184
16	MUSKOGEE GENERATING STATION	Muskogee	221112	Fossil Fuel Electric Power Generation	350,606
17	U.S. ARMY FORT SILL	Comanche	928110	National Security	335,276
18	SINCLAIR TULSA REFINERY	Tulsa	324110	Petroleum Refining	325,824
19	OGE- SOONER GENERATING STATION	Noble	221112	Fossil Fuel Electric Power Generation	262,476
20	VALERO REFINING CO- ARDMORE REFINERY	Tulsa	324110	Petroleum Refining	248,739
21	TRACKER MARINE LLC	Ottawa	336612	Boat Building	236,160
22	AES SHADY POINT LLC	Le Flore	221112	Fossil Fuel Electric Power Generation	219,760
23	SUNOCO, INC. (R&M) TULSA REFINERY	Tulsa	324110	Petroleum Refining	203,448
24	REXAM BEVERAGE CAN CO OKLAHOMA CITY PLANT	Oklahoma	332431	Metal Can Manufacturing	177,237
25	WYNNEWOOD REFINING CO	Garvin	324110	Petroleum Refining	134,824
				90% of total releases	24,669,010

Table F - 25 Facilities with Greatest Total Reuse

FACILITY	COUNTY	TOTAL RECYCLING & ENERGY RECOVERY, lbs.	INDUSTRIAL CLASSIFICATION
BAKER PETROLITE	Osage	36,495,800	Petrochemical Manufacturing
WYNNEWOOD REFINING CO.	Garvin	28,413,944	Petroleum Refining
QUAD GRAPHICS	Oklahoma	15,683,215	Commercial Printing & Engraving
TERRA NITROGEN, L.P., VERDIGRIS PLANT	Rogers	8,126,100	Nitrogenous Fertilizer Production
CENTRILIFT CABLE PLANT	Rogers	6,124,424	Oil & Gas Field Drilling Equipment Manufacturing
VALERO REFINING CO- ARDMORE REFINERY	Carter	6,086,064	Petroleum Refining
AMERICAN CASTINGS, LLC	Mayes	5,347,063	Iron Foundries
KOCH NITROGEN CO.	Garfield	5,155,000	Nitrogenous Fertilizer Production
BAKER PETROLITE CORP.	Tulsa	3,131,837	Petrochemical Manufacturing
SHEFFIELD STEEL CORP	Tulsa	2,741,480	Iron & Steel Mills
HALLIBURTON ENERGY SERVICES	Stephens	1,453,832	Oil & Gas Field Drilling Equipment Manufacturing
MCALISTER ARMY AMMUNITION PLANT	Pittsburg	1,371,671	National Security
NATIONAL STANDARD CO.	Payne	932,900	Steel Wire Drawing
TERRA INTERNATIONAL INC.	Woodward	806,057	Nitrogenous Fertilizer Production
WELLMAN PRODUCTS	Rogers	594,400	Powder Metallurgy Part Manufacturing
CENTRILIFT PUMP PLANT	Rogers	483,919	Pump and Pumping Equipment Manufacturing
SULZER CHEMTECH	Tulsa	424,000	Misc. Fabricated Metal Product Manufacturing
SULZER CHEMTECH USA INC.	Tulsa	395,000	Misc. Fabricated Metal Product Manufacturing
VALMONT COATINGS	Rogers	377,100	Metal Coating, Engraving & Allied Services
AMERICAN FOUNDRY GROUP	Muskogee	353,694	Steel Foundries
GEMINI COATINGS INC.	Canadian	305,492	Paint & Coating Manufacturing
GOODYEAR TIRE & RUBBER CO.	Comanche	299,543	Tire Manufacturing
PRO-FAB. INC.	Canadian	295,184	Aircraft Parts & Auxillary Equipment Manufacturing
WOLVERINE TUBE, INC.	Pottawatomie	247,701	Copper Rolling, Drawing & Extruding
AUTOMOTIVE COMPONENTS HOLDINGS, LLC	Tulsa	237,376	Flat Glass Manufacturing

Figure 21

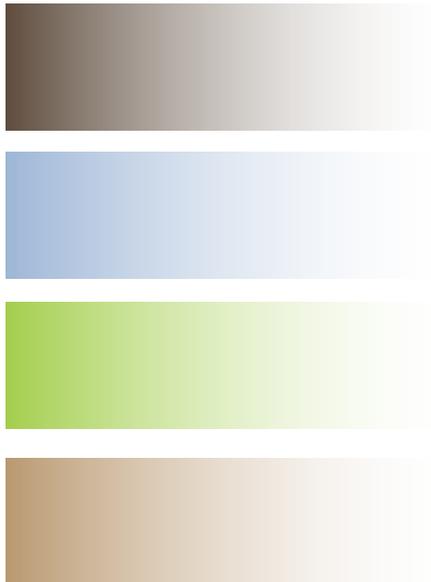


Due to the very large quantities of anhydrous ammonia used and stored and the volatility of ammonia, air emissions account for almost 84 percent of on-site releases from nitrogen fertilizer plants. (see Chemicals Reported in 2007) However, nitrogenous fertilizer producers also accounted for approximately 15 million pounds of chemicals reused in 2007.

Industrial Waste Handlers, Treatment Storage and Disposal NAICS 562211 (SIC 4953)

Industrial waste handlers permitted to dispose of hazardous wastes are the second largest source of environmental releases reported in the State. While some materials transferred

to these facilities are neutralized through treatment, the bulk of hazardous wastes managed by these facilities are disposed into highly regulated and monitored landfills. The variability in the degree of toxicity and the quantities of chemicals managed at this type of facility are substantial; however, the risks of public exposure or adverse environmental effects from disposal to a RCRA Subtitle C site are low. Additionally, transfers from Oklahoma facilities to in-state hazardous waste treatment, storage and disposal sites result in a “double counting” effect, that is, the chemicals reported as transferred in-state for treatment, storage or disposal will be counted again in the quantities of releases reported by the



Treatment Storage and Disposal (TSD) site. Approximately 12.5 percent of industrial wastes reported released by a TSD site also were reported transferred by an Oklahoma facility. Similarly, transfers of chemicals from out-of-state facilities for disposal to RCRA Subtitle C landfills located in Oklahoma are counted as releases in this state. Consequently Oklahoma's total land releases rose significantly when this industrial sector was required to report to TRI.

Paperboard Mills- NAICS 322130 (SIC 2631)

Another industry utilizing large amounts of volatile chemicals is paperboard manufacturing. Over 68 percent of releases reported by this industry were on-site releases to air. Pulp paper is formed into various pressed paper products, a process which uses ammonia and methanol, both highly volatile chemicals. Methanol increasingly is used by this industry as an alternative to more toxic organo-chloride compounds. Approximately 86 percent of total methanol releases in 2007 were reported by paperboard mills, 71 percent of these were permitted stack air releases.

Fossil Fuel Electric Power Generation- NAICS 221112 (Coal-Fired Utilities- SIC 4911)

Coal-Fired Electric Utilities are one of the eight industries required to report the first time for 1998 and as such contributed to significant increases in

Oklahoma's totals for land and air releases. All power plants operating in the State consume fossil fuels to generate electricity and seven fossil fuel powered utilities reported chemical usage above thresholds for 2007. Coal is the chief fuel for electricity generating plants in the State and natural gas plants may utilize coal during start ups. Consequently, the majority of chemicals reported by this industry are either components of bituminous coal or formed during its combustion. (See Chemicals Reported in 2007) For example, 75 percent of on-site barium compounds releases in 2007 came from this industry. Chemicals released to air by fossil fuel-fired utilities overwhelmingly are acid aerosols released through permitted, stack air emissions which employ in-line air scrubbers and neutralizers. Forty-two percent of all on-site releases reported by this industry were to air. Comparatively small quantities of metallic compounds are released through stack air emissions. The bulk of these compounds are found in residual ashes and released into permitted on- and off-site landfills; 57 percent of on-site releases by power plants in 2007 were to land. Power plants reported approximately 12 percent of total releases for 2007.

Soybean Mills- NAICS 311222 (SIC 2075)

Soybean mills process soybeans through fermentation and extract proteins to form a variety of products for human

and livestock consumption. Nitrate compounds are the largest reportable component in the waste streams of this industry, 99 percent in 2007, and the reported quantities of these compounds were greatly effected by the Nitrate Reporting Initiative begun in 1999. The Nitrate Initiative addressed under or non-reporting of water dissociable nitrates which is particularly significant to aqueous releases. Increases in nitrates releases reported by this industry alone more than tripled all reported releases to surface water in the State. As striking as the increase appeared, it represented an improvement in the accuracy of reporting nitrates rather than an actual increase in discharges of these compounds.

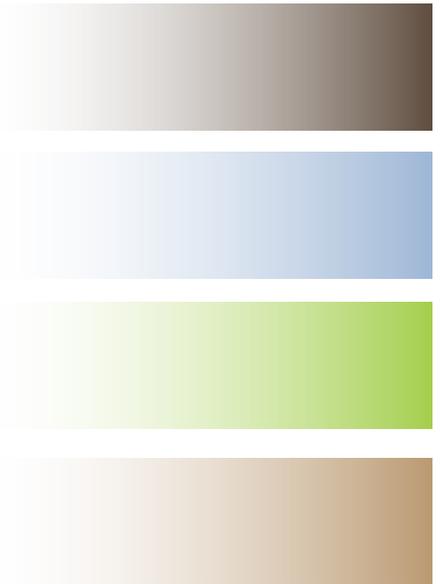
Petroleum Refining- NAICS 324110 (SIC 2911)

Petroleum refining is the physical, thermal and chemical separation of crude oil into its major distillation fractions which then are processed through further separation and conversion steps into finished petroleum products. The chief products of this industry fall into three categories: fuels such as gasoline, diesel, liquefied petroleum gas, jet fuel and kerosene; finished nonfuel products such as solvents, lubricating oils and greases, petroleum wax and jelly, asphalt and coke; and chemical industry feedstocks such as naphtha, ethane, propane, butane, ethylene, propylene, butadiene, benzene, toluene and xylenes. The later are primary

materials for a large number of products, including pesticides, paints, waxes, thinners, solvents, detergents, refrigerants, resins, sealants, latex, plastics and synthetic fibers. Petroleum fuels comprise about 40 percent of the total energy consumed in the U.S., based on BTUs. Approximately 90 percent of the petroleum products used in the U.S. are fuels, with gasoline accounting for about 43 percent of the total. Seven petroleum refineries were operational in Oklahoma in 2007, and together reported approximately five percent of total on-site releases in the State for the year. Petroleum refining was the chief source for reportable releases of polyaromatic compounds (PACs), in particular benzo(g,h,i)perylene in Oklahoma in 2007.

Petrochemical Manufacturing- NAICS 325110 (SIC 2899)

Chemical feedstocks produced from petroleum refining are further refined and blended into a variety of products including field chemicals necessary for oil and natural gas production. Chief among these products are fluid stimulants, hydrates, corrosion and scale inhibitors and paraffin. Petrochemical manufacturers also produce additives necessary for petroleum refining, agricultural herbicides and polymers with broad applications. Approximately 65 percent of toluene reported released in 2007 came from this industry and it was the largest source for ethylene releases as well.



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Chemicals Reported in 2007

Oklahoma facilities reported the manufacture, process or otherwise use of 123 listed toxic chemicals or chemical groups for 2007. Chemicals released in greatest quantities are illustrated in Figure 22. The ten chemicals released in greatest quantities are discussed below, and together ammonia, nitrate compounds, methanol, barium compounds, nitric acid, toluene, hydrochloric acid aerosols, hydrogen fluoride, copper and lead compounds accounted for three quarters of all chemicals releases, as reported under TRI. (Table G) The chemicals reported for 2007 reflect the scope of commerce in the State.

Ammonia remained the chemical released in the largest quantities in Oklahoma during 2007, as in previous years and accounted for 22.5 percent of all toxic chemicals released in Oklahoma for the year. This compound is a component of fertilizers and stock feeds, and over 91 percent of ammonia releases came from this industry. Ammonia gas is used by other industries as a refrigerant, while ammonia solutions are used in paper pulping operations and food processing. (Figure 23) For 2007, over six million pounds of ammonia releases were reported by thirteen different industries; however total ammonia releases

Figure 22

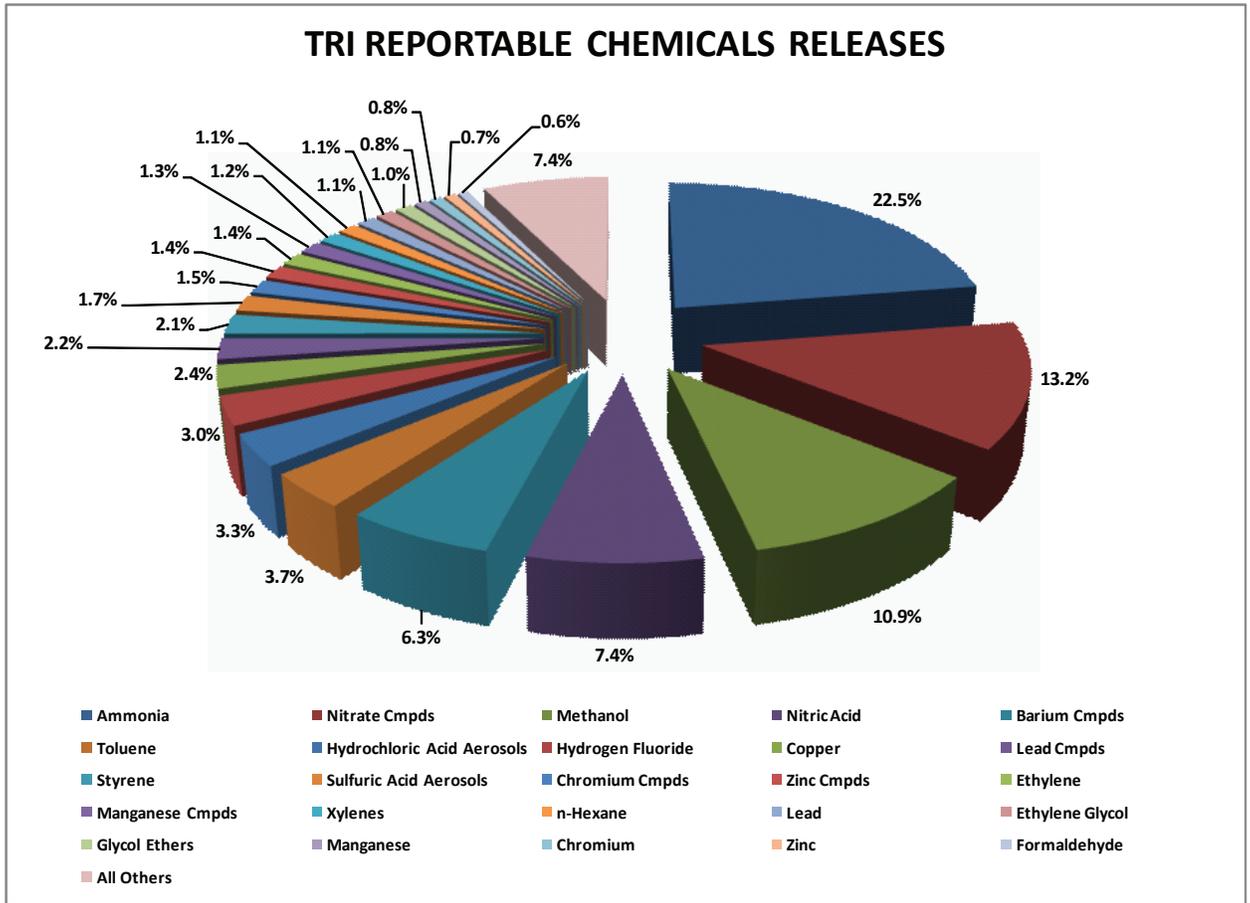


Table G - 25 Chemicals Released in Greatest Quantities

decreased by 14 percent from 2004 to 2007.

Due to its volatility, 98 percent of reported ammonia releases are air emissions. Ammonia gas produces highly irritating and corrosive vapors and is an inhalation and dermal hazard. Skin contact with ammonia vapor or compressed gas may result in cryogenic burns as well. Nitrogen fertilizers production uses anhydrous gaseous ammonia, which is hygroscopic and therefore extremely damaging to the mucus membranes of the eyes and respiratory tract.

Nitrate compounds contain nitrogen, as does ammonia,

specifically the nitrate-oxygen ion, NO₃. Nitrate containing chemicals were reported by a total of 21 facilities in the State for 2007 and accounted for 13.2 percent of total releases. Soybean processor and fertilizer producers reported the majority of these, 72.3 percent of releases in 2007. (Figure 24) At ambient temperatures, nitrates exist as solid salts containing the nitrate ion, for example, sodium nitrate, silver nitrate and ammonium nitrate. However, in aqueous solutions, the form in which reportable nitrate compounds are used and released, the compounds dissociate to form negatively charged nitrate

Chemical	On-site Releases, lbs.
Ammonia	6,103,816
Nitrate Cmpds	3,570,031
Methanol	2,950,715
Nitric Acid	2,010,092
Barium Cmpds	1,706,725
Toluene	1,004,546
Hydrochloric Acid Aerosols	907,345
Hydrogen Fluoride	823,078
Copper	654,608
Lead Cmpds	585,957
Styrene	560,753
Sulfuric Acid Aerosols	458,830
Chromium Cmpds	402,219
Zinc Cmpds	381,597
Ethylene	368,785
Manganese Cmpds	348,228
Xylenes	330,018
n-Hexane	294,554
Lead	292,056
Ethylene Glycol	287,796
Glycol Ethers	279,320
Manganese	209,465
Chromium	208,194
Zinc	189,173
Formaldehyde	164,515

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Figure 23

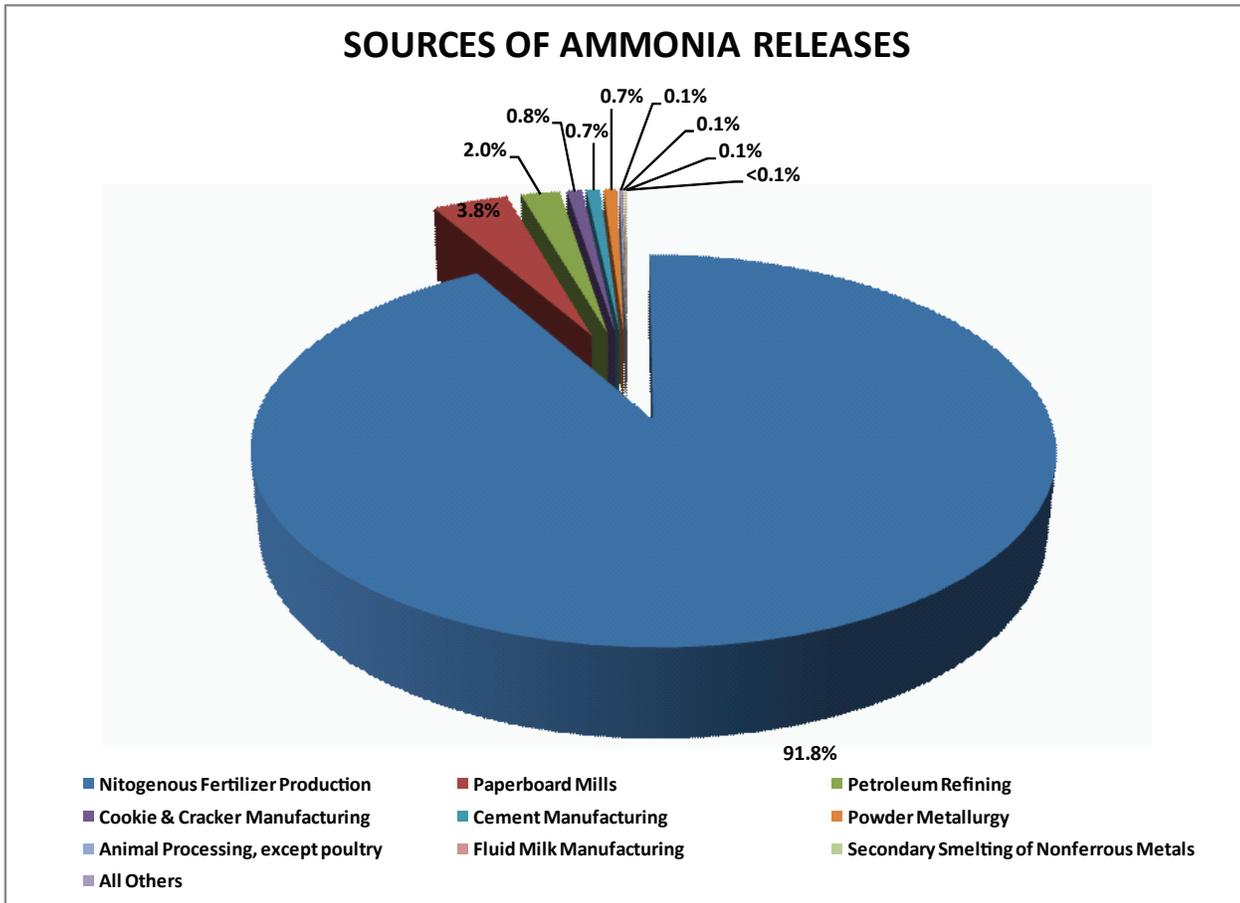
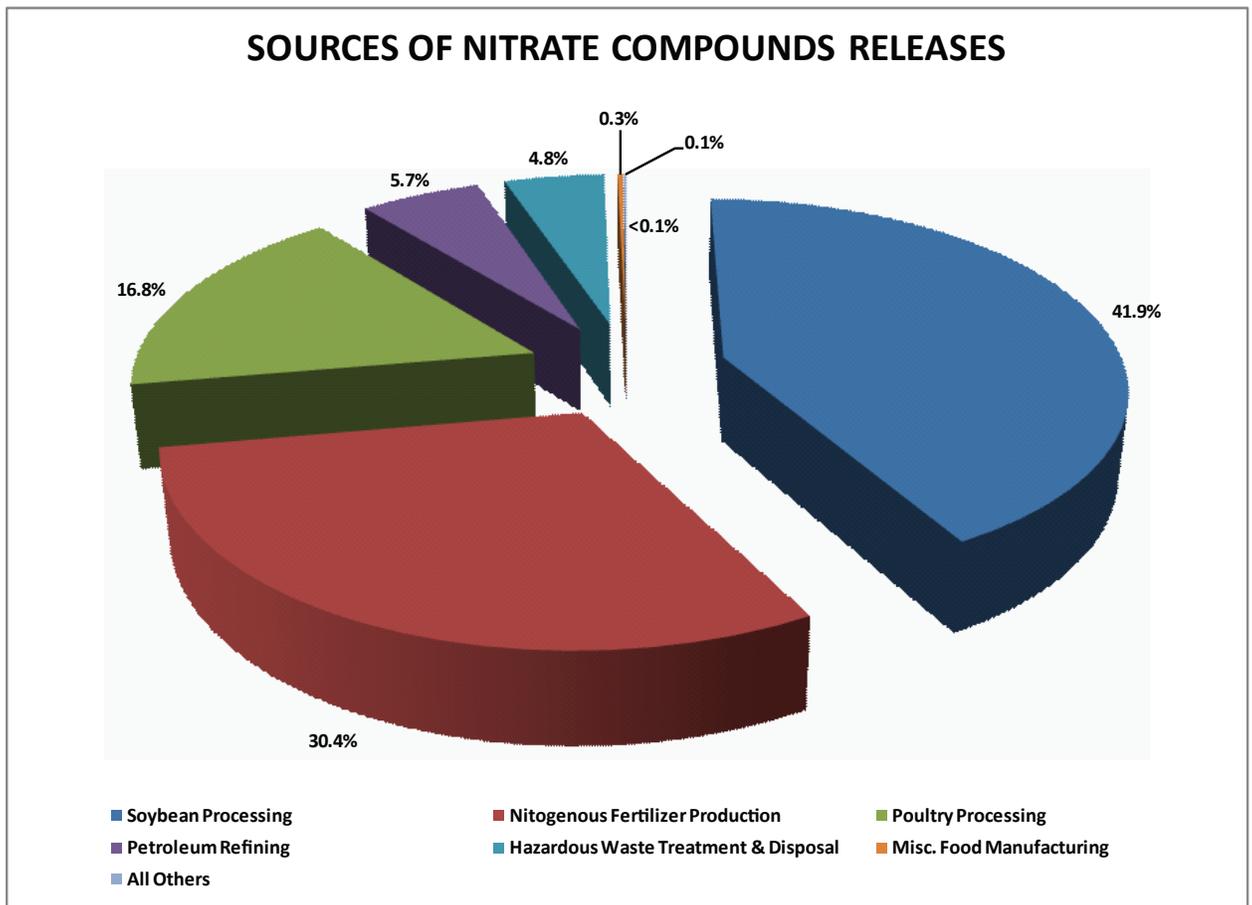


Figure 24



ions and the corresponding cations. The production of water dissociable nitrates in waste streams, frequently formed as a result of nitric acid neutralization, often was excluded from the calculations for TRI reporting. Beginning with RY 1999, EPA's Nitrate Initiative sought to improve the accuracy of nitrate release numbers by addressing the under reporting of water dissociable nitrate compounds. Additional clarification stated that nitrate anions formed by the dissociation of any nitrate-containing chemical are reportable, regardless of whether the parent compound itself is listed under Section 313. As a result of the Nitrate Initiative, Oklahoma saw a substantial increase in the overall numbers

reported for nitrates and a consequential and dramatic increase in the figures for releases to surface waters, POTWs and landfills as well as in treatment figures that represent more accurate data rather than actual increases in releases.

In Oklahoma, underground injection of nitrate containing solutions is the means of disposal used most frequently by industrial waste management operations. Underground injection presents an extremely small risk of human exposure. Certain geological formations may cause naturally high concentrations of nitrates in potable groundwater.

Prolonged ingestion of high concentrations of nitrates oxidizes the iron in hemoglobin

to form methemoglobin in the blood which is unable to carry oxygen. This leads to generalized lack of oxygen in organ tissue and a dangerous condition called methemoglobinemia. Children and in particular infants under age six months are most susceptible to this condition, ("blue-baby" syndrome), and most likely to suffer long term deleterious effects from it.

Methanol, also known as methyl alcohol or wood alcohol, is a common industrial solvent with multiple and varied industrial applications, and was reported by 32 facilities in 16 different industrial classifications for total releases of over 3.5 million pounds. Primary users of methanol in Oklahoma are the paper production industry. Methanol also is a secondary product of ammonia fertilizer production. (Figure 25) It is highly volatile and flammable, and virtually all releases of methanol are permitted air emissions.

Exposure to methanol vapors can result in eye irritation, headaches, fatigue and drowsiness; exposure to high doses may cause temporary coma. Methanol is highly water soluble and ingestion of the compound can cause permanent blindness, liver damage and death; however, the risk of this means of exposure from environmental contaminants is very low.

Nitric acid is a clear, oily liquid that may be colorless, yellow or red and has a choking, acrid odor. It is produced in the

manufacture of ammonium nitrate fertilizer and used in photo engraving, metal etching, and synthesis of organic chemicals. However for 2007, overwhelmingly nitric acid was reported as a waste treated and released into a RCRA Subtitle C land fill. (Figure 26)

Nitric acid is highly corrosive and can attack some forms of plastic and rubber. Poisonous nitrous oxide fumes are produced when heated, and mixed with steam or water produces toxic, corrosive and flammable vapors. It is a strong oxidizer and reacts explosively with metal powders, cyanides, sulfides, turpentine, acetonitrile and many reducing agents. Acetone, arsine, and other chemicals are oxidized explosively by fuming nitric acid. Nitric acid causes severe burns to any tissues with which it comes into contact. Inhalation of nitric acid fumes can cause pulmonary edema and pneumonitis, and acute exposure to high concentrations can cause shock and cardiac insufficiency.

Barium is a naturally occurring metal, and small quantities of barium containing compounds can be present naturally in the soils of Oklahoma. **Barium compounds** have varied industrial uses, however, under the TRI reporting requirements, these chemicals are reported chiefly as managed industrial wastes from the non-combustible components of coal in the ash produced by coal-fired electrical plants. (Figure 27) Fly ash containing

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Figure 25

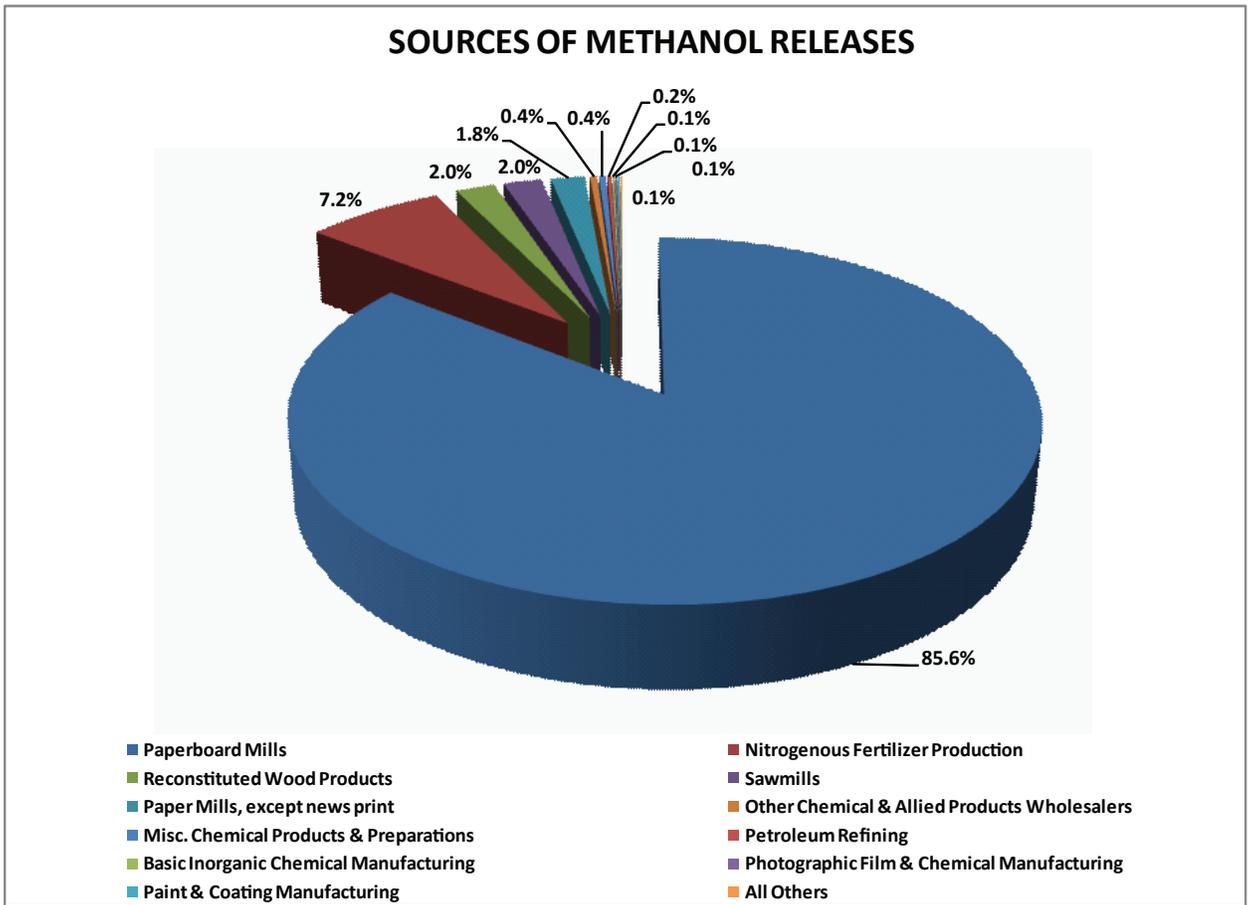


Figure 26

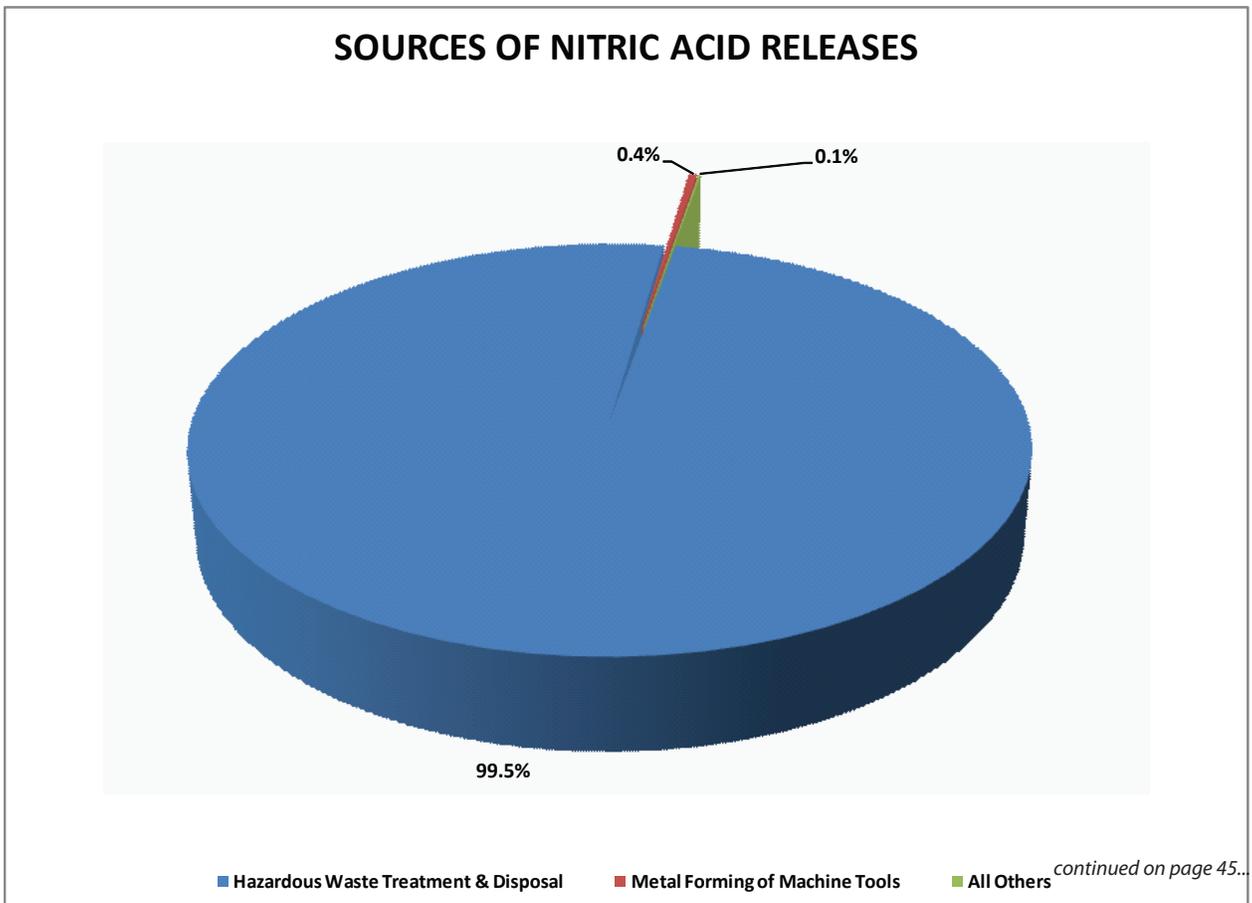
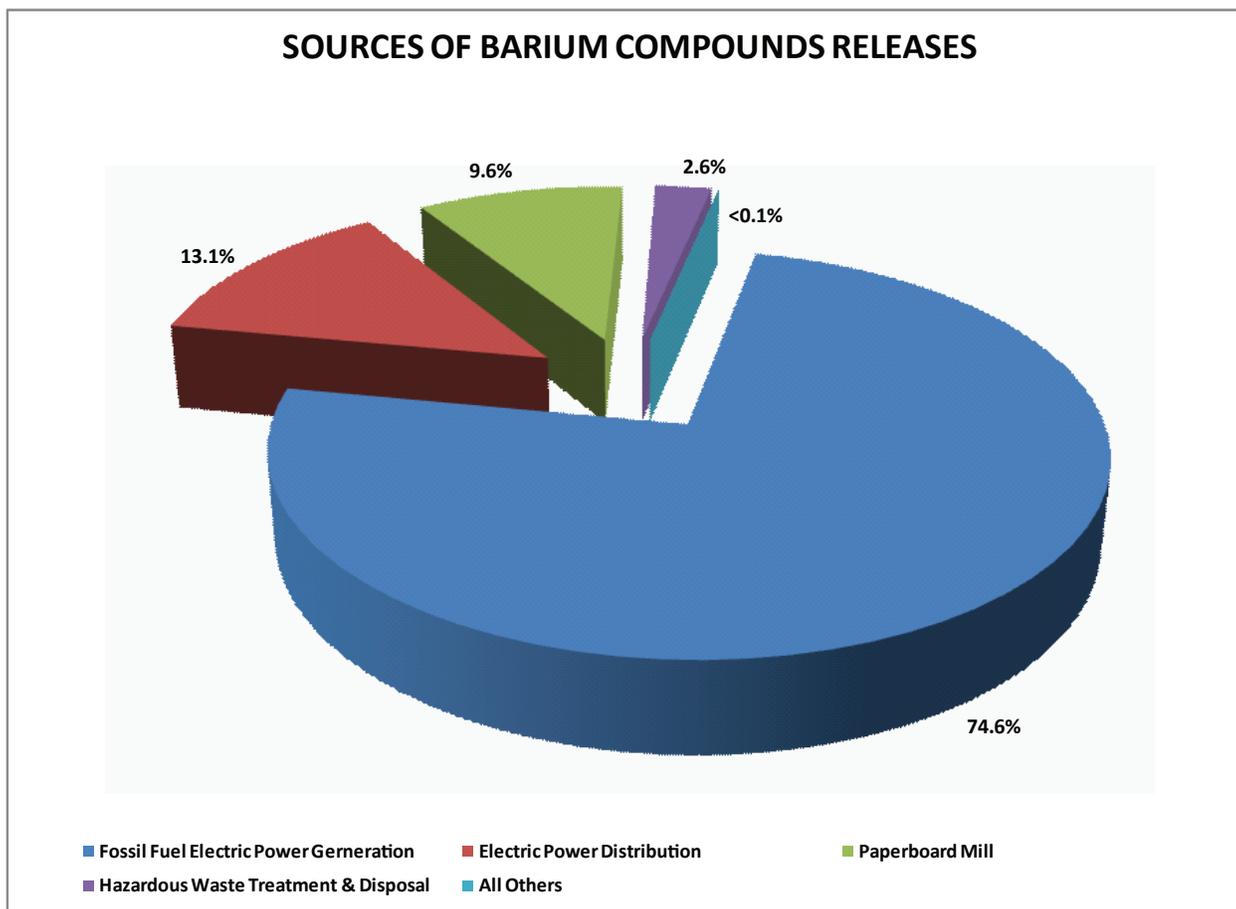


Figure 27



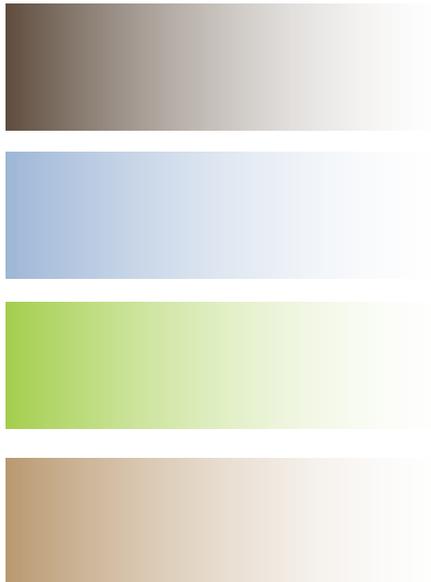
barium compounds most frequently is disposed to land through the use of permitted sanitary landfills, RCRA Subtitle C regulated disposal facilities and surface impoundments. Barium compounds accounted for 6.3 percent of total TRI releases in the State in 2007.

The ability of barium compounds to create health or environmental hazards is dependent on the water solubility of individual compounds and the toxicity of each. Generally, relatively high concentrations of barium are required to be toxic or hazardous. Ingestion is the most common means of exposure, although the dust of dry barium compounds may pose an inhalation hazard. Potential health effects from

exposure to high concentrations of barium or barium compounds are gastric irritation, muscle fatigue, cardiac arrhythmia, and damage to internal organs. Barium sulfate (barite) is excluded from TRI reporting.

Toluene, also known as methyl benzene or toluol, is an aromatic compound and is a clear, colorless liquid at ambient temperature and pressure with a sweet, pungent odor. It is a widely used industrial solvent, a component of paints, inks, adhesives, degreasers and cleaning agents, and used for chemical extractions. (Figure 28) During petroleum refining, toluene is isolated, and back blended into fuels. It also is a by-product of styrene production. Toluene accounted for 3.9

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percent of total releases in 2007 and was reported by thirty-six facilities. Because of its volatility, the majority of toluene released to the environment is through stack or fugitive air emissions. Consequently inhalation of fumes is the primary means of exposure, although it may be absorbed dermally as well. Continuous exposure or exposure to higher concentrations of toluene may cause unconsciousness and eventual asphyxiation. Long-term exposure eventually results in kidney and brain damage. Toluene is not classified as a known or potential carcinogen; however, it is a possible mutagen and highly flammable.

Hydrochloric acid is extremely corrosive and the vast majority is handled in aqueous solutions, however even dilute solutions of hydrochloric acid will corrode most metals and of course it is extremely damaging to skin and mucus membranes. For TRI reporting purposes, only **hydrochloric acid aerosols** are reported, also known as "1995 and after", referring to a 1995 clarification that specifies only aerosols of the chemical are reported. An aerosol of hydrochloric acid is considered to be any mist, vapor, gas, fog or other airborne form of particle size. Sprayed or distilled acid is reportable, as is hydrogen chloride gas.

Hydrochloric acid is a by-product of coal combustion, and coal fired electrical utilities were the source of 48.4 percent of releases in 2007. (Figure 29)

However, gases generated by coal combustion are treated by in-line or stack scrubbers that greatly reduce concentrations of hydrochloric acid and other chemicals prior to release as permitted, stack air emissions. Eighteen facilities reported hydrochloric acid aerosol releases for 2007.

Hydrogen fluoride is a colorless gas with a sharp, acrid odor. It is hygroscopic and readily dissolves in water to form hydrofluoric acid. In its gaseous state, releases occur to the air and inhalation is the means of exposure. Even at low levels hydrogen fluoride is an eye, skin and respiratory irritant as hydrofluoric acid is formed when the gas comes into contact with moisture in these organs. Acute inhalation exposure at high concentrations may cause pulmonary edema and cardiac arrhythmia. Hydrofluoric acid is extremely corrosive and may cause severe burns.

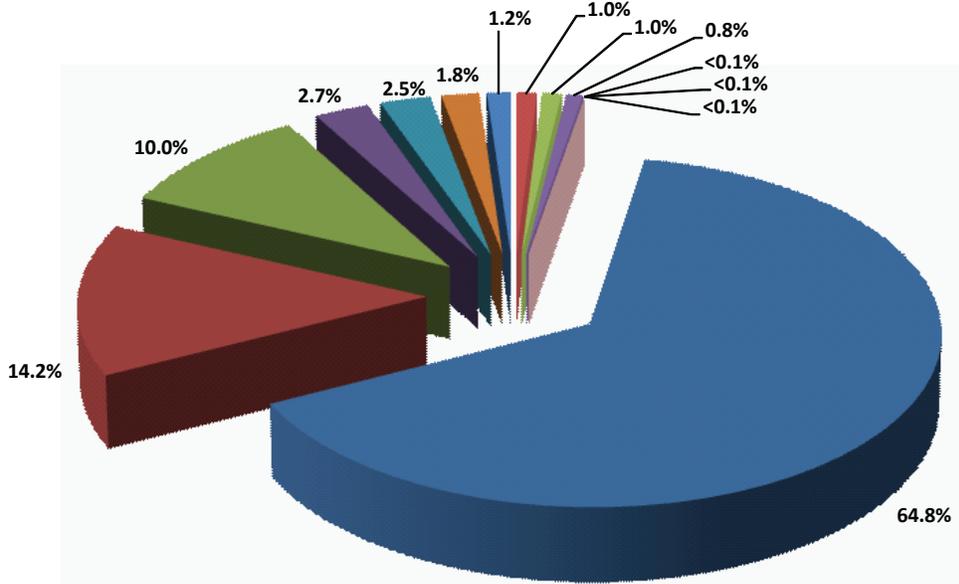
Hydrogen fluoride is formed during coal combustion and coal fired electricity utilities are the largest source of releases in the State. (Figure 30) Other common uses are as a catalyst or hardener or an agent to etch glass. Sixteen facilities reported hydrogen fluoride releases for 2007.

Elemental copper is a light reddish-brown metal that occurs naturally in deposits in the earth's crust and also in minute quantities in soils, sediments, waters and air. Oxidized copper develops a green coating or patina and is a component of a

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Figure 28

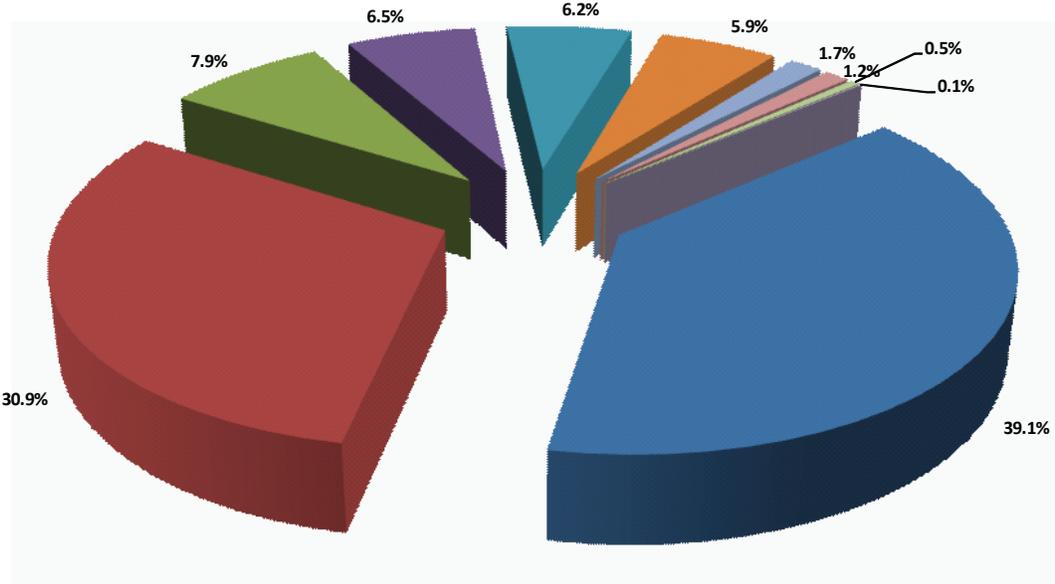
SOURCES OF TOLUENE RELEASES



- Petrochemical Manufacturing
- Commercial Gravure Printing
- Construction Machinery Manufacturing
- Photographic Film & Chemical Manufacturing
- Aircraft Parts & Auxiliary Equipment Manufacturing
- Petroleum Refining
- Air-Conditioning & Warm Air Heating Equipment Manufacturing
- Paint & Coating Manufacturing
- Mechanical Power Transmission Equipment Manufacturing
- All Others

Figure 29

SOURCES OF HYDROCHLORIC ACID AEROSOLS RELEASES



- Fossil Fuel Electric Power Generation
- Paper Mills
- Electric Power Distribution
- Paperboard Mills
- Misc. Chemical Products & Preparations
- Brick & Structural Clay Tile Manufacturing
- Ceramic Wall & Floor Tile Manufacturing
- Petroleum Refining
- Lime Manufacturing
- Plastics Material & Resin Manufacturing

Figure 30

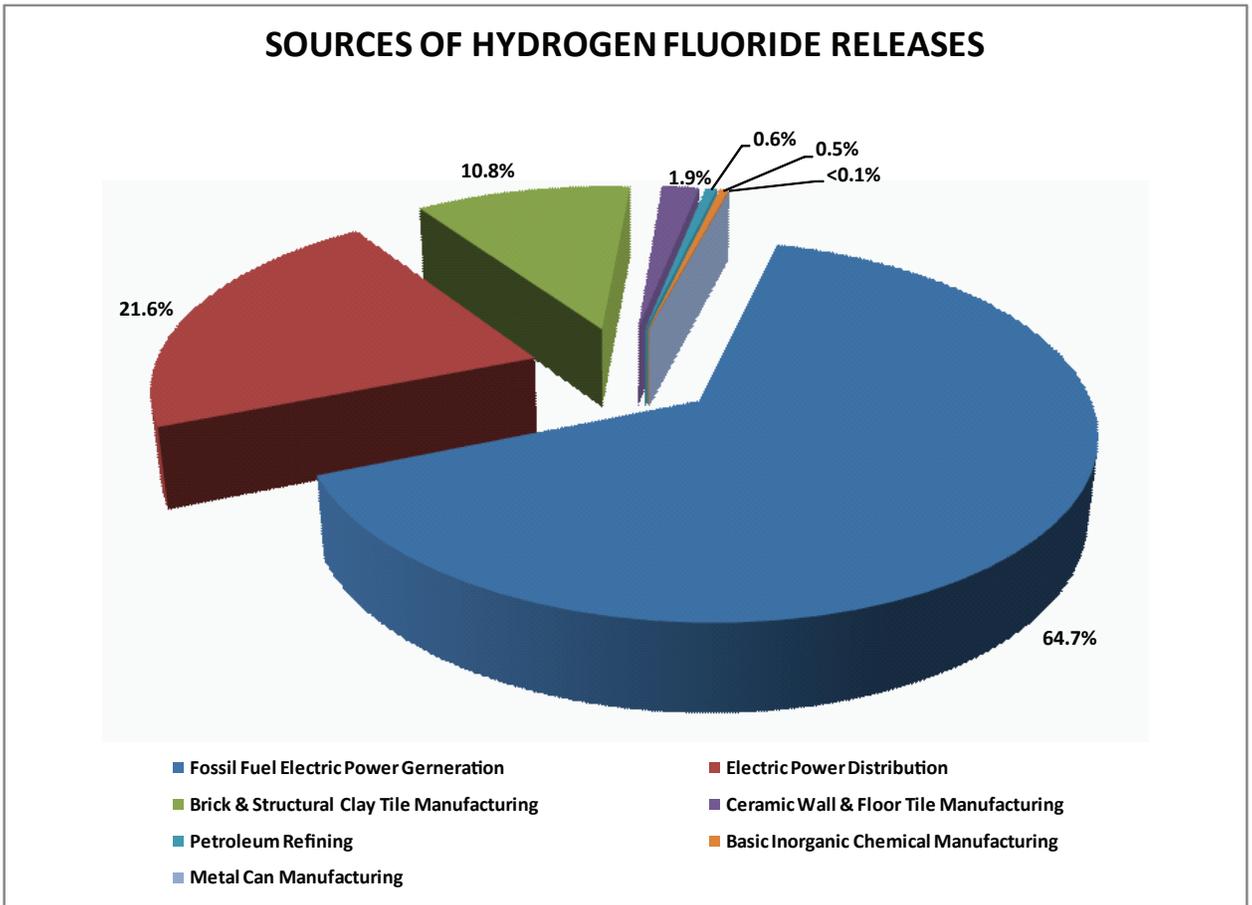
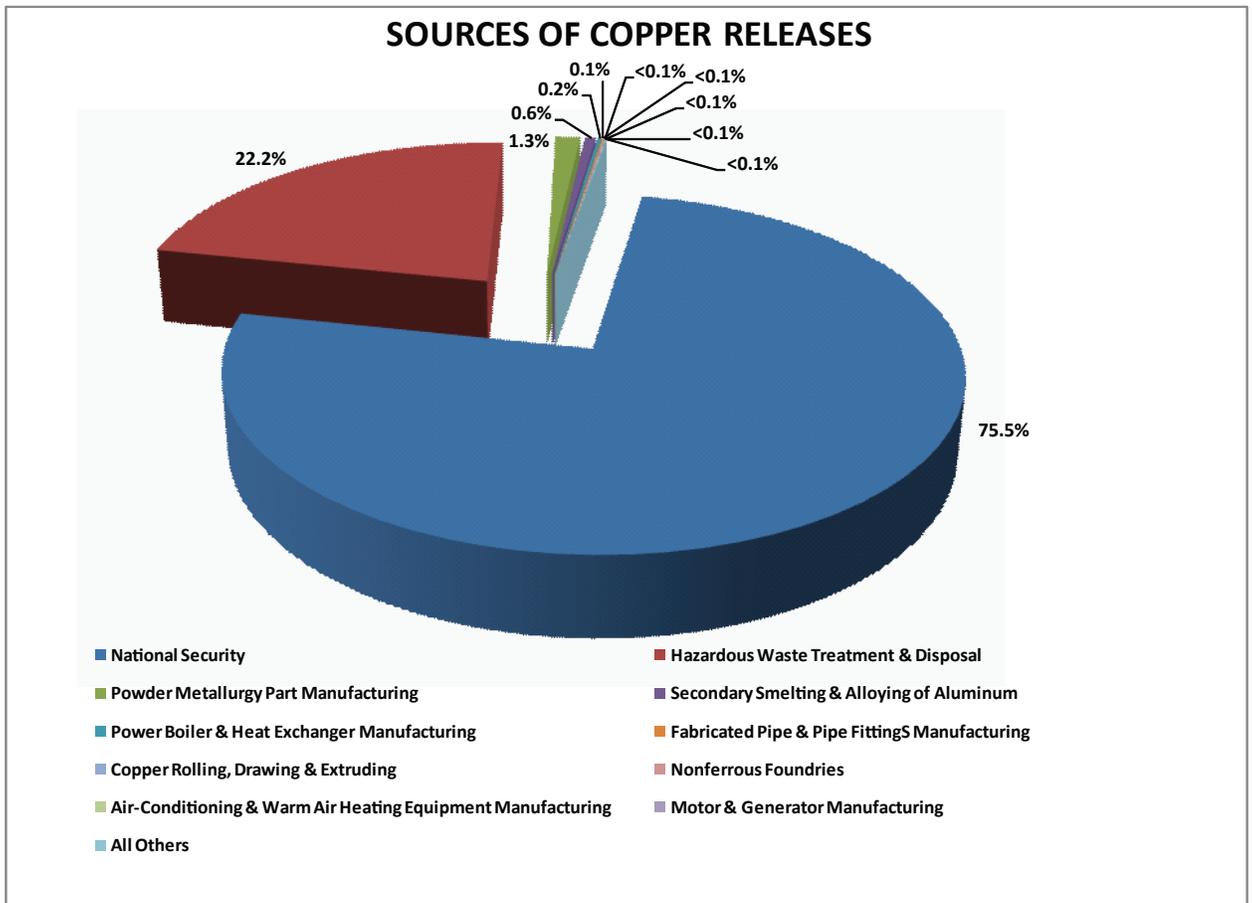


Figure 31



number of compounds found in nature, many distinguished by their blue-green color.

Copper smelting and mixing of molten copper with other metals to form alloys, such as bronze (copper and tin) and brass (copper and zinc) dates to ancient times. Common industrial uses are for pipes and valves in distribution systems, in fertilizers, bactericides, fungicides, algicides, animal feed additives, electroplating and the manufacturing of azo-dyes. Sixty-two Oklahoma facilities used or processed copper at or above the TRI thresholds; however, artillery shells used by the U.S. Armed Forces was the source of 75.5 percent of copper releases in 2007. (Figure 31) The majority of releases are made to permitted landfills and recycling is the chief means of managing copper wastes in the State.

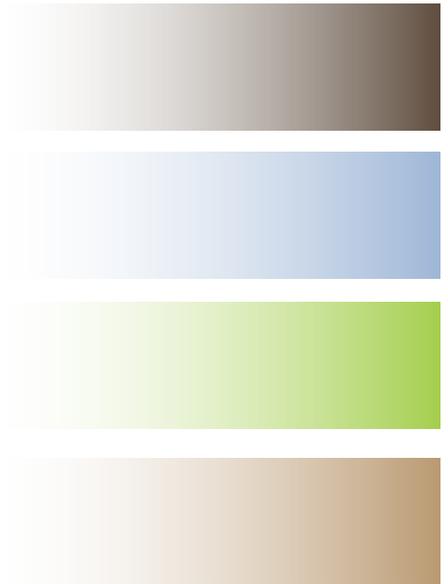
Copper is an essential trace nutritional element for all organisms including humans and other animals. However, inhalation of copper dust and fumes can affect the respiratory tract causing coughing, sneezing, and pain in the chest. Liver and endocrine function also may be affected. Copper dust and fumes can cause eye irritation, headaches and muscle aches. Ingesting large amounts of copper from drinking water can cause vomiting, abdominal pain, nausea, diarrhea. Copper is not known to play a role in cancer or birth defects.

Lead compounds reported to TRI include both inorganic and

organic lead compounds with varied industrial applications such as the manufacture of metal products, paints, and ceramic glazes. Lead compounds also are produced in the combustion of fossil fuels, however, in Oklahoma the vast majority of lead compounds releases are by Hazardous Waste Treatment and Disposal sites to RCRA Subtitle C landfills. (Figure 32) Lead compounds are listed as Persistent, Bioaccumulative and Toxic (PBT) chemicals, and for those lead compounds that are not components of stainless steel, brass or bronze alloys, 100 pound reporting threshold applies. For 2007 586,000 pounds of lead compounds were reported released in the State, a little of two percent of total releases for the year.

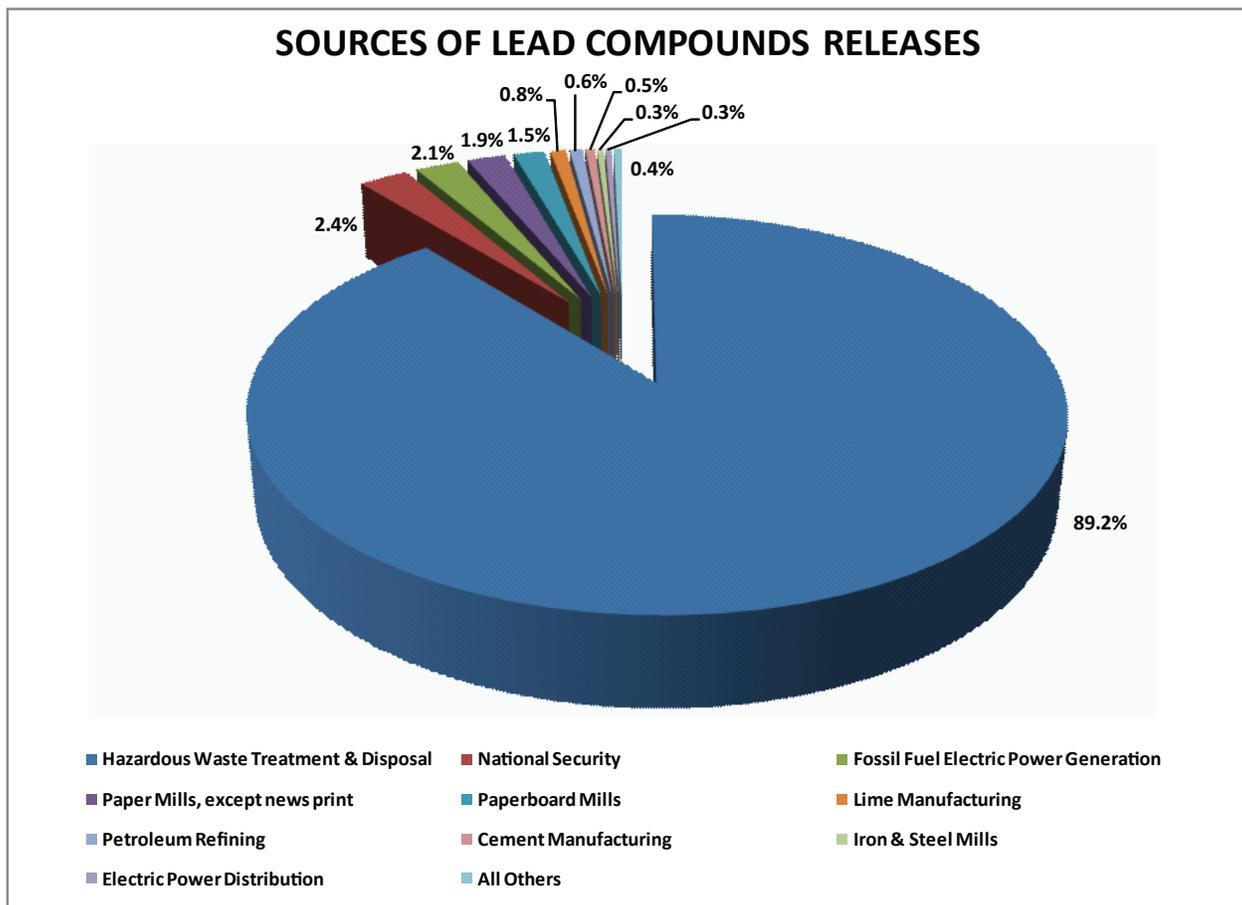
Exposure to lead compounds frequently occurs from breathing contaminated workplace air including that from mining operations or through inhaling contaminated household dust or eating lead-based paint chips or contaminated dirt. Lead and lead containing compounds are highly toxic, causing a range of deleterious health effects even at low dose levels. Brain damage, kidney damage, and gastrointestinal distress result from acute exposure to high levels of lead compounds and chronic exposure leads to toxic effects on the blood, central nervous system, blood pressure, kidneys, and Vitamin D metabolism. Children are particularly sensitive to the

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2007

Figure 32



chronic effects of this class of chemicals, with slowed cognitive development, reduced growth and other effects reported. Reproductive effects, such as decreased sperm count in men and spontaneous abortions in women, have been associated with high exposure to lead containing compounds. The developing fetus is at particular risk from maternal lead exposure, with low birth weight and slowed postnatal neurobehavioral development possible. Human studies regarding lead and lead compounds exposure and cancer are inconclusive.

Concerned parties outside of the EPA may petition the agency to add or delete chemicals from the list. The list of chemicals and chemical families reportable

under TRI continues to change. Beginning with Reporting Year 1995, the list increased from 313 to over 600 chemicals or chemical groups. The PBT Rule went into effect in 2000 (see Persistent, Bioaccumulative, and Toxic Chemicals) adding four reportable chemicals as PBTs. The Final Rule for Lead applied for the first time in 2001 which set the reporting threshold for lead or lead compounds not contained in specific alloys. Beginning with Reporting Year 2008, the reporting of some dioxins may require the use of Schedule 1 which lists the toxic equivalents of different congeners.

Information provided to the Hazardous Chemical Inventory (Tier II) regarding the storage of hazardous

and potentially dangerous materials is intended both to protect emergency responders and facilitate planning for chemical emergencies. The materials reported to Tier II as stored in greatest quantities for 2007 are listed in Table H. Eight of the materials reported stored in greatest quantities (crude oil, gasoline, diesel fuel, butane, isobutene, condensate, compressed natural gas and liquefied petroleum gas “propane”) are directly related to Oklahoma’s energy production and refining industries. With the exception of ammonia, the only

EHS listed in the top 25, the Tier II reporting threshold for all other chemicals or materials is 10,000 pounds or greater. Ammonia, as with TRI reporting, was by far the EHS stored in greatest quantities due to the production and storage of nitrogenous fertilizers. (Table I) Because Tier II covers only storage, chemicals produced as wastes or byproducts such as nitrate compounds frequently are unreported. Methanol while not an EHS ranked 16th by total quantities reported under Tier II and was the third most released TRI chemical.

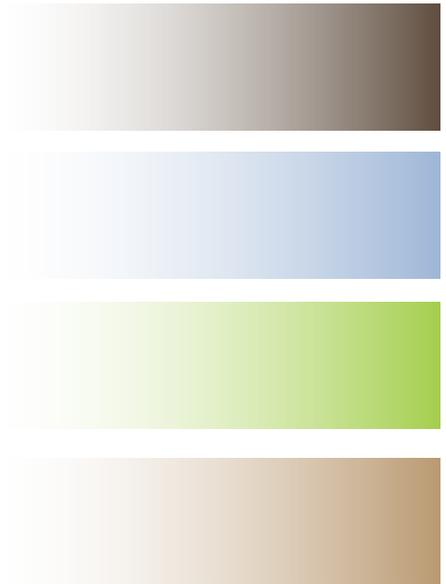


Table H - TIER II Materials Reported in Greatest Quantities

RANK	CHEMICAL/MATERIAL REPORTED	TOTAL STORED, lbs.
1	Crude Oil	28,806,626,941
2	Coal	4,547,846,000
3	Gasoline	2,888,366,342
4	Calcium Carbonate	1,874,775,987
5	Diesel Fuel	1,857,623,036
6	Asphalt	1,389,331,864
7	Cement	1,221,270,154
8	Soda Ash / Fly Ash	1,050,248,817
9	Kerosene	991,537,049
10	Natural Gas Compressed	867,665,236
11	Naphtha	805,160,453
12	Petroleum Coke	569,034,000
13	Ammonia	448,800,592
14	Ammonium Nitrate	315,043,249
15	LPG Propane	271,553,413
16	Methanol	252,068,577
17	Calcium Fluoride sludge (80%)	250,000,000
18	Butane	210,248,334
19	Urea	186,370,000
20	Diammonium phosphate	140,830,788
21	Toluene	125,234,866
22	Isobutane	119,200,000
23	Condensate	102,823,968
24	Diammonium phosphate	95,743,240
25	Sodium Hydroxide	92,725,483
	TOTAL	49,480,128,389

Table I - TIER II Extremely Hazardous Substances Reported in Greatest Quantities

RANK	EHS CHEMICAL REPORTED	TOTAL STORED, lbs.
1	Ammonia	448,800,592
2	Sulfuric Acid	60,730,780
3	Chlorine	12,353,198
4	Nitric Acid	7,215,732
5	Hydrazine	5,028,004
6	Hydrofluoric Acid	1,938,617
7	Hydrogen Peroxide	1,505,173
8	Sulfur Dioxide	1,472,600
9	Formaldehyde	1,024,783
10	Isophorone diisocyanate	509,000
11	Methyl Parathion	300,000
12	Dimethoate	264,000
13	Chloropyrifos	256,000
14	Trifluralin	206,000
15	Paraquate Dichloride	142,950
16	Carbon Disulfide	135,211
17	Temik	130,000
18	Phosphorus	125,000
19	PHENOL	122,561
20	Thimet	105,050
21	Nitrous Oxide	100,550
22	Carbofuran	93,840
23	Sodium Cyanide	72,510
24	Boron Trifluoride	51,000
25	Endosulfan	50,600
	TOTAL	542,733,752



Persistent, Bioaccumulative and Toxic Chemicals

The most significant recent change to the list of chemicals reportable under TRI was the 1999 Final Rule on Persistent, Toxic and Bioaccumulative (PBT) chemicals, (64 CFR 58666). PBT chemicals are of particular concern as they are demonstrated to be highly toxic, difficult to destroy and tend not to degrade but persist in the environment and accumulate in the body tissues of humans and wildlife (bioaccumulate). Implementation of the PBT rule should be viewed as a step in addressing one of the chief limitations of TRI data, specifically, the wide variability

in toxicity between different chemicals. Beginning with RY 2000, reporting thresholds for 18 chemicals or chemical groups classified as PBTs were lowered substantially. With the Final Rule for Lead and Lead Compounds promulgated for RY 2001 (66 CFR 4500), the list was completed to its current form. (Table J) Thresholds take into account both the individual toxicity of the given chemical and the risks for exposure to

it. Seven chemicals and two chemical families previously not reportable under Section 313 were added to the list as part of the final PBT rule. The present PBT list is composed of organo-chlor pesticides, other highly chlorinated or brominated aromatic compounds, chemicals with multiple, linked aromatic rings (polyaromatic compounds) and two heavy metals reported as elements or compounds.

The lowered thresholds apply to all reportable activities, that is, no alternate thresholds for 'otherwise use' are applicable. Use of Form A was briefly allowed for PBT reporting, including 2007 reporting, but will be disallowed again starting with 2008 for any PBT chemical. The de minimus concentration exemption is not applicable for any PBT chemical, with the exception of lead containing alloys. PBT thresholds do not apply to lead contained in stainless steel, brass or bronze alloys. When lead or lead compounds contained in these alloys are reported, the 25,000 pound threshold for produce and manufacture and the 10,000 pound threshold for otherwise use remain in effect.

Table J - PBT Chemicals and Thresholds

Manufacture, process and otherwise use thresholds	
Aldrin	100 lbs./yr.
Lead	100 lbs./yr.
Lead Cmpds.	100 lbs./yr.
Methoxychlor	100 lbs./yr.
Pendimethalin	100 lbs./yr.
Polycyclic Aromatic Cmpds. (PAC's)	100 lbs./yr.
Tetrabromobisphenol A	100 lbs./yr.
Trifluralin	100 lbs./yr.
Chlordane	10 lbs./yr.
Benzo(g,h,i) perylene	10 lbs./yr.
Heptachlor	10 lbs./yr.
Hexachlorobenzene	10 lbs./yr.
Isodrin	10 lbs./yr.
Mercury	10 lbs./yr.
Mercury Cmpds.	10 lbs./yr.
Octachlorostyrene	10 lbs./yr.
Polychlorinated Biphenyls (PCB's)	10 lbs./yr.
Pentachlorobenzene	10 lbs./yr.
Toxaphene	10 lbs./yr.
Dioxin and dioxin-like Cmpds.	0.1 gm/yr.

Table K - Total Production Related Wastes for PBTs

Persistent, Bioaccumulative and Toxic Chemical	Facilities	Total Releases	Transfers	Treatment	Reuse	TPRW
Benzo(g,h,i)perylene	18	682.0	253.0	53.0	70,504.0	71,492.0
Chlordane	1	121.0	0.0	0.0	0.0	121.0
Dioxins	18	46.05 gm	9.31 gm	0.0 gm	0.0 gm	.122 lb
Heptachlor	1	97.0	0.0	0.0	0.0	97.0
Lead	57	292,056.0	63,665.6	0.0	422,444.3	778,165.9
Lead compounds	49	585,957.0	128,230.00	0.0	3,272,683	3,986,870.3
Mercury	8	4,079.0	101.0	0.0	9.0	4,189.0
Mercury compounds	17	2,675.0	1,299.0	0.0	128.0	4,102.0
Polychlorinated Biphenyls (PCBs)	1	19,082.0	0.0	0.0	0.0	19,082.0
Polycyclic Aromatic Compounds (PACs)	24	5,073.0	9,709.0	5,906.0	781,473.0	802,161.0
Tetrabromo-bis-phenol A	1	0.0	0.0	0.0	0.0	0.0
Toxaphene	1	109.0	0.0	0.0	0.0	109.0
Trifluralin	1	4,494.0	0.0	0.0	0.0	4,494.0

2.69% of TPRW

Oklahoma companies reported 13 PBT chemicals for 2007. (Table K) Over 1/3 of TRI facilities in the state reported at least one PBT chemical for 2007, a total of 114 facilities. Despite the frequency of PBTs reported, these chemicals nominally affect TRI data for the State. Only 3.5 percent of all TRI releases and less than 3 percent of total production related wastes reported in Oklahoma for 2007 were releases, transfers or other management of PBTs. TPRW for PBTs decreased substantially from 2006 to 2007, from 12.87 million to 5.67 million pounds.

Lead and lead compounds accounted for approximately 96 percent of all PBT releases reported for 2007. Of the 5.67 million pounds of PBTs reported managed in 2007, 4.77 million pounds, over 84 percent, came from the recycling of lead and lead containing compounds. This was the fourth year that the 100 pound threshold applied for both lead and lead compounds. While the reported numbers for releases of both increased with the implementation of the 2001 Final Rule, this does not indicate that greater quantities of these chemicals were released into the environment but rather indicates an improvement in the reporting of these chemicals. It is important to note that those facilities reporting the greatest usage and waste management for lead and compounds use primarily lead containing alloys and therefore continue to report under the higher thresholds.

Fifty-seven Oklahoma facilities reported lead releases in 2007. Hazardous Waste Treatment, Storage and Disposal sites permitted under RCRA Subtitle C were the major source of elemental lead releases in the State in 2007 followed by U.S. Military bases. (Figure 33) Other industrial sectors reporting releases of lead include lime kilns, the production of inorganic chemicals, miscellaneous chemical products, steel wire drawing, iron foundries and aluminum smelting.

Industries reporting releases of lead compounds are shown in Figure 32. Over 89 percent of releases were permitted land disposals at highly regulated RCRA Subtitle C hazardous waste facilities. Other sources of lead compounds releases were military bases and coal fired electricity plants.

Mercury compounds are trace constituents of coal and crude oil, and are released in minute quantities by the combustion of these fuels. Releases by coal fired electric utilities and into RCRA Subtitle C hazardous waste landfills were roughly equal in 2007 and accounted for over 85 percent of releases. Trace quantities of naturally occurring mercury in native rock also accounts for the production of mercury compounds in hydraulic cement production and lime kilns. (Figure 34) In 2007 92.9 per cent of all elemental mercury releases reported were permitted land disposals into highly regulated

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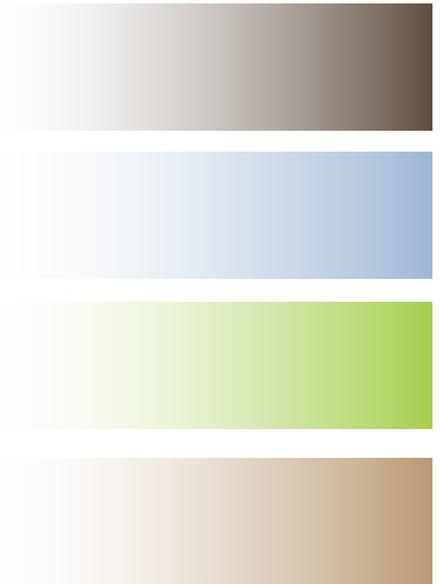


Figure 33

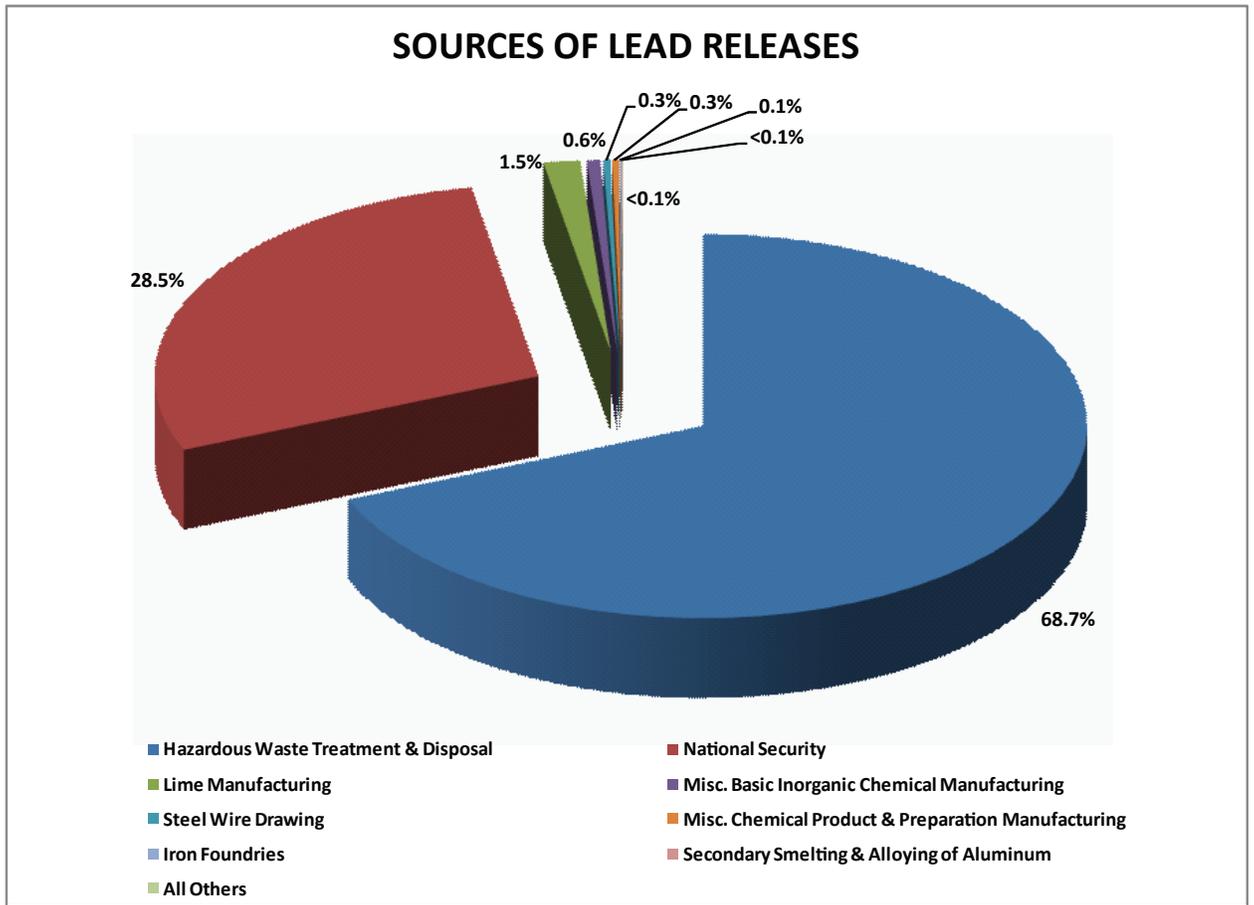
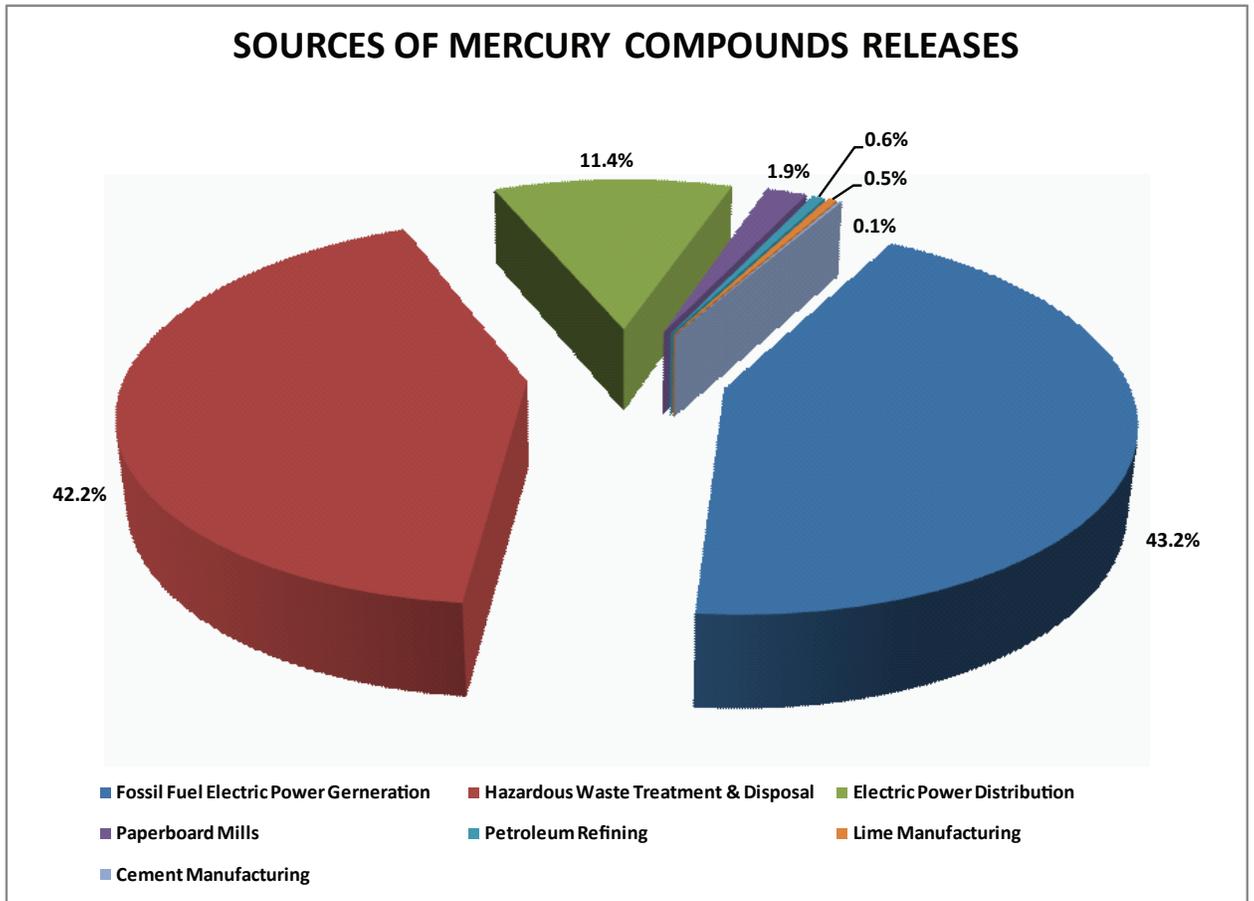


Figure 34



RCRA Subtitle C landfills. (Figure 35) Petroleum refining, paper mills and cement kilns making up the balance.

The health hazards from exposure to mercury and compounds are well documented and extremely serious, although in Oklahoma combined releases of mercury and mercury compounds were slightly more than 0.02 percent of total releases reported in Oklahoma for 2007.

Polyaromatic compounds (PAC), also known as polynuclear aromatics (PNA) or polycyclic aromatic hydrocarbons (PAH) describes a group of related chemicals that generally occur as complex mixtures rather than as discrete compounds characterized by multiple benzene rings connected together. These chemicals are in the incomplete combustion of fossil fuels or incineration of organic materials such as wood or garbage. Polyaromatics are natural components of crude oil and are produced during petroleum refining. (Figure 36) As major constituents of carbon black, tire manufacturing also is a significant source of PAC releases. While **benzo(ghi)perylene** is a polyaromatic compound, it is the only one of these chemicals listed as a separate PBT. There are no specific commercial uses of benzo(ghi)perylene alone, although like other PACs, it is produced by incomplete combustion. Petroleum refining, is the largest source of benzo(g,h,i)perylene releases as well as polyaromatic compounds

in general. (Figure 37) Four chemicals currently listed under PACs are under consideration for separate reporting as is done currently with benzo(g,h,i)perylene. All are reasonably anticipated to be human carcinogens; however, RY 2011 or 2012 would be the earliest reasonable projection for these changes to occur.

Dioxin and dioxin-like chemicals refers to a group of chlorinated aromatic compounds containing the dioxin linkage, that is, a double substitution of oxygen in an aromatic ring. These chemicals once were used as defoliants and pesticides; however, in the past 20 years the only dioxins manufactured for commercial use in the United States are extremely small quantities for research purposes. Many of these chemicals are known human carcinogens and additionally can impair normal development and reproduction. The most common means of exposure to dioxins is through ingestion followed by inhalation in contaminated areas. Dioxins are the only TRI chemicals reported in grams with a reporting threshold of 0.1 gram. Releases of dioxins in 2007 totaled only 46 grams, or 0.10 pounds. No dioxins were reported treated or reused.

Dioxins are incidentally produced as byproducts from combustion of fossil fuels or incineration of organic materials, formed as paper pulp is bleached, or appear as impurities in chlorinated pesticides.

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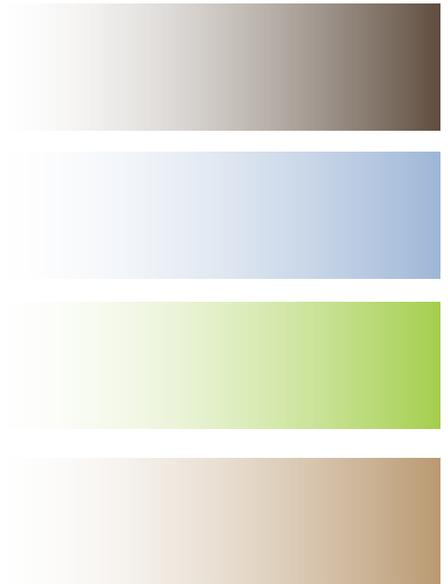


Figure 35

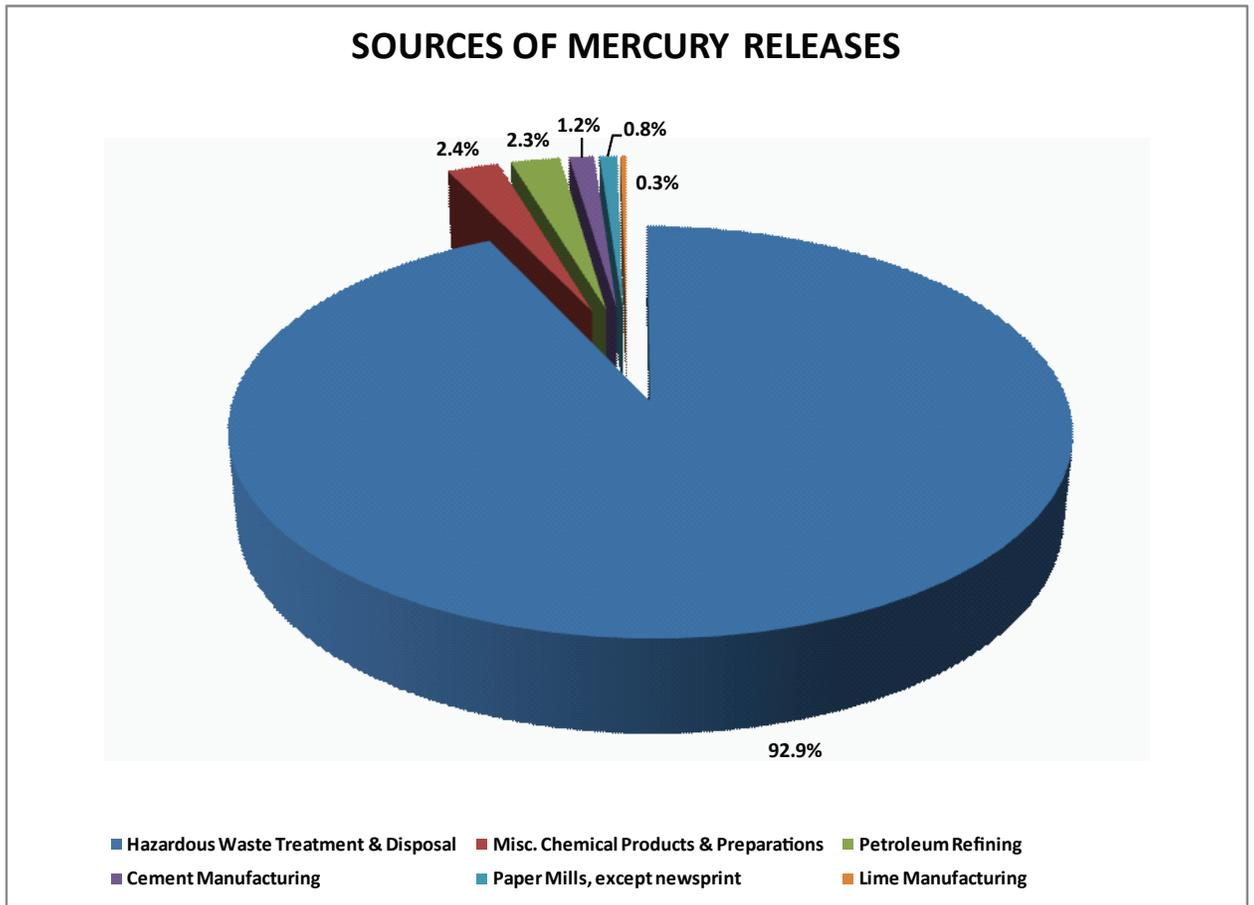


Figure 36

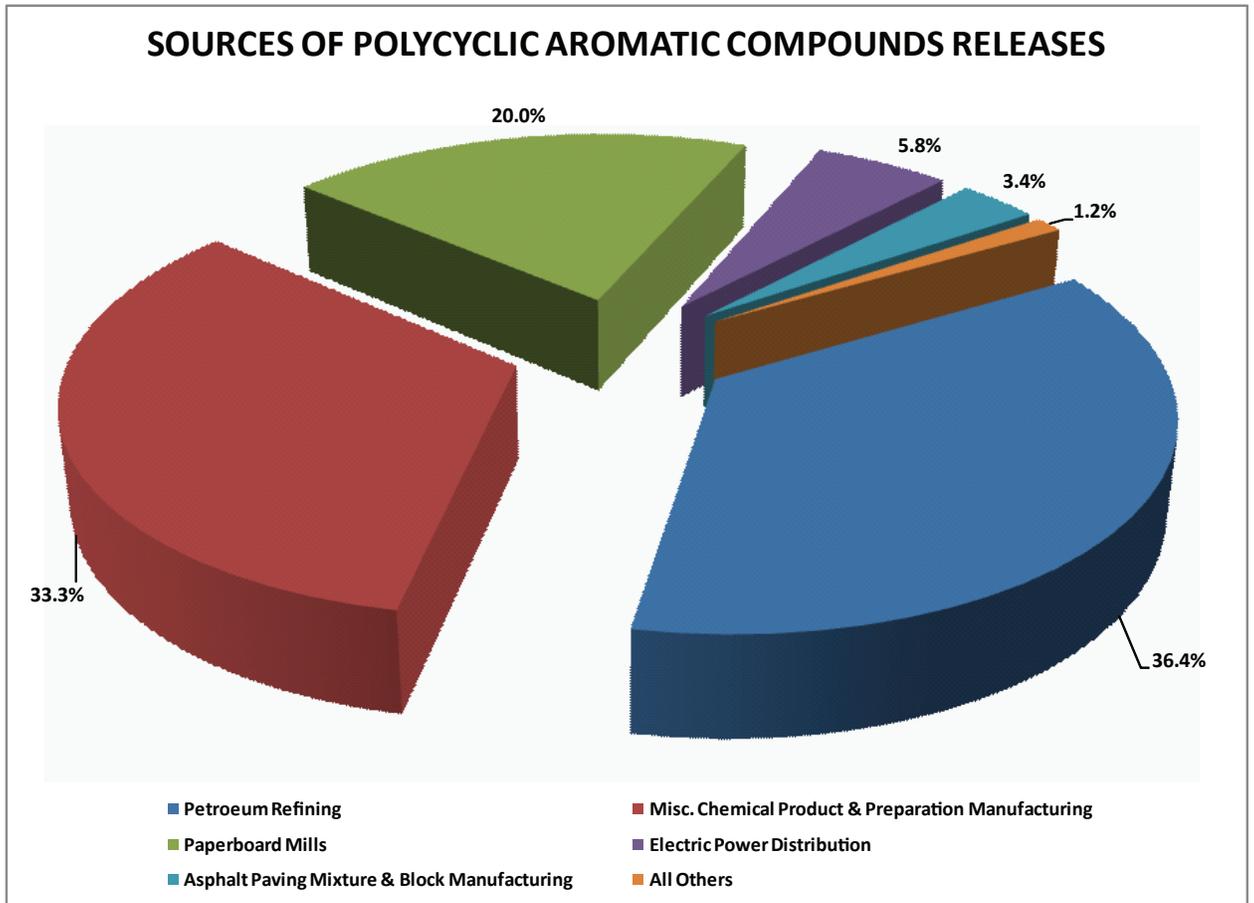


Figure 37

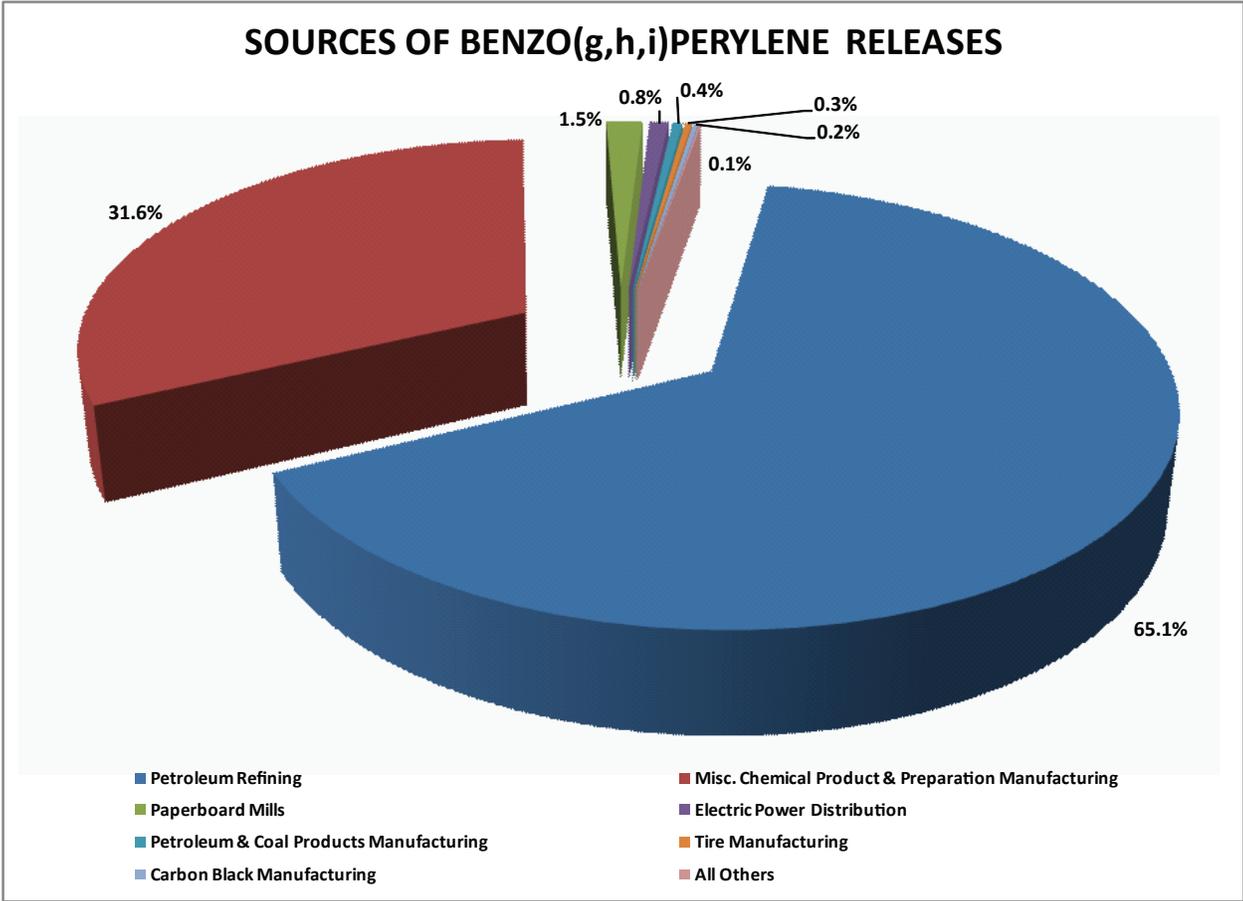
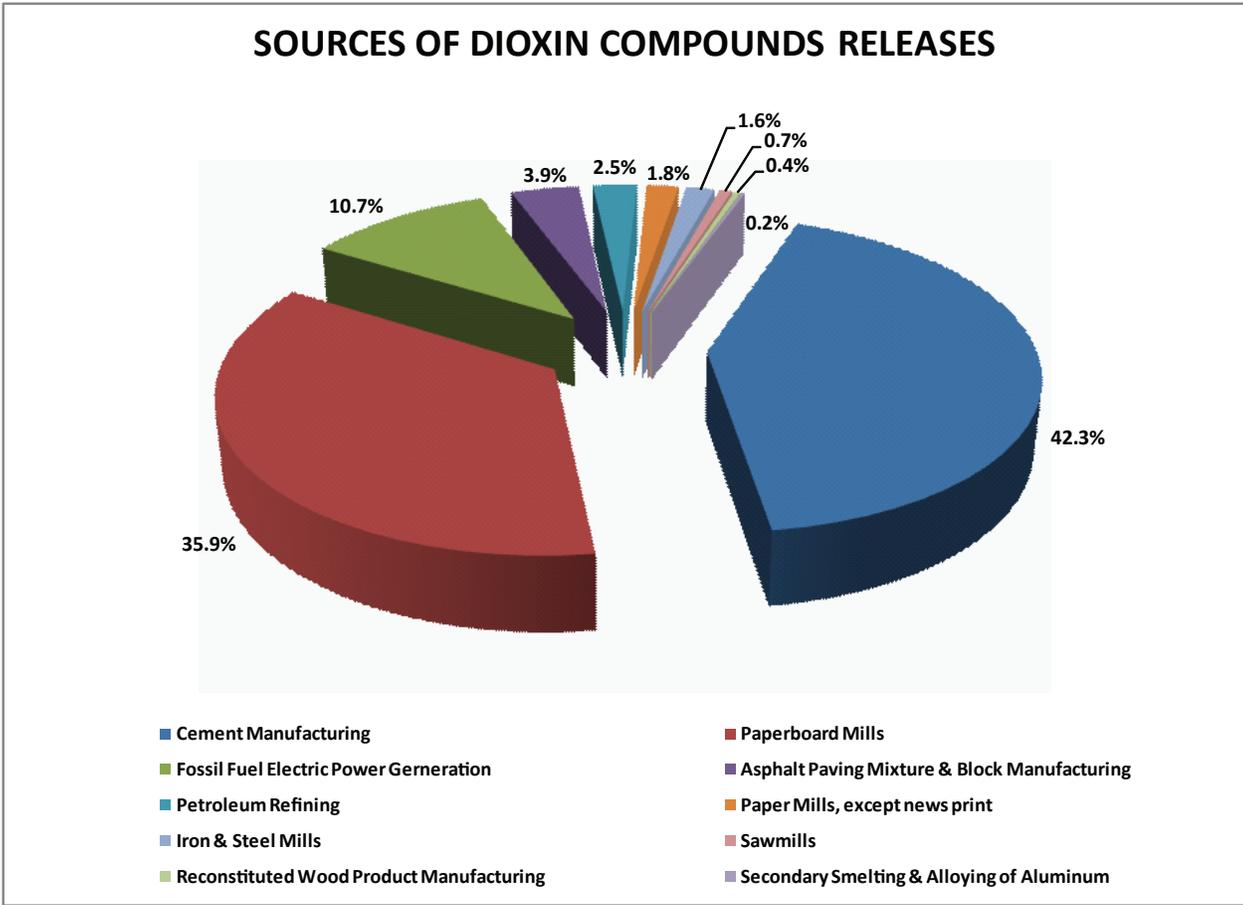
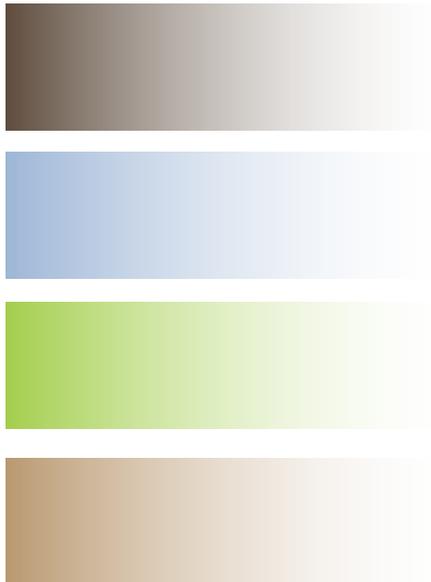


Figure 38





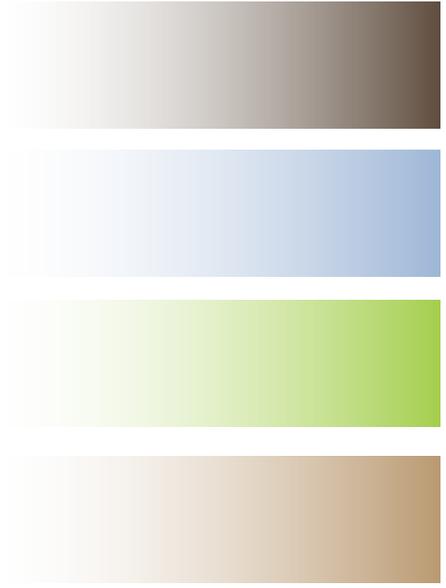
(Figure 38) The most commonly known and most toxic of these chemicals, tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) is highly toxic and a known human carcinogen. As with most families of chemicals, there is variability in toxicity between 2,3,7,8-TCDD and other congeners. TRI reporting for dioxin and dioxin-like compounds requires the distribution between 17 of the most chlorinated dioxin compounds be reported as well. Assumptions concerning the toxicity of reported dioxins require analyzing the distribution of compounds.

Tetrabromobisphenol A is used as a reactive flame retardant in epoxy, vinyl esters and polycarbonate resins and in polymers, polystyrenes, phenolic resins, adhesives, paper and textiles. It was reported by only one facility engaged in plastics and resin manufacturing in the state for 2007 with no reported releases, transfers or other waste management.

Reported releases of **polychlorinated biphenyls (PCB)** in 2007 were by a single landfill permitted under RCRA Subtitle C, that is, these chemicals

were managed by an Oklahoma TSD rather than generated or used by in-state industries.

Modifications and additions to the list of PBT chemicals are anticipated. For example, EPA deferred a decision in the final rule on dicofol, a pesticide, until the agency further evaluates data on its persistence. Cobalt and cobalt compounds were considered for the initial PBT list as well; however, EPA deferred the decision pending more investigation into the bioaccumulative properties of these chemicals. Another pesticide, mirex, already considered a PBT for Pollution Prevention activities could eventually be listed as such for TRI reporting. As mentioned above, six polyaromatic compounds could be separated out for discreet reporting and another 12 chemicals reasonably anticipated to be human carcinogens may be added to the PBT list as well. As with previous expansions in TRI reporting, future changes in PBT reporting will make the data more representative and thereby better inform the public of chemical risks in the community.



TRI 2007

Glossary

Acid aerosols- Mists, vapors, gas, fog and other airborne forms of any particle size of a chemical; current TRI usage refers to aerosols of sulfuric acid or hydrochloric acid.

Bioaccumulation- The process by which organisms may accumulate chemical substances in their bodies. The term refers to both uptakes of chemicals from water and from ingested foods and sediment residues.

Carcinogen/carcinogenic- A substance that can cause transformed cells leading to some form of cancer.

CAS- Chemical Abstract Service; numerical designations for chemicals generated under the CAS system are discrete identifiers.

de minimis- An exemption to TRI reporting whereby any chemical or chemical group that comprises less than 1% of a mixture need not be reported even if the total quantity of the chemical exceeds the threshold quantity. If Occupational Safety and Health Administration (OSHA) lists the chemical or chemical group as a carcinogen, the de minimis concentration drops to 0.1%.

DEQ- Oklahoma Department of Environmental Quality

Extremely Hazardous Substance (EHS)- any of over 250 chemicals listed as such under by the Hazardous Chemical Inventory (Tier II) under Section 302 of SARA Title III

EPA- the federal Environmental Protection Agency

EPCRA- Emergency Planning and Community Right to Know (see SARA Title III)

Energy Recovery- Recovery of useful energy from waste mainly through combustion of chemical waste.

Facility- Defined for the purposes of TRI reporting as all buildings, equipment, structures and other stationary items which are located on a single site or on contiguous or adjacent sites and which are owned or operated by the same entity.

Form A- The abbreviated version of the Toxic Chemical Release Inventory Form for TRI reporting, used when total releases of chemical or chemical group during a calendar year do not exceed 500 pounds and the total amount manufactured, processed or otherwise used does not exceed one million pounds. Form A is actually a certification

statement attesting to these conditions. More than one chemical or group can be reported on one Form A.

Form R- The Toxic Chemical Release Inventory Form standard for TRI reporting. Facility information and activities relating to a specific chemical are stated on a Form R along with releases and the media into which the chemical is released, transfers and treatment of wastes, and sources reductions and reuse.

Fugitive (Non-Point) Air Releases- Emissions to the air that are not conveyed through stacks, vents, ducts, pipes or other confined air streams. Examples include equipment leaks from valves, pump seals, flanges, compressors, sampling connections, open-ended lines and evaporative losses from surface impoundments and spills.

LEPC- Local Emergency Planning Committee; LEPC's are mandated under SARA Title III.

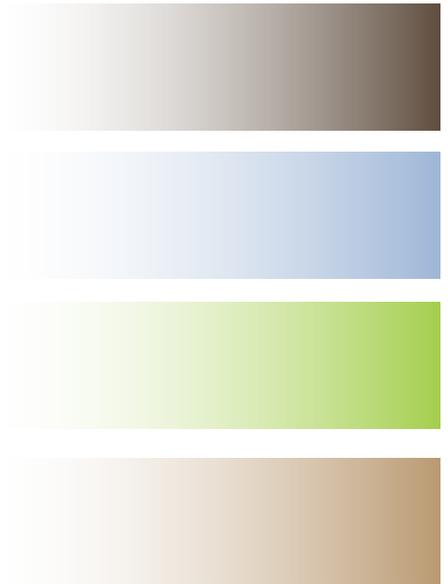
Manufacture- To produce, prepare, import or compound a toxic chemical.

Material Safety Data Sheet (MSDS)- A form prepared by the manufacturer of a product to provide information on the safe use, handling and potential hazards of a product. Should include toxicity and safety information relevant for the user or handler. Section 313 chemicals should be noted on MSDS.

North American Industrial Classification System- the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy. NAICS was developed by the Office of Management and Budget and adopted in 1997 to replace the Standard Industrial Classification (SIC) system, and adopted for TRI for RY 2006. Industries in the United States are identified by a six-digit code, the first two digits indicating one of 20 different broad industrial sectors.

Off-Site Locations- Locations outside the boundaries of a facility to which wastes are transported for treatment, energy recovery, recycling or disposal.

Otherwise Use- Any use of a toxic chemical at a facility which is not covered by the definition of manufacture or process. This includes any activities in which a listed toxic chemical does not become intentionally incorporated into the final product for distribution in commerce. Examples of otherwise use include but are not limited to



degreasers, solvents in paints that are applied to a product, chemicals used in water treatment and refrigerants or coolants.

PAH- Polynuclear Aromatic Hydrocarbons, also known as PNA's; a group of chemicals characterized by multiple, joined aromatic rings.

PBT- for TRI reporting, those chemicals designated by the EPA to be Persistent, Bioaccumulative and Toxic

PCB- Polychlorinated Biphenyls, individually identified by Arachlor series; the higher the Arachlor series number the greater the degree of chlorination. Once used in electrical transformer oil.

Persistence- As related to chemicals in the environment, the length of time a chemical can exist in the environment before being destroyed (i.e., transformed) by natural processes.

Publicly Owned Treatment Works (POTW)- A wastewater treatment facility that is owned by a unit of the government.

Process- Refers to the preparation of a listed toxic chemical after its manufacture for distribution in commerce. Processing is usually the intentional incorporation of a toxic chemical into a product. It includes but is not limited to making mixtures, repackaging or using a toxic chemical as a feedstock, raw material or starting material for making another chemical.

RCRA- Resource Conservation and Recovery Act

Recycle- The process of capturing a useful product from a waste stream. Solvent recovery, metals recovery and acid regeneration are examples of recycling.

Releases- Refers to on-site discharges of TRI listed chemicals to the air, water, land or disposal in underground injection wells. Includes permitted, accidental and non-permitted discharges.

Releases to Air- Sum of Fugitive (Non-Point) Air Releases plus Stack (Point Source) Air Releases.

Releases to Land- Refers to land filling, surface impoundments, land treatment/application farming or any other release of a toxic chemical to land within the boundaries of a facility.

Releases to Water- Refers to discharging of chemicals to surface waters, ie, rivers, lakes, ponds and streams.

SARA Title III- The section of the Superfund Amendments and Reauthorization Act (SARA) which mandates Emergency Planning and Community Right to Know.

Stack (Point Source) Air Releases- Emissions to the air that are conveyed through stacks, vents, ducts, pipes or other confined air streams. Examples include storage tank emissions from air pollution control equipment.

Standard Industrial Classification Code (SIC Code)- A four digit number code designated by the Federal Office of Management and Budget to describe the type of activity(s) at a facility. The first two numbers of the code define a major business sector, and the last two numbers define a facility's specialty within the major sector. SIC has been replaced by NAICS for TRI and other reporting and no further revisions to SIC are planned.

Threshold Planning Quantity- quantity of a stored EHS requiring emergency planning also used as reporting threshold for Tier II

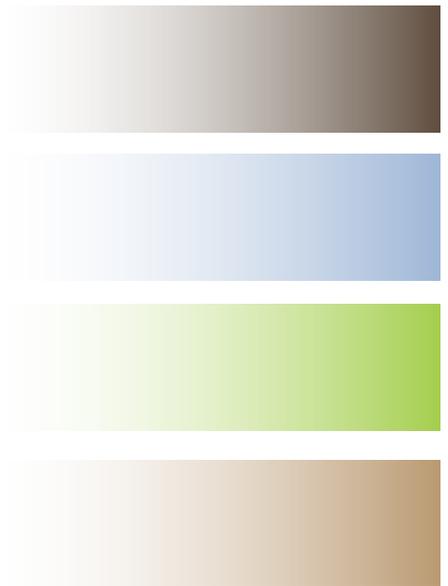
Tier II- the form for reporting chemical storage under Section 312 of SARA Title III and synonymous with the program, also known as the Hazardous Chemical Inventory

Toxic- A substance that produces or causes a systemic damage to an organism, for example acute or chronic neurological, respiratory or reproductive disorders, also carcinogenic or teratogenic effects.

TRI- Toxics Release Inventory; Section 313 of SARA Title III

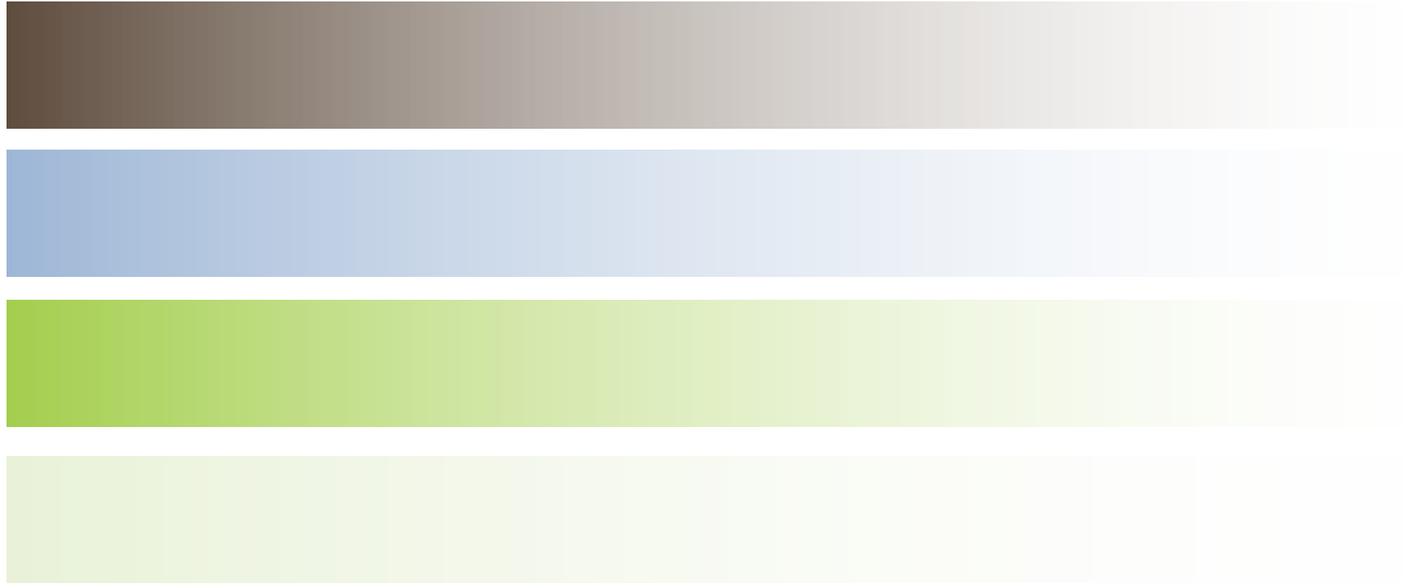
Transfers- Refers to TRI listed chemicals sent off-site for energy recovery, recycling, treatment or disposal. Reported as transfers to either Publicly Owned Treatment Works or other off-site transfers (non-POTW) such as incinerators, landfills, other treatment, recycling, energy recovery or disposal facilities not part of the reporting facility.

TSD- Treatment, Storage and Disposal facility for industrial wastes.





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