UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

Region 10: Persistent, Bioaccumulative, and Toxic Chemical Summary Report:

Toxic Release Inventory Trends 1991 - 1997

October 1999

TABLE OF CONTENTS

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BACKGROUND

On November 9, 1998 (63 FR 60332), the Environmental Protection Agency (EPA) Office of Solid Waste published a draft list of fifty-three persistent, bioaccumulative, and toxic (PBT) chemicals. EPA is targeting PBT chemicals for voluntary reduction in response to the Government Performance and Results Act (GPRA). Specifically, the EPA Office of Solid Waste committed to the following GPRA goal:

- ***By 2005, reduce the most persistent, bioaccumulative, and toxic chemicals in our nation's hazardous waste streams by 50% as compared with a baseline year of 1991.***

A cross-Agency workgroup, with representatives from all media offices (including the EPA Office of Solid Waste, Office of Pollution Prevention and Toxic Substances, Office of Water, and Office of Air and Radiation), expects to finalize the PBT list by winter 2000. Due to a revised, stricter definition of PBT, several of the original fifty-three PBT chemicals may not be on the finalized list. For example, many of the metals such as zinc and nickel, fail to meet the revised PBT criteria because of low bioaccumulative potential. Also, an increased emphasis on cross media air and water transfers may add several new chemicals to the list.[1]

This report is an attempt to measure how EPA Region 10 and its four state partners (AK, ID, OR, and WA) would rank if the GPRA 2005 goal were measured today. Since the PBT chemical list is not final, this report is a preliminary assessment. However, initial trends are encouraging. The 1991-1997 Toxic Release Inventory data shows remarkable PBT chemical pollution prevention success in Alaska and Washington. In both states, facilities reduced production-related waste beyond the 50% target set by the GPRA goal. Furthermore, facilities in Oregon reduced reported PBT waste by 19%. These results are significantly better than the national average, which is an 18% increase in PBT waste from 1991 to 1997. EPA Region 10 applauds the pollution prevention success achieved to date in the region.

The analysis of Idaho TRI data is complicated by reporting error and the revised definition of PBT chemicals. Idaho experienced a seventy-six million pound increase in reported PBT waste in 1997. This increase is the result of reporting error by a single facility, P4 Productions, L.L.C. The

[1] The above conclusions are based on informal conversations with EPA workgroup members. No official announcements concerning the PBT list will be made until publication of the winter 2000 FR notice.

facility should have reported their waste stream throughout the 1991-1996 reporting years, thus leveling the 1997 spike in the data. Moreover, it is doubtful that this facility's waste will be considered a PBT chemical upon list finalization. The substance in question is nonhazardous, Bevill-exempt mining waste. Due to low bioaccumulative potential, most heavy metal mining wastes will not meet the revised PBT definition proposed for the finalized list. When this waste stream is removed from the analysis, TRI data shows a 7% reduction in PBT chemical waste in Idaho and a 41% reduction in PBT chemical waste in Region 10.

Finally, this report is an attempt to identify common priorities and areas for potential collaboration in helping Idaho and Oregon achieve the same level of pollution prevention success as Washington and Alaska. EPA Region 10 would like to work with both the Idaho Division of Environmental Quality and the Oregon Department of Environmental Quality in finding ways to measure and achieve tangible pollution prevention results.

CHEMICALS ON THE NOVEMBER 9, 1998 DRAFT WASTE MINIMIZATION PBT LIST (63 FR 60332)

- Dioxins
- Furans

Chlorinated Solvents:

- Chloroform
- 1,1-Dichloroethane
- 1,1,1-Trichloroethane

Chlorobenzenes:

- 1,2-Dichlorobenzene
- 1,3-Dichlorobenzene
- 1,4-Dichlorobenzene
- 1,2,4-Trichlorobenzene
- 1,2,4,5-Tetrachlorobenzene
- Pentachlorobenzene
- Hexachlorobenzene

Other Halogenated Organics:

- 4-Bromophenyl phenyl ether
- Hexachlorobutadiene
- Octachlorostyrene

Pesticides

- alpha-Endosulfan
- beta-Endosulfan
- Heptachlor
- Heptachlor epoxide
- gamma-Hexachlorocyclohexane
- Methoxychlor
- Pentachloronitrobenzene
- Pentachlorophenol
- 2,4,5-Trichlorophenol

Organonitrogens:

- Nitrobenzene

Nonhalogenated Phenolics:

- Phenol
- 2,4,6-tris-(1,1-Dimethylethyl)phenol

Phthalate esters:

- Bis-(2-ehylhexyl)phthalate
- Butylbenzyl phthalate
- Dibutyl phthalate

Polycyclic aromatic hydrocarbons

- Acenaphthene
- Acenapthylene
- Anthracene
- Benzo(g,h,l)perylene
- Fluoranthene
- Fluorene
- 2-Methylnaphthalene
- PAH group (as defined in TRI)
- Phenanthrene
- Pyrene

Metals and metal compounds

- Antimony
- Arsenic
- Cadmium
- Chromium
- Copper
- Lead
- Mercury
- Nickel
- Selenium
- Zinc
- Cyanide

METHODS

Data in this report is taken from the *Right to Know Network* Toxic Release Inventory database, which is available at the following Internet address: http://www.rtk.net/. PBT chemicals were searched by CAS number, except for metals. In the case of metals, the search included both the elemental metal and related metal compounds. This methodology is consistent with the methodology used in the creation of the draft PBT list.

The definitions in this report are based on TRI categories. Small quantity generators, households, and non-industrial sectors are exempt from TRI reporting. Therefore, the TRI category "Total Production-Related Waste" represents only waste from large industrial facilities and not the sum total of all waste within a geographic area. The "Total Production-Related Waste" TRI category also excludes remediation activities and accidental spills. Accidental spill information, although not covered by production-related waste, is accounted for in the total on-site release measurement. Recycling, as defined in this report, is the sum of TRI categories "On-site Recycling" and "Off-site Recycling." The TRI category "Total On-site Releases" includes air, water, underground injection wells, and land releases. This report aims to measure all cross media impacts of hazardous waste management.

The chemical Phenanthrene and the chemical group Polycyclic Aromatic Hydrocarbons (PAHs) were added to TRI reporting in 1995. In this analysis, references to the 1991 baseline include 1995 data for these two chemicals. Reported production-related waste of these two chemicals is negligible in Alaska, Idaho, and Oregon. In these states, inclusion of 1995 data does not significantly affect reduction percentages. Reported production-related waste of Phenanthrene and PAHs was much higher in Washington, possibly due to more sophisticated TRI reporting. However, reductions in the period 1995 to 1997 were consistent with 1991 baseline reduction percentages. Therefore, inclusion of the 1995 data had little effect on overall results.

PBT CHEMICALS NOT MEASURED IN THIS REPORT

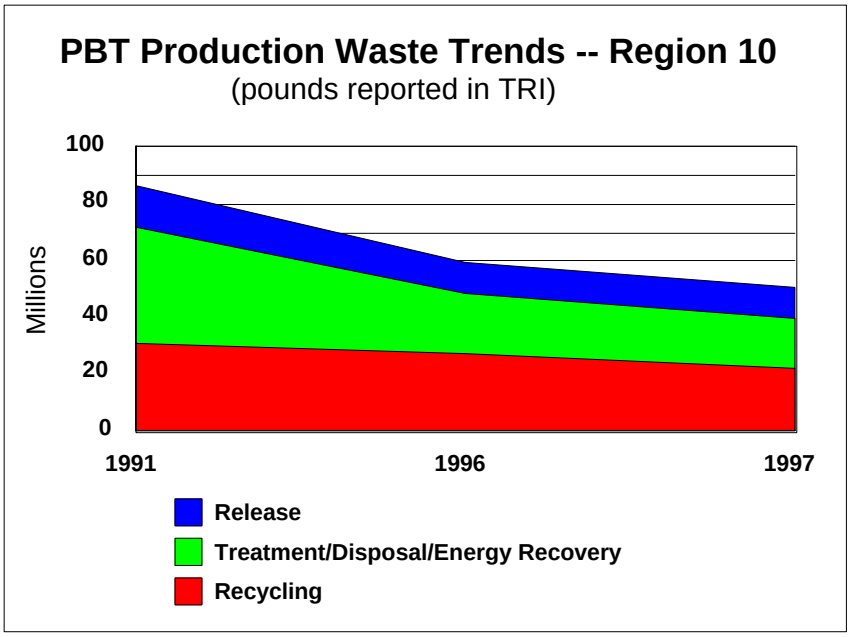
The following twenty-one chemicals from the November 8, 1998 PBT list are not currently reported in TRI. No reliable quantitative information is available for these chemicals, therefore they have been excluded from the analysis in this report. Chemicals marked with an asterisks have been proposed for addition to TRI reporting. If this proposal passes Office of Management and Budget (OMB) review, these chemicals will be included in the year 2000 reporting cycle.

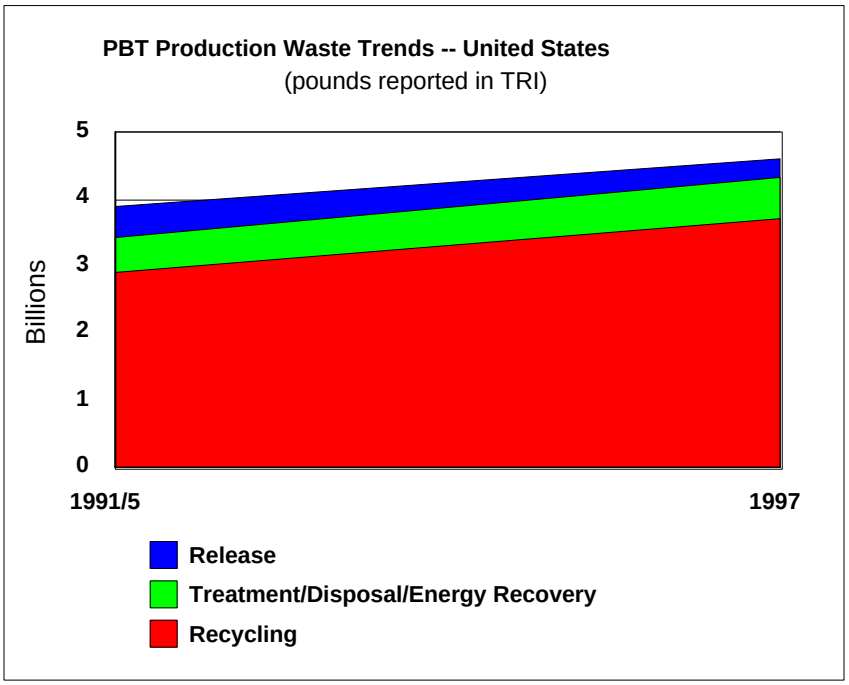
Dioxin / Furan group*
1,1-Dichloroethane
1,2,4,5-Tetrachlorobenzene
Pentachlorobenzene*
4-Bromophenyl phenyl ether
Octachlorostyrene*
alpha-Endosulfan
beta-Endosulfan
Heptachlor epoxide
gamma-Hexachlorocyclohexane
Pentachloronitrobenzene
2,4,6-tris-(1,1-Dimethylethyl)phenol
Bis-(2-ehylhexyl)phthalate
Acenaphthene
Acenapthylene
Benzo(g,h,l)perylene*
Fluoranthene*
Fluorene
2-Methylnaphthalene
Pyrene

The eleven chemicals listed below are tracked in the TRI database, however no Region 10 facilities surpassed the 10,000 pound usage threshold that triggers TRI reporting for these specific chemicals. Some of these chemicals such as heptachlor, methoxychlor, and 2,4,5-trichlorophenol are pesticides. Non-industrial entities such as farms, households, and businesses with less than ten employees are not required to report to TRI, therefore actual releases of these chemicals may be occurring but are not reported to TRI. A proposed TRI rule, if finalized, may lower the reporting thresholds for several of the PBT chemicals marked below with an asterisks(*). Efforts have also been made by EPA Headquarters to expand the number of SIC codes required to report under TRI.

1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Hexachlorobenzene*
Hexachlorobutadiene
Heptachlor*
Methoxychlor*
2,4,5-Trichlorophenol
Nitrobenzene
Butylbenzyl phthalate
Beryllium and compounds

PRODUCTION WASTE: COMPARISON OF REGION 10 VS. NATIONAL TRENDS

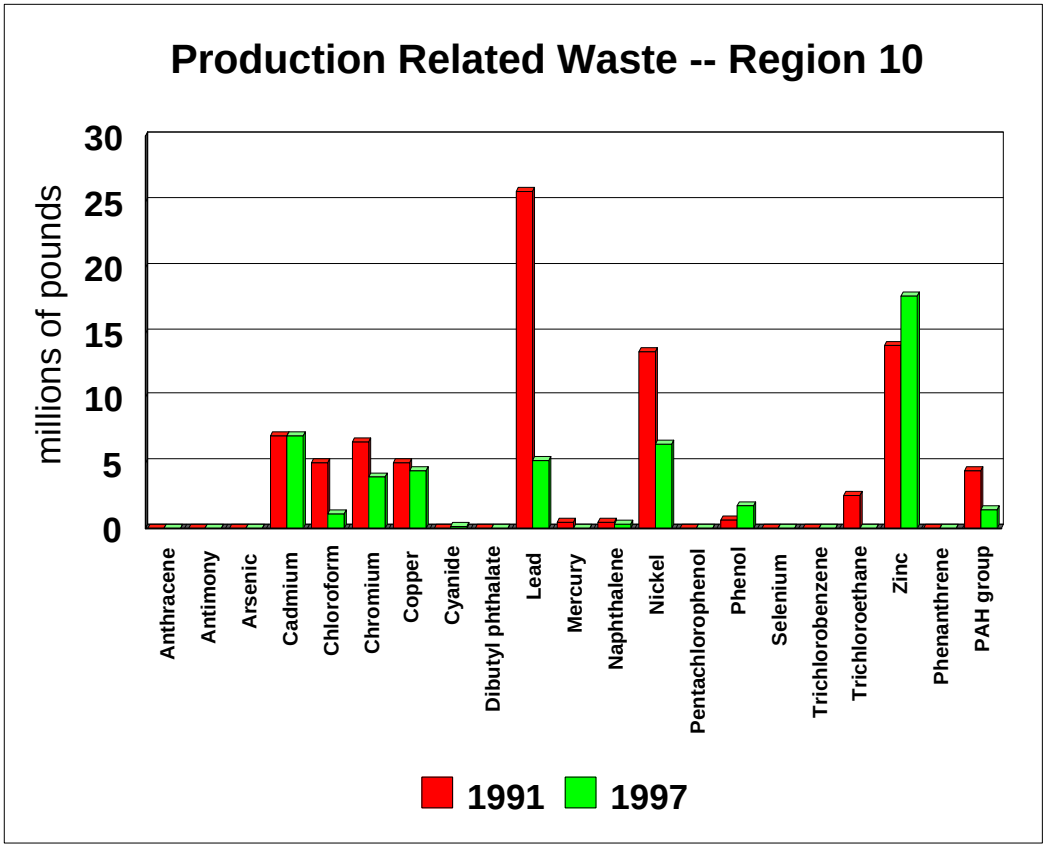




These two graphs show regional and national trends for the twenty-one PBT chemicals measurable with TRI data. Based on this preliminary data, results in Region 10 are impressive. Region 10 facilities reduced total waste from 87 million pounds to 51 million pounds. This 36 million pound reduction is a 41% decrease in total PBT production waste. This result is dramatically better than the national average which is an 18% increase in PBT production waste between 1991 and 1997. Region 10's favorable results may change when the PBT list is finalized. However, based on the draft 1998 PBT list, Region 10 appears well positioned to meet the year 2005 GPRA goal targeting a 50% reduction.

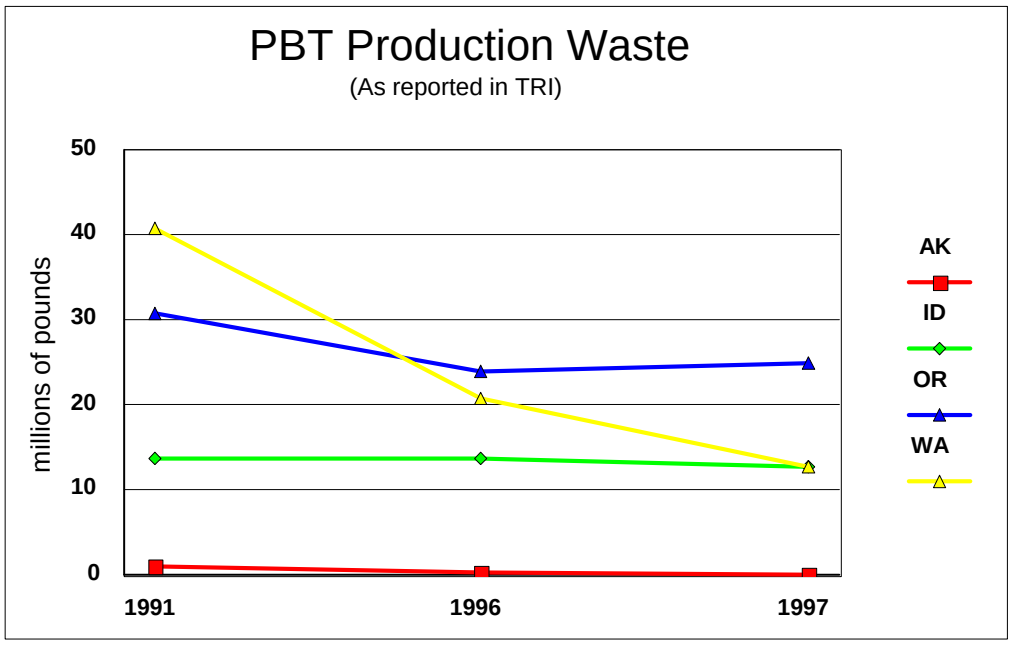
PBT PRODUCTION WASTE BY CHEMICAL (1991-1997)

As shown in the graph below, Region 10 facilities achieved pollution prevention success primarily through waste minimization and source reduction of lead and lead compounds. Industrial facilities cut lead production waste from 25 million pounds in 1991 to 5 million pounds in 1997, an 80% reduction. Region 10 facilities also reduced nickel and nickel compound waste from 14 million pounds to 7 million pounds. These two waste streams accounted for the greatest gross weight reduction. On a percentage basis, there were several impressive results. Reported TRI mercury releases declined 99%. Chloroform and Trichloroethane production waste declined 76% and 98%, respectively. Trichlorobenzene production waste was completely eliminated between 1991 and 1997.



REGION 10 STATE COMPARISONS

Credit for regional success in PBT waste reduction goes largely to Washington State. Washington reduced total PBT waste from 41 million pounds in 1991 to 13 million pounds in 1997, a 69% reduction. Washington's 28 million pound reduction accounts for over three-quarters of the total regional reduction. This success is the result of the progressive Hazardous Waste Reduction Act of 1990. This Washington law requires TRI reporters or any facilities generating over 2,640 pounds of hazardous wastes per year to submit pollution prevention plans, set voluntary reduction targets, and pay a fee to the state hazardous waste program. This fee supports pollution prevention outreach, research, and technical assistance to the facilities. Facilities also have the option of inviting a Washington Department of Ecology engineer to work on more extensive pollution prevention projects under the TREE (Toxic Reduction Engineer Exchange) program.



Recently, Washington's pollution prevention programs have been sector based. However in December 1998, Washington became one of the first states in the nation to initiate an independent state-led PBT effort. In 1999, Washington submitted four grant proposals to compete for national PBT funds from the EPA Office of Pollution Prevention and Toxic Substances. These efforts were unsuccessful due to EPA Headquarters budget limitations. However, Region 10

anticipates submitting future Washington proposals as grant opportunities emerge in the coming years.

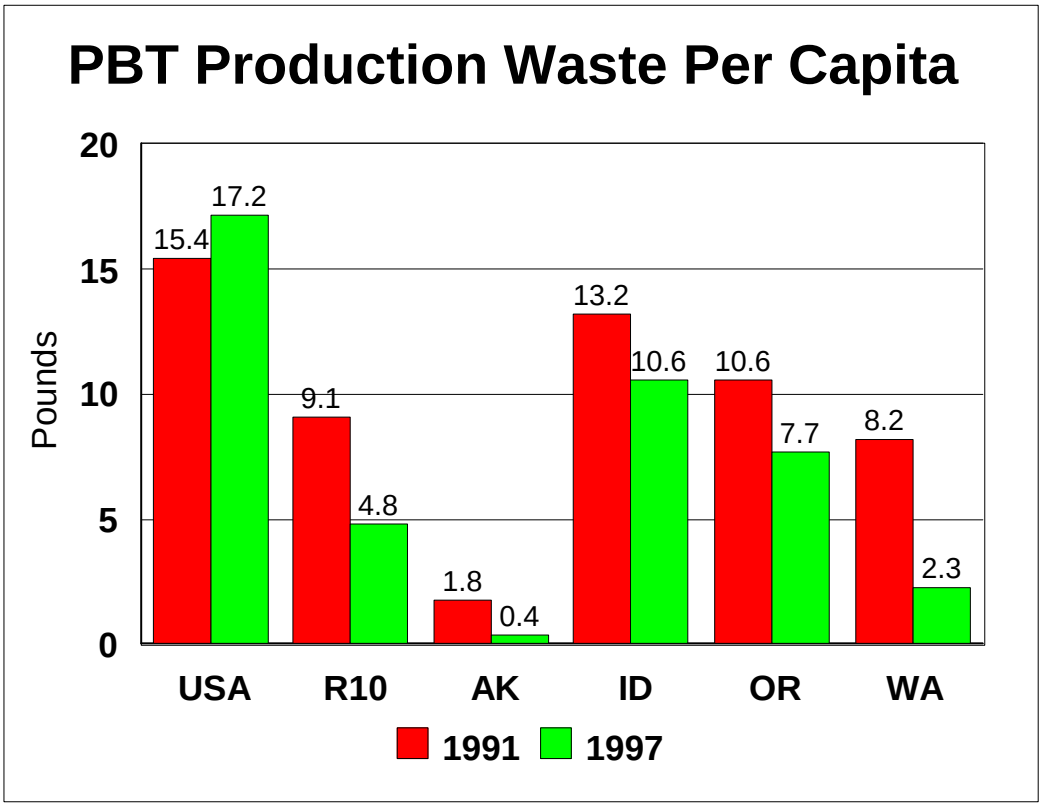
On a percentage basis, Alaska's reductions are also impressive. Since Alaska has a very small universe creating PBT wastes, pollution prevention efforts at the two largest TRI waste reporters, Unocal Agricultural Products and Ketchikan Pulp Co., had a big impact on overall waste reduction numbers. Alaska's PBT waste universe, mainly chloroform, declined from 1 million pounds in 1991 to approximately two-hundred thousand pounds in 1997, a 77% decrease.

PBT trends in Oregon between 1991-1996 are good, however the most recent data between 1996-1997 shows disturbing signs of reversing earlier progress. Oregon's 19% reduction in PBT waste from 1991-1997 is much better than the national trend. Facilities in Oregon reported a 7 million pound reduction of PBT production wastes between 1991-1996, from 31 million pounds to 24 million pounds. However the 1997 reporting year shows a one million pound increase in PBT waste production since 1996. Though patterned after Washington's 1990 Hazardous Waste Reduction Act, Oregon's Toxic Use Reduction Act appears to lack the enforcement authority and budget necessary to achieve the aggressive results demonstrated by Washington State. This situation may change due to Governor John Kitzhaber's recent Executive Order 99-13, issued September 27, 1999, which addresses PBTs and hormone-disrupting contaminates.

During the period 1991-1997, Idaho facilities achieved a 7% reduction in PBT wastes. This percentage excludes 1997 TRI data for zinc waste produced by the P4 Production L.L.C. facility in Idaho. This waste was excluded from analysis because of TRI reporting errors in 1991 and 1996. The zinc waste in question is unlikely to meet the more stringent PBT criteria that will be proposed in the finalized PBT list. However, if zinc waste from the P4 Production L.L.C. facility is included in the analysis, Idaho's percentage diminishes to a 1% reduction from 1991-1997.

PRODUCTION WASTE PER CAPITA

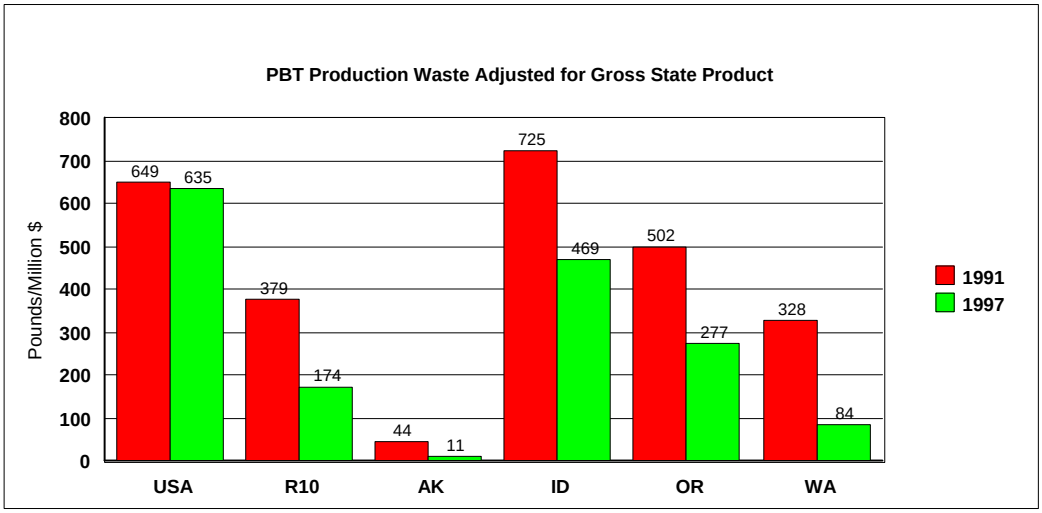
Critics cite population growth as a challenge to meeting waste reduction targets. Between 1991 and 1997, Alaska, Idaho, Oregon, and Washington experienced total population growth of 7%, 16%, 11%, and 12% respectively, compared to the national average of 6%. When adjusted for population growth, PBT waste reduction percentages for Idaho and Oregon improve to 20% and 27%, respectively. However, results for Washington illustrate that it is possible to meet waste reduction targets during periods of booming population growth. Washington's 2.3 pounds of production waste per person in 1997 is one-seventh the national average. The Region as a whole produced 4.8 pounds of PBT production waste per person in 1997, which is less than one-third the national average.



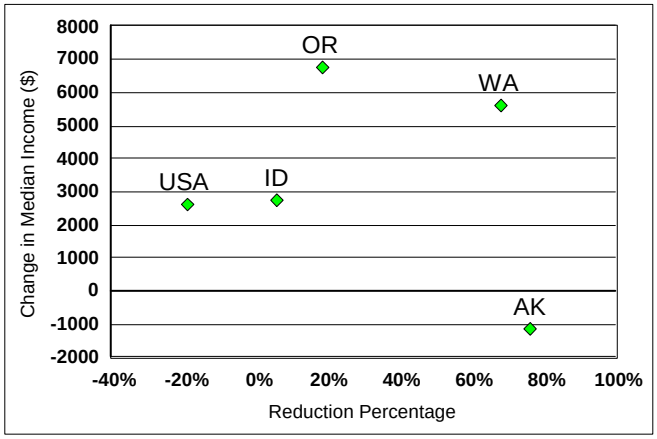
ECONOMIC FACTORS

The Government Performance and Results Act (GPRA) reduction target is based on a static 1991 baseline. During the period 1991-1997, the gross state products of Idaho, Oregon, and Washington increased 44%, 47%, and 22%, in real dollar terms, compared to the national gross domestic product increase of 21%. Unlike the other Region 10 states, the gross state product of Alaska declined 6% from 1991 to 1997.

The graph below shows the number of pounds of PBT waste reported to the Toxic Release Inventory for every million dollars of gross state product (adjusted for inflation). After accounting for economic growth, trends for all the Region 10 states are much better than the national average. Foremost among the states is Washington, with a mere 84 pounds of PBT waste per million dollars of gross state product. The final chart, at the bottom of this page shows the change in median household income, adjusted for inflation, during the period 1991-97 on the y-axis

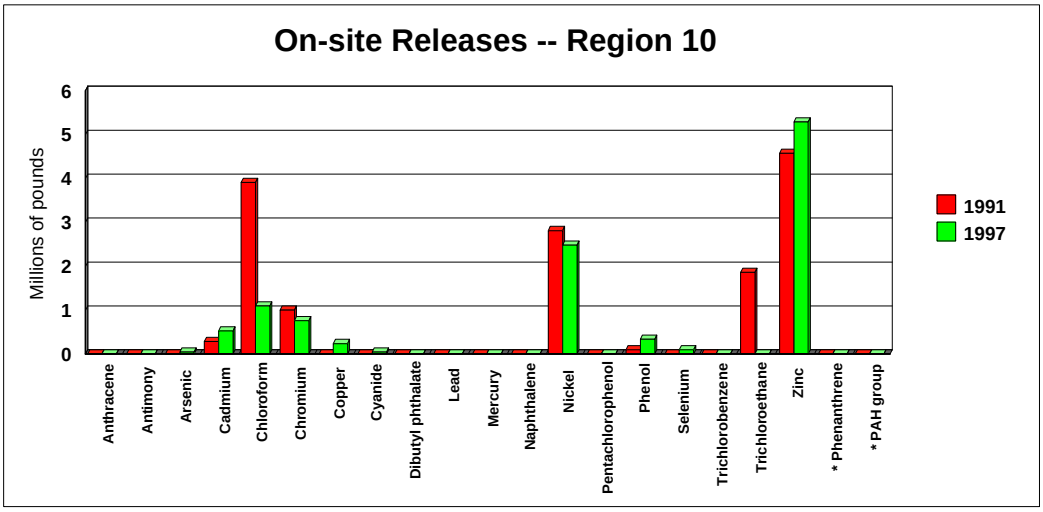


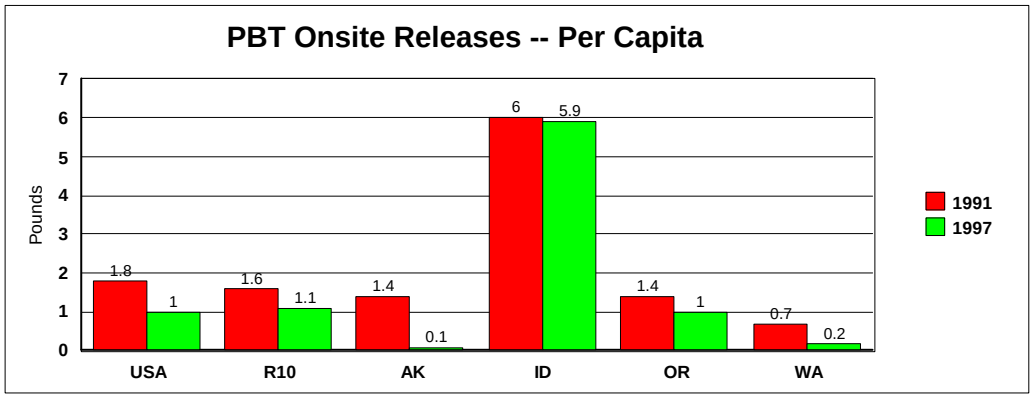
versus the amount of PBT waste reduction on the x-axis. As illustrated by Washington in the graph, it is possible to effectively reduce PBT waste while increasing real household income.



ON-SITE RELEASES

Though not part of the waste minimization Government Performance and Results Act (GPRA) goal, on-site release trends for PBT chemicals are extremely important. Overall, Region 10 facilities reduced PBT releases to the environment by 24%. Similar to the trends in production waste, Washington and Alaska led the Region 10 states with reductions of 73% and 93%, respectively. Oregon reduced on-site releases between 1991-96, but the 1997 TRI reporting year shows an increase in releases from 1996-97. Lastly, Idaho had the greatest on-site release quantity, approximately 7 million pounds. Idaho was also the only state in the Region to increase PBT onsite releases, with a 14% increase from 1991-1996. Because of releases in Idaho, Region 10 is doing slightly worse than the rest of the nation in terms of PBT chemical release per capita. However, it is important to note that zinc, nickel, and a number of other metal compound families will likely fail to meet the revised persistent, bioaccumulative, and toxic (PBT) definition. Since these metals comprise over three-quarters of onsite releases in Idaho and Oregon, release trends in the Region may change upon finalization of the pollution prevention PBT list.





CONCLUSION AND RECOMMENDATIONS

There are many limitations to the Toxic Release Inventory. Facilities are required to report release or other chemical management activity (recycling, energy recovery, treatment, etc.) only if they exceed a 10,000 pound usage threshold for that specific chemical. Secondly, only specific industrial SIC categories are required to report. Lastly, facilities self report based on estimated rather than measured amounts. Due to these factors, critics of the TRI complain that it captures only a tiny segment of pollution problems and pollution prevention opportunities. In particular, households, small facilities, and facilities that are not in the industrial sector, such as agricultural suppliers, are excluded from analysis using TRI.

The criticisms listed above are valid. However, since the first reporting year in 1987, the TRI database has become progressively more sophisticated. In the 1995 reporting year, EPA added an additional 300 toxic chemicals. In the 1998 reporting year, EPA added seven additional SIC sectors including mining and wholesale distributers of chemicals and petroleum. Currently, a new TRI rule proposes lowering reporting thresholds for a number of persistent, bioaccumulative, and toxic chemicals such as dioxins. Despite its limitations, TRI is an effective tool for measuring trends. Furthermore, TRI appears to be the only tool capable of measuring progress with respect to the Government Performance and Results Act. Since GPRA reporting to Congress may have significant implications, it is in the best interest of both states and the EPA to demonstrate pollution prevention success based on clear, quantitative results.

Overall, PBT production-related waste trends in Region 10 appear promising. Due to Washington's pollution prevention success during the period 1991-1997, the region appears likely to meet the 50% waste reduction target. Regionally, this positive outcome hinges on the assumption that several of the metal compounds on the draft PBT list will not be included in the finalized PBT list. Otherwise, waste from the primary metals industry, especially in Idaho, could jeopardize regional progress towards the GPRA waste reduction goal.

Even with metal compounds excluded from the analysis, waste reduction trends in Idaho are disappointing. Unlike Alaska, Oregon, and Washington which have aggressive pollution prevention programs, the Idaho Division of Environmental Quality appears to have few resources devoted to source reduction or recycling. This report does not mean to imply that wastes in Idaho are being improperly disposed. However, from a pollution prevention standpoint, recycling and waste reduction are superior to land disposal or treatment. In the long term, with the

rising cost of remediation activities and liability risk, it appears financially beneficial to both facilities and the state to invest in source reduction technologies.

Lastly, continued PBT chemical source reduction in Oregon is key to meeting the overall Region 10 waste minimization GPRA goal. PBT trends in Oregon between 1991-1996 are good, however the most recent data between 1996-1997 shows disturbing signs of reversing earlier progress. Region 10 is eager to work with the Oregon Department of Environmental Quality to support PBT chemical activities and voluntary waste minimization efforts. Region 10 is also open to discussing alternative means of quantifying pollution prevention success other than using the TRI database. Since waste minimization is a voluntary program, it allows for increased flexibility in state/EPA cooperation.

Appendix

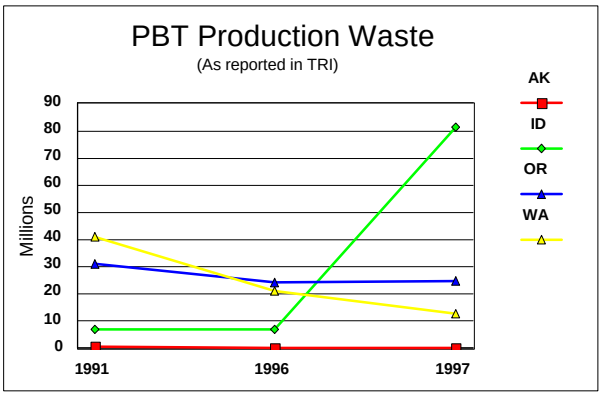
RESULTS -- REGION 10 -- OVERVIEW

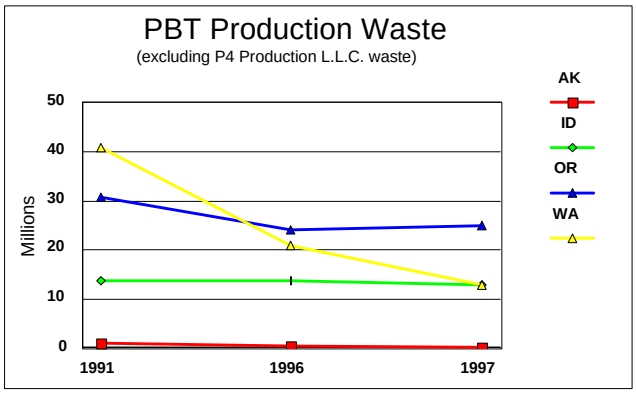
Reported TRI production-related waste (uncorrected for reporting error)

Total Waste	1991	1996	1997	Change	%
AK	1,009,140	378,323	236,558	(772,582)	-77%
ID	6,855,625	6,832,330	81,592,359	74,736,734	1090%
OR	30,909,139	24,099,768	25,005,945	(5,903,194)	-19%
WA	40,916,936	20,970,049	12,834,415	(28,082,521)	-69%
Total	**79,690,840**	**52,280,470**	**119,669,277**	**39,978,437**	**50%**

Reported TRI production-related waste (adjusted for P4 Production L.L.C. waste):

Total Waste	1991	1996	1997	Change	%
AK	1,009,140	378,323	236,558	(772,582)	-77%
ID	13,705,625	13,682,330	12,792,359	(913,266)	-7%
OR	30,909,139	24,099,768	25,005,945	(5,903,194)	-19%
WA	40,916,936	20,970,049	12,834,415	(28,082,521)	-69%
Total	**86,540,840**	**59,130,470**	**50,869,277**	**(35,671,563)**	**-41%**





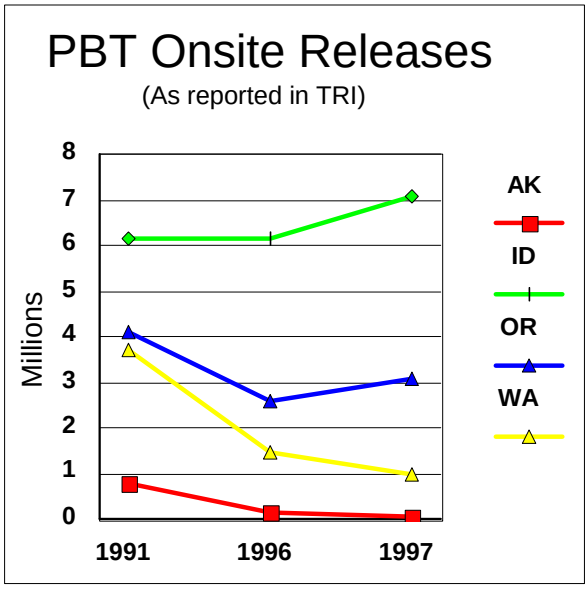
GPRA performance numbers for Region 10 and Idaho are skewed by a 76 million pound reporting error at one Idaho facility, P4 Production L.L.C. Due to confusion over whether the facility should report process waste from phosphorous mining, P4 Production L.L.C. neglected to report zinc waste during the 1991 and 1996 reporting years. The facility did correct its 1997 data, thus creating a large spike in the raw data. Since zinc is no longer a likely candidate chemical for the finalized PBT list, the waste stream from this facility was removed from analysis in this report. The Idaho Division of Environmental Quality confirmed that the zinc byproduct is not a hazardous waste and is outside the scope of RCRA due to the Bevill exemption for mining wastes.

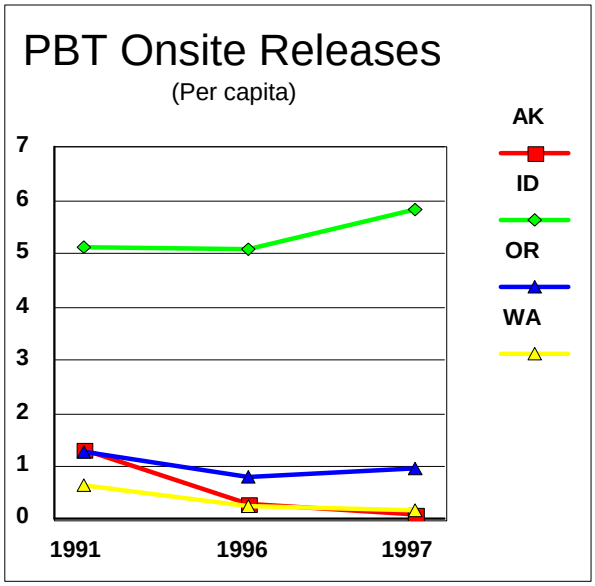
Total On-site Releases

Total Releases	1991	1996	1997	Change	%
AK	793,140	172,274	53,332	(739,808)	-93%
ID	6,185,833	6,151,261	7,073,888	888,055	14%
OR	4,111,342	2,605,075	3,083,942	(1,027,400)	-25%
WA	3,726,931	1,484,688	990,027	(2,736,904)	-73%
Total	**14,817,246**	**10,413,298**	**11,201,189**	**(3,616,057)**	**-24%**

On-site Releases Per Capita

Total Releases Per Capita	Population	1991	1996	1997	Change	%
AK	609,655	1.30	0.28	0.09	(1.21)	-93%
ID	1,208,865	5.12	5.09	5.85	0.73	14%
OR	3,243,272	1.27	0.80	0.95	(0.32)	-25%
WA	5,614,151	0.66	0.26	0.18	(0.49)	-73%
Total	**10,675,943**	**1.39**	**0.98**	**1.05**	**(0.34)**	**-24%**

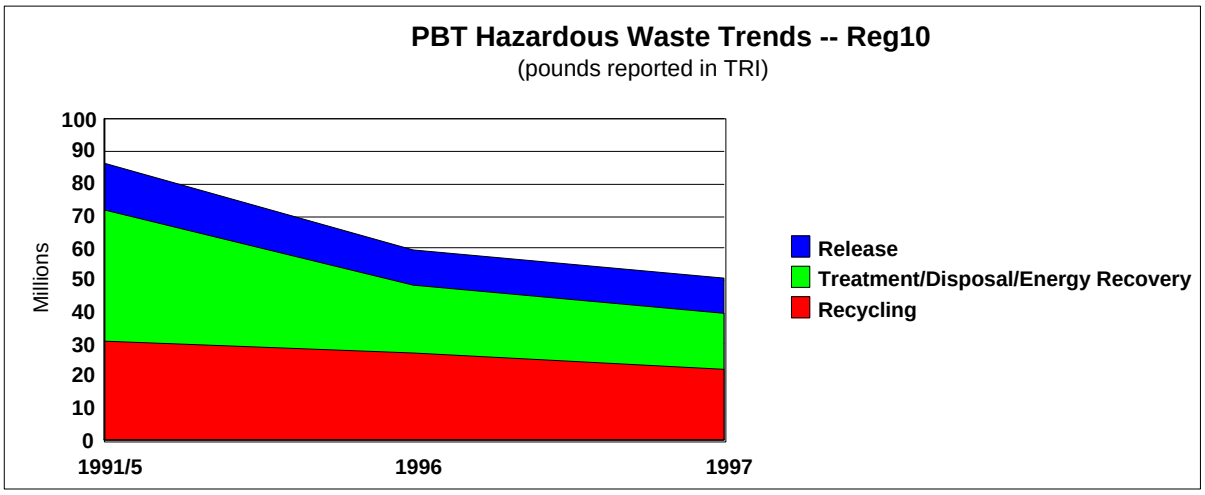




RESULTS -- REGION 10 / NATIONAL COMPARISON

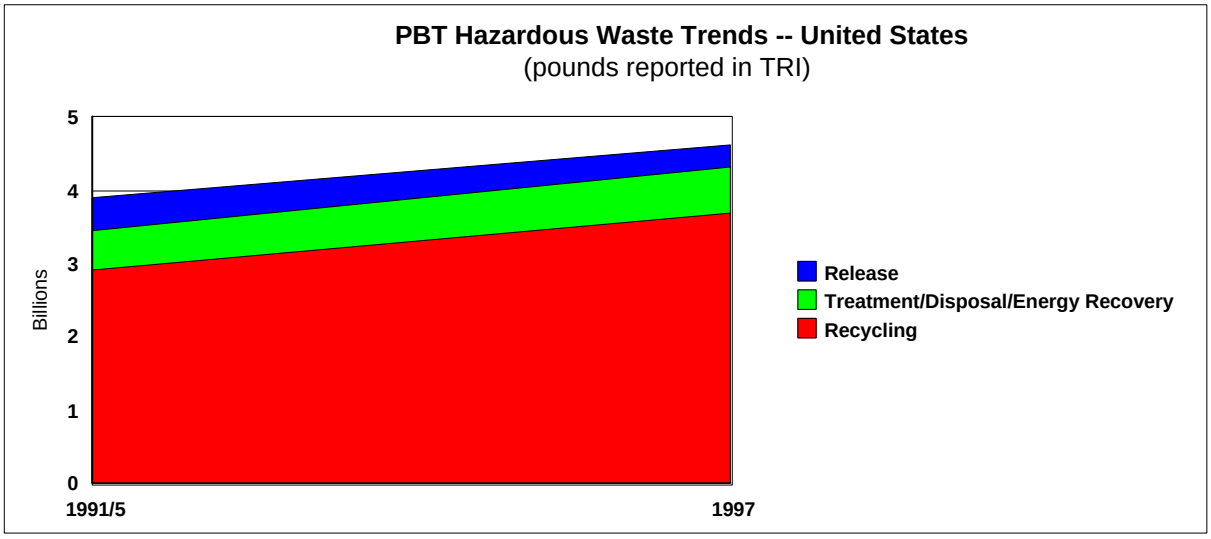
Region 10:

Year	Total waste	Release	Treatment, Disposal, and Energy Recovery	Recycling
1991/5	86,540,840	14,817,246	40,420,960	31,302,634
1996	59,130,470	10,413,298	21,304,949	27,412,223
1997	50,869,277	11,201,189	17,382,395	22,285,693
% change	-41%	-24%	-57%	-29%



National:

Year	Total waste	Release	Treatment, Disposal, and Energy Recovery	Recycling
1991/5	3,892,953,485	444,954,201	539,447,048	2,908,552,236
1997	4,611,776,980	278,201,118	623,908,210	3,709,667,652
% change	18%	-37%	16%	28%



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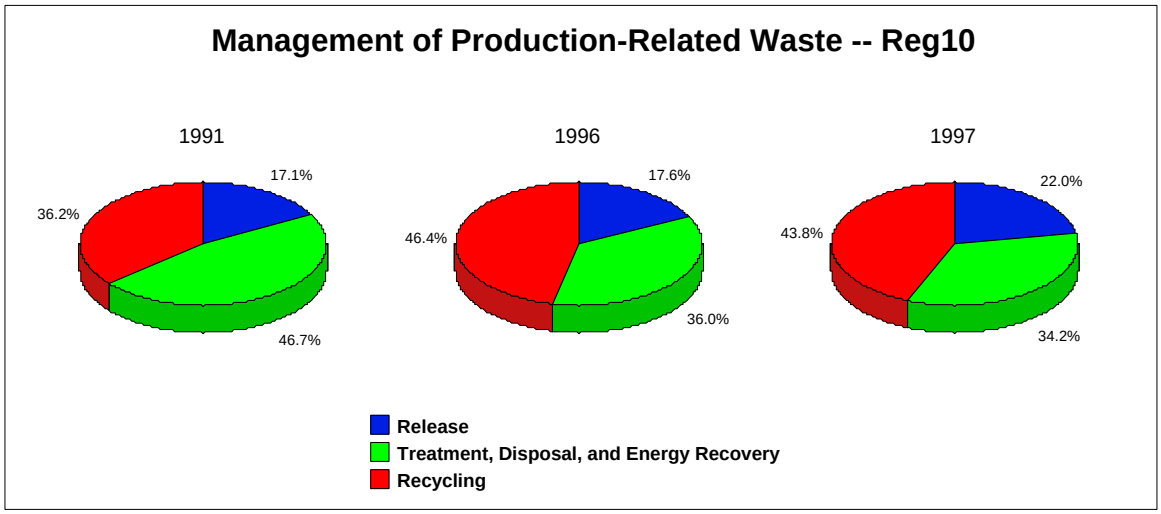
% change	-41%	-24%	-57%	-29%



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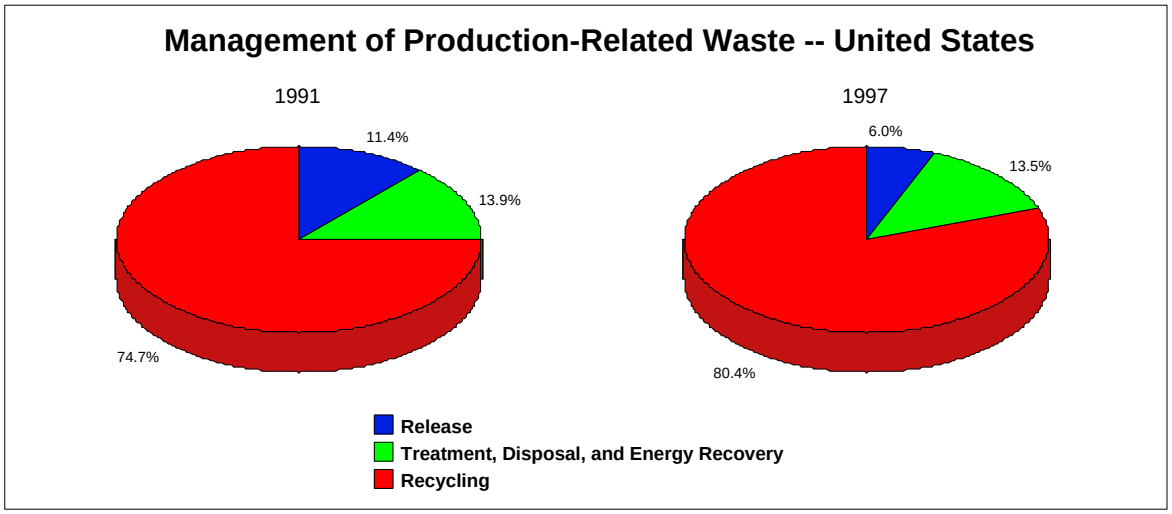
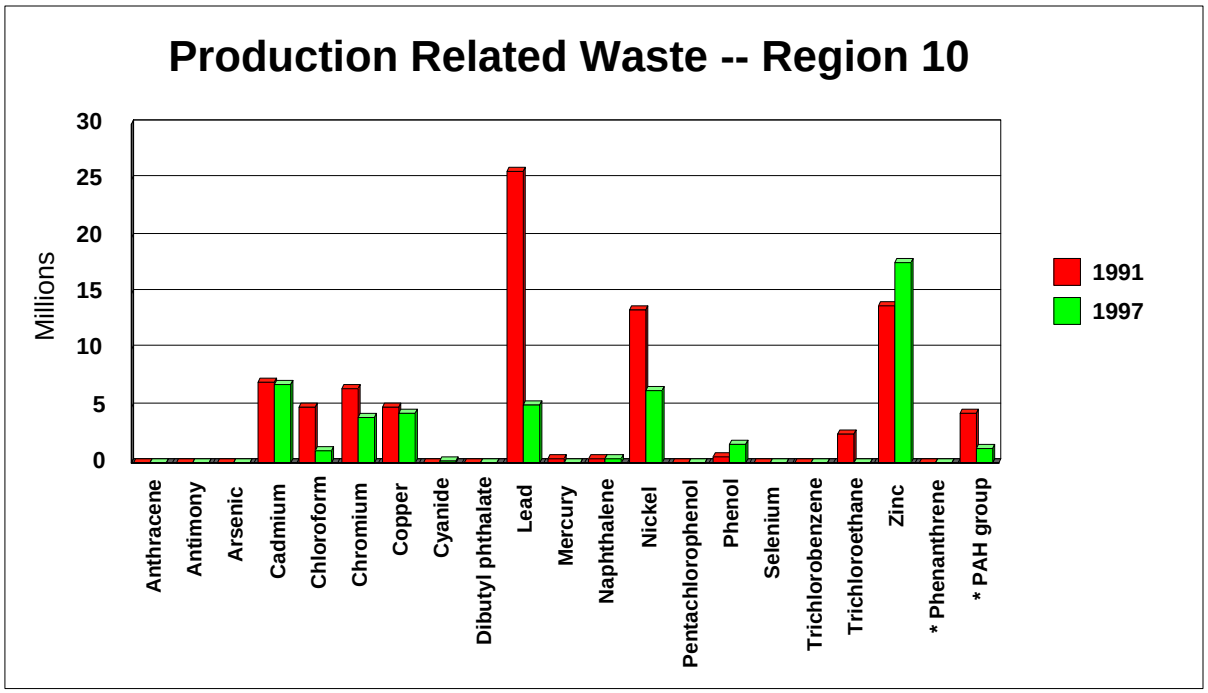
Year	Total waste	Release	Treatment, Disposal, and Energy Recovery	Recycling
1991/5	3,892,953,485	444,954,201	539,447,048	2,908,552,236
1997	4,611,776,980	278,201,118	623,908,210	3,709,667,652
% change	18%	-37%	16%	28%



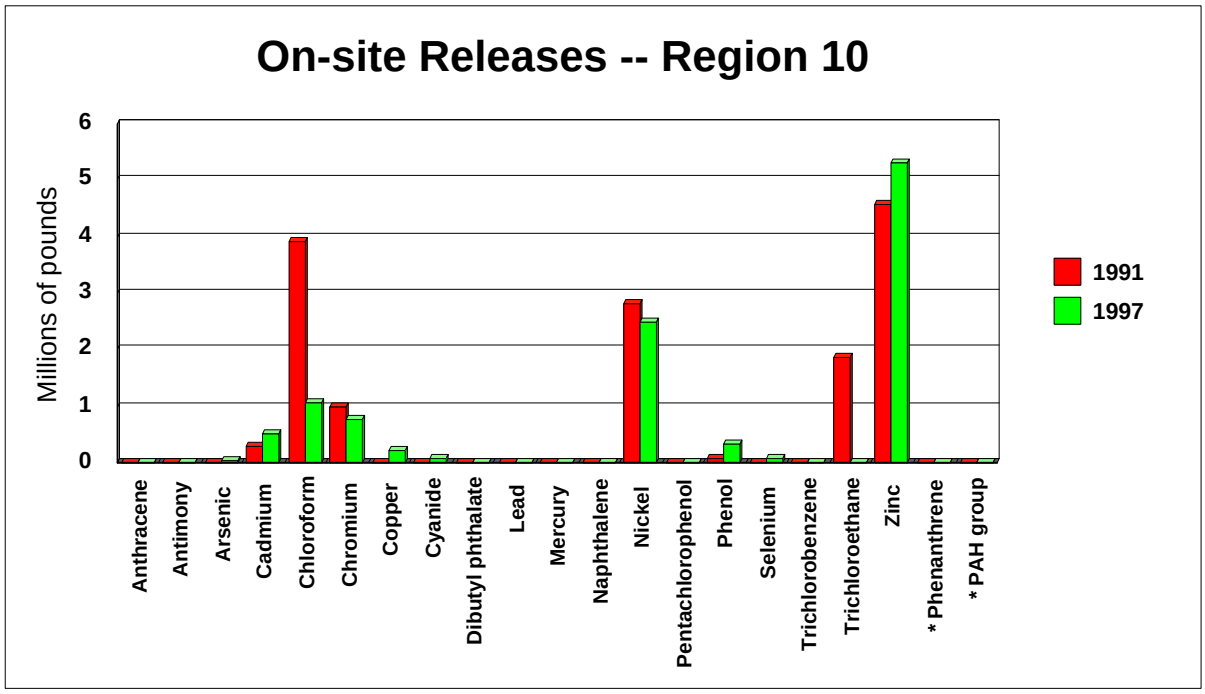
RESULTS -- REGION 10 / NATIONAL COMPARISON -- PRODUCTION WASTE

	United States			Region 10		
Chemical	**1991**	**1997**	**%**	**1991**	**1997**	**%**
Anthracene	11,515,128	1,232,035	-89%	5,555	13,674	146%
Antimony	29,268,064	20,387,751	-30%	103,948	55,314	-47%
Arsenic	12,393,317	13,013,522	5%	31,770	98,997	212%
Cadmium	8,616,753	19,694,300	129%	7,207,612	7,123,423	-1%
Chloroform	60,867,293	37,629,145	-38%	5,052,984	1,229,400	-76%
Chromium	252,527,179	247,954,891	-2%	6,743,229	4,031,874	-40%
Copper	1,028,009,575	2,025,909,960	97%	5,078,667	4,460,558	-12%
Cyanide	18,838,191	27,783,150	47%	80,785	284,218	252%
Dibutyl phthalate	328,063	1,166,689	256%	0	10,200	-
Lead	1,107,718,910	958,839,163	-13%	25,807,854	5,240,488	-80%
Mercury	1,983,117	547,613	-72%	510,590	3,900	-99%
Naphthalene	42,252,860	35,669,827	-16%	493,854	456,979	-7%
Nickel	149,038,130	180,382,327	21%	13,594,894	6,571,950	-52%
Pentachlorophenol	179,889	1,445,542	704%	6,337	3,366	-47%
Phenol	111,132,610	122,887,276	11%	653,806	1,774,995	171%
Selenium	615,130	1,228,043	100%	0	109,695	-
Trichlorobenzene	3,907,255	2,272,472	-42%	55,500	0	-100%
Trichloroethane	324,206,911	45,678,592	-86%	2,576,751	56,706	-98%
Zinc	704,371,326	853,810,433	21%	14,075,295	17,879,528	27%
* Phenanthrene	1,657,464	1,586,445	-4%	51,042	17,482	-66%
* PAH group	23,526,320	12,657,804	-46%	4,410,367	1,446,530	-67%
Total	**3,892,953,485**	**4,611,776,980**	**18%**	**86,540,840**	**50,869,277**	**-41%**



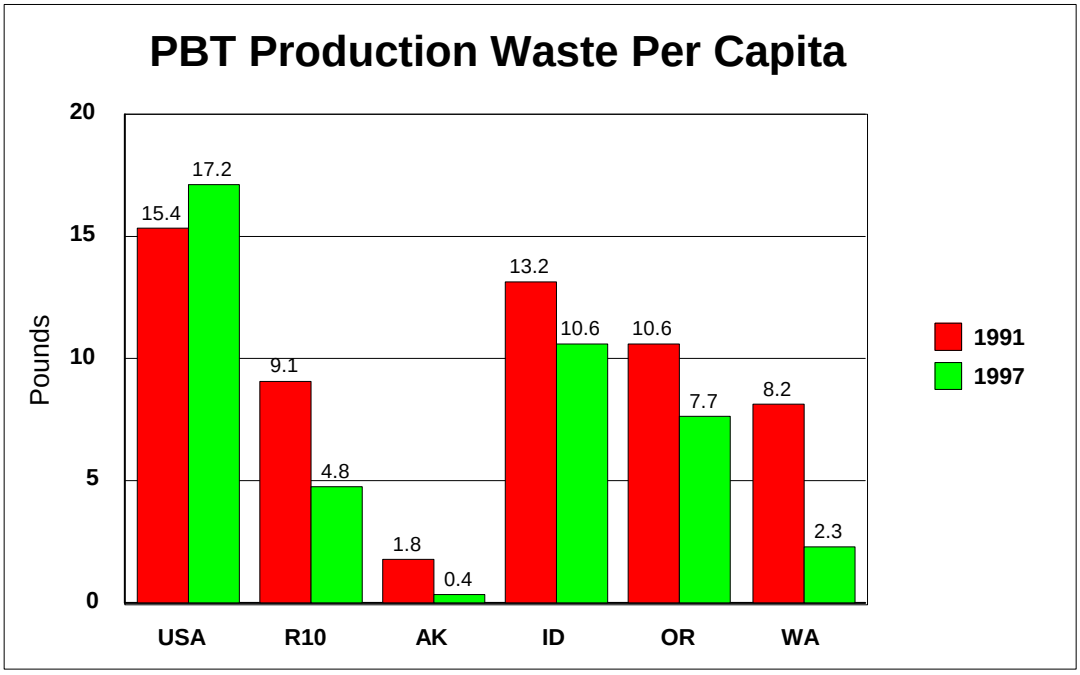
RESULTS -- REGION 10 / NATIONAL COMPARISON -- ONSITE RELEASES

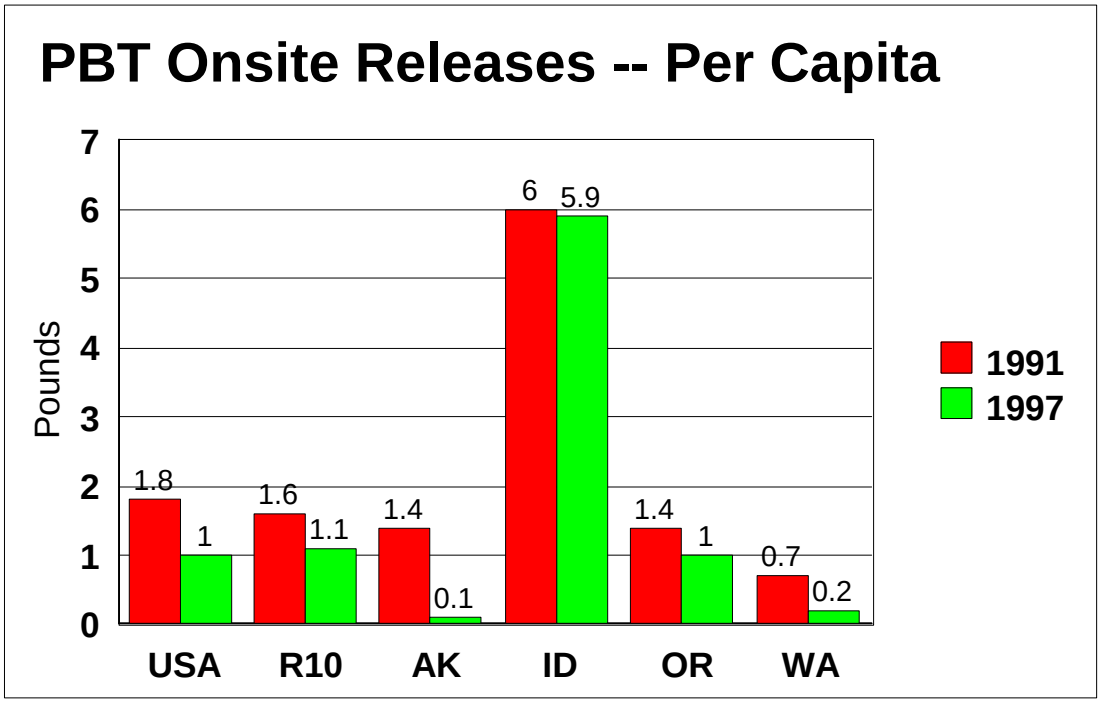
	United States			Region 10		
Chemical	**1991**	**1997**	**%**	**1991**	**1997**	**%**
Anthracene	67,842	101,158	49%	5,405	1,673	-69%
Antimony	1,939,017	1,394,890	-28%	9,990	9,378	-6%
Arsenic	4,758,148	6,046,473	27%	878	70,577	7938%
Cadmium	717,484	1,065,794	49%	317,922	525,857	65%
Chloroform	20,153,960	7,404,528	-63%	3,921,204	1,096,068	-72%
Chromium	28,830,297	31,982,751	11%	1,013,873	777,503	-23%
Copper	63,254,880	46,762,384	-26%	12,223	254,873	1985%
Cyanide	4,787,252	4,559,186	-5%	1,048	74,159	6976%
Dibutyl phthalate	328,063	200,903	-39%	0	8,030	-
Lead	19,715,981	19,615,439	-1%	25,824	11,299	-56%
Mercury	27,272	22,773	-16%	2,000	1,442	-28%
Naphthalene	2,918,072	2,768,919	-5%	21,000	7,089	-66%
Nickel	5,955,144	5,632,739	-5%	2,836,296	2,504,328	-12%
Pentachlorophenol	16,296	41,297	153%	1,857	1,025	-45%
Phenol	10,595,209	10,523,527	-1%	105,740	340,705	222%
Selenium	140,621	407,082	189%	0	109,678	-
Trichlorobenzene	420,825	313,416	-26%	0	0	-
Trichloroethane	145,092,621	3,940,953	-97%	1,877,288	34,577	-98%
Zinc	134,695,195	134,744,169	0%	4,604,037	5,331,978	16%
* Phenanthrene	76,410	160,942	111%	24,297	5,021	-79%
* PAH group	463,612	511,795	10%	36,364	35,929	-1%
Total	**444,954,201**	**278,201,118**	**-37%**	**14,817,246**	**11,201,189**	**-24%**



RESULTS -- REGION 10 / NATIONAL COMPARISON -- PER CAPITA

	USA	R10	AK	ID	OR	WA
1991	252,127,000	9,541,170	569,054	1,038,505	2,918,640	5,014,971
1997	267,744,000	10,675,943	609,655	1,208,865	3,243,272	5,614,151
% change	6%	12%	7%	16%	11%	12%

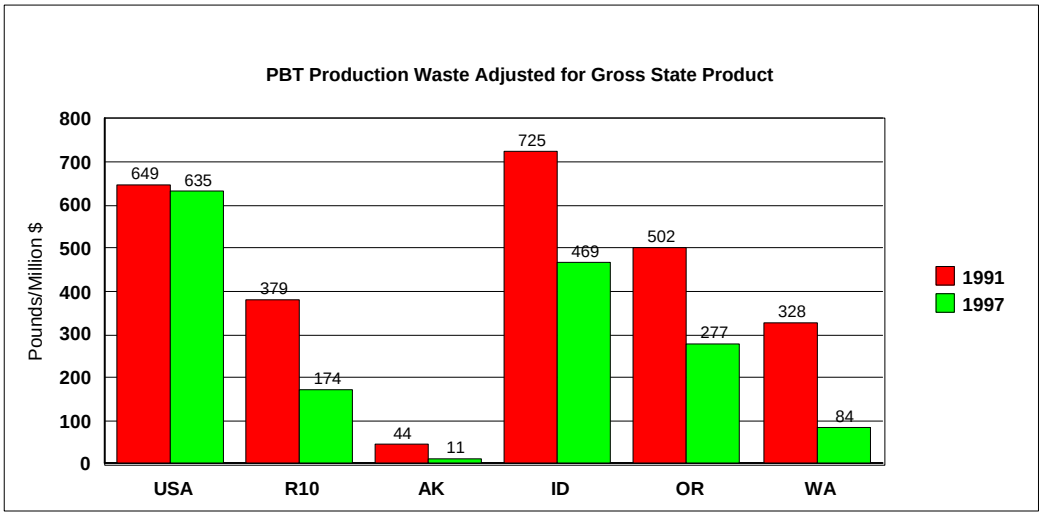




RESULTS -- REGION 10 / NATIONAL COMPARISON -- ECONOMIC DATA

Gross state product in millions, in1992 deflated dollars (from the Bureau of Economic Analysis)

	1991	1997	%change
USA	5,995,715	7,262,914	21%
R10	228,237	291,648	28%
AK	23,186	21,848	-6%
ID	18,907	27,287	44%
OR	61,513	90,225	47%
WA	124,631	152,288	22%



RESULTS -- REGION 10 / NATIONAL COMPARISON -- ECONOMIC DATA

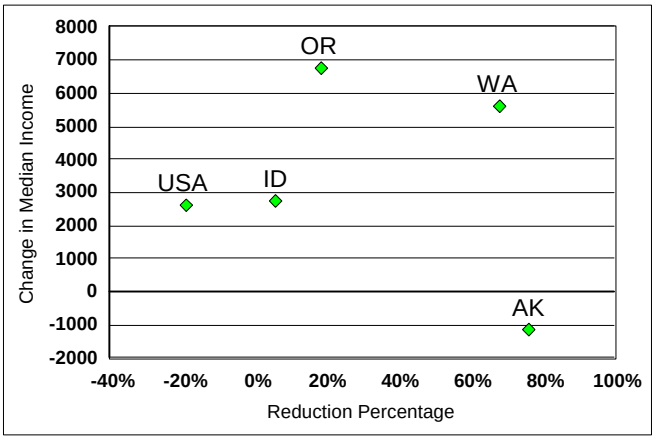
median income (US Census Bureau)

	1991	**1997**	cpi
USA	43,056	53,350	1991=136.2
ak	49,721	57,474	1997=160.5
id	36,789	46,126	
or	40,272	54,226	
wa	43,982	57,421	

median household income (adjusted with CPI)

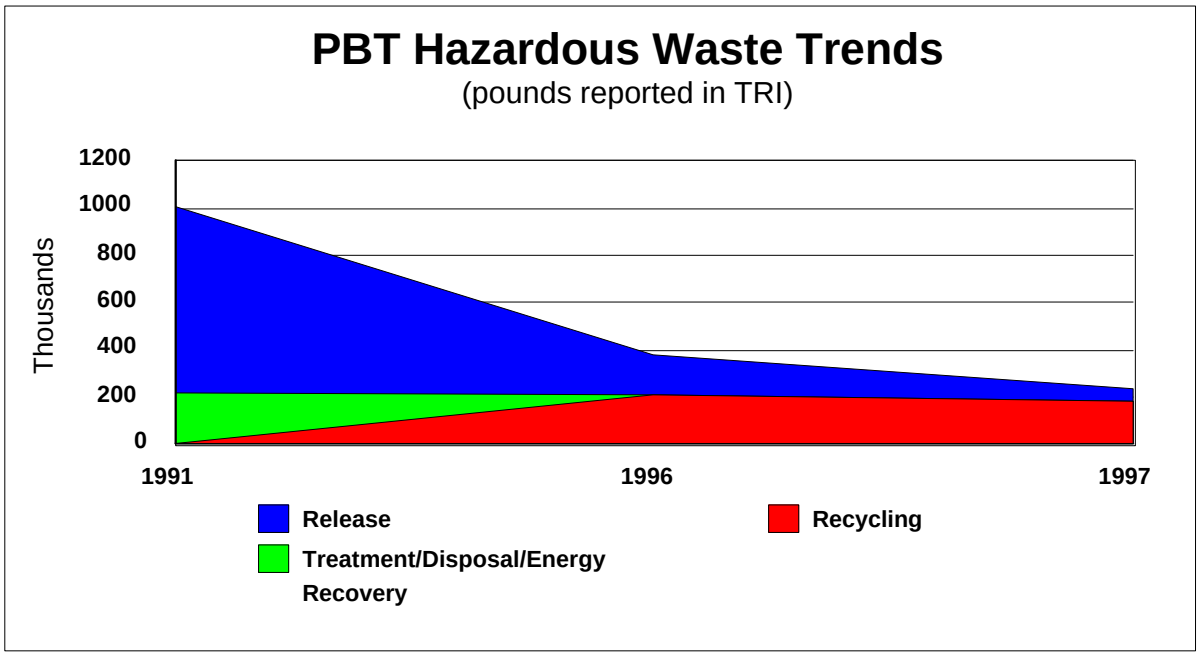
	1991	**1997**	change
USA	50,738	53,350	2,612
ak	58,592	57,474	(1,118)
id	43,353	46,126	2,773
or	47,457	54,226	6,769
wa	51,829	57,421	5,592

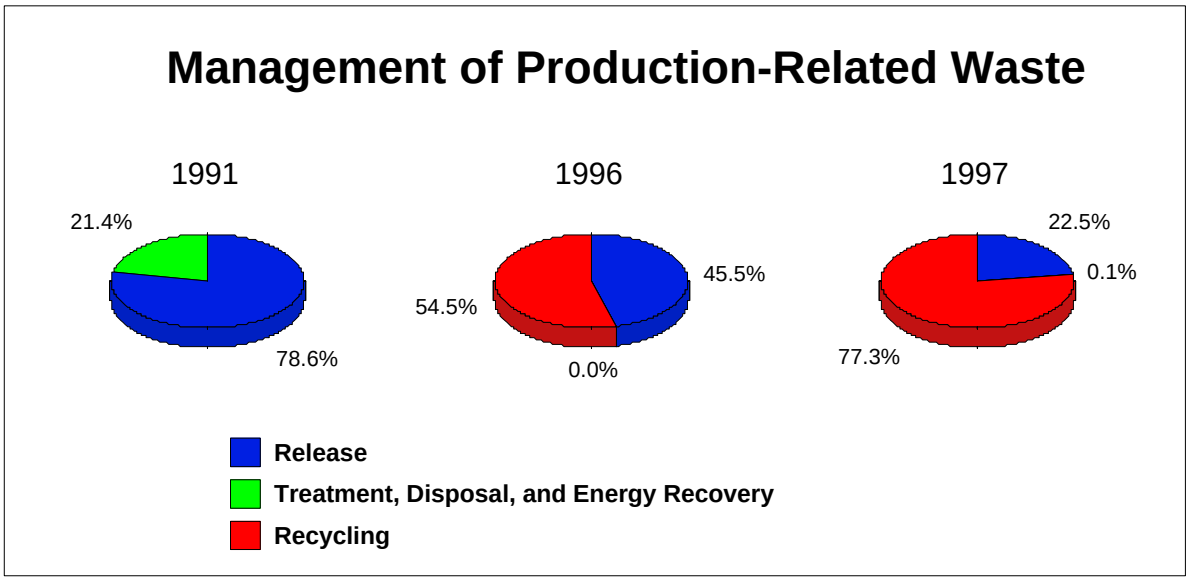
	USA	AK	ID	OR	WA
reduction	-0.185	0.766	0.067	0.191	0.686
income	2,612	(1,118)	2,773	6,769	5,592



RESULTS -- ALASKA -- SUMMARY OF TRENDS

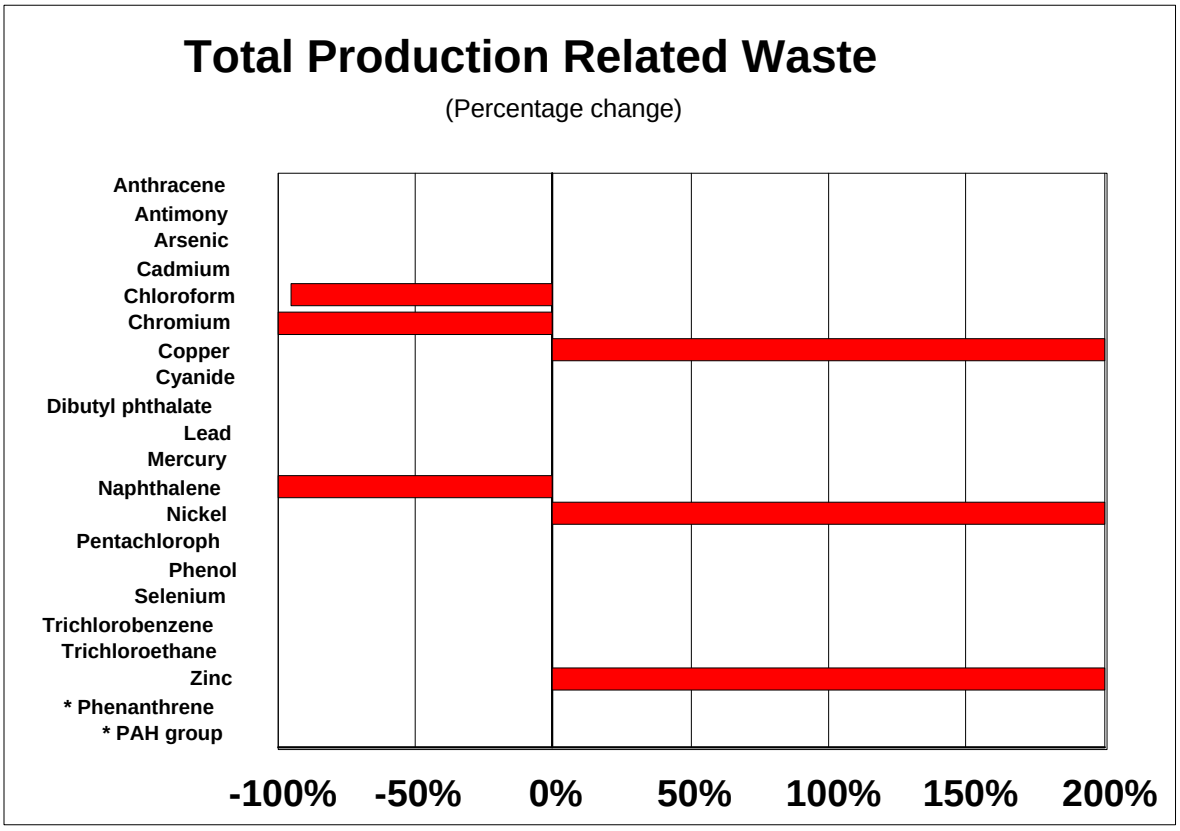
Year	Total waste	Release	Treatment, Disposal, and Energy Recovery	Recycling
1991	1,009,140	793,140	216,000	0
1996	378,323	172,274	35	206,014
1997	236,558	53,332	320	182,906
% change	-77%	-93%	-100%	-





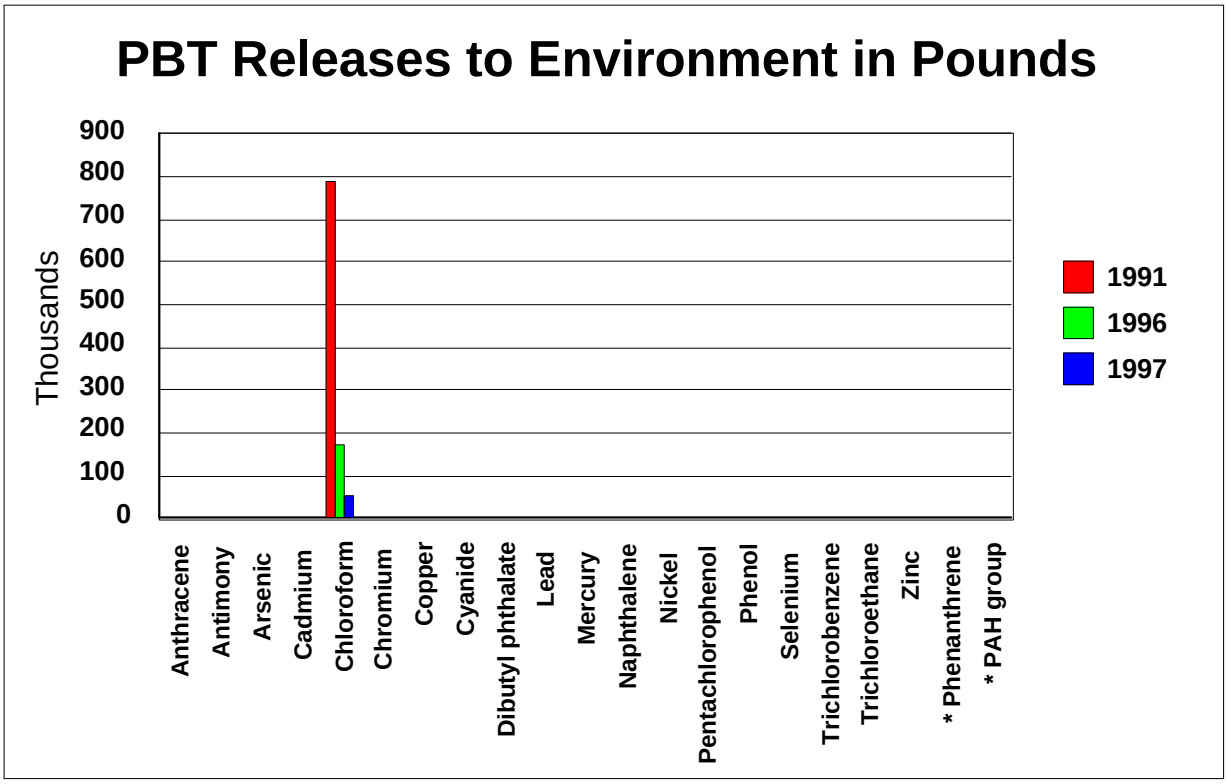
RESULTS -- ALASKA -- PRODUCTION WASTE

Chemical	1991/95	1996	1997	Change	%
Anthracene	0	0	0	0	-
Antimony	0	0	0	0	-
Arsenic	0	0	0	0	-
Cadmium	0	0	0	0	-
Chloroform	1,008,000	172,002	53,000	(955,000)	-95%
Chromium	255	32,001	0	(255)	-100%
Copper	255	104,051	110,110	109,855	43080%
Cyanide	0	0	0	0	-
Dibutyl phthalate	0	0	0	0	-
Lead	0	0	0	0	-
Mercury	0	0	0	0	-
Naphthalene	120	0	0	(120)	-100%
Nickel	255	5,212	12,380	12,125	4755%
Pentachlorophenol	0	0	0	0	-
Phenol	0	0	0	0	-
Selenium	0	0	0	0	-
Trichlorobenzene	0	0	0	0	-
Trichloroethane	0	0	0	0	-
Zinc	255	65,057	61,068	60,813	23848%
* Phenanthrene	0	0	0	0	-
* PAH group	0	0	0	0	-
Total	**1,009,140**	**378,323**	**236,558**	**(772,582)**	**-77%**



RESULTS -- ALASKA -- ONSITE RELEASES

Chemical	1991/95	1996	1997	% 1997
Anthracene	0	0	0	-
Antimony	0	0	0	-
Arsenic	0	0	0	-
Cadmium	0	0	0	-
Chloroform	792,000	172,002	53,000	-93%
Chromium	255	1	0	-100%
Copper	255	57	110	-57%
Cyanide	0	0	0	-
Dibutyl phthalate	0	0	0	-
Lead	0	0	0	-
Mercury	0	0	0	-
Naphthalene	120	0	0	-100%
Nickel	255	157	154	-40%
Pentachlorophenol	0	0	0	-
Phenol	0	0	0	-
Selenium	0	0	0	-
Trichlorobenzene	0	0	0	-
Trichloroethane	0	0	0	-
Zinc	255	57	68	-73%
* Phenanthrene	0	0	0	-
* PAH group	0	0	0	-
Total	**793,140**	**172,274**	**53,332**	**-93%**



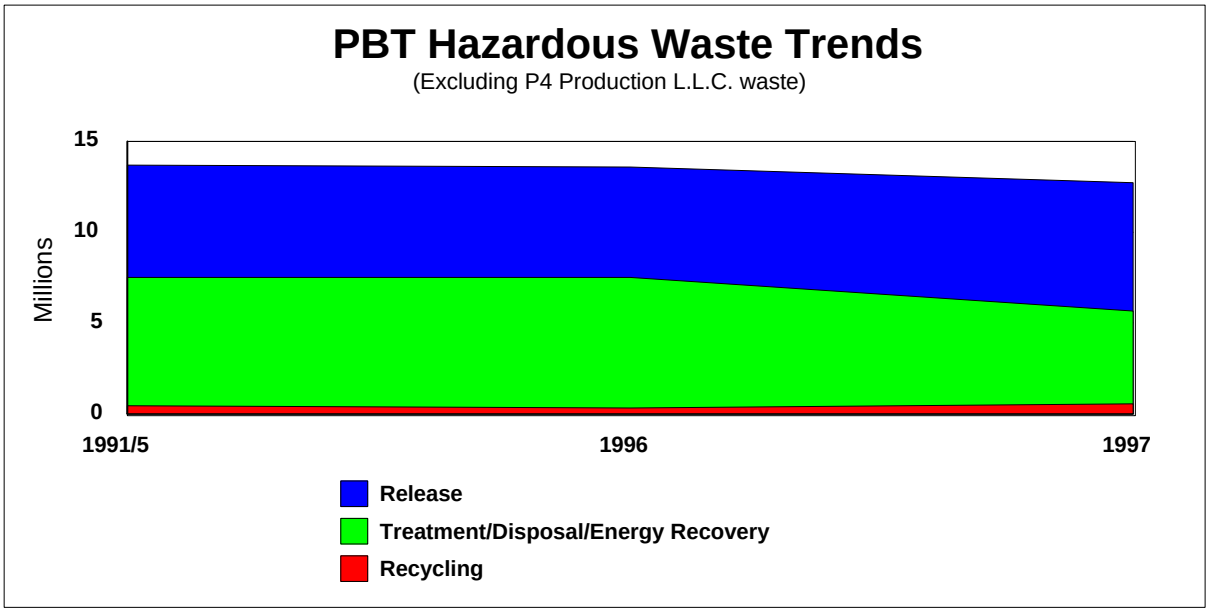
RESULTS -- IDAHO -- SUMMARY OF TRENDS

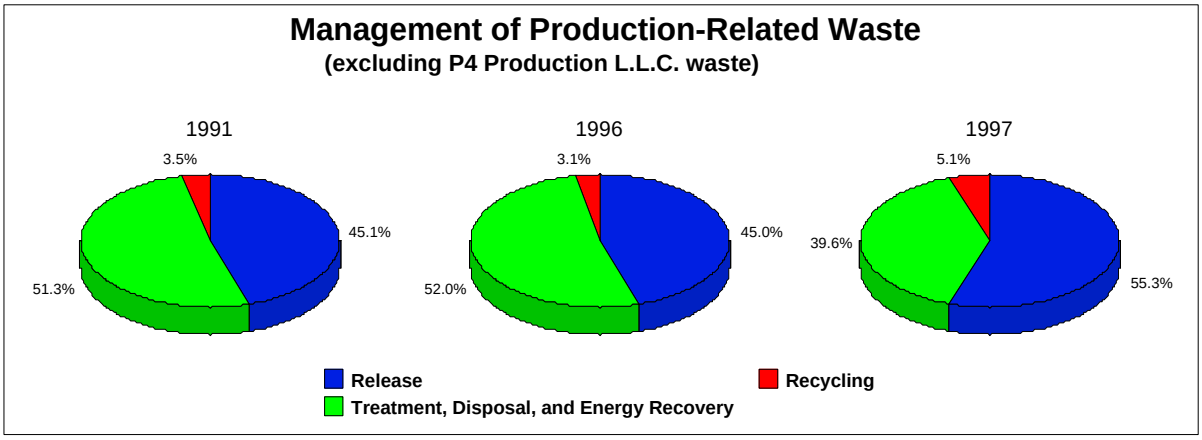
Reported TRI data:

Year	Total waste	Release	Treatment, Disposal, and Energy Recovery	Recycling
1991/5	6,855,625	6,185,833	185,735	484,057
1996	6,832,330	6,151,261	262,257	418,812
1997	81,592,359	7,073,888	73,868,439	650,032
% change	1090%	14%	39671%	34%

TRI data with P4 Productions L.L.C. waste excluded:

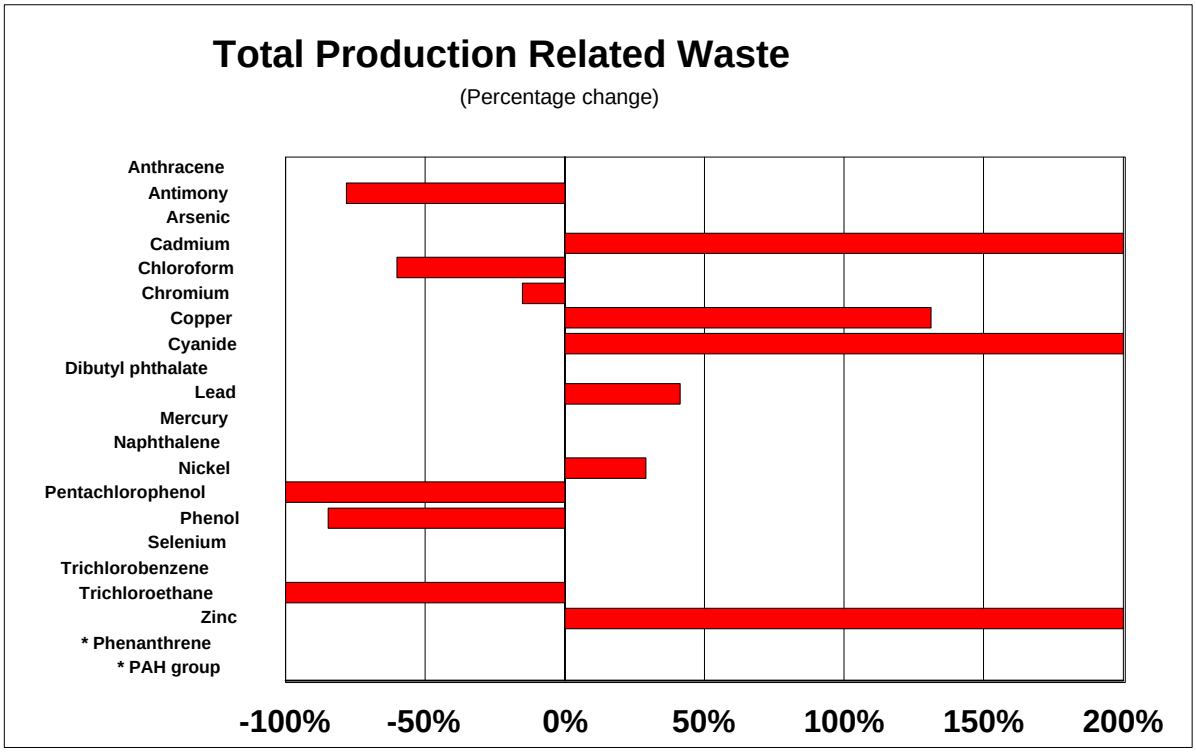
Year	Total waste	Release	Treatment, Disposal, and Energy Recovery	Recycling
1991/5	13,705,625	6,185,833	7,035,735	484,057
1996	13,682,330	6,151,261	7,112,257	418,812
1997	12,792,359	7,073,888	5,068,439	650,032
% change	-7%	14%	-28%	34%





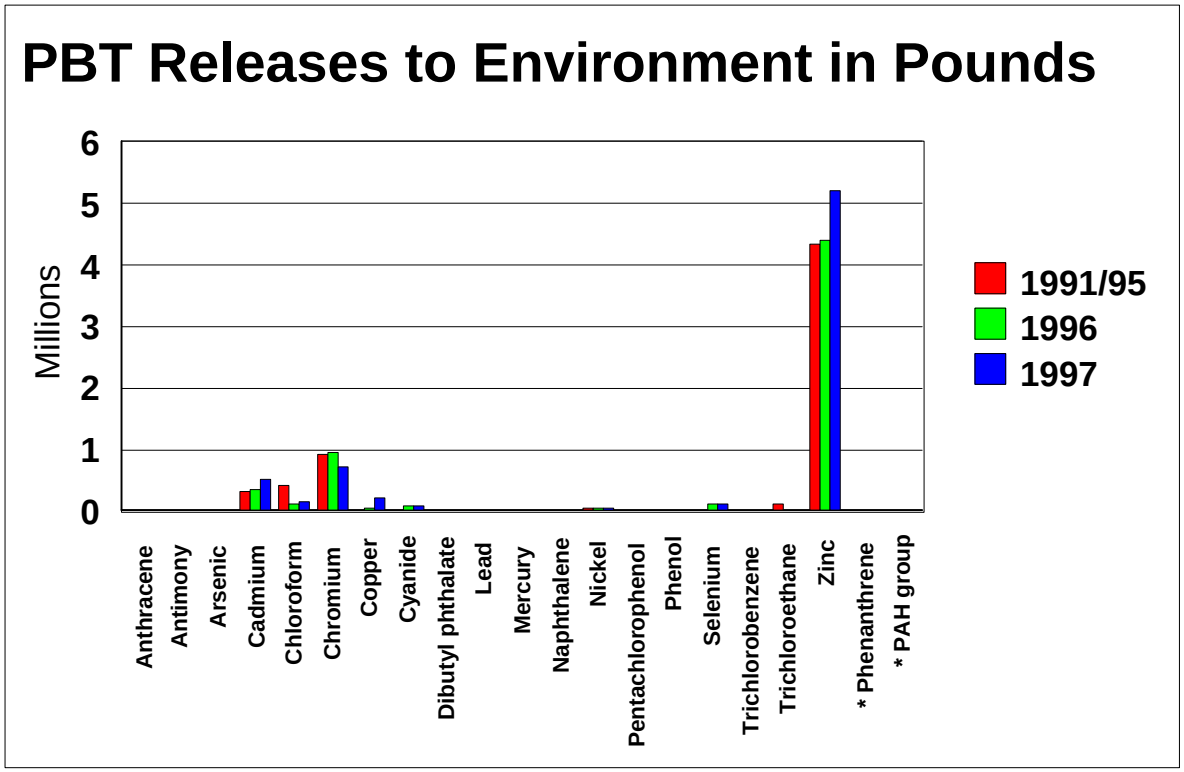
RESULTS -- IDAHO -- PRODUCTION WASTE

Chemical	1991/95	1996	1997	Change	%
Anthracene	0	0	0	0	-
Antimony	4,557	1,601	1,003	(3,554)	-78%
Arsenic	0	536	1,197	1,197	-
Cadmium	317,084	338,341	7,122,923	6,805,839	2146%
Chloroform	486,100	158,600	194,300	(291,800)	-60%
Chromium	924,659	995,072	785,133	(139,526)	-15%
Copper	164,719	186,809	381,156	216,437	131%
Cyanide	35,000	243,500	232,285	197,285	564%
Dibutyl phthalate	0	0	0	0	-
Lead	344,585	300,659	487,808	143,223	42%
Mercury	0	0	0	0	-
Naphthalene	0	0	0	0	-
Nickel	61,950	69,943	80,267	18,317	30%
Pentachlorophenol	474	0	0	(474)	-100%
Phenol	26,100	4,010	4,130	(21,970)	-84%
Selenium	0	118,956	109,691	109,691	-
Trichlorobenzene	0	0	0	0	-
Trichloroethane	134,167	0	0	(134,167)	-100%
Zinc	4,356,230	4,414,303	72,192,466	67,836,236	1557%
* Phenanthrene	0	0	0	0	-
* PAH group	0	0	0	0	-
Total	**6,855,625**	**6,832,330**	**81,592,359**	**74,736,734**	**1090%**



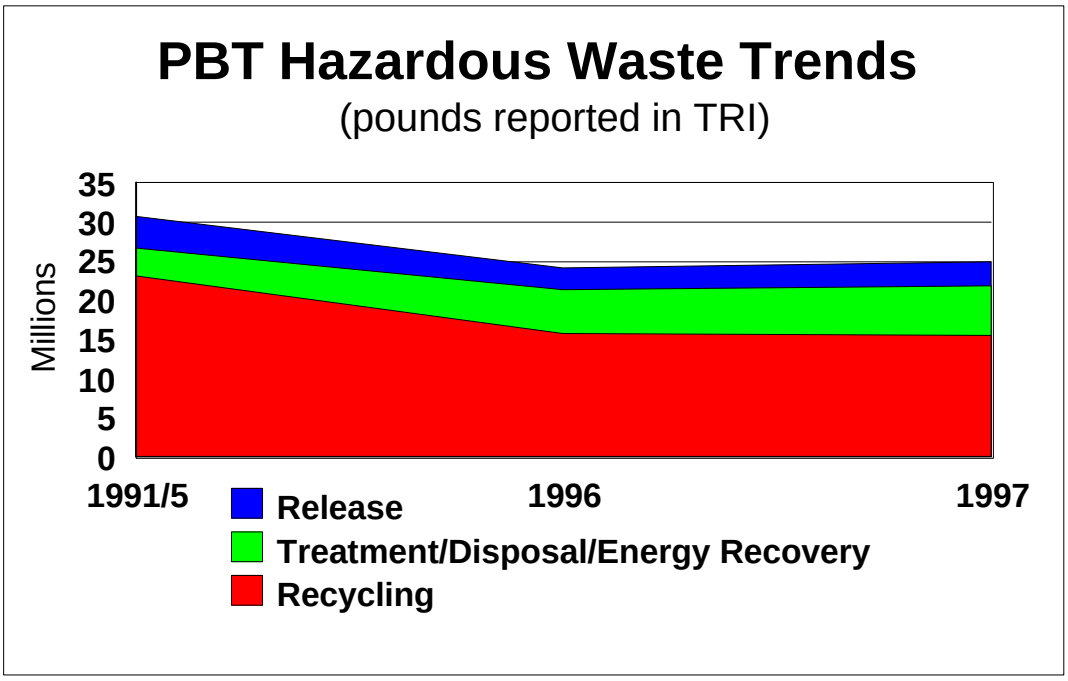
RESULTS -- IDAHO -- ONSITE RELEASES

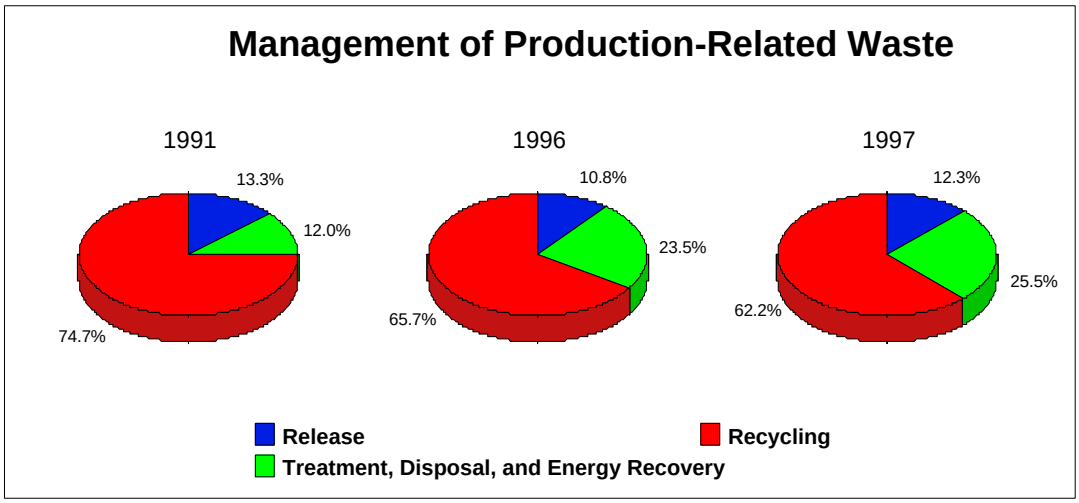
Chemical	1991/95	1996	1997	% 1997
Anthracene	0	0	0	-
Antimony	5	1,601	1,002	19940%
Arsenic	0	535	1,190	-
Cadmium	317,049	338,304	525,607	66%
Chloroform	417,100	122,250	156,050	-63%
Chromium	924,908	960,221	736,590	-20%
Copper	141	60,265	219,302	155433%
Cyanide	703	76,072	74,154	10448%
Dibutyl phthalate	0	0	0	-
Lead	715	140	3,593	403%
Mercury	0	0	0	-
Naphthalene	0	0	0	-
Nickel	61,154	65,248	49,673	-19%
Pentachlorophenol	12	0	0	-100%
Phenol	4,850	765	765	-84%
Selenium	0	118,940	109,677	-
Trichlorobenzene	0	0	0	-
Trichloroethane	116,456	0	0	-100%
Zinc	4,342,740	4,406,920	5,196,285	20%
* Phenanthrene	0	0	0	-
* PAH group	0	0	0	-
Total	**6,185,833**	**6,151,261**	**7,073,888**	**14%**



RESULTS -- OREGON -- SUMMARY OF TRENDS

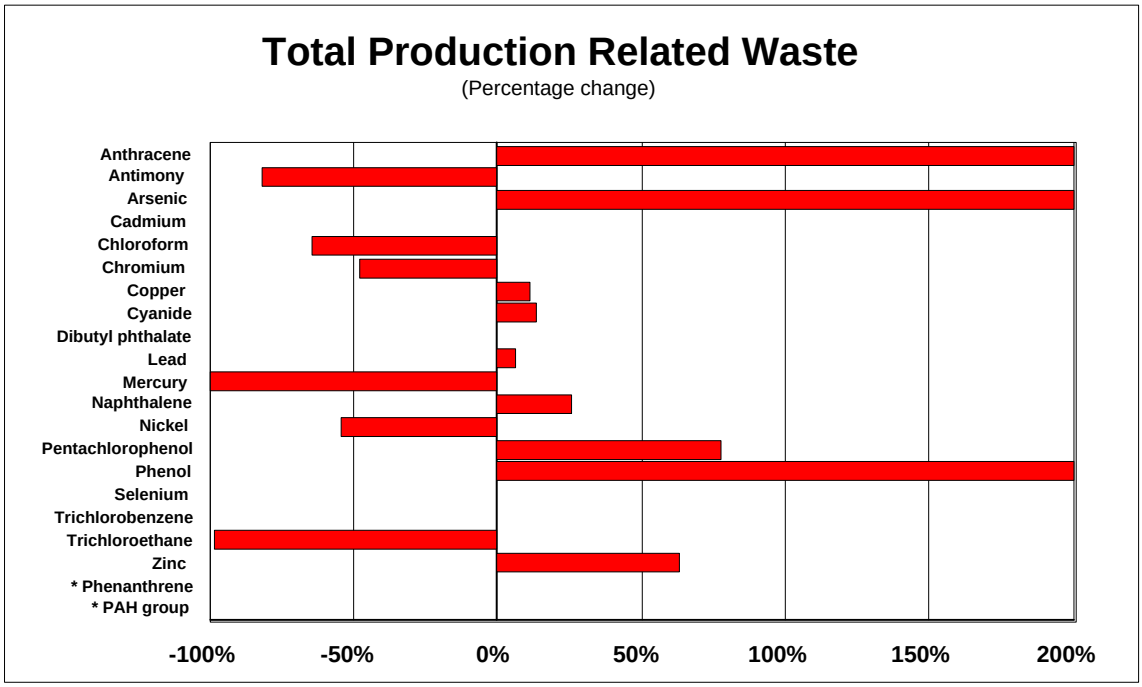
Year	Total waste	Release	Treatment, Disposal, and Energy Recovery	Recycling
1991/5	30,909,139	4,111,342	3,712,920	23,084,877
1996	24,099,768	2,605,075	5,666,551	15,828,142
1997	25,005,945	3,083,942	6,380,216	15,541,787
% change	-19%	-25%	72%	-33%





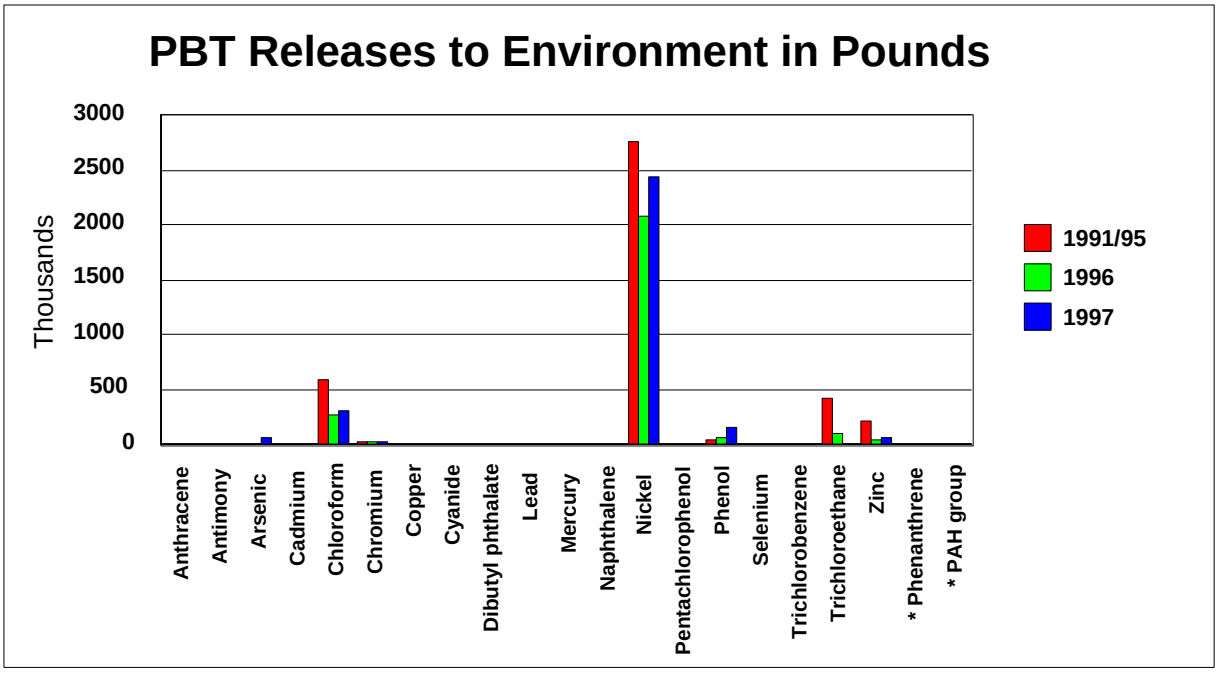
RESULTS -- OREGON -- PRODUCTION WASTE

Chemical	1991/95	1996	1997	Change	%
Anthracene	36	0	12,075	12,039	33442%
Antimony	60,761	18,731	11,071	(49,690)	-82%
Arsenic	11,047	14,670	79,857	68,810	623%
Cadmium	0	0	0	0	-
Chloroform	1,051,255	337,700	376,800	(674,455)	-64%
Chromium	4,430,814	1,944,016	2,306,514	(2,124,300)	-48%
Copper	1,599,419	1,712,787	1,784,336	184,917	12%
Cyanide	45,785	45,595	51,933	6,148	13%
Dibutyl phthalate	0	0	0	0	-
Lead	3,882,391	5,484,202	4,131,920	249,529	6%
Mercury	411,590	0	0	(411,590)	-100%
Naphthalene	10,902	11,450	13,700	2,798	26%
Nickel	13,096,404	4,845,643	5,976,685	(7,119,719)	-54%
Pentachlorophenol	1,707	16,626	3,033	1,326	78%
Phenol	61,872	616,595	952,574	890,702	1440%
Selenium	0	0	0	0	-
Trichlorobenzene	0	0	0	0	-
Trichloroethane	609,430	125,976	11,447	(597,983)	-98%
Zinc	5,635,726	8,925,777	9,222,751	3,587,025	64%
* Phenanthrene	0	0	0	0	-
* PAH group	0	0	71,249	71,249	-
Total	**30,909,139**	**24,099,768**	**25,005,945**	**(5,903,194)**	**-19%**



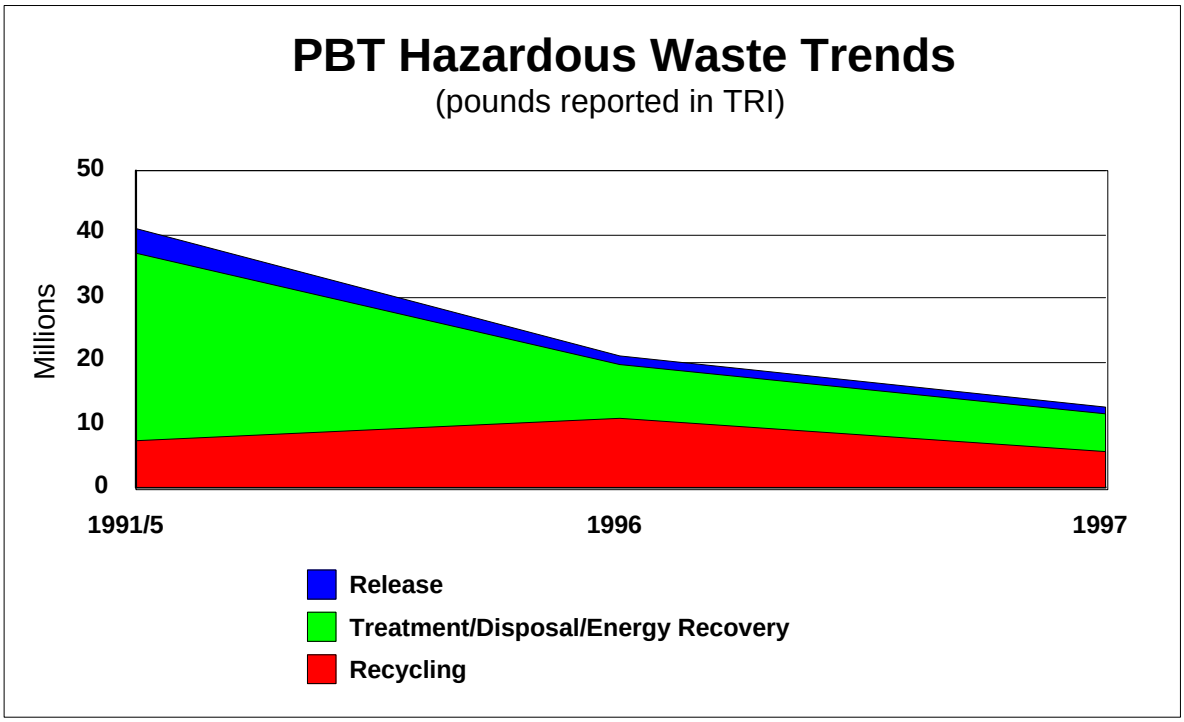
RESULTS -- OREGON -- ONSITE RELEASES

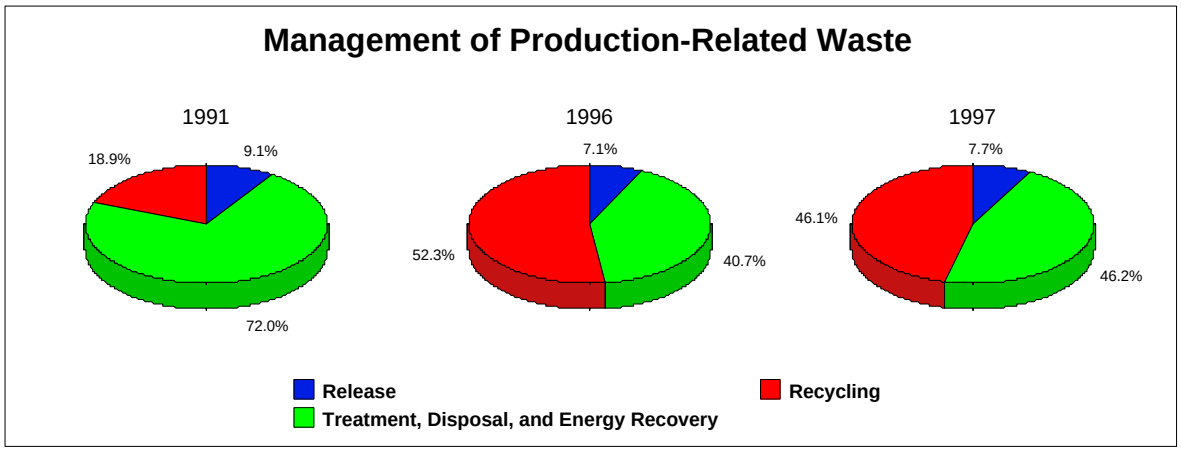
Chemical	1991/95	1996	1997	% 1997
Anthracene	31	0	74	139%
Antimony	10	251	1	-90%
Arsenic	760	52	65,994	8583%
Cadmium	0	0	0	-
Chloroform	589,910	268,250	302,250	-49%
Chromium	24,497	19,348	19,941	-19%
Copper	7,823	2,692	18,780	140%
Cyanide	345	5	5	-99%
Dibutyl phthalate	0	0	0	-
Lead	15,529	1,179	2,439	-84%
Mercury	500	0	0	-100%
Naphthalene	10,902	11,447	1,740	-84%
Nickel	2,767,979	2,086,416	2,442,037	-12%
Pentachlorophenol	790	1,158	525	-34%
Phenol	53,114	74,085	151,133	185%
Selenium	0	0	0	-
Trichlorobenzene	0	0	0	-
Trichloroethane	430,753	95,172	6,174	-99%
Zinc	208,399	45,020	72,602	-65%
* Phenanthrene	0	0	0	-
* PAH group	0	0	247	-
Total	**4,111,342**	**2,605,075**	**3,083,942**	**-25%**



RESULTS -- WASHINGTON -- SUMMARY OF TRENDS

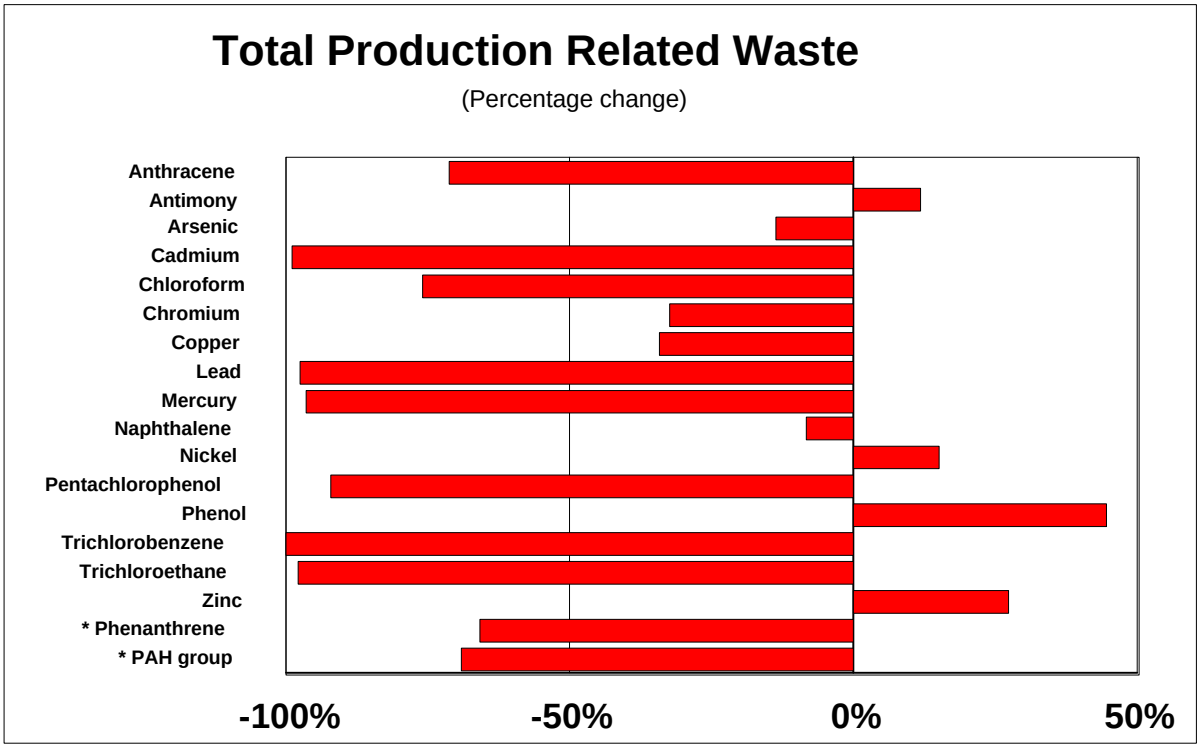
Year	Total waste	Release	Treatment, Disposal, and Energy Recovery	Recycling
1991	40,916,936	3,726,931	29,456,305	7,733,700
1996	20,970,049	1,484,688	8,526,106	10,959,255
1997	12,834,415	990,027	5,933,420	5,910,968
% change	-69%	-73%	-80%	-24%





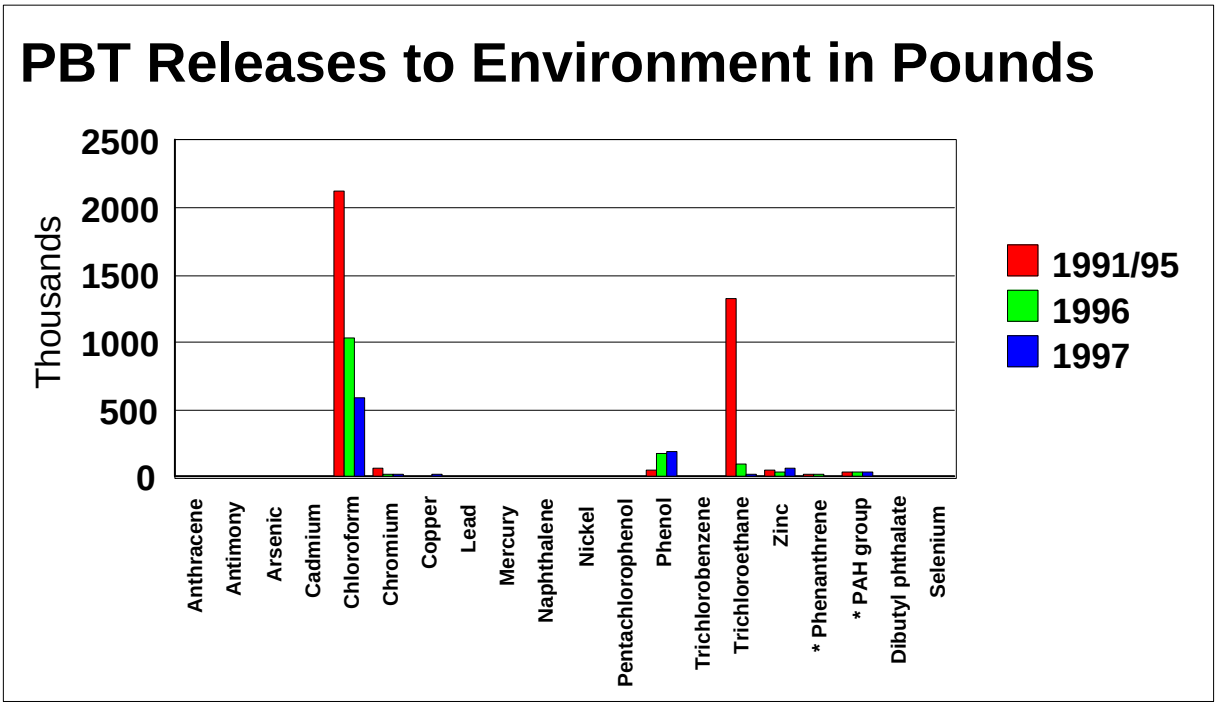
RESULTS -- WASHINGTON -- PRODUCTION WASTE

Chemical	1991/95	1996	1997	Change	%
Anthracene	5,519	15,778	1,599	(3,920)	-71%
Antimony	38,630	52,576	43,240	4,610	12%
Arsenic	20,723	20,119	17,943	(2,780)	-13%
Cadmium	40,528	762	500	(40,028)	-99%
Chloroform	2,507,629	1,095,300	605,300	(1,902,329)	-76%
Chromium	1,387,501	1,335,783	940,227	(447,274)	-32%
Copper	3,314,274	2,994,721	2,184,956	(1,129,318)	-34%
Lead	21,580,878	656,691	620,760	(20,960,118)	-97%
Mercury	99,000	4,300	3,900	(95,100)	-96%
Naphthalene	482,832	360,633	443,279	(39,553)	-8%
Nickel	436,285	564,641	502,618	66,333	15%
Pentachlorophenol	4,156	450	333	(3,823)	-92%
Phenol	565,834	742,252	818,291	252,457	45%
Trichlorobenzene	55,500	0	0	(55,500)	-100%
Trichloroethane	1,833,154	116,477	45,259	(1,787,895)	-98%
Zinc	4,083,084	5,385,908	5,203,243	1,120,159	27%
* Phenanthrene	51,042	52,152	17,482	(33,560)	-66%
* PAH group	4,410,367	7,559,374	1,375,281	(3,035,086)	-69%
Dibutyl phthalate	0	12,124	10,200	10,200	--
Selenium	0	8	4	4	--
Total	**40,916,936**	**20,970,049**	**12,834,415**	**(28,082,521)**	**-69%**



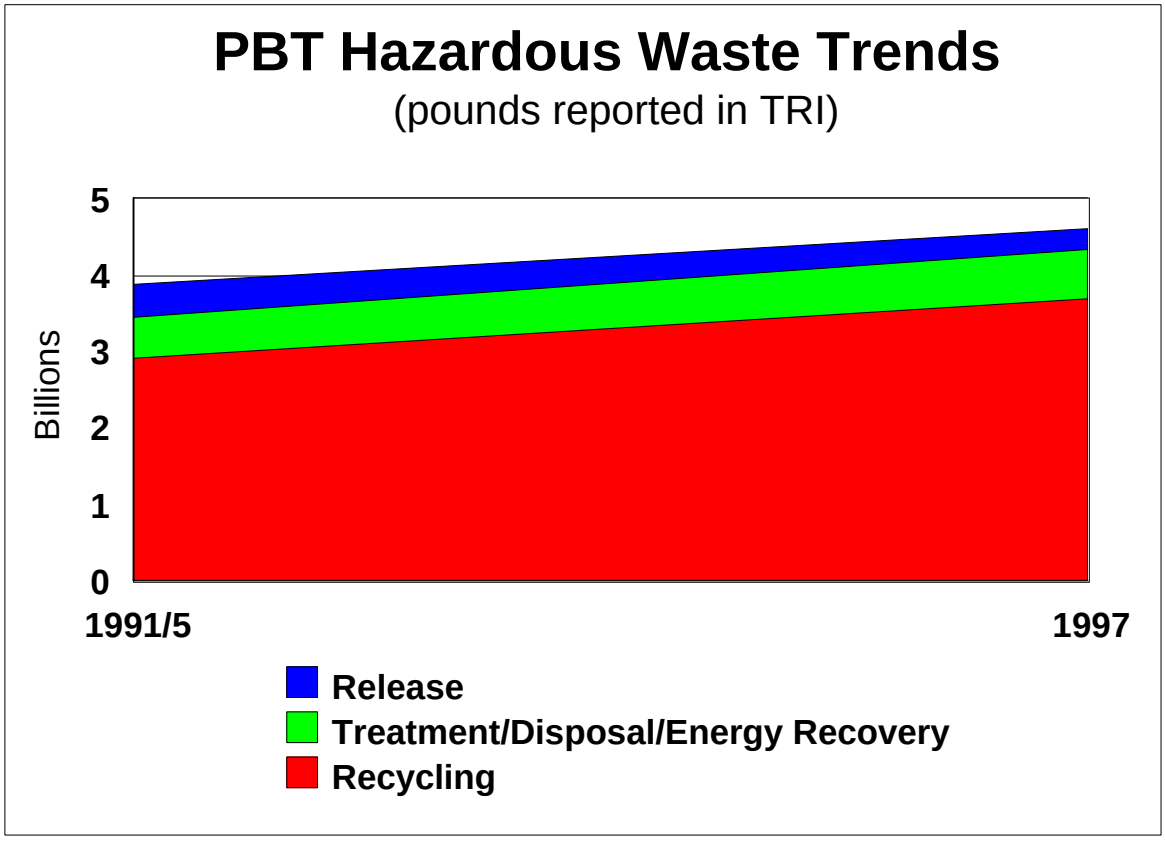
RESULTS -- WASHINGTON -- ONSITE RELEASES

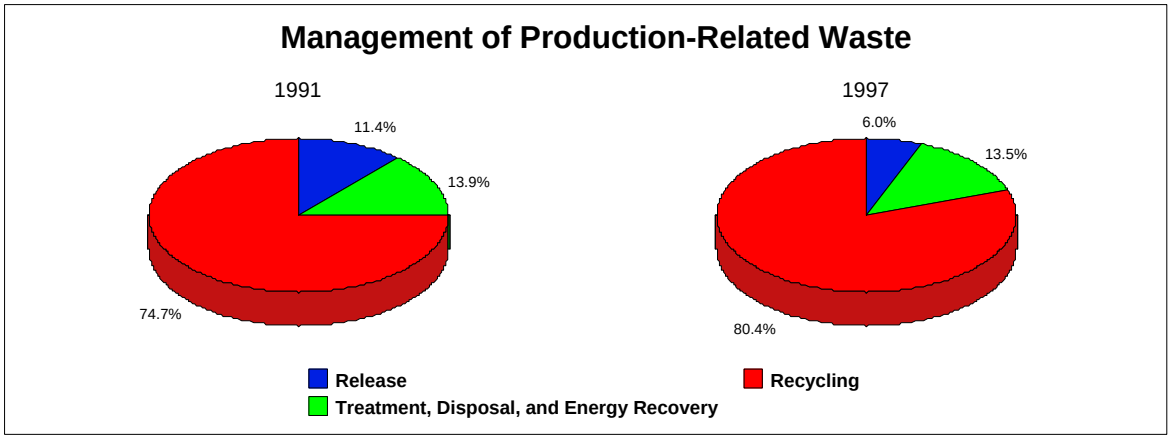
Chemical	1991/95	1996	1997	% 1997
Anthracene	5,374	3,649	1,599	-70%
Antimony	9,975	9,035	8,375	-16%
Arsenic	118	2,627	3,393	2775%
Cadmium	873	761	250	-71%
Chloroform	2,122,194	1,034,403	584,768	-72%
Chromium	64,213	20,090	20,972	-67%
Copper	4,004	12,295	16,681	317%
Lead	9,580	6,160	5,267	-45%
Mercury	1,500	1,505	1,442	-4%
Naphthalene	9,978	4,995	5,349	-46%
Nickel	6,908	9,435	12,464	80%
Pentachlorophenol	1,055	511	500	-53%
Phenol	47,776	174,530	188,807	295%
Trichlorobenzene	0	0	0	-
Trichloroethane	1,330,079	95,807	28,403	-98%
Zinc	52,643	42,255	63,023	20%
* Phenanthrene	24,297	24,251	5,021	-79%
* PAH group	36,364	33,078	35,682	-2%
Dibutyl phthalate	0	9,300	8,030	-
Selenium	0	1	1	-
Total	**3,726,931**	**1,484,688**	**990,027**	**-73%**



RESULTS -- UNITED STATES -- SUMMARY OF TRENDS

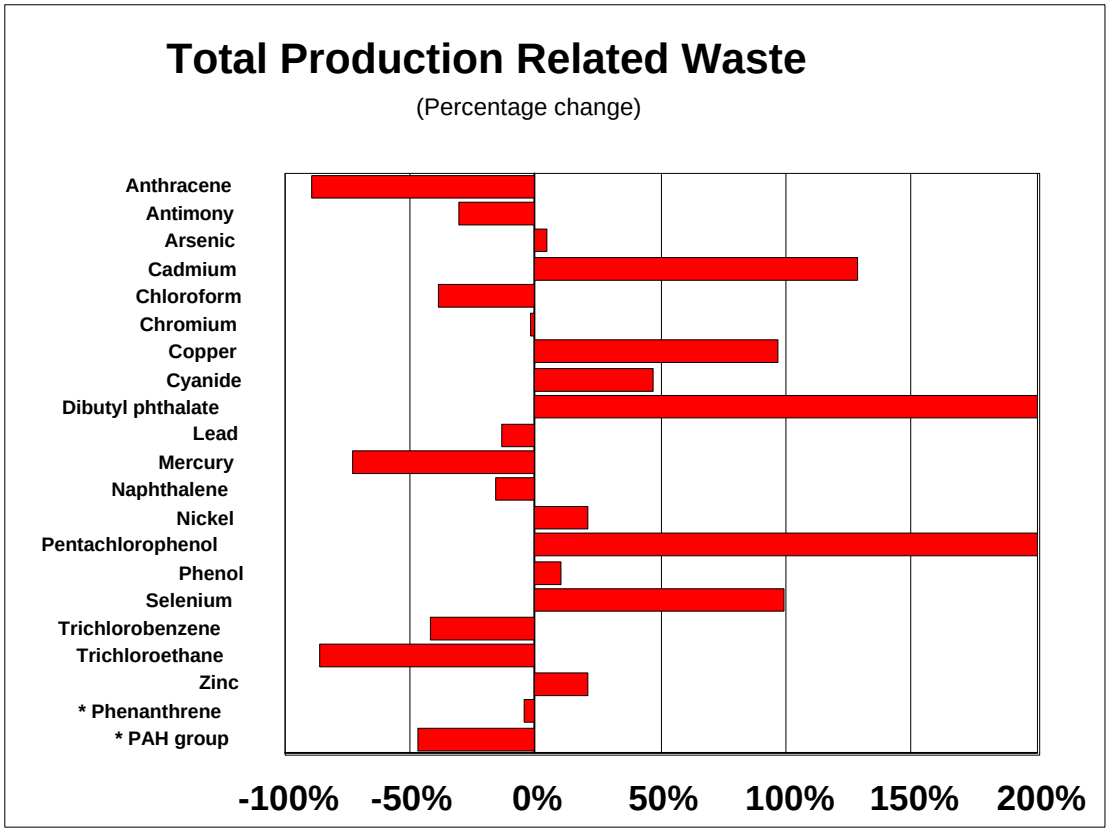
Year	Total waste	Release	Treatment, Disposal, and Energy Recovery	Recycling
1991/5	3,892,953,485	444,954,201	539,447,048	2,908,552,236
1997	4,611,776,980	278,201,118	623,908,210	3,709,667,652
% change	18%	-37%	16%	28%





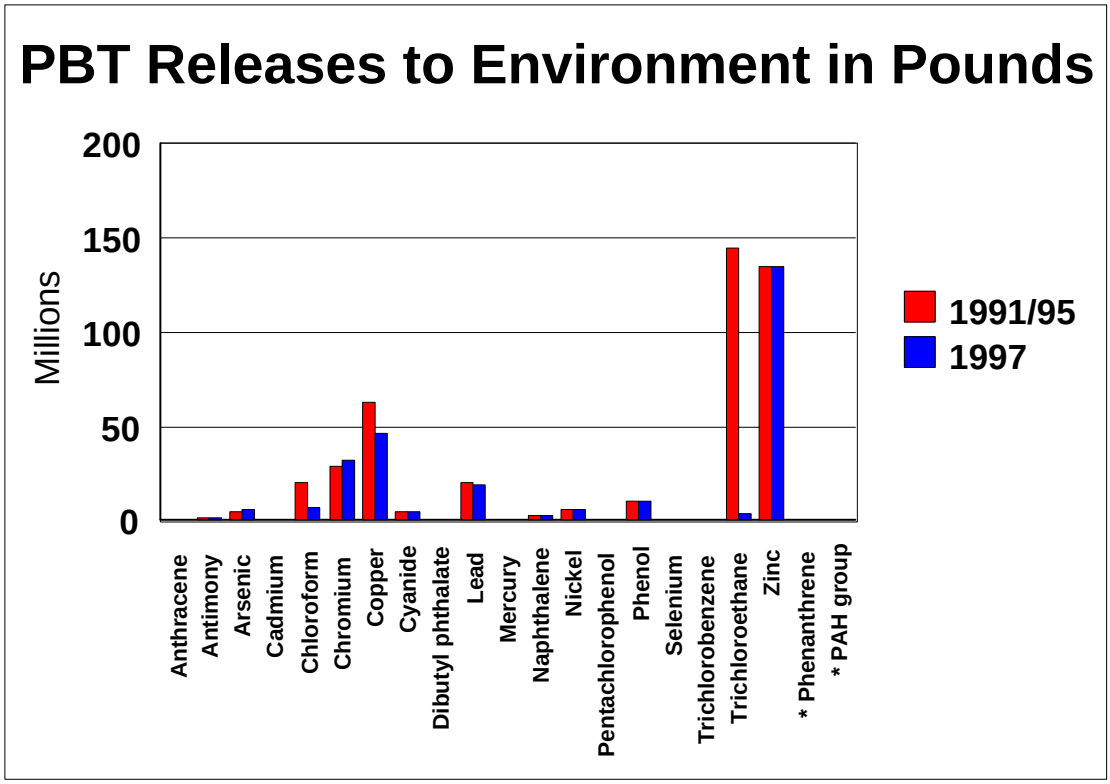
RESULTS -- UNITED STATES -- PRODUCTION WASTE

Chemical	1991/95	1997	Change	%
Anthracene	11,515,128	1,232,035	(10,283,093)	-89%
Antimony	29,268,064	20,387,751	(8,880,313)	-30%
Arsenic	12,393,317	13,013,522	620,205	5%
Cadmium	8,616,753	19,694,300	11,077,547	129%
Chloroform	60,867,293	37,629,145	(23,238,148)	-38%
Chromium	252,527,179	247,954,891	(4,572,288)	-2%
Copper	1,028,009,575	2,025,909,960	997,900,385	97%
Cyanide	18,838,191	27,783,150	8,944,959	47%
Dibutyl phthalate	328,063	1,166,689	838,626	256%
Lead	1,107,718,910	958,839,163	(148,879,747)	-13%
Mercury	1,983,117	547,613	(1,435,504)	-72%
Naphthalene	42,252,860	35,669,827	(6,583,033)	-16%
Nickel	149,038,130	180,382,327	31,344,197	21%
Pentachlorophenol	179,889	1,445,542	1,265,653	704%
Phenol	111,132,610	122,887,276	11,754,666	11%
Selenium	615,130	1,228,043	612,913	100%
Trichlorobenzene	3,907,255	2,272,472	(1,634,783)	-42%
Trichloroethane	324,206,911	45,678,592	(278,528,319)	-86%
Zinc	704,371,326	853,810,433	149,439,107	21%
* Phenanthrene	1,657,464	1,586,445	(71,019)	-4%
* PAH group	23,526,320	12,657,804	(10,868,516)	-46%
Total	**3,892,953,485**	**4,611,776,980**	**718,823,495**	**18%**



RESULTS -- UNITED STATES -- ONSITE RELEASES

Chemical	1991	1997	% 1997
Anthracene	67,842	101,158	49%
Antimony	1,939,017	1,394,890	-28%
Arsenic	4,758,148	6,046,473	27%
Cadmium	717,484	1,065,794	49%
Chloroform	20,153,960	7,404,528	-63%
Chromium	28,830,297	31,982,751	11%
Copper	63,254,880	46,762,384	-26%
Cyanide	4,787,252	4,559,186	-5%
Dibutyl phthalate	328,063	200,903	-39%
Lead	19,715,981	19,615,439	-1%
Mercury	27,272	22,773	-16%
Naphthalene	2,918,072	2,768,919	-5%
Nickel	5,955,144	5,632,739	-5%
Pentachlorophenol	16,296	41,297	153%
Phenol	10,595,209	10,523,527	-1%
Selenium	140,621	407,082	189%
Trichlorobenzene	420,825	313,416	-26%
Trichloroethane	145,092,621	3,940,953	-97%
Zinc	134,695,195	134,744,169	0%
* Phenanthrene	76,410	160,942	111%
* PAH group	463,612	511,795	10%
Total	**444,954,201**	**278,201,118**	**-37%**



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