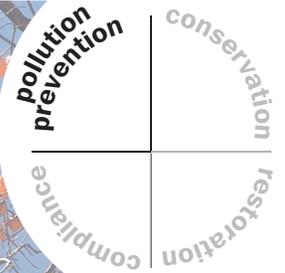


# APPENDIX V

## TOXIC RELEASE INVENTORY

### FOR CALENDAR YEAR 2003



The Toxic Release Inventory (TRI) Report provides information about toxic chemicals released into the environment or transferred off-site from a facility. The Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and the Pollution Prevention Act of 1990 required the United States Environmental Protection Agency (EPA) to develop and maintain a publicly accessible toxic chemical database. This TRI database, known as the Toxic Release Inventory System, contains information on—

- Chemicals released into the local environment during the preceding year
- The quantity of each chemical released into the air, water, and land in that year
- How chemical wastes were treated at the reporting facility
- The quantity of chemicals transported away from the reporting facility for disposal, treatment, energy recovery or recycling

The primary purpose of TRI reporting is to establish an inventory of toxic chemical releases and inform the public about both routine and accidental releases of toxic chemicals into the environment. Citizens, businesses, and governments can then use this information to work together to be aware of toxic chemicals present in their community and prepare for potential emergency releases. Although Federal agencies are not regulated under EPCRA, Executive Order (E.O.) 13148, “Greening the Government through Leadership in Environmental Management,” requires Federal facilities to comply with TRI reporting requirements.

Although the reporting period for this Defense Environmental Programs Annual Report to Congress covers Fiscal Year 2004 (October 1, 2003 through September 30, 2004), the TRI reporting period covers Calendar Year (CY) 2003 (January 1 through December 31, 2003). Facilities were required to report their TRI releases to EPA by July 1, 2004.

EPA’s original reportable TRI list included 300 toxic chemicals. EPA selected these chemicals based on the criterion that each chemical’s toxicity caused serious chronic or acute human health risks and/or adverse environmental effects. EPA can add to the list of TRI-reportable chemicals and can remove, or delist, chemicals according to industry standards and best available scientific information. TRI chemicals are added and deleted through either EPA-initiated action or an independent petition process. EPA’s TRI reporting program is constantly evolving through the addition and deletion of toxic chemicals, chemical categories, newly regulated facilities, and new data elements. The chemical list for the 2003 Report contained over 600 chemicals and 30 chemical categories.

## Executive Order 13148 Reduction Requirements

The Department of Defense (DoD) works hard to comply with TRI reporting requirements and reduce releases of toxic chemicals. Executive Order 13148 requires each agency to reduce its reported TRI releases

and off-site transfers of toxic chemicals for treatment and disposal by 10 percent annually, or by 40 percent overall by December 31, 2006. The E.O. establishes 2001 as the baseline year for reduction goals. The 40 percent reduction is on top of the 50 percent reduction DoD achieved by 1999, under E.O. 12856, "Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements."

A large portion of TRI reported releases occur as a byproduct of critical DoD manufacturing and utilities processes. DoD cannot reduce these coincidentally manufactured chemicals, such as nitrate compounds from wastewater treatment and hydrochloric acid from coal-fired heating plants, without expensive, long-term infrastructure projects. Munitions lifecycle-related activities also add to TRI releases, particularly those used on ranges and during demilitarization, because these processes will not benefit from standard pollution prevention approaches. A longer-term initiative for reducing TRI releases from munitions involves substituting chemicals in the munitions during the acquisition design phase. The impacts of such changes will take time to have a significant impact on range TRI release totals.

## **Reporting TRI Data**

Facilities manufacturing, processing, or otherwise using TRI chemicals in excess of reporting thresholds must report their releases and waste management activities on chemical inventory forms (Form Rs). Facilities must submit Form Rs to EPA and state authorities on or before July 1 of each year for activities that occurred during the previous calendar year. EPA checks these data submissions for reporting errors and compiles the information into a publicly accessible database.

TRI-reported releases may have been released evenly over the course of the calendar year, intermittently, or in a single event. A facility may revise its TRI estimates if new information, better data, or more accurate measurement tools become available. Facilities may update their TRI data after the reporting deadline has passed. Enabling facilities to revise historical data encourages review and recalculation of original data submissions to improve accuracy.

### ***Munitions Demilitarization Reporting Requirements***

In 2000, DoD began reporting releases and off-site transfers from munitions demilitarization activities. Although reporting releases associated with these activities was not a new requirement, DoD deferred reporting until it developed detailed guidance and tools to ensure consistent reporting.

The Department maintains a large stockpile of munitions. As munitions reach the end of their useful life, it is necessary for DoD to demilitarize excess, obsolete, or unserviceable munitions. Demilitarization activities vary depending on mission requirements, mission activity levels, and the budget available for demilitarization actions.

### ***Reporting Thresholds for Persistent Bioaccumulative Toxics***

In 2000, EPA lowered the reporting threshold for persistent bioaccumulative toxic (PBT) chemicals and added other PBT chemicals to the TRI list of toxic chemicals. PBTs are of concern because they are toxic, remain in the environment for long periods of time, are not readily destroyed, and can accumulate in body tissue.

The lowered thresholds require facilities, including DoD installations, to report the amount of PBT chemicals released into air, land, and water at much lower levels than previously reported. EPA finalized two thresholds based on the chemicals' potential to persist and bioaccumulate in the environment.

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The two levels include setting manufacture, process, and otherwise use thresholds to 100 pounds for PBT chemicals and to 10 pounds for a subset of PBT chemicals that are highly persistent and highly bioaccumulative. One exception is the dioxin and dioxin-like compounds category that has a threshold of 0.1 grams.

In 2001, EPA published the TRI lead rule classifying lead and lead compounds as PBT chemicals and lowered their thresholds. Lead and lead compounds were on the original TRI chemicals list, but with this ruling, EPA reclassified lead and lead compounds as PBT chemicals due to their bioaccumulative properties. Facilities that manufacture, process, or otherwise use more than 100 pounds of lead or lead compounds must now report releases and off-site transfers. Previously, facilities were required to report lead and lead compound releases only if they manufactured or processed more than 25,000 pounds annually or otherwise used more than 10,000 pounds annually.

### ***Reporting from Ranges***

Beginning in 2001, DoD reported releases and off-site transfers associated with operational range activities, including training, live fire, and clearance activities. DoD developed and implemented the necessary tools, such as the Toxic Release Inventory Data Delivery System, to identify and report releases from munitions activities on operational ranges because these methods were not previously available. The system uses emissions factors and munitions use information supplied by installations to calculate the amount of TRI-listed toxic chemicals released.

The requirement for reporting operational range training activities had widespread implications for DoD. Many installations that previously were not required to file Form R reports found themselves required to report TRI releases and waste management activities. Many National Guard bases and Reserve installations filed Form R reports for the first time in 2001. As a result the number of DoD facilities reporting TRI releases and off-site transfers increased in 2001. Specifically, 77 facilities reported in 2001 due to range-only activities. These facilities reported 6.7 million pounds of releases and off-site transfers.

### ***Reporting Thresholds for Coincidental Manufacturing***

In September 2001, a DoD question and answer document clarified the reporting of toxic chemicals coincidentally manufactured during other processes. Nitrate compounds are one of the most common chemicals reported at DoD installations from coincidental manufacture. These compounds are often produced during wastewater treatment. Other common chemicals reported from coincidental manufacture include coal combustion byproducts. If installations use coal, fuel oil, and other raw materials there is a potential for the coincidental manufacture of toxic chemicals such as sulfuric acid, hydrochloric acid, hydrogen fluoride, and metal compounds. For example, some DoD installations have coal-fired power plants to provide heating for the base facilities. The presence of chlorine in coal results in the coincidental manufacture of hydrochloric acid during the coal burning process. Facilities must calculate the amount of TRI chemicals coincidentally manufactured and released as a byproduct and count it towards their TRI threshold.

Some DoD installations had sufficient information to implement this clarification with the 2001 reporting year even though they were not required to do so until the 2002 reporting year. Other facilities, however, were not able to begin reporting until the 2002 reporting period. In 2001, 14 facilities reported nitrate compounds compared to 26 in 2002 and 25 in 2003. Many of these facilities have since revised their data and submitted updates to EPA to include releases from coincidental manufacturing processes. In

2004, the Navy submitted updated Form Rs for nine facility releases in 2001 and four in 2002 for nitrate compounds and zinc, bringing the total for number of facilities reporting nitrate compounds in 2001 to 22. These revisions are included in the following data report.

## DoD's 2003 TRI Report

Calculating, reporting, and reducing TRI releases and off-site transfers is a priority at DoD facilities. By complying with TRI reporting requirements, DoD can identify—

- Processes that produce the releases and off-site transfers of these chemicals
- Procedures or processes that require the use of these chemicals
- Pollution prevention opportunities

This analysis helps DoD develop a strategy for reducing releases and off-site transfers of TRI-reportable chemicals. By reducing uses of toxic chemicals, DoD minimizes its impacts on the environment, DoD personnel, their families, and surrounding communities.

In 2003, DoD reported releases and off-site transfers of 17.6 million pounds, an increase of 16.8 percent from the 2001 TRI Report total. The increase between 2001 and 2003 reporting is primarily due to increased activities to support mission requirements and deployments, such as increased vehicle maintenance and training.

When subtracting the amounts reported as a result of operational range activities, DoD released and transferred off-site 10.9 million pounds of TRI chemicals in 2003. Compared to the 2001 non-range release totals of 10.6 million pounds, 2003 releases represent an increase of 2.4 percent. Range installation releases accounted for approximately 38 percent of the total DoD reportable releases in 2003, with the Army having the highest percentage of their releases originating from range activities (Figure V-1).

**Figure V-1**

**DoD Component Percentages of TRI Releases from Ranges**

Range Installations	2003
Army	46.67%
Navy	3.41%
Marine Corps	42.18%
Air Force	20.81%
<b>Total</b>	<b>36.78%</b>

Past TRI releases prior to 2000 were largely air releases from painting, depainting, and cleaning operations (Figure V-2). Releases to land and water dominate the 2001, 2002, and 2003 TRI data. Releases to land are primarily metals from munitions used on training ranges or treated during open burning and open detonation (OB/OD). Releases to water are mainly nitrate compounds released as a byproduct of wastewater treatment operations. These types of releases have not been the traditional focus of installation pollution prevention programs.

Figure V-3 shows DoD's toxic chemical releases and off-site transfers since 2001, assuming range facilities are not included in the total. This figure demonstrates an increase in the amount of chemicals released or transferred off-site in 2003. The largest increase is from on-site releases to water. Releases to water are mainly from nitrate compounds. More facilities began reporting nitrate compounds as coincidentally manufactured chemicals in 2002.

Figure V-2: 2003 TRI Data

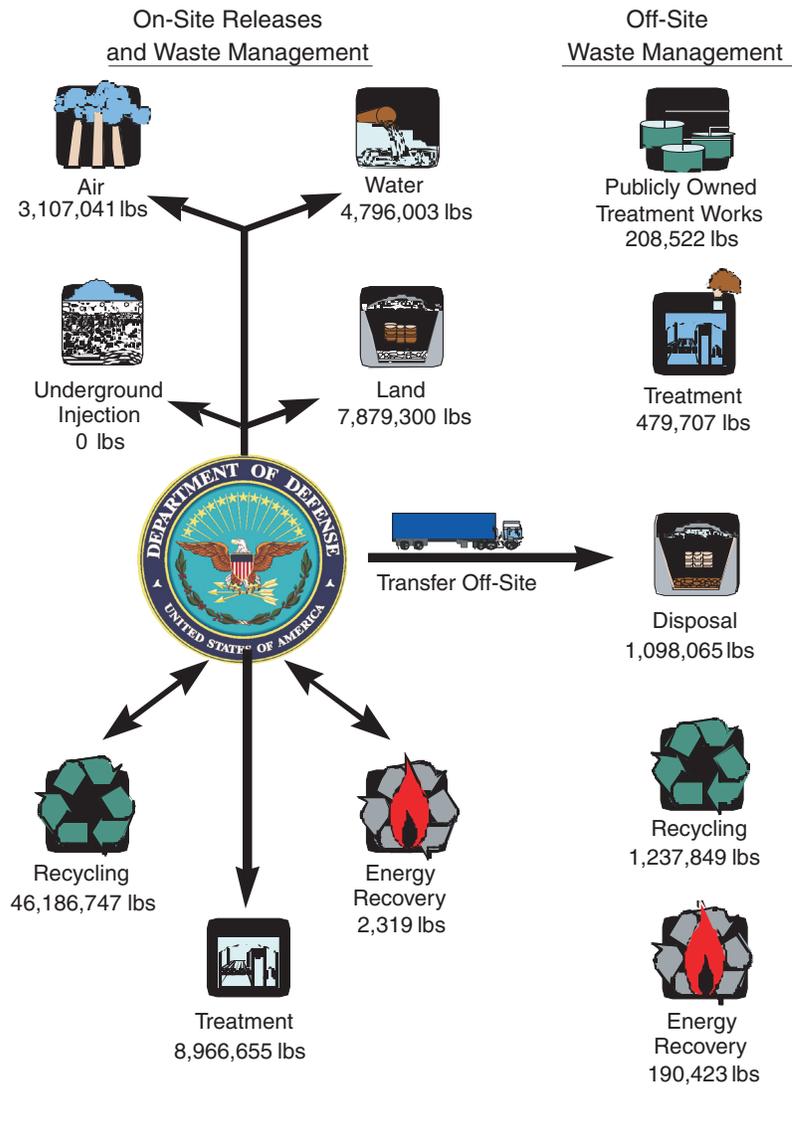


Figure V-3: DoD TRI Reportable Quantities (pounds), 2001 to 2003 Not Including Range Releases

Category	2001	2002	2003	2001 - 2003 % Change
On-site to Water	4,440,131	5,001,387	4,795,961	8.01%
On-site to Air	2,995,428	2,784,618	2,897,006	-3.29%
On-site Underground Injection	0	0	0	-
On-site Land	1,563,549	1,893,674	1,411,830	-9.70%
Off-site to POTW	220,140	270,355	208,522	-5.28%
Off-site Treatment	474,080	580,222	479,707	1.19%
Off-site Disposal	945,823	1,051,353	1,098,039	16.09%
<b>Calculated Baseline</b>	<b>10,639,152</b>	<b>11,581,609</b>	<b>10,891,065</b>	<b>2.37%</b>

**Figure V-4: DoD TRI Reportable Quantities (pounds), 2001 to 2003  
Including Range Releases**

Category	2001	2002	2003	2001 - 2003 % change
On-site to Water	4,440,158	5,002,923	4,796,003	8.01%
On-site to Air	3,022,163	2,825,150	3,107,041	2.81%
On-site Underground Injection	0	0	0	-
On-site Land	5,897,764	7,624,589	7,879,300	33.60%
Off-site to POTW	220,140	270,355	208,522	-5.28%
Off-site Treatment	474,080	580,222	479,707	1.19%
Off-site Disposal	988,849	1,051,985	1,098,065	11.04%
<b>Total</b>	<b>15,043,155</b>	<b>17,355,224</b>	<b>17,568,637</b>	<b>16.79%</b>

Figure V-4 illustrates DoD's overall reportable quantities of toxic chemical releases and off-site transfers. These measurements include TRI data from operational range training. In 2001, 69 facilities reported due to range-only activities with 4.4 million pounds of releases and off-site transfers. The amounts of range releases increased in 2003, with 77 facilities reporting 6.7 million pounds of releases and off-site transfers due to increased activities associated with training and deployments.

## Top Ten Chemicals Reported in 2003

The top ten chemicals released in 2003 are similar to 2002's top ten list except for the removal of copper compounds and the addition of xylene (Figure V-5). Xylene appears on the list not because of an increase in its releases, but due to a 64 percent decrease in copper compound releases in 2003. Xylene releases actually decreased by 24 percent in 2003. Two facilities that had previously reported copper compound releases were no longer required to report because they no longer meet chemical or full-time employee reporting thresholds. Changes in TRI reporting requirements and the new DoD interpretation of TRI reporting requirements have vastly changed the makeup of the top ten list since the last baseline year for reductions in 1994.

**Figure V-5  
Top 10 CY2003 DoD Chemicals**

Name of Chemical	
NITRATE COMPOUNDS	5,378,439
COPPER	4,154,942
LEAD COMPOUNDS	1,562,890
LEAD	1,340,277
HYDROCHLORIC ACID (1995 AND AFTER "ACID AEROSOLS" ONLY)	738,877
ZINC (FUME OR DUST)	521,658
ALUMINUM (FUME OR DUST)	438,460
DICHLOROMETHANE	437,515
METHYL ETHYL KETONE	418,684
XYLENE	227,280

Releases of nitrate compounds and hydrochloric acid continue to remain high due to a DoD interpretation of "coincidental manufacture." Reporting of heavy metals such as copper, lead, lead compounds, aluminum (fume or dust), and zinc (fume or dust) occur on operational ranges and during munitions demilitarization activities. DoD's reporting of releases from operational ranges remains high as a result of increased activities associated with training and deployment operations.

Methyl ethyl ketone and dichloromethane are the main components released during aircraft and vehicle maintenance. Industry has not yet developed suitable alternatives to these chemicals, which are integral to operations.

Xylene is a major component of JP-8 and JP-5, military aircraft turbine fuels, which is released to the air during refueling operations.

## Top Ten Installations Reported in 2003

The nature of DoD's 2003 top ten installations releases is similar to the 2001 baseline even though some of the installations have changed. In 2003, installations involved with the lifecycle of munitions (manufacturing, use, and demilitarization) were DoD's largest reporters of TRI releases and off-site transfers (Figure V-6).

**Figure V-6**  
**Top 10 CY2003 DoD Installations**

Name of Installation	
RADFORD ARMY AMMUNITION PLANT	3,078,765
FORT LEONARD WOOD MANEUVER SUPPORT CENTER RANGE	1,074,277
ANNISTON ARMY DEPOT	557,770
FORT CAMPBELL RANGE	541,266
FORT HOOD RANGE	522,621
FORT BRAGG RANGE	385,454
NELLIS AFB TRAINING RANGE	374,558
PEARL HARBOR NAVAL COMPLEX	371,644
FORT SILL FIELD ARTILLERY RANGE	356,702
CAMP PENDLETON	344,959

Radford Army Ammunition Plant is the largest contributor to DoD's totals, with over 3 million pounds of TRI releases reported. The increases from Radford Army Ammunition Plant are a result of revised coincidental manufacturing reporting requirements. Pearl Harbor Naval Complex and Camp Pendleton also increased reporting of nitrate compounds. All three installations releases are attributable to discharges from wastewater treatment plants.

Anniston Army Depot demilitarizes munitions. OB/OD is the most common method for disposing of munitions. Releases from munitions disposal include heavy metals similar to those from operational ranges.

Fort Leonard Wood Maneuver Support Center Range, Fort Campbell Range, Fort Hood Range, Fort Bragg Range, Nellis Training Range, and Fort Sill Field Artillery Range report releases and offsite transfers associated with operational range activities, including range training, live fire, and clearance activities. Range releases generally consist of copper, copper compounds, lead, and lead compounds.

## Status of DoD Component Reduction Plans

To measure progress towards reducing TRI releases, DoD requires its Components to report the status of their reduction plans to meet the E.O. 13148 reduction goal.

### **Army**

The Army continues to work towards the 40 percent reduction goal in spite of challenges posed by a wartime climate. The global war on terrorism mission requirements and operations in Afghanistan and Iraq are associated with the increase in reporting of TRI chemicals.

The Army's single largest chemical category reported is water-dissociable nitrate compounds, which continue to be below the limits set in wastewater permits. The Army has conducted numerous functional and operational analyses in order to gain a detailed understanding of the processes that generate these releases. The Army will continue to identify processes where releases can be reduced using Environmental Management Systems and pollution prevention efforts.

## ***Navy***

The revised 2001 baseline for the Navy is 2.5 million pounds (44,000 pounds from ranges). In the latest report of TRI data from CY2003, the Navy had approximately 2.48 million pounds of releases to the environment and off-site transfers, a 1 percent reduction from the 2001 baseline. Approximately 936,000 pounds (38 percent) of the 2003 releases resulted from the coincidental manufacture of nitrate compounds during wastewater treatment operations, and 278,000 pounds (11 percent) of air releases resulted from the coincidental manufacture of zinc in coal burning operations.

Because the Navy already achieved significant reductions in TRI releases between 1994 and 1999, achieving the new TRI reduction goal will be challenging, requiring a continued effort to target specific processes. A large portion of the releases are coincidentally manufactured chemicals from otherwise exempt activities. Further efforts to reduce these releases would require a significant investment of time and resources to either replace the current treatment and heating facilities, or possibly connect into municipal operations. The Navy is evaluating and in some cases already implementing these options.

## ***Marine Corps***

The Marine Corps will have difficulty achieving the E.O. 13148 reduction goal because of their over 90 percent reduction in releases and offsite transfers during the previous period (1994 to 2000). Over 70 percent of the Marine Corps' 2001 baseline consists of releases of nitrate compounds created during wastewater treatment. The reduction of nitrate compounds requires significant and costly upgrades to wastewater treatment systems. The Marine Corps expects that the new tertiary treatment plant at Camp Pendleton (scheduled for completion in 2007) will significantly reduce nitrate compounds in the wastewater effluent and thus significantly reduce the overall amount of total nitrate compounds released at Camp Pendleton. The installation represents approximately one-third of releases. It is unlikely that de-nitrification upgrades to other Marine Corps wastewater treatment systems will occur in the foreseeable future because other Marine Corps installations reporting nitrate compounds releases are operating within their National Pollutant Discharge Elimination System permits. The length of the military construction process and the competition for scarce funds also makes upgrading these facilities unlikely.

## ***Air Force***

The Air Force is approaching the E.O. 13148 reduction goals using a two-pronged approach. The first strategy is to develop and implement new pollution prevention technologies. The majority of the Air Force's TRI chemical use, outside of munitions activities and fuel use, is for aircraft maintenance functions. Research is underway to find pollution prevention technologies that provide alternative cleaners, paint stripping processes, and protective coatings that reduce the use of TRI chemicals. TRI reductions made through technological advancement can lead to long-term success provided sufficient funding is available to continue research efforts. The Air Force invested approximately \$13 million in FY2004 for weapon system pollution prevention technology demonstration and validation research efforts.

The second strategy focuses on the management of TRI releases and off-site transfers. Proactive management practices, such as the on-site reuse of off-specification jet fuel, reduce TRI releases attributable to the off-site transfer of fuel to a recycling facility. Additionally, installations are continually seeking environmentally-friendly substitutes for TRI chemicals presently in use for a variety of purposes.

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The top ten releasing Air Force installations achieved a 20 percent reduction from 2001 to 2003, over and above the 79 percent reduction the entire Air Force achieved from 1994 to 1999. The Air Force anticipates that until activities to support mission needs are reduced (i.e., the number of aircraft refueling operations is reduced), TRI emissions will remain fairly constant and it will be difficult to meet the 2006 reduction goal.

### ***Defense Logistic Agency***

The Ozone-Depleting Substances (ODSs) Reserve operation at Defense Supply Center Richmond (DSCR), Virginia is the Defense Logistics Agency's (DLA's) only remaining contributor of TRI releases. The ODS recycling facility at DSCR engages in the purification, repackaging, and storage of these gases in cylinders. The Reserve only supports mission-critical weapons platforms. There are no acceptable ODS alternatives for many of the major weapon systems currently deployed. TRI releases are process-based, so it is unlikely that DLA will be able to reduce this percentage, especially with the unusually low baseline year releases. In 2001, DLA reported low levels of releases due to a temporary halt of the production process while DSCR relocated the ODS Reserve operations to a more modern facility. During CY2003 and CY2004, production increased and the releases remained steady at about 5,000 pounds. DLA expects the ODS Reserve mission to support DoD weapons systems to continue well into the future.

## **Future Directions**

Given the changes in reporting requirements and the great reductions DoD has already achieved, the challenges of meeting further reduction goals are evident. In many cases, pollution prevention solutions are not applicable because of the make up of current TRI releases—chemicals released in wastewater treatment processes, burning coal activities, refueling operations, and the lifecycle of munitions. Further reduction of TRI releases, especially during wartime, is a complex challenge.

**DoD TABLES**

**Table V-1**  
**DoD TRI Reportable Quantities,**  
**2001-2003**  
 (pounds released or transferred)

Category	2001	2002	2003	2001- 2003 % change
On-site to Water	4,440,158	5,002,923	4,796,003	8.01%
On-site to Air	3,022,163	2,825,150	3,107,041	2.81%
On-site Underground Injection	0	0	0	-
On-site Land	5,897,764	7,624,589	7,879,300	33.60%
Off-site to POTW	220,140	270,355	208,522	-5.28%
Off-site Treatment	474,080	580,222	479,707	1.19%
Off-site Disposal	988,849	1,051,985	1,098,065	11.04%
<b>Calculated Baseline</b>				<b>16.79%</b>

**Table V-2**  
**Change in Top 10 Chemicals**  
**Released or Transferred based**  
**on 2001 Baseline**  
 (pounds released or transferred)

Name of Chemical	2001	2002	2003	2001 - 2003 % change
NITRATE COMPOUNDS	5,010,112	5,845,229	5,378,439	7.35%
COPPER	2,864,607	3,275,746	4,154,942	45.04%
LEAD COMPOUNDS	1,011,077	1,449,669	1,562,890	54.58%
LEAD	976,690	1,143,543	1,340,277	37.23%
ALUMINUM (FUME OR DUST)	948,188	633,764	438,460	-53.76%
HYDROCHLORIC ACID (1995 AND AFTER "ACID AEROSOLS" ONLY)	854,013	648,271	738,877	-13.48%
METHYL ETHYL KETONE	469,204	530,798	418,684	-10.77%
ZINC (FUME OR DUST)	426,034	367,983	521,658	22.45%
DICHLOROMETHANE	386,483	391,782	437,515	13.20%
COPPER COMPOUNDS	207,014	627,995	224,494	8.44%
<b>TOTAL</b>	<b>13,153,422</b>	<b>14,914,780</b>	<b>15,216,236</b>	<b>15.68%</b>

**Table V-3**  
**Change in Top 10 DoD**  
**Installations Released or**  
**Transferred based**  
**on 2001 Baseline**  
 (pounds released or transferred)

Name of Installation	2001	2002	2003	2001 - 2003 % change
RADFORD ARMY AMMUNITION PLANT	3,162,293	3,047,324	3,078,765	-2.64%
TINKER AFB	479,956	293,605	314,686	-34.43%
PUGET SOUND NAVAL SHIPYARD	479,773	139,465	158,307	-67.00%
SIERRA ARMY DEPOT	441,409	859	509	-99.88%
FORT WAINWRIGHT	440,103	166,503	168,547	-61.70%
NAB LITTLE CREEK	365,135	271,569	278,476	-23.73%
PEARL HARBOR NAVAL COMPLEX	359,220	460,229	371,644	3.46%
SCHOFIELD BARRACKS	326,667	420,317	131,841	-59.64%
NELLIS AFB TRAINING RANGE	309,581	422,261	374,558	20.99%
TWENTYNINE PALMS RANGE	293,501	261,452	48,813	-83.37%
<b>TOTAL</b>	<b>6,657,638</b>	<b>5,483,584</b>	<b>4,926,146</b>	<b>-26.01%</b>

**Table V-4**  
**Top 10 CY2003 DoD Chemicals**  
 (pounds released or transferred)

Name of Chemical	
NITRATE COMPOUNDS	5,378,439
COPPER	4,154,942
LEAD COMPOUNDS	1,562,890
LEAD	1,340,277
HYDROCHLORIC ACID (1995 AND AFTER "ACID AEROSOLS" ONLY)	738,877
ZINC (FUME OR DUST)	521,658
ALUMINUM (FUME OR DUST)	438,460
DICHLOROMETHANE	437,515
METHYL ETHYL KETONE	418,684
XYLENE (MIXED ISOMERS)	277,280

**Table V-5**  
**Top 10 CY 2003 DoD Installation**  
 (pounds released or transferred)

Name of Installation	
RADFORD ARMY AMMUNITION PLANT	3,078,765
FORT LEONARD WOOD MANEUVER SUPPORT CENTER RANGE	1,074,277
ANNISTON ARMY DEPOT	557,770
FORT CAMPBELL RANGE	541,266
FORT HOOD RANGE	522,621
FORT BRAGG RANGE	385,454
NELLIS AFB TRAINING RANGE	374,558
PEARL HARBOR NAVAL COMPLEX	371,644
FORT SILL FIELD ARTILLERY RANGE	356,702
CAMP PENDLETON	334,959

**ARMY TABLES**

**Table V-1**  
**Army TRI Reportable Quantities,**  
**2001 to 2003**  
 (pounds released or transferred)

Category	2001	2002	2003	2001-2003 % change
On-site to Water	3,133,507	3,324,496	3,056,004	-2.47%
On-site to Air	1,334,187	1,359,027	1,549,231	16.12%
On-site Underground Injection	0	-	-	-
On-site Land	3,787,162	5,039,861	5,891,132	55.56%
Off-site to POTW	7,420	67,026	25,971	250.02%
Off-site Treatment	185,566	267,714	238,883	28.73%
Off-site Disposal	438,124	746,166	718,296	63.95%
<b>Calculated baseline</b>				<b>29.19%</b>

**Table V-2**  
**Change in Top 10 Army Chemicals**  
**Released and Transferred based**  
**on 2001 Baseline**  
 (pounds released or transferred)

Name of Chemical	2001	2002	2003	2001 - 2003 % change
NITRATE COMPOUNDS	3,497,464	3,852,789	3,424,208	-2.09%
COPPER	1,722,224	2,018,669	3,366,557	95.48%
LEAD	679,642	974,454	1,145,886	68.60%
ALUMINUM (FUME OR DUST)	665,824	633,764	161,087	-75.81%
HYDROCHLORIC ACID (1995 AND AFTER "ACID AEROSOLS" ONLY)	634,263	426,860	490,432	-22.68%
LEAD COMPOUNDS	577,222	826,077	1,001,005	73.42%
METHYL ETHYL KETONE	176,424	255,037	146,146	-17.16%
COPPER COMPOUNDS	156,650	577,085	155,658	-0.63%
NITROGLYCERIN	156,305	155,969	193,003	23.48%
DICHLOROMETHANE	122,015	152,265	178,612	46.39%

**Table V-3**  
**Change in Top 10 Army Installations**  
**Released or Transferred based**  
**on 2001 Baseline**  
 (pounds released or transferred)

Name of Installation	2001	2002	2003	2001 - 2003 % change
RADFORD ARMY AMMUNITION PLANT	3,162,293	3,047,324	3,078,765	-2.64%
SIERRA ARMY DEPOT	441,409	859	509	-99.88%
FORT WAINWRIGHT	440,103	166,503	168,547	-61.70%
SCHOFIELD BARRACKS	326,667	420,285	312,930	-4.21%
ANNISTON ARMY DEPOT	283,462	719,241	557,770	96.77%
FORT HOOD RANGE	263,902	263,902	522,621	98.04%
FORT BENNING RANGE	251,363	157,270	303,210	20.63%
FORT BRAGG RANGE	245,215	403,638	385,454	57.19%
HOLSTON AAP	235,302	269,214	254,538	8.18%
RED RIVER ARMY DEPOT	216,679	147,981	95,730	-55.82%

**Table V-4**  
**Top 10 CY2003 Army Chemicals**  
 (pounds released or transferred)

Name of Chemical	
NITRATE COMPOUNDS	3,424,208
COPPER	3,366,557
LEAD	1,145,886
LEAD COMPOUNDS	1,001,005
HYDROCHLORIC ACID (1995 AND AFTER "ACID AEROSOLS" ONLY)	490,432
ZINC COMPOUNDS	486,590
ZINC (FUME OR DUST)	243,295
NITROGLYCERIN	193,003
DICHLOROMETHANE	178,612
ALUMINUM (FUME OR DUST)	161,087

**Table V-5**  
**Top 10 CY2003 Army Installations**  
 (pounds released or transferred)

Name of Installation	
RADFORD ARMY AMMUNITION PLANT	3,078,765
FORT LEONARD WOOD MANEUVER SUPPORT CENTER RANGE	1,074,277
ANNISTON ARMY DEPOT	557,770
FORT CAMPBELL RANGE	541,266
FORT HOOD RANGE	522,621
FORT BRAGG RANGE	385,454
FORT SILL FIELD ARTILLERY RANGE	356,702
TOOELE ARMY DEPOT - MUNITION TREATMENT	336,510
SCHOFIELD BARRACKS	312,930
FORT BENNING RANGE	303,210

**NAVY TABLES**

**Table V-1**  
**Navy TRI Reportable Quantities,**  
**2001 to 2003**  
 (pounds released or transferred)

Category	2001	2002	2003	2001 - 2003 % change
On-site to Water	891,271	882,194	899,992	0.98%
On-site to Air	695,862	687,568	711,667	2.27%
On-site Underground Injection	0	0	0	-
On-site Land	363,280	270,468	527,574	45.23%
Off-site to POTW	950	1,316	837	-11.93%
Off-site Treatment	184,477	133,229	63,775	-65.43%
Off-site Disposal	379,994	166,035	245,211	-35.47%
<b>Calculated baseline</b>				<b>-2.65%</b>

**Table V-2**  
**Change in Top 10 Navy Chemicals**  
**Released and Transferred based**  
**on 2001 Baseline**  
 (pounds released or transferred)

Name of Chemical	2001	2002	2003	2001 - 2003 % change
NITRATE COMPOUNDS	924,292	1,035,877	935,734	1.24%
COPPER	415,190	146,113	227,078	-45.31%
ZINC (FUME OR DUST)	365,135	271,451	278,363	-23.76%
LEAD	126,425	25,690	59,711	-52.77%
N-BUTYL ALCOHOL	111,743	169,139	127,093	13.74%
ETHYLENE GLYCOL	67,452	27,550	17,594	-73.92%
XYLENE (MIXED ISOMERS)	66,959	92,514	83,824	25.19%
AMMONIA	55,300	59,799	0	-
N-METHYL-2-PYRROLIDONE	51,660	21,200	4,133	-92.00%
COPPER COMPOUNDS	50,364	50,910	68,836	36.68%

**Table V-3**  
**Change in Top 10 Navy Installations**  
**Released or Transferred based**  
**on 2001 Baseline**  
 (pounds released or transferred)

Name of Installation	2001	2002	2003	2001 - 2003 % change
PUGET SOUND NAVAL SHIPYARD	479,773	139,465	158,307	-67.00%
NAB LITTLE CREEK	365,135	271,569	278,476	-23.73%
PEARL HARBOR NAVAL COMPLEX	359,220	460,229	371,644	3.46%
NSWC CRANE DEMIL	264,898	125,289	234,412	-11.51%
NAS JACKSONVILLE	152,795	188,561	248,753	62.80%
NAS CORPUS CHRISTI	151,660	115,496	116,238	-23.36%
NORFOLK NAVAL SHIPYARD	139,901	209,134	122,837	-12.20%
COMNAVMARIANAS GUAM	125,000	124,731	71,635	-42.69%
NAVAL STATION MAYPORT	114,457	123,788	202,212	76.67%
NAWS CHINA LAKE	89,018	60,480	63,203	-29.00%

**Table V-4**  
**Top 10 CY2003 Navy Chemicals**  
 (pounds released or transferred)

Name of Chemical	
NITRATE COMPOUNDS	935,734
ZINC (FUME OR DUST)	278,363
ALUMINUM (FUME OR DUST)	277,373
COPPER	227,078
N-HEXANE	132,226
N-BUTYL ALCOHOL	127,093
XYLENE (MIXED ISOMERS)	83,824
COPPER COMPOUNDS	68,836
LEAD	59,711
METHYL ETHYL KETONE	46,084

**Table V-5**  
**Top 10 CY2003 Navy Installations**  
 (pounds released or transferred)

Name of Installation	
PEARL HARBOR NAVAL COMPLEX	371,644
NAB LITTLE CREEK	278,476
NAS JACKSONVILLE	248,753
NSWC CRANE DEMIL	234,412
NAVAL STATION MAYPORT	202,212
PUGET SOUND NAVAL SHPYD	158,307
NSWC CRANE DIV	132,298
NORFOLK NAVAL SHIPYARD	122,837
NAS CORPUS CHRISTI	116,238
NAS FALLON BRAVO 17	92,038

**MARINE CORPS TABLES**

**Table V-1**  
**Marine Corps TRI Reportable**  
**Quantities, 2001 to 2003**  
(pounds released or transferred)

Category	2001	2002	2003	2001 - 2003 % change
On-site to Water	338,784	652,454	740,369	118.54%
On-site to Air	132,920	133,359	181,456	36.52%
On-site Underground Injection	0	0	0	-
On-site Land	885,236	1,244,632	708,330	-19.98%
Off-site to POTW	48	0	0	-100.00%
Off-site Treatment	7,291	7,416	30,914	324.00%
Off-site Disposal	46,376	9,273	11,011	-76.26%
<b>Calculated baseline</b>				<b>18.53%</b>

**Table V-2**  
**Change in Top 10**  
**Marine Corps Chemicals**  
**Released and Transferred based**  
**on 2001 Baseline**  
(pounds released or transferred)

Name of Chemical	2001	2002	2003	2001 - 2003 % change
COPPER	452,758	826,495	314,313	-30.58%
LEAD COMPOUNDS	370,284	348,540	337,341	-8.90%
NITRATE COMPOUNDS	338,793	654,266	742,095	119.04%
LEAD	111,662	62,266	68,924	-38.27%
HYDROCHLORIC ACID (1995 AND AFTER "ACID AEROSOLS" ONLY)	65,740	62,406	103,819	57.92%
METHYL ETHYL KETONE	28,087	27,770	30,444	8.39%
DICHLOROMETHANE	19,741	20,395	14,370	-27.21%
TOLUENE	11,901	12,763	11,878	-0.19%
ETHYLENE GLYCOL	7,506	6,772	30,292	303.56%
XYLENE (MIXED ISOMERS)	3,792	2,819	1,000	-73.63%

**Table V-3**  
**Change in Top 10**  
**Marine Corps Installations**  
**Released or Transferred based**  
**on 2001 Baseline**  
(pounds released or transferred)

Name of Installation	2001	2002	2003	2001 - 2003 % change
TWENTYNINE PALMS RANGE	293,501	261,452	48,813	-83.37%
CAMP PENDLETON RANGE	237,607	188,052	138,740	-41.61%
CAMP LEJEUNE	212,219	225,179	230,068	8.41%
CAMP PENDLETON	203,810	254,585	344,959	69.26%
QUANTICO RANGE COMPLEX	108,000	116,919	118,256	9.50%
CAMP LEJEUNE RANGE	84,398	175,760	195,382	131.50%
PARRIS ISLAND RANGE	67,402	72,575	77,511	15.00%
MCAS CHERRY POINT	49,787	107,223	169,042	239.53%
PUULOA TRAINING FACILITY	48,200	6,200	10,673	-77.86%
CAMP BILLY MACHEN/CHOCOLATE MOUNTAINS GUNNERY RANGE	46,270	0	47,627	2.93%

**Table V-4**  
**Top 10 CY2003 Marine Corps Chemicals**  
(pounds released or transferred)

Name of Chemical	
NITRATE COMPOUNDS	742,095
LEAD COMPOUNDS	337,341
COPPER	314,313
HYDROCHLORIC ACID (1995 AND AFTER "ACID AEROSOLS" ONLY)	103,819
LEAD	68,924
METHYL ETHYL KETONE	30,444
ETHYLENE GLYCOL	30,292
N-METHYL-2-PYRROLIDONE	17,419
DICHLOROMETHANE	14,370
TOLUENE	11,878

**Table V-5**  
**Top 10 CY2003 Marine Corps Installations**  
(pounds released or transferred)

Name of Installation	
CAMP PENDLETON	344,959
CAMP LEJEUNE	230,068
CAMP LEJEUNE RANGE	195,382
BASE QUANTICO	182,692
MCAS CHERRY POINT	169,042
CAMP PENDLETON RANGE	138,740
QUANTICO RANGE COMPLEX	118,256
PARRIS ISLAND RANGE	77,511
TWENTYNINE PALMS RANGE	48,813
CAMP BILLY MACHEN/CHOCOLATE MOUNTAINS AERIAL GUNNERY RANGE	47,627

## AIR FORCE TABLES

**Table V-1**  
**Air Force TRI Reportable**  
**Quantities, 2001 to 2003**  
 (pounds released or transferred)

Category	2001	2002	2003	2001 - 2003 % change
On-site to Water	76,596	143,779	99,637	30.08%
On-site to Air	903,420	640,405	1,245,774	-26.99%
On-site Underground Injection	0	0	0	-
On-site Land	862,788	1,917,706	752,264	-12.81%
Off-site to POTW	211,722	220,171	181,713	-14.17%
Off-site Treatment	96,746	54,221	146,135	51.05%
Off-site Disposal	124,355	277,749	123,548	-0.65%
<b>Calculated baseline</b>				<b>-13.74%</b>

**Table V-2**  
**Change in Top 10 Air Force**  
**Chemicals Released and**  
**Transferred based**  
**on 2001 Baseline**  
 (pounds released or transferred)

Name of Chemical	2001	2002	2003	2001 - 2003 % change
COPPER	274,435	309,513	246,994	-10.00%
ALUMINUM (FUME OR DUST)	271,464	0	0	-
NITRATE COMPOUNDS	249,563	302,297	276,402	10.75%
METHYL ETHYL KETONE	221,491	211,474	196,010	-11.50%
DICHLOROMETHANE	208,825	208,745	207,093	-0.83%
BARIUM	197,364	137,000	115,000	-41.73%
HYDROCHLORIC ACID (1995 AND AFTER "ACID AEROSOLS" ONLY)	154,010	159,005	144,626	-6.09%
GLYCOL ETHERS	114,250	18,215	15,139	-86.75%
ETHYLENE GLYCOL	108,586	88,166	117,303	8.03%
PHENOL	95,780	48,131	53,312	-44.34%

**Table V-3**  
**Change in Top 10 Air Force**  
**Installations Released or**  
**Transferred based**  
**on 2001 Baseline**  
 (pounds released or transferred)

Name of Installation	2001	2002	2003	2001 - 2003 % change
TINKER AFB	479,956	193,605	314,686	-34.43%
NELLIS AFB TRAINING RANGE	309,581	422,261	374,558	20.99%
HILL AFB (OGDEN ALC)	260,588	336,373	332,612	27.64%
EIELSON AFB	226,152	213,902	155,080	-31.43%
ROBINS AFB	220,351	176,146	140,921	-36.05%
BARRY M. GOLDWATER RANGE LUKE AFB	171,312	20,372	20,832	-87.84%
AIR FORCE PLANT NO. 4	145,868	166,998	177,836	21.92%
EGLIN AFB RANGES	129,333	80,761	17,386	-86.56%
WRIGHT-PATTERSON AFB	95,623	87,015	92,639	-3.12%
AIR FORCE PLANT NO. 6	65,481	47,360	50,977	-22.15%

**Table V-4**  
**Top 10 CY2003 Air Force Chemicals**  
 (pounds released or transferred)

Name of Chemical	
NITRATE COMPOUNDS	276,402
COPPER	246,994
LEAD COMPOUNDS	219,803
DICHLOROMETHANE	207,093
METHYL ETHYL KETONE	196,010
HYDROCHLORIC ACID (1995 AND AFTER "ACID AEROSOLS" ONLY)	144,626
ETHYLENE GLYCOL	117,303
BARIUM	115,000
XYLENE (MIXED ISOMERS)	73,967
TOLUENE	73,874

**Table V-5**  
**Top 10 CY2003 Air Force Installations**  
 (pounds released or transferred)

Name of Installation	
NELLIS AFB TRAINING RANGE	374,558
HILL AFB (OGDEN ALC)	332,612
TINKER AFB	314,686
AIR FORCE PLANT NO. 4	177,836
EIELSON AFB	155,080
ROBINS AFB GA	140,921
WRIGHT-PATTERSON AFB	92,639
HOLLOMAN AFB	58,376
HOLLOMAN AFB RANGE	52,044
UTAH TRAINING RANGE DEMIL	52,000

**DEFENSE LOGISTIC AGENCY TABLES**

**Table V-1**  
**DLA TRI Reportable Quantities,**  
**2001 to 2003**  
 (pounds released or transferred)

Category	2001	2002	2003	2001 - 2003 % change
On-site to Water	0	0	0	-
On-site to Air	869	4,791	5,084	485.04%
On-site Underground Injection	0	0	0	-
On-site Land	0	0	0	-
Off-site to POTW	0	0	0	-
Off-site Treatment	0	0	0	-
Off-site Disposal	0	0	0	-
<b>Calculated baseline</b>				<b>485.04%</b>

**Table V-2**  
**Change in Top 10 DLA**  
**Chemicals Released and**  
**Transferred based on**  
**2001 baseline**  
 (pounds released or transferred)

Name of Chemical	2001	2002	2003	2001 - 2003 % change
BROMOTRIFLUOROMETHANE	471	1,867	3,156	570.06%
DICHLORODIFLUOROMETHANE (CFC-12)	220	1,562	726	230.00%
BROMOCHLORODIFLUOROMETHANE	80	0	0	-100.00%
DICHLOROTETRAFLUROETHANE	55	1,362	1,202	2085.45%
TRICHLOROFLUOROMETHANE	43	0	0	-100.00%

**Table V-3**  
**Change in Top DLA Installations'**  
**Released or Transferred based on**  
**2001 baseline**  
 (pounds released or transferred)

Name of Installation	2001	2002	2003	2001 - 2003 % change
DEFENSE GENERAL SUPPLY CENTER RICHMOND*	869	4,791	5,084	485.04%

\* During baseline year 2001, the DLA Ozone Depleting Substances Reserve facility in Richmond, Virginia ceased reclamation operations while moving to a newer facility.

**Table V-4**  
**Top 2003 DLA Chemicals**  
 (pounds released or transferred)

Name of Chemical	
BROMOTRIFLUOROMETHANE	3,156
DICHLOROTETRAFLUROETHANE	1,202
DICHLORODIFLUOROMETHANE (CFC-12)	726

**Table V-5**  
**Top 2003 DLA Installation**  
 (pounds released or transferred)

Name of Installation	
DEFENSE GENERAL SUPPLY CENTER RICHMOND	5,084