

NAVSEA Toxic Release Inventory (TRI) Report

2001



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Occupational Safety and Health Office (SEA 04RE)**

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Executive Summary

Executive Order (EO) 13148 set a new TRI reduction goal of 40 percent from 2001 to 2006. The purpose of this and future reports is to track data from 1999 through the end of 2006 in order to promote reduction efforts and aid compliance. This is the second report, which covers calendar year 2001.

Reportable TRI releases for NAVSEA activities increased by 82,082 pounds from 2000 to 2001. Dredging and munitions waste accounted for almost all of the increase, while releases from other processes remained at the same level or decreased. The primary components of dredging were metals released to land. The increase in munitions releases was caused by 68,129 pounds of nitrate compounds released to water or sent to offsite treatment. NAVSEA releases constituted over seventy-five percent of Navy reportable releases in 2001.

Navigation and CERCLA dredging was completed in 2001 and this should provide a significant reduction for NSY Puget Sound. However, this will most likely be offset by the overhaul of the USS ENTERPRISE in 2002 by NSY Norfolk, which will cause a large increase in reportable releases for that facility. Munitions releases will continue to fluctuate because NSWC Indian Head totals have hovered above and below the reporting limit for the past several years.

Army OB/OD operations at NSWC Crane are beyond the control of the Navy and releases will most likely remain at current levels if munitions disposal continues. However, individual chemical releases may vary from year to year according to the type of ordnance being disposed.

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Purpose

Executive Order (EO) 12856 mandated that federal facilities comply with the Emergency Planning and Community Right-to-Know Act (EPCRA). Under EPCRA, facilities that exceed reporting thresholds for listed chemicals must submit Toxic Release Inventory (TRI) reports to the Environmental Protection Agency (EPA) each year.

Executive Order (EO) 13148 set a TRI reduction goal of 40 percent from 2001 to 2006. Compliance will require the careful tracking of data for that period. This is the second summary report. The first report used 1999 as the base year and that data was summarized with 2000 data. This second summary report adds 2001 data and successive reports will provide annual updates.

Information from this report will be used to measure the NAVSEA P2 Program performance. It will be combined with other metrics involving the sixteen NAVSEA Target Chemicals and the P2 Annual Data Summary (P2 ADS) for Hazardous Waste, in order to identify P2 opportunities and initiate projects to reduce TRI emissions and environmental risks.

The data presented here has been provided by the Center for Naval Analysis (CNA) and also extracted from the CY 2000 DOD TRI Report. Additional information regarding NAVSEA releases can be found in the approved CNA Navy TRI report for 2001.

New Reporting Requirements for 2001

Two new requirements for TRI reporting went into effect with reporting year 2001. EPA lowered the threshold to 100 pounds for reporting lead and lead compounds, and facilities were required to report releases from ranges. Previously, facilities were only required to report these chemicals if they exceeded the 25,000-pound manufacturing or processing threshold, or the 10,000-pound otherwise-used threshold. Releases from ranges are similar to those from the open detonation of munitions for the purposes of demilitarization. Reportable releases generally include inorganic chemicals (mainly metals) released to the air and ground, and combustion by-products released to air.

NAVSEA Reportable Releases

Only a portion of the releases reported on Toxic Release Inventory (TRI) forms count toward the NAVSEA reduction goal. Those releases for 2001 are reported under the categories shown in Figure 1. Releases reported under Recycling, Energy Recovery, On-site Treatment, or Underground Injection are not the subject of this report and are not included in any total below.

The following section summarizes reportable releases by NAVSEA facilities for 2001. Subsequent sections will discuss the contribution of these releases to Navy and DoD totals and emerging trends. Please note that the 2001 TRI totals shown here are higher than in the first (1999-2000) report in order to match changes in historical data listed in the 2001 CNA Navy TRI report.

Categories

Figures 1 and 2 and Table 1 show NAVSEA releases by category. The purpose is to show the contribution of each release category to the whole; quantities for individual categories should not be inferred from this illustration. All totals in table 1 are in pounds.

Reportable total: 971,864 lbs

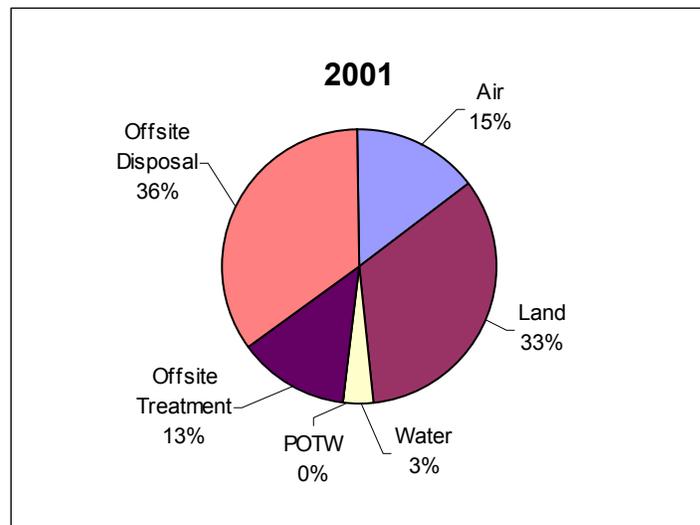


Figure 1 – 2001 NAVSEA Releases by Category

Table 1 – NAVSEA Releases by Category

Release	2000	2001	+ / -	%
Air	255,314	146,178	(109,136)	-43%
Land	253,793	320,790	66,997	26%
Water	5,608	34,008	28,400	506%
POTW	762	908	146	19%
Offsite Treatment	73,714	125,900	52,186	71%
Offsite Disposal	300,606	344,079	43,473	14%
Total	889,797	971,863	82,066	9%

Air: Two large changes influenced the decrease in air releases in 2001: NSWC Crane dropped the release of manganese compounds to air from 61,000 pounds to zero, and NSY Puget Sound decreased the release of ethylene glycol to air from over 47,000 pounds to only 475 pounds. The former was due to a shift in the type of munitions being demilitarized and was offset by an increase in copper. The latter was due to a re-examination of emission calculation methods for targeted processes and the application of a more accurate air emission factor in 2001.

Land: The second largest category in 2001 was releases to land. Almost all of this increase was due to demilitarization activities at NSWC Crane that released 265,444 pounds of metals to land, including 247,819 pounds of copper. The continued production of waste from an ongoing CERCLA project at NSY Puget Sound also caused a 17,594 pounds increase in copper and lead.

Water: The large increase in this category was the result of over 29,000 pounds of nitrate compounds in water produced during the onsite treatment of nitric acid being discharged at NSWC Indian Head.

Offsite Disposal: The largest category in 2001 was offsite disposal. All reporting activities lowered their releases in this category with the exception of NSY Puget Sound. The shipyard showed a significant increase in copper from disposing of sediment from navigation dredging operations and an increase in lead from the disposal of SHT tiles from submarine scrapping.

Offsite Treatment: The increase in releases to offsite treatment was due to the appearance of two new chemicals in this category: 39,000 pounds of nitrate compounds at NSWC Indian Head, and 37,845 pounds of ethylene glycol during a carrier overhaul at NSY Puget Sound.

POTW: Releases to Publicly Owned Treatment Works (POTW) showed a small increase between 2000 and 2001.

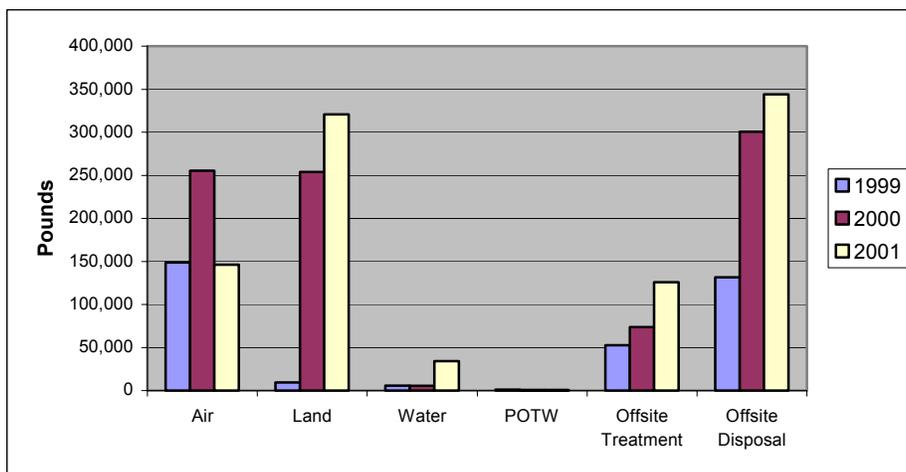


Figure 2 – 1999-2001 NAVSEA Releases by Category

Facilities

Eight NAVSEA facilities reported releases in 2001 as shown in Figure 3. A breakdown of releases by facility is provided in Appendix A. Note that demilitarization and range releases are separate in Figure 3, but are combined in the appendix.

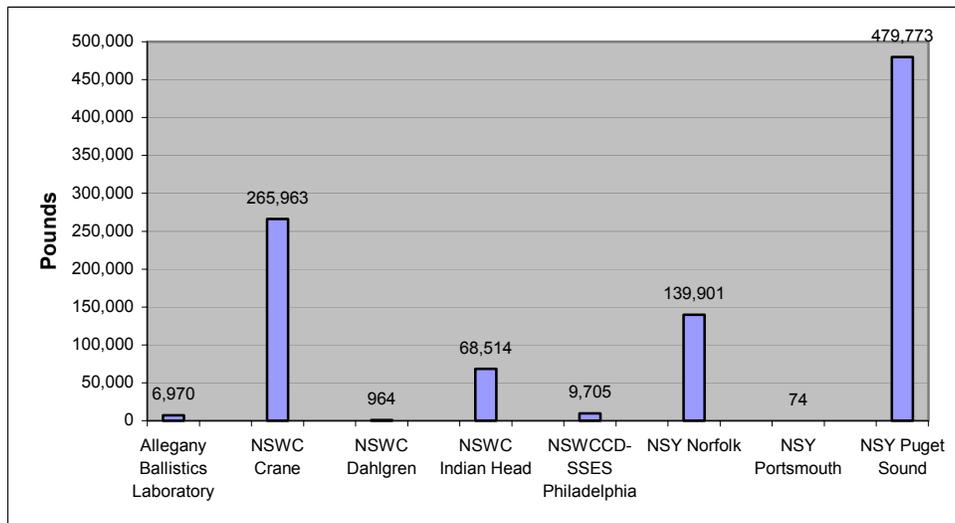


Figure 3 – 2001 NAVSEA Releases by Facility

NSY Puget Sound and NSWC Crane accounted for almost 77 percent of NAVSEA reportable releases. These two facilities and NSY Norfolk accounted for about 91 percent of the NAVSEA total in 2001. Of the eight reporting facilities, only NSY Puget Sound and NSWC Indian Head showed a significant increase in total releases between 2000 and 2001. The other six facilities either lowered their reportable releases or showed only a minor increase.

Releases at NSY Puget Sound continued to come from ship maintenance, submarine scrapping, and dredging. Painting, deck coating and fluid changeouts are ongoing operations and emissions actually decreased in 2001, as did releases from scrapping waste. However, dredging waste doubled in 2001 and offset these reductions, but this project has ended and the shipyard total should be reduced by over 200,000 pounds in 2002.

The open burning/open detonation (OB/OD) of munitions produced all of the releases reported by NSWC Crane in 2001. Total releases did not change significantly from 2000, but the list of reported chemicals was shortened from six to four.

Releases at NSY Norfolk came mainly from hull painting. Releases dropped by 24,000 pounds because of significant reductions of copper compounds, xylene, and zinc compounds due to a reduced workload.

Reportable Chemicals

Twenty-two chemicals were reported for 2000-01 and are listed in Table 2. Six of these chemicals are part of a list of sixteen Target Chemicals identified by NAVSEA for Pollution Prevention reduction efforts. All totals in Table 2 are in pounds.

Table 2 – Reportable Chemicals

	<u>2000</u>	<u>2001</u>	<u>Primary Release Source(s)</u>
1,2,4-trimethylbenzene	0	21,640	Ship Maintenance
Aluminum	2	0	OB/OD
Chromium *	36,739	14,996	Scrapping
Copper	159,639	400,490	OB/OD, Scrapping, Foundry, Dredging,
Copper compounds	86,348	50,364	Ship Maintenance
Dichloromethane *	15,095	6,062	Ship Maintenance
Ethylene glycol *	96,474	66,812	Fluid change-out
Lead	85,539	107,826	OB/OD, Scrapping, Foundry, Dredging
Lead Compounds	0	10,138	OB/OD
Manganese	3,496	3,978	Scrapping, OB/OD
Manganese compounds	67,000	0	OB/OD
MEK*	12,700	15,377	Ship Maintenance
Mercury *	0	26	Foundry Operations
N-butyl alcohol *	66,967	64,343	Ship Maintenance
Nickel	44,246	45,182	OB/OD, Scrapping, Foundry, Dredging
Nitrate Compounds	0	68,129	Munitions Manufacturing
Nitric Acid	2	1	Munitions Manufacturing
Nitroglycerin	251	295	OB/OD
Polycyclic Aromatic Compounds	6	0	Stack Air
Xylene *	84,131	53,259	Ship Maintenance, Dredging
Zinc	61,395	0	OB/OD, Scrapping, Foundry, Dredging
Zinc compounds	69,761	42,946	Hull Painting
Total	889,791	971,863	* NAVSEA Target Chemical

Copper: This chemical showed the greatest increase and was the largest release in 2001. The leading source of copper was OB/OD operations at NSWC Crane. Additional releases of copper were produced from submarine scrapping and dredging at NSY Puget Sound and the foundry at NSWC-SSES Philadelphia.

Lead: The second largest release was 107,826 pounds of lead that primarily came from scrapping and dredging operations at NSY Puget Sound. Lead releases from scrapping showed a modest increase due to the increased disposal of SHT tiles, but lead from dredging doubled in 2001. This trend will be reversed in 2002 as dredging has now ceased.

Nitrate Compounds: The third largest release was 68,129 pounds of nitrate compounds reported by NSWC Indian Head. This chemical is formed during the treatment of nitric acid, which is used in manufacturing explosives. It is released in wastewater discharged to water and some is transferred offsite for treatment.

Other Chemicals: Nitrate compounds were new to the list of NAVSEA reported chemicals, as was the addition of 21,640 pounds of 1,2,4-trimethylbenzene and 10,138 pounds of lead compounds.

1,2,4-trimethylbenzene and MEK were both used in painting operations at NSY Norfolk, while most of the lead compounds were generated by munitions manufacture or disposal activities at various sites.

Twelve chemicals showed a decrease in 2001, of which five are NAVSEA Target Chemicals. Almost 70 percent of this reduction can be attributed to variations in workload at NSY Norfolk and NSY Puget Sound, while the remaining reduction (manganese compounds) was due to a change in the type of munitions destroyed.

Ten chemicals increased in 2001, of which two are NAVSEA Target Chemicals. Most of these releases were associated with munitions manufacture or demilitarization.

As with previous years, xylene, n-butyl alcohol, copper compounds, and zinc compounds are primarily associated with ship maintenance. Ship maintenance also produces most of the releases of methyl ethyl ketone (MEK) and dichloromethane, which are used in paint thinners and paint strippers. Suitable substitutes for most of these chemicals have not yet been identified and their use continues to vary from year to year in proportion to the shipyard workload.

Chemicals used in amounts close to the reporting threshold continue to vary between years. An example is NSWC Indian Head, which was below the 25,000-pound manufacturing threshold for nitrate compounds in 1999 and 2000, but exceeded it in 2001. MEK was not reported by NSY Puget Sound for 2001 because releases have consistently been close to the threshold and did not exceed 10,000 pounds in that year.

Navy Reportable Releases

2001 Releases. NAVSEA releases comprised a significant portion of the 2001 Navy TRI report as shown in Table 3. Shipyards and other NAVSEA activities generated seventeen chemicals that constituted seventy-five percent of the Navy total. Nine of these chemicals were generated only by NAVSEA activities; these nine chemicals by themselves totaled 247,531 pounds, or 19 percent of the Navy total. All totals in Table 3 are in pounds.

Table 3 – Navy Reportable Releases

	<u>2001 NAVSEA</u>	<u>2001 Navy</u>	<u>Percent</u>
1,2,4-trimethylbenzene	21,640	21,640	100%
Chromium	14,996	14,996	100%
Copper	400,490	415,190	97%
Copper Compounds	50,364	50,364	100%
Dichloromethane	6,062	35,902	17%
Ethylene glycol	66,812	67,452	99%
Lead	107,826	126,425	85%
Lead Compounds	10,138	10,576	96%
Manganese	3,978	3,978	100%
MEK	15,377	43,892	35%
Mercury	26	33,326	0.1%
N-butyl alcohol	64,343	111,743	58%
Nickel	45,182	45,182	100%
Nitrate Compounds	68,129	68,129	100%
Nitric Acid	1	1	100%
Nitroglycerin	295	295	100%
Xylene	53,259	66,959	80%
Zinc Compounds	42,946	42,946	100%
Other Chemicals		322,674	
Total	971,864	1,294,537	75%

Processes. 2001 TRI releases were assigned to ten processes. Figure 4 illustrates the contribution of each process to the Navy total.

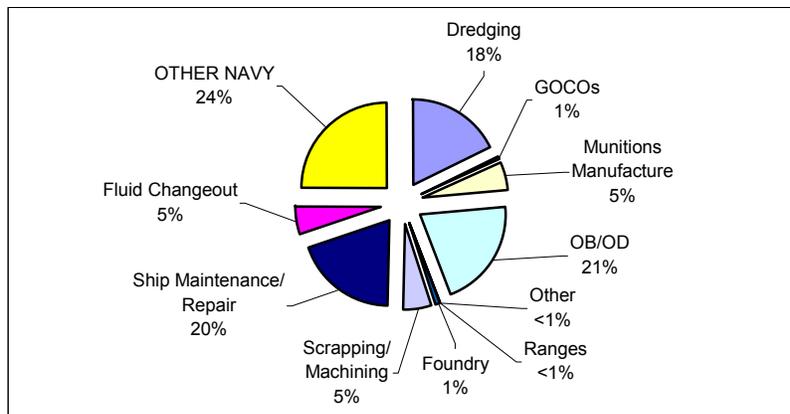


Figure 4 – Navy Reportable Releases for 2001

The largest release category was ship maintenance and repair (252,462 pounds), which occurred at NSY Norfolk and NSY Puget Sound. This category covers a variety of processes including painting, deck coating, and solvent cleaning. Significant releases from these operations were copper compounds, lead, n-butyl alcohol, xylene, zinc compounds, 1,2,4-trimethylbenzene, and MEK. NAVSEA activities contributed to most or all of the Navy totals for these releases.

Open burning/open detonation of munitions (265,832 pounds) was the second largest category. Most of the chromium, copper, and lead compounds generated under this category came from demilitarization operations reported by NSWC Crane, with a small contribution from NSWC Dahlgren. The 247,819 pounds of copper generated by NSWC Crane during OB/OD operations constituted almost 60 percent of the Navy total.

Navigation/CERCLA dredging operations (229,142 pounds) made up the third largest category. The copper, lead, and nickel releases from these activities constituted 30 percent, 60 percent, and 66 percent of the Navy total, respectively. These operations took place at NSY Puget Sound and were halted in 2001.

Fluid changeout generated ninety-nine percent of ethylene glycol reported by the Navy in 2001. This process is associated with ship maintenance but kept separate for this report. Munitions manufacture (68,169 pounds) and submarine scrapping and machining waste (68,786 pounds) also made a significant contribution to the Navy total.

DoD Reportable Releases

2000 Releases. (2001 data was not available for this report). NAVSEA releases comprised only ten percent of the 2000 DoD TRI total. However, these releases comprised nineteen percent of DoD releases for the chemicals shown in the following table. All totals are in pounds.

Table 4 – DoD Reportable Releases

	<u>NAVSEA</u>	<u>DoD</u>	<u>Percent</u>
Aluminum	2	917,249	<1%
Benzo (g,h,l) perlyne	1	1	100%
Chromium	25.819	42.805	60%
Copper *	147,718	441,242	33%
Copper Compounds*	86,348	408,421	21%
Dichloromethane *	15,940	363,205	4%
Ethylene glycol *	96,452	245,415	39%
Lead	69,177	113,438	61%
Manganese	3,496	146,555	2%
Manganese Compounds	67,000	75,384	89%
MEK *	12,700	474,879	3%
N-butyl alcohol	66,967	87,968	76%
Nickel	34,874	36,738	95%
Nitric Acid	2	9,719	<1%
Nitroglycerin*	251	159,617	<1%
Polycyclic Aromatic Compounds	6	6	100%
Xylene	82,237	153,209	54%
Zinc	61,395	322,241	19%
Zinc compounds *	69,761	322,241	22%
Total for All Releases	838,783	8,432,160	10%
Total for Above Releases	838,783	4,230,333	19%

*Top ten 2000 DoD chemical (pounds released)

NAVSEA-generated benzo (g,h,l) perlyne, chromium, lead, manganese compounds, n-butyl alcohol, nickel, PACs, and xylene all exceeded fifty percent of the DoD amounts for those releases. Copper and ethylene glycol also contributed between thirty and fifty percent of the DoD total. Ship painting at NSY Norfolk and dredging at NSY Puget Sound contributed 43 percent of DoD xylene releases.

Figure 5 shows the contribution of both the NAVSEA and other Navy TRI releases to the 2000 total.

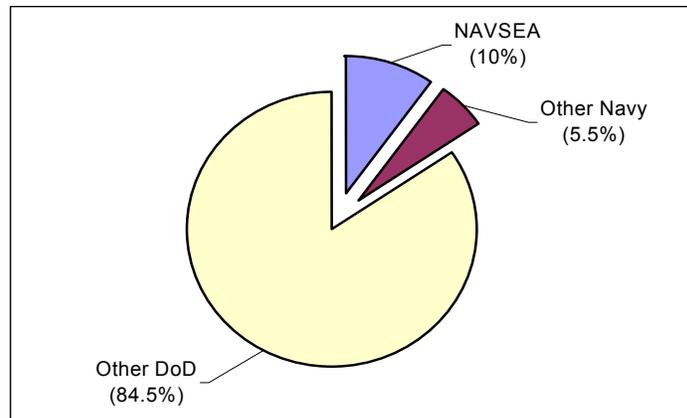


Figure 5 – DoD Reportable Releases for 2000

Trends and Opportunities

This report covers the third year of a six-year reporting cycle and existing data allows for some observations about the generation of TRI releases at NAVSEA activities.

Overall Trend. Figure 6 shows the relationship between NAVSEA and Navy TRI totals from 1999 to 2001. NAVSEA releases continue to play a dominant role and have increased as a percentage of the Navy total over time.

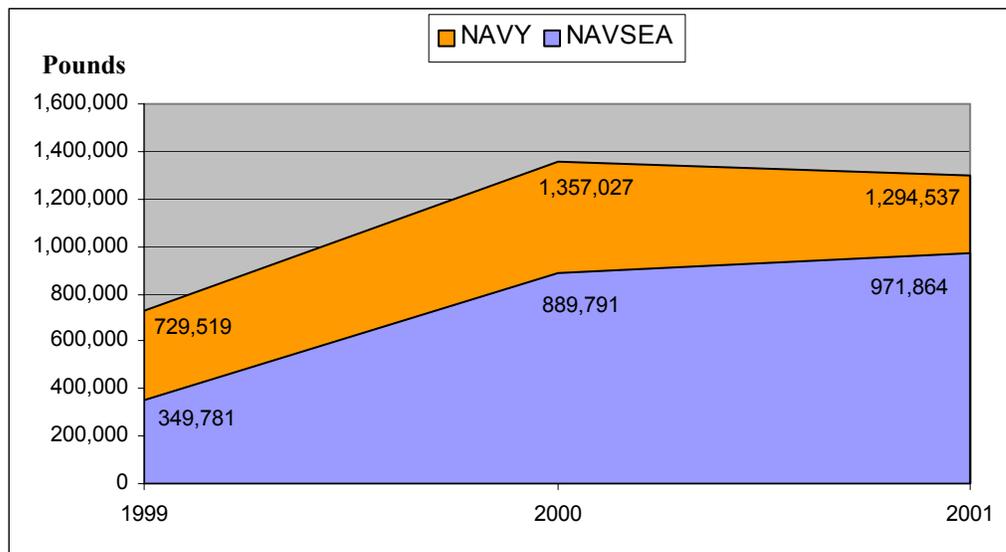


Figure 6 – NAVSEA and Navy Reportable Releases for 1999-2001

Facilities. NSWC Crane and NSY Puget Sound continue to report the greatest amount of releases. This is because releases were generated by ongoing operations where reductions could only be achieved by decreasing the scope of the effort. One facility should show a decrease in 2002 as NSY Puget Sound anticipates a significant drop in total releases with the ending of dredging operations in 2001. However, releases from Army OB/OD operations at NSWC Crane are expected to remain at high levels, although the chemicals may change according to the type of munitions being disposed.

Releases at NSY Norfolk dropped in 2001 due to a shift in the mix of ships serviced. The shipyard anticipates a large increase in releases for 2002 due to the *USS Enterprise* overhaul that started in January of that year and other availabilities that included the *USS Theodore Roosevelt* and *USS Harry S. Truman*. Without a dramatic change in the materials used for ship maintenance, release totals should continue to vary from year to year in proportion to the workload in spite of ongoing pollution prevention efforts.

Reportable releases from NSWC Indian Head will continue to fluctuate as Navy combat operations change. Indian Head reported nitrate compounds in 1996, 1997, and 1998, but releases fell below reporting thresholds in 1999 and 2000. The threshold was exceeded in 2001, and thus the facility had to report 68,129 pounds. (CNA 2001 TRI Report).

Figure 7 shows the three-year trend for all NAVSEA reporting activities. All totals are in pounds.

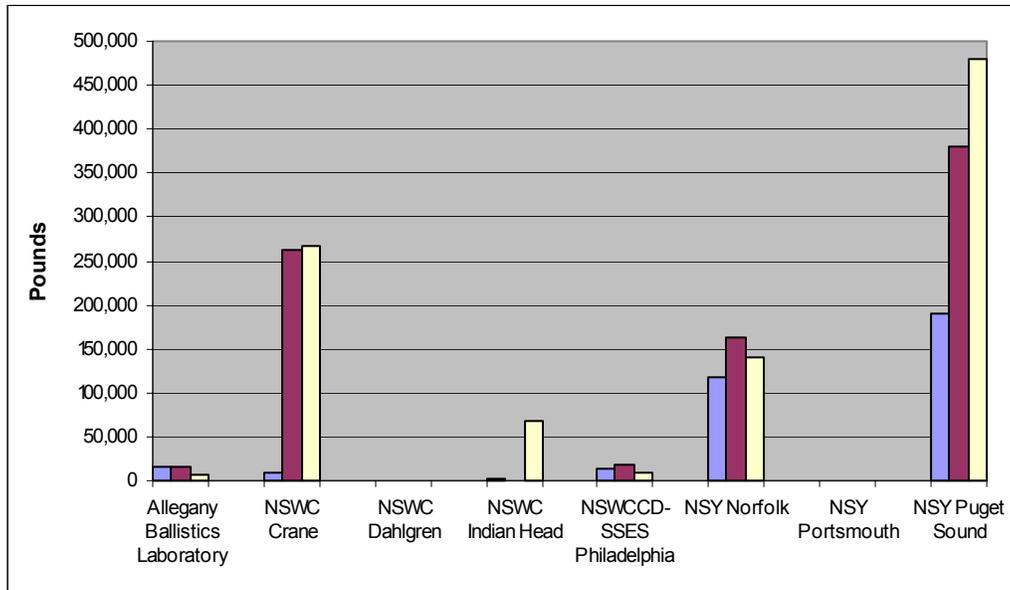


Figure 7 – 1999–2001 NAVSEA Releases by Facility

Processes. The rise in NAVSEA reportable releases was primarily driven by the inclusion of OB/OD operations at Crane in 2000 and dredging operations at PSNS. Releases from ship maintenance rose sharply in 2000 due to a carrier overhaul, but decreased again as shipyard workload dropped. All totals below are in pounds.

Table 5 - 1999–2001 NAVSEA Releases by Process

Category	1999	2000	2001
OB/OD	9,810	263,447	265,832
Ship Maintenance	228,360	315,836	252,462
Dredging	0	109,641	229,142
Fluid Changeout	11,402	96,474	69,284
Scrapping/Machining	68,103	72,026	68,786
Munitions	2,972	2	68,169
Foundry	13,014	17,009	9,705
GOCOs	16,120	15,350	6,970
Ranges			1,026
Other		6	488
	349,781	889,791	971,864

Totals releases over three years for all nine processes are shown in pounds in Table 5 above. Because some processes are related, Figure 8 combines them into five general categories to better illustrate trends. The chart visually shows that shipyard maintenance activities have dominated NAVSEA totals since 1999, but releases from munitions manufacturing and disposal have risen each year and may even overtake shipyard releases in future years. These two categories combined with dredging pushed NAVSEA totals close to a million pounds in 2001.

Scrapping and machining operations are workload dependent, but totals remained level and are not expected to drop. The “Other” category (the Philadelphia foundry and GOCO) actually dropped from 32,365 pounds to 17,163 pounds in 2001, but future reductions are not expected to be as dramatic.

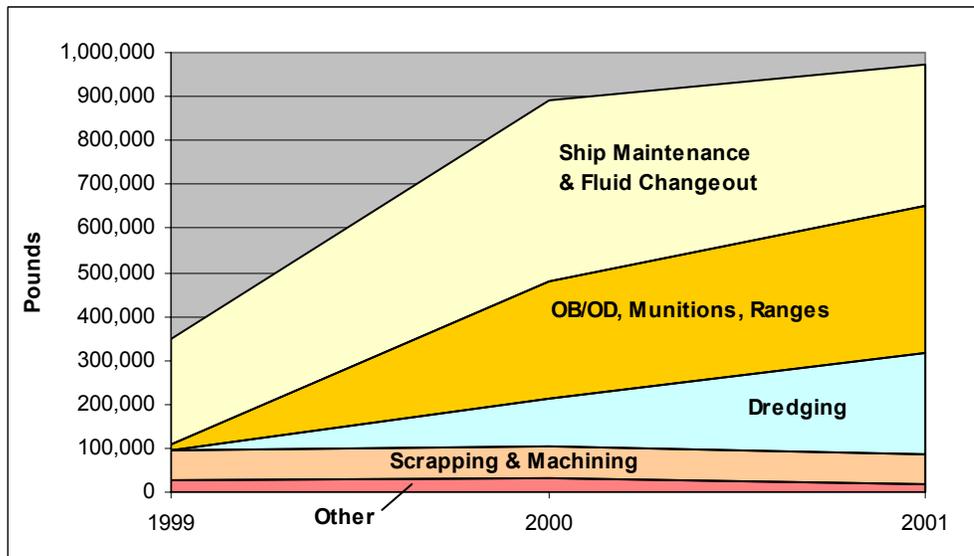


Figure 8 – 1999–2001 NAVSEA Releases by Process

Opportunities. As discussed in the initial report for 1999-2000, NAVSEA reduction initiatives should include aggressive action to find substitutes for the present coatings, thinners and strippers specified for Fleet use. Past TRI release reports for NSY Norfolk show that about 75% of historical releases continue to be related to chemicals present in shipboard paints.

Workload variability also has a large impact on NAVSEA’s reportable TRI and P2 Programs. As an example, releases from increased OB/OD operations at NSWC Crane changed from just over 10,000 pounds in 1999 to more than 260,000 pounds in 2000 and 2001. The total is expected to remain high even though the volume of munitions destroyed is unpredictable from year to year. The doubling of releases at NSY Puget Sound due to maintenance on the USS CARL VINSON in 2000 and the drop-off in releases related to ship maintenance in 2001 illustrates that a change in workload can significantly change release totals. Even relatively small changes in workload can cause facilities to be below the threshold in one year (and report zero releases) and then exceed it in another year and have to report. (CNA 2001 TRI Report).

As discussed in the initial report, any meaningful reduction initiative must include a method of representing data that reflects workload changes until all paints and solvents are free from TRI chemicals. Reduction initiatives also should not rely exclusively on TRI data to identify target releases because some chemicals may escape detection by consistently remaining below the reporting baseline.

References

- [1] Monica Giovachino. *The Navy’s Toxic Release Inventory*, January 2003
- [2] DOD CY00 Toxic Release Inventory Report

Appendix A - Reportable Releases by Facility

<u>Reporting Facility</u>	<u>Chemical</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>Process</u>
Allegany Ballistics Lab	Copper		5	120	GOCO Operations
Allegany Ballistics Lab	Dichloromethane	15,940	15,095	3,590	GOCO Operations
Allegany Ballistics Lab	Lead Compounds			2,765	GOCO Operations
Allegany Ballistics Lab	Manganese			200	GOCO Operations
Allegany Ballistics Lab	Nitroglycerin	180	250	295	GOCO Operations
	Total	16,120	15,350	6,970	
NSWC Crane	Aluminum		2	0	OB/OD
NSWC Crane	Chromium		11,024	12,057	OB/OD
NSWC Crane	Copper	1,029	96,015	247,837	OB/OD / Munitions
NSWC Crane	Lead	1,768	28,010		OB/OD
NSWC Crane	Lead Compounds			6,055	OB/OD / Ranges / Munitions
NSWC Crane	Manganese	7,013			OB/OD
NSWC Crane	Manganese Compounds		67,000		OB/OD
NSWC Crane	Phosphoric Acid	202			Munitions Manufacturing
NSWC Crane	Zinc		61,395		OB/OD
	Total	10,012	263,446	265,963	
NSWC Dahlgren	Lead			30	Munitions Manufacturing
NSWC Dahlgren	Lead Compounds			934	Munitions Manufacturing
	Total			964	
NSWC Indian Head	Lead Compounds			384	Other
NSWC Indian Head	Nitrate Compounds			68,129	Munitions Manufacturing
NSWC Indian Head	Nitric Acid	2,770	2	1	Munitions Manufacturing
NSWC Indian Head	Nitroglycerin		1	1	Munitions Manufacturing
	Total	2,770	3	68,514	
NSWCCD-SSES Philadelphia	Copper	12,221	16,015	8,935	Foundry Operations
NSWCCD-SSES Philadelphia	Lead			63	Other
NSWCCD-SSES Philadelphia	Mercury			26	Foundry Operations
NSWCCD-SSES Philadelphia	Nickel			681	Foundry Operations
	Total	13,014	17,009	9,705	

Appendix A – Reportable Releases by Facility (Continued)

<u>Reporting Facility</u>	<u>Chemical</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>Process</u>
NSY Norfolk	1,2,4-trimethylbenzene			21,640	Ship Maintenance
NSY Norfolk	Copper Compounds	24,220	48,460	24,705	Ship Maintenance
NSY Norfolk	Dichloromethane			2,472	Ship Maintenance
NSY Norfolk	Ethylene Glycol	11,402	15,000	13,514	Fluid change out
NSY Norfolk	Lead			1,608	Ship Maintenance
NSY Norfolk	MEK			15,377	Ship Maintenance
NSY Norfolk	N-butyl Alcohol	54,704	25,900	21,187	Ship Maintenance
NSY Norfolk	Xylene	28,151	52,100	39,398	Ship Maintenance
NSY Norfolk	Zinc Compounds		21,580		Ship Maintenance
	Total	118,477	163,040	139,901	
NSY Portsmouth	Lead			74	Stack Air
NSY Portsmouth	Polycyclic Aromatic Compounds		6		
	Total		6	74	
NSY Puget Sound	Chromium	2,860	25,715	2,295	Scrapping / Dredging
NSY Puget Sound	Copper	17,587	47,604	143,598	Scrapping / Dredging
NSY Puget Sound	Copper Compounds	27,463	37,888	25,659	Ship Maintenance
NSY Puget Sound	Ethylene glycol		81,474	53,298	Fluid change out
NSY Puget Sound	Lead	20,735	57,529	106,051	Scrapping
NSY Puget Sound	Manganese	3,210	3,496	3,778	Scrapping
NSY Puget Sound	MEK		12,700		Ship Maintenance
NSY Puget Sound	N-butyl alcohol	37,035	41,067	43,156	Ship Maintenance
NSY Puget Sound	Nickel	23,711	43,252	44,501	Scrapping
NSY Puget Sound	Xylene	28,885	32,031	13,861	Ship Maintenance / Dredging
NSY Puget Sound	Zinc Compounds	27,902	48,181	42,946	Ship Maintenance
	Total	189,388	430,937	479,773	
	Total NAVSEA	349,781	889,791	971,864	

Appendix B – Reportable Releases by Process

	<u>Chemical</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>Reporting Facility</u>
Foundry Operations	Copper	12,221	16,015	8,935	NSWCCD-SSES Philadelphia
	Lead			63	NSWCCD-SSES Philadelphia
	Mercury			26	NSWCCD-SSES Philadelphia
	Nickel	793	994	681	NSWCCD-SSES Philadelphia
	Total	13,014	17,009	9,705	
Munitions Manufacturing	Chromium			14	NSWC Crane
	Copper			18	NSWC Crane
	Lead Compounds			7	NSWC Crane
	Nitric Acid	2,770	2	1	NSWC Indian Head
	Nitrate Compounds			68,129	NSWC Indian Head
	Phosphoric Acid	202			NSWC Crane
	Total	2,972	2	68,169	
OB/OD	Aluminum		2		NSWC Crane
	Chromium		11,024	12,057	NSWC Crane
	Copper	1,029	96,015	247,819	NSWC Crane
	Lead	1,768	28,010		NSWC Crane
	Lead Compounds			5,022	NSWC Crane / NSWC Dahlgren
	Lead Compounds			934	NSWC Dahlgren
	Manganese	7,013			NSWC Crane
	Manganese Compounds		67,000		NSWC Crane
	Nitroglycerin			1	NSWC Indian Head
	Zinc		61,395		NSWC Crane
	Total	9,810	263,447	265,832	
Ranges	Lead Compounds			1,026	NSWC Crane
	Total			1,026	

Appendix B – Reportable Releases by Process (Continued)

	<u>Chemical</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>Reporting Facility</u>
Scrapping / Machining	Chromium	2,860	2,243		NSY Puget Sound
	Copper	17,587	20,821	19,390	NSY Puget Sound
	Lead	20,735	22,359	31,098	NSY Puget Sound
	Manganese	3,210	3,496	3,778	NSY Puget Sound
	Nickel	23,711	23,107	14,520	NSY Puget Sound
	Total	68,103	72,026	68,786	
Ship Maintenance	1,2,4-trimethylbenzene			21,640	NSY Norfolk
	Chromium			2,925	NSY Puget Sound
	Copper Compounds	24,220	48,460	24,705	NSY Norfolk
	Copper Compounds	27,463	37,888	25,659	NSY Puget Sound
	Lead			1,608	NSY Norfolk
	MEK			15,377	NSY Norfolk
	MEK		12,700		NSY Puget Sound
	N-butyl alcohol	54,704	25,900	21,187	NSY Norfolk
	N-butyl alcohol	37,035	41,067	43,156	NSY Puget Sound
	Xylene	28,151	52,100	39,398	NSY Norfolk
	Xylene	28,885	27,960	13,861	NSY Puget Sound
	Zinc compounds		21,580		NSY Norfolk
	Zinc compounds	27,902	48,181	42,946	NSY Puget Sound
	Total	228,360	315,836	252,462	
Fluid Change Out	Dichloromethane			2,472	NSY Norfolk
	Ethylene Glycol	11,402	15,000	13,514	NSY Norfolk
	Ethylene Glycol		81,474	53,298	NSY Puget Sound
	Total	11,402	96,474	69,284	

Appendix B – Reportable Releases by Process (Continued)

	<u>Chemical</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>Reporting Facility</u>
Dredging	Chromium		23,472		NSY Puget Sound
	Copper		26,783	124,208	NSY Puget Sound
	Lead		35,170	74,953	NSY Puget Sound
	Nickel		20,145	29,981	NSY Puget Sound
	Xylene		4,071		NSY Puget Sound
	Total		109,641		229,142
GOCOs	Copper		5	120	Allegany Ballistics Lab
	Dichloromethane	15,940	15,095	3,590	Allegany Ballistics Lab
	Lead Compounds			2,765	Allegany Ballistics Lab
	Manganese			200	Allegany Ballistics Lab
	Nitroglycerine	180	250	295	Allegany Ballistics Lab
	Total	16,120	15,350	6,970	
Other	Lead			30	NSWCDD Panama City
	Lead			74	NSY Portsmouth
	Lead Compounds		6	384	NSWC Indian Head
	PACs				NSY Portsmouth
	Total		6	488	
	TOTAL NAVSEA	349,781	889,781	971,864	

Appendix C- Reportable Releases by Chemical

	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>Primary Release Source(s)</u>
1,2,4-trimethylbenzene	0	0	21,640	Ship Maintenance
Aluminum	0	2	0	OB/OD
Chromium *	2,860	36,739	14,996	Scrapping
Copper	30,837	159,639	400,490	OB/OD, Scrapping, Foundry, Dredging,
Copper compounds	51,683	86,348	50,364	Ship Maintenance
Dichloromethane *	15,940	15,095	6,062	Ship Maintenance
Ethylene glycol *	11,402	96,474	66,812	Fluid change-out
Lead	22,503	85,539	107,826	OB/OD, Scrapping, Foundry, Dredging
Lead Compounds	0	0	10,138	OB/OD
Manganese	10,223	3,496	3,978	Scrapping, OB/OD
Manganese compounds	0	67,000	0	OB/OD
MEK*	0	12,700	15,377	Ship Maintenance
Mercury *	0	0	26	Foundry Operations
N-butyl alcohol *	91,739	66,967	64,343	Ship Maintenance
Nickel	24,504	44,246	45,182	OB/OD, Scrapping, Foundry, Dredging
Nitrate Compounds	0	0	68,129	Munitions Manufacturing
Nitric Acid	1,770	2	1	Munitions Manufacturing
Nitroglycerin	180	251	295	OB/OD
Polycyclic Aromatic Compounds	0	6	0	Stack Air
Xylene *	57,036	84,131	53,259	Ship Maintenance, Dredging
Zinc	0	61,395	0	OB/OD, Scrapping, Foundry, Dredging
Zinc compounds	27,902	69,761	42,946	Ship Maintenance
Total	349,781	889,791	971,863	

Appendix D – 2001 Reportable Releases

Chemical	NSY Puget Sound	NSY Norfolk	NSWC Crane	NSWCCD Philadelphia	Allegany Bal. Lab	NSWC Dahlgren	NSWC Ind. Head	NSY Portsmouth	NAVSEA Total	NAVY Total	DOD Total
1,2,4-trimethylbenzene		21,640							21,640	21,640	No Data Available
Chromium	2,925		12,071						14,996	14,996	
Copper	143,598		247,837	8,935	120				400,490	415,190	
Copper compounds	25,659	24,705							50,364	50,364	
Dichloromethane		2,472			3,590				6,062	35,902	
Ethylene glycol	53,298	13,514							66,812	67,452	
Lead	106,051	1,608		63		30		74	107,826	126,425	
Lead Compounds			6,055		2,765	934	384		10,138	10,576	
Manganese	3,778				200				3,978	3,978	
MEK		15,377							15,377	43,892	
Mercury				26					26	33,326	
N-butyl alcohol	43,156	21,187							64,343	111,743	
Nickel	44,501			681					45,182	45,182	
Nitrate compounds							68,129		68,129	68,129	
Nitric acid							1		1	1	
Nitroglycerin					295				295	295	
Xylene	13,861	39,398							53,259	66,959	
Zinc compounds	42,946								42,946	42,946	
Subtotal									971,864	1,158,997	
Other Chemicals										135,540	
Grand Total	479,773	139,901	265,963	9,705	6,970	964	68,514	74	971,864	1,294,537	