

Department of Defense Reduces Toxic Chemical Release Over 50% Within Three Years



Public Data Report On Toxics Release Inventory Data for 1994-1996

Executive Summary

The Department of Defense (DoD) eliminated over 50% of its toxic chemical releases between 1994 and 1996--three years ahead of the President's goal. This report provides detailed information on this dramatic reduction.

In August 1993, the President issued Executive Order 12856, *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements, which* required federal agencies to comply with the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 and the Pollution Prevention Act of 1990. In Executive Order 12856, the President challenged federal agencies to be open with the community about releases of toxic chemicals, reduce these releases 50% by 1999, and aggressively use pollution prevention approaches to minimize the federal government's impact on the environment.

Both Acts require certain manufacturing sectors to publicly report toxic chemical releases and off-site transfers to the Environmental Protection Agency (EPA) and state governments. EPA compiles this data into a database known as the Toxics Release Inventory (TRI), which is released to the public. Executive Order 12856 extended compliance to federal facilities.

This report summarizes the DoD TRI data for calendar year (CY) 1996, as well as trend data for CY 1994 through CY 1996. In 1994, DoD released and transferred off-site 10.7 million pounds of toxic chemicals. By 1996, the amount released and transferred was only 5.7 million pounds, or 54% less than was released and transferred in 1994. The reduction was due primarily to DoD aggressively eliminating some toxic chemical uses, closing two bases and four government owned, contractor operated (GOCO) facilities, as well as reducing toxic chemical production.

DoD's 1996 Toxics Release Inventory Data

The Environmental Protection Agency's (EPA) Toxics Release Inventory (TRI) Program provides the public with information on the releases of listed toxic chemicals in their communities and provides the agency with information to assist in determining the need for future regulations. Facilities must report on both routine and accidental releases of listed toxic chemicals, the maximum amount of the listed chemical on site during the calendar year, and the amount of chemical contained in wastes transferred off site. DoD is using the information collected under this program to measure progress in pollution prevention initiatives at DoD installations. A baseline was developed from 1994 reporting year data. The goal is to reduce the emissions reported from the 1994 reporting year 50% by 1999. This reduction goal applies to all of DoD; each installation is expected to implement measures to support the overall reduction goal. DoD provides this more detailed report to show how DoD achieved its reductions in toxic chemicals releases and transfers.

Figure 1 shows the amounts and types of releases, recycling, energy recovery and off-site transfers associated with the DoD's CY 1996 TRI reporting. Appendix I "Explanation of Terms" provides a detailed explanation of each icon in this graphic.

In CY 1996, 79 installations met TRI reporting thresholds for one or more toxic chemicals and filed a Form R for each chemical with EPA and states in September 1997. DoD filed 254 copies of the Form R for CY 1996. DoD's on-site releases totaled 3.8 million pounds (5,379,816 pounds in CY 1995) while private industry on-site releases to the air, water, land and underground injection for the TRI reporting year 1996 were 2.2 billion pounds. Thus, DoD represents a small portion of those total TRI releases, approximately 0.17%.

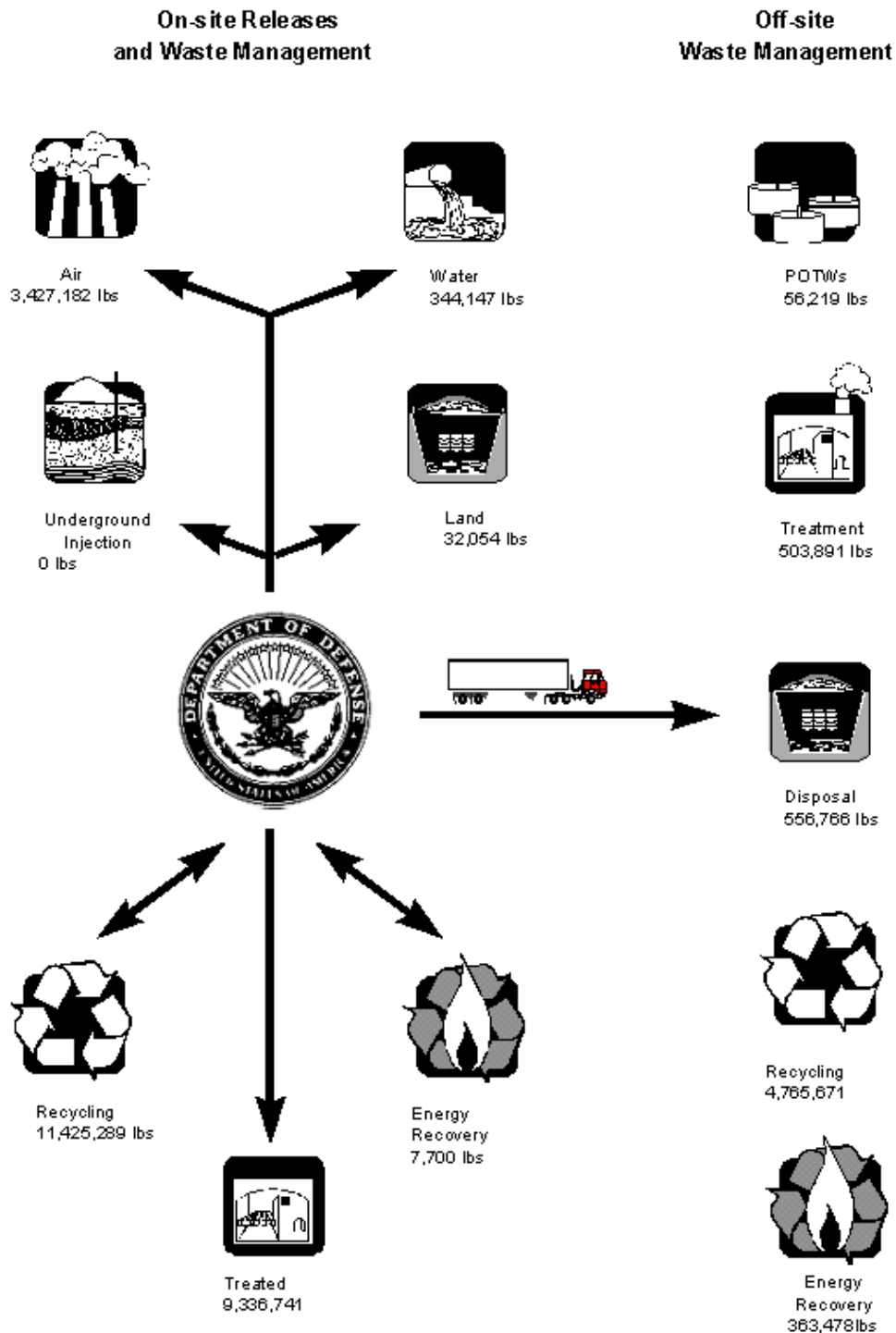


Figure 1 CY 1996 TRI Data

Executive Order Reduction Program

Executive Order 12856, *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements*, requires that federal agencies reduce their releases and off-site transfers of toxic chemicals by 50% by 1999 from a 1994 baseline. The Executive Order measures progress by tracking on-site releases to air, land, water, and underground injection, as well as off-site transfers for treatment, storage, or disposal.¹

The 1990 Pollution Prevention Act declared the following policy commonly known as the pollution prevention hierarchy:

- Pollution should be prevented or reduced at the source whenever feasible;
- Pollution that cannot be prevented should be recycled in an environmentally safe manner, whenever feasible;

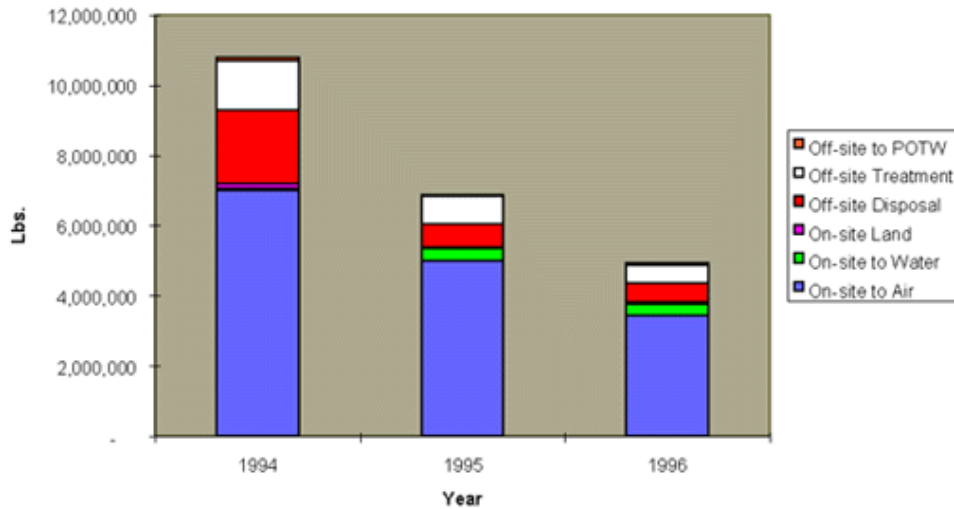
- Pollution that cannot be prevented or recycled should be treated in an environmentally safe manner, whenever feasible, and;
- Disposal or other release into the environment should be employed only as a last resort.

The goal of DoD's pollution prevention policy and the Executive Order is to encourage DoD installations to move their activities involving pollutants from reactively disposing of waste into the environment to eliminating the generation of waste.

DoD significantly reduced its releases and transfers by meeting its reduction goal three years ahead of schedule. DoD's baseline, as established by the CY 1994 reports and properly accounting delisted chemicals, is 10.7 million pounds. The amount of on-site releases and off-site transfers for disposal and treatment in 1996 is approximately 4.9 million pounds, representing a 54% reduction in the CY 1994 baseline.²

Figure 3 provides a comparison of the CY 1994 through CY 1996 baseline and illustrates the elements that comprise the baseline.

Figure 2 Change in DoD TRI Releases and Transfers 1994 to 1996



On-site Releases and Waste Management

Off-site Waste Management

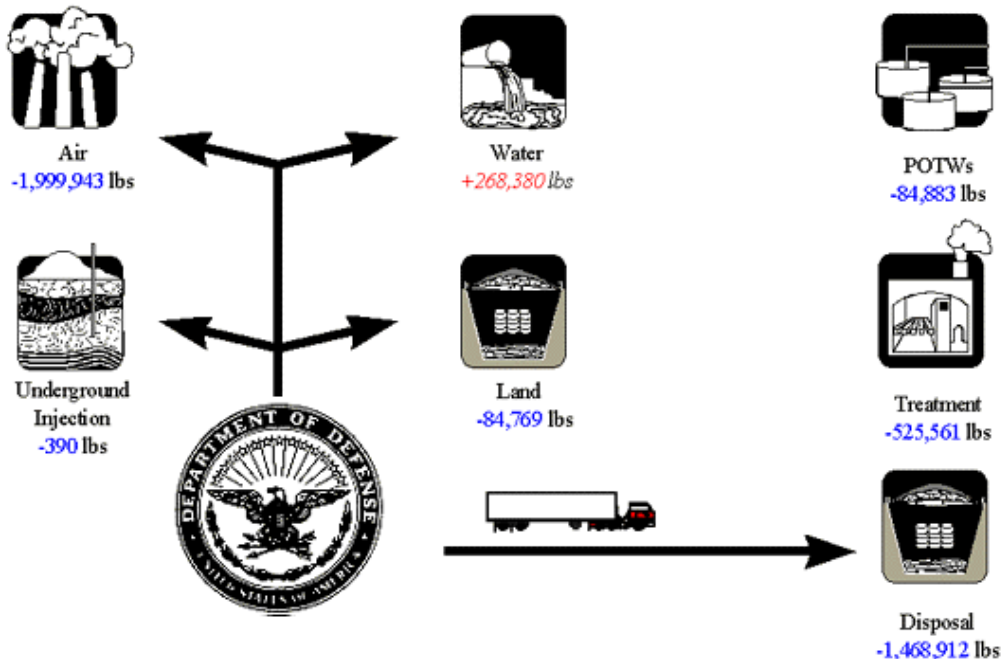


Figure 3 Change in DoD TRI Releases and Transfers 1994 to 1996

Chemical Distribution of Reductions

The majority of DoD's toxic chemical releases and off-site transfers involve a limited number of toxic chemicals. In DoD's March 1994 TRI Report, the top ten chemicals released or transferred accounted for 68% of the baseline. (See table below) Since 1994, DoD has made significant reductions in the release of these chemicals.

DoD installations reported 53 different TRI chemicals released or transferred, reduced from 74 chemicals reported in CY 1994. These are chemicals are used throughout industry and DoD in a variety of painting, paint stripping , cleaning, degreasing, other maintenance operations, as well as producing antifreeze and manufacturing munitions. DoD has a number of initiatives underway to reduce the use of these chemicals.

Table 1 Change in Top 10 Chemical Releases and Transfers

Top 10 Chemicals From the 1994 Baseline	1994	1995	1996	Percent Change 94-96	Percent Change 95-96
DICHLOROMETHANE	2,235,670	1,617,221	967,859	-56.71%	-40.15%
METHYL ETHYL KETONE	1,504,895	1,097,024	939,170	-37.59%	-14.39%
1,1,1-TRICHLOROETHANE	1,232,070	751,890	283,334	-77.00%	-62.32%
ETHYLENE GLYCOL	537,125	329,919	292,700	-45.51%	-11.28%
TOLUENE	445,350	234,517	194,972	-56.22%	-16.86%
PHENOL	411,988	266,784	124,235	-69.84%	-53.43%
ZINC COMPOUNDS	409,180	52,738	34,171	-91.65%	-35.21%
TETRACHLOROETHYLENE	359,039	217,682	242,049	-32.58%	-11.19%
HEXACHLOROETHANE	351,370	56,112	23,470	-93.32%	-58.17%
HYDROCHLORIC ACID	298,000	Delisted	Delisted	-----	-----

Reductions at Individual Installations

As in CY 1995, DoD's large maintenance and depot operations, primarily those engaged in overhauling and repairing aircraft, comprised the largest reported volumes in DoD releases and transfers. DoD has implemented strong pollution prevention programs at these facilities, reducing releases and transfers by 53% from CY 1994 to 1996.

Table 2 - Change in Top 10 Installation Releases and Transfers

Top 10 1994 Installations	1994	1995	1996	Percent Change 94-96	Percent Change 95-96
TINKER AFB	1,569,614	1,080,881	728,670	-53.58%	-32.59%
ROBINS AFB	776,616	578,562	334,898	-56.88%	-42.12%
ARMY PINE BLUFF ARSENAL	725,534	253,949	47,011	-93.52%	-81.49%
AF PLANT 06	554,555	507,909	292,613	-47.23%	-42.39%
ANNISTON ARMY DEPOT	527,591	428,840	225,446	-57.27%	-47.43%
VOUGHT AIRCRAFT COMPANY (NORTHROP)	462,481	496,710	249,900	-45.97%	-49.69%
HILL AFB	367,909	263,560	294,815	-19.87%	11.86%
KELLY AFB	342,871	227,663	144,014	-58.00%	-36.74%
MCCLELLAN AFB	340,750	231,800	279,100	-18.09%	20.41%
NAS JACKSONVILLE	325,648	247,896	217,041	-33.35%	-12.45%

Reasons for the DoD's TRI Reduction

DoD attributes its dramatic 54% reduction in its 1994 TRI releases and transfers to three primary factors:

- DoD's emphasis on pollution prevention programs
- Production changes and base closures³
- Improved reporting and more accurate accounting of material.

While changes in DoD activity levels did contribute to the reduction in DoD's releases and transfers, particularly in 1995, DoD's pollution prevention program contributed substantially to the 54% reduction. Large industrial installations such as Tinker and Robins Air Force Base, Jacksonville Naval Air Station, Anniston Army Depot and Barstow Marine Corps Logistics Base achieved significant reductions in their TRI releases and transfers while their production levels remained stable or increased. The aggressive pollution prevention programs instituted at these and other DoD installations reduced releases and transfers significantly. As stated in the 1994 public data release, 68% of DoD's releases and transfers consisted of DoD's top 10 chemicals and the top 10 installations accounted for 50% of the releases and transfers. The following describes how each of the DoD Component's pollution programs reduced TRI releases and transfers. The descriptions also provide information on how the reductions in these TRI chemicals reflect larger efforts to improve compliance with existing environmental regulations and reduce costs.

Army

The Army mapped out a strategy to use process modification, chemical substitution, improved materials management, and the use of off-the-shelf products to reduce toxic chemical releases as well as the amount of hazardous waste disposed and improve compliance with environmental regulations. These source reduction techniques contributed to half of the Army's 58% reduction in on-site releases and transfers from 1994 to 1996. Decreased production, mothballing facilities, and improved record keeping accounted for the remaining progress.

The Army's Holston Ammunition Plant reduced nitrate releases by modifying its ammunition process to eliminate sodium nitrate by-products. The Army used a variety of process and chemical substitution methods to decrease the use of the toxic chemicals 1,1,1-Trichloroethane, Trichloroethylene, and Methyl Ethyl Ketone. The techniques included using aqueous parts washers with alternative coating formulations. These techniques helped contribute to the Army reduce the release of these chemicals by 81%, 61%, and 54% respectively. In addition to reducing the toxic chemical releases, these changes improved the Army's compliance.

Similar process changes helped Army maintenance depots lower their toxic chemical releases. Anniston Army Depot in Alabama, for example, replaced cadmium plating for some parts by using an aluminum ion vapor deposition process. Rock Island Arsenal in Illinois installed a chrome recovery system to capture air release from chrome plating. Rock Island, along with Letterkenny Army Depot in Pennsylvania, and Red River Army Depot in Texas reduced chromium releases and complied with Clean Air Act National Emissions Standards for Hazardous Air Pollutants by making changes to chromium plating baths. These changes helped bring chromium releases below reporting thresholds, eliminating over 25,000 pounds of chromium that was reported as released in 1994.

Additionally, the Army is evaluating innovative substitutions and off-the-shelf products to further reduce toxic chemical releases as well as improve compliance with regulations. For example, Corpus Christi Army Depot is using wheat-starch blasting to remove coatings from helicopter blades, which is safer and less toxic than the previously used process.

The US Army Research Lab has developed a water-reducible formulation to replace the current formulation used in chemical agent resistant coating of all Army combat vehicles, aircraft, and other equipment. The current formulation contains numerous toxic chemicals and has a moderate level of volatile organic compound (VOC) emissions. The new formulation will use less of these chemicals and reduces VOC emissions by approximately four million pounds per year.

In addition to these techniques, the Army is expanding the use of centralized and computer tracking systems to better manage the hazardous materials and toxic chemicals it still must use. Improved management of these chemicals limits the amounts that must be used and eliminates having to dispose of expired material. In Hawaii, for example, the use of a tracking system has improved compliance with existing laws and reduced disposal and management costs. Moreover, the reduction in materials purchased saved the Army \$758,000.

Navy

The Center for Naval

Analyses conducted a thorough review of the Navy's toxic chemical release trends for 1994 through 1996. The findings parallel the overall DoD picture. According to the study, Navy TRI data changed for four reasons:

- Pollution prevention efforts
- Closure of three military and three GOCO facilities

- Workload changes
- Improved reporting

From 1994 to 1996, pollution prevention accounted for more than half of the Navy's reduction in toxic chemical releases and off-site transfers. The closures accounted for most of the remaining reductions, with workload changes accounting for a small amount of the reduction. Improved reporting, conversely, increased the amount of releases that the Navy reported to EPA.

In response to Clean Air Act regulations and DoD's efforts to eliminate reliance on ozone depleting substances (many of which are toxic chemicals), the Navy used a variety of pollution prevention techniques that reduced toxic chemical releases, including:

- Replacing ozone depleting substances with alternative chemicals or processes
- Using alternatives to chemical paint strippers
- Using paints and thinners that have lower VOC contents
- Managing the use of glycol ethers and other VOCs more efficiently

Jacksonville Naval Air Station in Florida successfully reduced its TRI baseline 33%, despite an increase in workload, by aggressively implementing alternatives to paint stripping and phasing out the use of ozone depleting substances. Similarly, Naval Shipyard Puget Sound reduced TRI releases 20% by decreasing dichloromethane and ozone depleting substances use.

Marine Corps

The Marine Corps achieved a 70% reduction in toxic chemical releases and transfers through pollution prevention and improved materials controls. Specific examples are discussed below.

Marine Corps Logistics Base (MCLB) in Barstow, California reduced their on-site stack air releases by approximately 49 % between 1994 and 1996, from 18,217 to 9,272 pounds. This included reducing 100 % of 1,1,1 Trichloroethylene (TCE) stack air releases (12,496 to 0 pounds) and by replacing maintenance equipment that used toxic chemicals with aqueous parts washers. The base achieved these dramatic reductions despite an increased workload by implementing a facility-wide pollution prevention plan.

In North Carolina, Marine Corps Air Station Cherry Point reduced their toxic chemical releases by approximately 62 % between 1994 and 1996 by replacing chemical paint strippers with abrasive blasting equipment and improving material usage estimates. The reductions occurred while production levels remained stable and included a 73 % reduction in dichloromethane releases (56,000 to 15,000 pounds).

Marine Corps Logistics Base (MCLB) in Albany, Georgia, reduced their toxic chemical releases by approximately 53 % between 1994 and 1996, from 282,273 to 133,200 pounds, including reducing 100 % of the dichloromethane releases (93,650 to 0 pounds). The reduction in dichloromethane releases has been achieved through a variety of alternative technologies, including aqueous parts cleaning technology.

Air Force

The Air Force established a well-funded pollution prevention program prior to the signing of EO 12856. Source reduction techniques such as process modifications and equipment changes enabled the Air Force to reduce its pollutant releases significantly prior to the establishment of the 1994 TRI baseline. The Air Force's 50% reduction in toxic chemical releases and transfers occurred for two primary reasons:

- Continued implementation of source reduction initiatives at its large facilities
- Improved reporting and material accounting at its small facilities

A number of smaller Air Force installations used chemicals at levels just above threshold reporting levels and had small releases in 1994. In 1995, a number of these installations found that improved accounting, application of regulations, and materials use dropped the chemical use below reporting thresholds and, therefore, eliminated TRI reporting altogether. None of these installations reported in 1996. This improved reporting accounted for just under 100,000 pounds in reductions of TRI chemical reported as released and transferred between 1994 and 1995. This 100,000 pound reduction is only about 8% of the 1.5 million reduction the Air Force achieved from 1994 to 1995.

The Air Force attributes the majority of its toxic chemical reductions to well-executed pollution prevention implementation at its large installations. For example, Tinker Air Force base, which accounted for 30% of the Air Force 1994 baseline, has an aggressive pollution prevention program in place that seeks to reduce its TRI releases and transfers 80% by the end of 1999. To date Tinker has reduced its TRI releases 54%, through a large number of source reduction changes, including:

- Using an alternative aqueous cleaning process to remove oily residue from replacement tubing manufactured at the base for aircraft. The alternative eliminated 14,000 pounds of 1,1,1, trichloroethane

- Replacing chemical stripping processes with mechanical systems such as robotic water systems to partially eliminate the use of chemicals such as dichloromethane

Defense Logistics Agency

The Defense Logistics Agency reduced its toxic chemical releases and transfers by approximately 75% between 1994 and 1995, primarily because the Air Force initiated a program to replace one kind of jet fuel for another mixture that has less environmental impact and does not contain TRI chemicals. The Defense Logistics Agency is the manager for 22 bulk fuel terminals which supply all DoD components with fuel. Because 14 of these facilities processed the old fuel mixture in quantities exceeding the TRI threshold in CY 1994, 14 bulk fuel terminals reported TRI releases. By switching to the new fuel mixture in CY 1995, these facilities did not have to submit TRI reports.

Appendix I -- An Explanation of Data Displayed and Terms Used

About TRI data

The Toxics Release Inventory (TRI) is a database maintained by EPA which provides information to the public about releases of toxic chemicals into the environment.

TRI was established under the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 and expanded under the Pollution Prevention Act of 1990. The intent of these laws was to provide the public with information about toxic chemicals released by facilities in their community. The release of such information has encouraged private sector facilities to reduce their releases through pollution prevention. Until 1993, federal agencies were not required to report TRI information. Presidential Executive Order 12856, *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements*, was issued in 1993 and directs all federal facilities to comply with the reporting requirement and established calendar year 1994 as the first reporting year for most federal agencies. As required, DoD installations submitted data each year since 1994. TRI reported to EPA according to the following schedule: 1994 reports were submitted in July 1995, 1995 reports in August 1996, and 1996 reports in September 1997. Normally, reports are due every July 1 after the calendar year ends; however, regulatory and other changes in the program delayed the reporting cycles for 1995 and 1996. CY 1997 reports are due to EPA and the states by July 1, 1998.

The TRI program requires facilities to report on the releases associated with over 600 chemicals and 20 chemical categories. Facilities file a separate reporting form, called a "Form R," for each chemical they manufacture, process, or otherwise use in excess of reporting thresholds. Only those facilities that manufacture or process listed toxic chemicals in excess of 25,000 pounds within one calendar year or otherwise use listed toxic chemicals in excess of 10,000 pounds within one calendar year are required to submit TRI reports to EPA and the states.

The thresholds are chemical-specific and do not apply to the aggregate of all chemicals manufactured or used at a facility. Once a facility meets a threshold for individual toxic chemicals, the facility must submit a TRI Form R report that details the amount of the particular toxic chemical released into the environment. Facilities report the amount released to the air, water, and land, as well as the amounts associated with waste management activities.

About the Data:

EPA's Toxic Chemical Inventory reporting program is a constantly evolving program as EPA expands the program to increase the number of chemicals and chemical categories, the type of facilities and the type of information (data elements) that must be reported. All TRI reporters must (including federal agencies under EO 12856) report all information required by the TRI program in the year for which the requirements are effective. For example, on November 30, 1994, EPA added approximately 300 toxic chemicals to the TRI list of toxic chemicals. The addition was effective for the 1995 reporting cycle. EPA also responds to petitions from interested parties and periodically removes (delists) or modifies the reporting requirements for toxic chemicals.

In addition to these changes, EPA allows TRI reporting facilities to submit revisions to prior year reports. Historically, the first year of TRI reporting has been difficult for first time reporters. Generally, accuracy improves with the second year of reports, and facilities often submit corrections to their first reports.

While it is easy to account for these changes when examining the data for the year in which they were effective, accounting for the changes must be done carefully when comparing historical data. This is especially true when data is to be compared for the purpose of tracking progress towards achieving a goal such as that contained in EO 12856. As noted in the report, EO 12856 requires federal agencies to reduce the releases and transfers off-site for disposal and treatment of toxic chemicals 50% by 1999, based on 1994 data. The 1994 **baseline**

was established as the amount of toxic chemicals accounted for in sections 8.1 and 8.7 of the Form R. As is the case for EPA's voluntary TRI reduction program (known as the 33/50 program), proper adjustments need to be made to limit artificial reductions or increases when examining baseline data.

Therefore, the following applies to the figures and tables in the report:

Figure 1 Calendar Year 1996 TRI Data: All numbers displayed in this chart reflect the aggregate of all data elements that DoD installations were required to report for 1995 reports. Figure 1, therefore, includes data for the 300 chemicals added by EPA in November 1994. All chemicals that were delisted by EPA up to July 31, 1996, have been removed from this data. This includes hydrochloric acid, which was partially delisted (only the aerosol form is reportable) in late July 1996. DoD removed hydrochloric acid from its database because it was too difficult to determine at the aggregate level whether the acid was in aerosol form or not. This policy is in line with EPA's 1995 Public Data Release. The figures also include all revisions to individual copies of Form R for Calendar Year 1994, 1995 and 1996 that installations submitted to EPA by March 1998.

Figures 2 and 3 and Tables 1 and 2 Changes in Releases and Transfers:

To ensure accurate tracking of the real progress made in reducing releases and transfers, the numbers in these figures and charts reflect the following. Chemicals EPA delisted until August 1997 have been removed from the comparison data. The delisted chemicals were removed from both the 1994 and 1995 data to avoid giving DoD installations artificial credit for these delisted chemicals. The figures also include all revisions to individual copies of the Form R that installations submitted to EPA by March 1998.

Air Releases. Releases to air are reported either as stack or fugitive emissions. Stack emissions are releases to air that occur through confined air streams, such as stacks, vents, ducts, or pipes. Fugitive emissions include equipment leaks, evaporative losses from surface impoundments and spills, and releases from building ventilation systems.

Surface Water Releases. Releases to water include discharges to streams, rivers, lakes, oceans, and other bodies of water. This includes releases from contained sources, such as industrial process outflow pipes or open trenches. Releases caused by runoff, including stormwater runoff, are also reportable under TRI.

Land Releases. Releases to land covered under TRI are those that occur within the boundaries of the reporting facility. Releases to land include disposal of toxic chemicals into landfills, land treatment/application farming (in which a waste containing a listed chemical is applied to or mixed with incorporated into soil), surface impoundments (which are uncovered holding areas used to volatilize and/or settle waste materials), and other land disposal (such as spills, leaks, or waste piles).

Underground Injection. Underground injection is a contained release of a fluid into a subsurface well for the purpose of waste disposal.

Recycling. Toxic chemicals can be either recycled on-site or sent off-site for recycling. The toxic chemicals may be recovered or regenerated by a variety of methods, including solvent recovery, metals recovery, and acid regeneration. Once recycled, these chemicals may be returned to the installation or sold for further processing or use. The quantity reported as on-site recycling in the Form R represents the quantity recovered at the facility, not the quantity that entered the recycling operation. The quantity reported as off-site recycling in the Form R represents the quantity that left the installation boundary for recycling, not the amount recovered at the off-site location.

Energy Recovery. Toxic chemicals can be either processed on-site or sent off-site for energy recovery. The toxic chemicals are combusted in industrial furnaces or boilers that generate heat or energy for use at that location. Treatment of a chemical by incineration is not considered to be energy recovery. The quantity reported as on-site energy recovery in the Form R represents the quantity of the toxic chemical that was destroyed in the combustion process, not the amount that entered the energy recovery unit. The quantity reported as off-site energy recovery in the Form R represents the quantity of the toxic chemical that left the installation boundary for recovery, not the amount destroyed at the off-site location.

Destruction. Toxic chemicals can be destroyed on-site using a variety of methods. After destruction, no further treatment or transfer to an off-site location is necessary. The quantity reported in the Form R represents the quantity of the toxic chemical that was destroyed in the on-site waste treatment operations, not the amount that entered any treatment operation.

POTWs. Toxic chemicals can be transferred off-site to a publicly owned treatment works (POTW). Wastewaters are transferred through pipes or sewers to a POTW. Not all TRI chemicals can be treated or removed by a POTW. The quantity reported in the Form R represents the quantity of the toxic chemical that left the installation boundary for POTW treatment, not the amount that was destroyed at the off-site location.

Treatment. Toxic chemicals may be sent off-site for treatment using a variety of methods, including biological treatment, neutralization, incineration, stabilization, and physical separation. These methods result in varying degrees of destruction of the toxic chemical.

Disposal. Toxic chemicals sent off-site to a facility for disposal generally are either released to land or injected underground at the off-site location.

Appendix II -- DoD Component Data

The following provides DoD Component specific details on the 1994 DoD baseline. Facilities shown as (GOCO) are government-owned, contractor-operated plants.

Army TRI Data

Table 1 Change in Top 10 Chemical Releases and Transfers

Top 10 1994 Chemical	1994 (1,000 lbs)	1995 (1,000 lbs)	1996 (1,000 lbs)	94-96% difference	95-96% difference
ZINC COMPOUNDS	368,971	20,008	31,171	-91.55%	55.79%
HEXACHLOROETHANE	351,370	56,112	23,470	-93.32%	-58.17%
METHYL ETHYL KETONE	230,817	152,486	105,603	-54.25%	-30.75%
1,1,1-TRICHLOROETHANE	226,377	137,450	86,833	-61.64%	-36.83%
TRICHLOROETHYLENE	214,223	148,508	40,000	-81.33%	-73.07%
DICHLOROMETHANE	186,409	150,300	86,990	-53.33%	-42.12%
ETHYLENE GLYCOL	121,059	194,648	85,073	-29.73%	-56.29%
PHOSPHORIC ACID	135,990	48,410	51,177	-62.37%	5.72%
CHLORINE	67,470	11,345	5,418	-91.97%	-52.24%
ETHYLBENZENE	0	4,016	0	0.00%	-100.00%

Table 2 Change in Top 10 Installation Releases and Transfers

Top 10 1994 Installations	1994 (1,000 lbs)	1995 (1,000 lbs)	1996 (1,000 lbs)	94-96% difference	95-96% difference
ARMY PINE BLUFF ARSENAL	725,534	253,949	47,011	-93.52%	-81.49%
ANNISTON ARMY DEPOT	527,591	428,840	225,446	-57.27%	-47.43%
RED RIVER ARMY DEPOT	117,864	81,798	45,778	-61.16%	-44.04%
LETTERKENNY ARMY DEPOT	144,485	109,693	39,621	-72.58%	-63.88%
ARMY WATERVLIET ARSENAL	135,075	46,144	82,375	-39.02%	78.52%
HOLSTON ARMY AMMUNITION PLNT	101,900	322,200	236,260	131.85%	-26.67%
LAKE CITY ARMY AMMUNITION PLNT	83,911	67,497	49,041	-41.56%	-27.34%
ROCK ISLAND ARSENAL	52,000	14,500	-	-100.00%	-100.00%
FORT HOOD	57,550	45,600	686	-98.81%	-98.50%
STRATFORD ENGINEERING PLANT	55,441	24,501	23,701	-57.25%	-3.27%

Navy TRI Data

Table 1 Change in Top 10 Chemical Releases and Transfers

Top 10 1994 Chemical	1994 (1,000 lbs)	1995 (1,000 lbs)	1996 (1,000 lbs)	94-96% difference	95-96% difference
1,1,1-TRICHLOROETHANE	596,172	438,269	120,000	-79.87%	-72.62%
DICHLOROMETHANE	358,283	252,221	161,750	-54.85%	-35.87%
METHYL ETHYL KETONE	288,488	231,715	198,900	-31.05%	-14.16%
N-BUTYL ALCOHOL	184,055	131,463	137,372	-25.36%	4.49%
NITRIC ACID	160,881	14,166	10,416	-93.53%	-26.47%
XYLENE (MIXED ISOMERS)	130,312	64,455	52,306	-59.86%	-18.85%
FREON 113	129,933	21,925	35,890	-72.38%	63.69%
TOLUENE	92,078	15,352	29,959	-67.46%	95.15%
HYDROCHLORIC ACID	0	Delisted	Delisted	0.00%	0.00%
PHENOL	48,068	31,949	31,490	-34.49%	-1.44%

Table 2 Change in Top 10 Installation Releases and Transfers

Top 10 1994 Installations	1994 (1,000 lbs)	1995 (1,000 lbs)	1996 (1,000 lbs)	94-96% difference	95-96% difference
VOUGHT AIRCRAFT COMP (NORTHROP)	462,481	496,710	249,900	-45.97%	-49.69%
NAS JACKSONVILLE	325,648	247,896	217,041	-33.35%	-12.45%
NAS ALAMEDA	227,500	-	-	-100.00%	0.00%
NORFOLK NAVAL SHIPYARD	186,090	65,666	53,980	-70.99%	-17.80%
GRUMMAN AEROSPACE CORP, BETHESDA	184,602	-	-	-100.00%	0.00%
NAVAL BASE NORFOLK	132,325	74,971	59,800	-54.81%	-20.24%
PHILADELPHIA NAVAL SHIPYARD	129,340	73,870	-	-100.00%	-100.00%
PUGET SOUND NAVAL SHIPYARD	178,400	147,041	139,800	-21.64%	-4.92%
NAVAL WEAPONS IND RESERVE PLNT	73,016	24,596	-	0.00%	-100.00%
NAWC PATUXENT RIVER	76,174	-	-	-100.00%	0.00%

Marine Corps TRI Data

Table 1 Change in Top 10 Chemical Releases and Transfers

Top 10 1994 Chemical	1994 (1,000 lbs)	1995 (1,000 lbs)	1996 (1,000 lbs)	94-96% difference	95-96% difference
ETHYLENE GLYCOL	454,000	86,708	38,002	-91.62%	-56.17%
DICHLOROMETHANE	155,986	98,300	15,000	-90.38%	-84.74%
METHYL ETHYL KETONE	144,653	128,588	127,600	-11.79%	-0.77%
1,1,1-TRICHLOROETHANE	76,062	48,289	-	-100.00%	-100.00%
TOLUENE	68,054	53,350	37,000	-45.63%	-30.65%
HYDROCHLORIC ACID	0	Delisted	Delisted	0.00%	0.00%
XYLENE (MIXED ISOMERS)	51,535	37,416	21,400	-58.47%	-42.81%
FREON 113	35,941	27,000	-	-100.00%	-100.00%
GLYCOL ETHERS	28,000	47,000	20,000	-28.57%	-57.45%
CHROMIUM	25,897	-	-	-100.00%	0.00%

Table 2 Change in Top 10 Installation Releases and Transfers

Top 10 1994 Installations	1994 (1,000 lbs)	1995 (1,000 lbs)	1996 (1,000 lbs)	94-96% difference	95-96% difference
MCLB BARSTOW	322,011	87,961	31,304	-90.28%	-64.41%
MCAS CHERRY PT	308,670	250,773	110,091	-64.33%	-56.09%
MCLB ALBANY	282,273	254,340	133,200	-52.81%	-47.63%
MCB CAMP PENDLETON	-	5,376	-	0.00%	-100.00%
USMC BLOUNT ISLAND COMMAND	20,000	-	10,700	-46.50%	
MCB CAMP LEJEUNE	31,630	-	835	-97.36%	
MCAS YUMA	1,050	1,028	-	-100.00%	-100.00%
MCB QUANTICO	34	36	37	8.82%	2.78%
MC RECRUIT DEPOT PARRIS ISLAND	5	-	-	-100.00%	0.00%

Air Force TRI Data

Table 1 Change in Top 10 Chemical Releases and Transfers

Top 10 1994 Chemical	1994 (1,000 lbs)	1995 (1,000 lbs)	1996 (1,000 lbs)	94-96% difference	95-96% difference
DICHLOROMETHANE	1,534,992	1,116,400	704,119	-54.13%	-36.93%
METHYL ETHYL KETONE	840,937	584,235	507,067	-39.70%	-13.21%
PHENOL	363,920	234,835	92,745	-74.52%	-60.51%
TETRACHLOROETHYLENE	335,798	217,340	241,835	-27.98%	11.27%
1,1,1-TRICHLOROETHANE	333,459	127,882	76,501	-77.06%	-40.18%
TOLUENE	225,563	133,460	90,287	-59.97%	-32.35%
ETHYLENE GLYCOL	162,300	40,916	144,009	-11.27%	251.96%
HYDROCHLORIC ACID	0	Delisted	Delisted	-100.00%	0.00%
CHROMIUM COMPOUNDS	151,886	56,898	52,246	-65.60%	-8.18%
GLYCOL ETHERS	139,390	30,193	44,076	-68.38%	45.98%

Table 2 Change in Top 10 Installation Releases and Transfers

Top 10 1994 Installations	1994 (1,000 lbs)	1995 (1,000 lbs)	1996 (1,000 lbs)	94-96% difference	95-96% difference
TINKER AFB	1,569,614	1,080,881	728,670	-53.58%	-32.59%
ROBINS AFB	776,616	578,562	334,898	-56.88%	-42.12%
AF PLANT 06 (LOCKHEED MARTIN)	554,555	507,909	292,613	-47.23%	-42.39%
OGDEN AIR LOGISTICS CENTER (HILL AFB)	367,909	263,560	294,815	-19.87%	11.86%
KELLY AFB	342,871	227,663	144,014	-58.00%	-36.74%
MCCLELLAN AFB	340,750	231,800	279,100	-18.09%	20.41%
EDWARDS AFB	132,062	-	-	-100.00%	0.00%
ARNOLD ENGINEER DEVELOP CNT	154,096	125,833	131,966	-14.36%	4.87%
AF PLANT 44 (HUGHES SYSTEM)	123,430	35,502	18,800	-84.77%	-47.05%
AF PLANT 03 (ROCKWELL INTERNATIONAL)	123,413	37,355	46,026	-62.71%	23.21%

Defense Logistic Agency TRI Data

Top 10 1994 Chemical	1994 (1,000 lbs)	1995 (1,000 lbs)	1996 (1,000 lbs)	94-96% difference	95-96% difference
TOLUENE	10,890	-	-	-100.00%	0.00%
CYCLOHEXANE	8,037	-	-	-100.00%	0.00%
BENZENE	6,353	-	-	-100.00%	0.00%
NAPHTHALENE	2,972	-	-	-100.00%	0.00%
METHANOL	2,908	-	-	-100.00%	0.00%
XYLENE (MIXED ISOMERS)	2,648	-	-	-100.00%	0.00%
BROMOTRIFLUOROMETHANE	1,372	3,685	645	-52.99%	-82.50%
BROMOCHLORODIFLUOROMETHANE	960	707	1,687	75.73%	138.61%
ETHYLBENZENE	494	-	-	-100.00%	0.00%
DICHLORODIFLUOROMETHANE	100	485	1,513	1413.00%	211.96%

Table 2 Change in Top 10 Installation Releases and Transfers

Top 10 1994 Installations	1994 (1,000 lbs)	1995 (1,000 lbs)	1996 (1,000 lbs)	94-96% difference	95-96% difference
GRAND FORK FUEL SUPPORT POINT	10,872	-	-	-100.00%	0.00%
VERONA FUEL SUPPORT POINT	5,516	-	-	-100.00%	0.00%
CHARLESTON FUEL SUPPORT POINT	4,274	-	-	-100.00%	0.00%
WILLIAM F. LANGER JEWEL BEARING PLANT	2,972	-	-	-100.00%	0.00%
ESCANABA FUEL SUPPORT POINT	2,819	-	-	-100.00%	0.00%
DEFENSE SUPPLY CENTER RICHMOND	2,432	5,101	4,854	109.75%	-4.84%
SEARSPORT FUEL SUPPORT POINT	1,780	-	-	-100.00%	0.00%
SAN PEDRO FUEL SUPPORT POINT	1,200	-	-	-100.00%	0.00%
TAMPA FUEL SUPPORT POINT	1,175	-	-	-100.00%	0.00%
MELVILLE FUEL SUPPORT POINT	1,035	-	-	-100.00%	0.00%

1

Hereinafter, "on-site releases" refers to on-site releases of toxic chemicals to the air, land, water, and underground injection. "Off-site transfers" refers to off-site transfers of toxic chemicals for the treatment, storage, or disposal.

2

As with any program that measures data over time, the effects from changes in reporting requirements and revisions to data must be analyzed to fully understand the data. See the entry "About the data in this report" in Appendix I for an explanation of what data is being displayed throughout this report.

³ Specific facilities that closed or were mothballed are as follows. **Navy:** Naval Air Station Alameda and Naval Shipyard Long Beach, in California, Philadelphia Naval Shipyard, Pennsylvania. In addition, four Navy Government Owned Contractor Operated facilities closed: Hercules Corporation's McGregor, Texas plant; Northrop Grumman Corporation's two facilities Calverton, Maryland and Bethpage, New York; and Raytheon's Bristol, Tennessee operation. **Army:** The Army mothballed their Kansas City Ammunition Plant and put Longhorn and Lonestar Ammunition Plants both in Texas on layaway status. Collectively, the Navy and Army facilities released and transferred nearly 725,000 pounds of toxic chemicals in 1994. By 1996, these facilities were no longer in use and consequently did not exceed TRI reporting thresholds. Thus these closings accounted for nearly 15% of DoD's total 5 million reduction.