Fishing for Trouble

How Toxic Mercury Contaminates Our Waterways and Threatens Recreational Fishing

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United States Public Interest Research Group Education Fund
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Acknowledgements

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Executive Summary

Our environment, and now our food supply, is becoming increasingly contaminated with mercury, an extremely dangerous toxic chemical. When mercury is ingested in its organic form, methylmercury, it can lead to neurological damage, especially in children. Health impacts of exposure to mercury include attention and language deficits, impaired memory, inability to process and recall information, and impaired visual and motor function. The Centers for Disease Control and Prevention estimated in its January 2003 study that 8% of American women of childbearing age have elevated levels of mercury in their bodies from eating contaminated fish. This means that approximately 322,000 newborns are at risk of neurological problems due to exposure *in utero*.

Mercury Contamination is a Widespread and Growing Concern

Currently, 43 states have advisories in effect for mercury-contaminated fish, warning the general population or sensitive subpopulations to reduce or avoid consumption, compared to only 27 states in 1993 and 39 states in 1997. This is nearly a 60% increase in 10 years. An analysis of EPA data from December 31, 2001 to December 31, 2002 found that:

- State agencies have 2,148 active mercury advisories in effect for at least 12,111,733 acres of lakes (including statewide advisories), or almost 30% of all lake acres; 453,101 miles of river (including statewide advisories), or almost 13% of all river miles; 15,639 miles of coastal areas (not including statewide advisories); 2,333 miles of our Great Lake coasts and tributaries; and 166,534 acres of bayou.
- 19 states (Connecticut, Florida, Illinoia r

fishing:

- Generated more than $35.6 billion in expenditures;
- Generated more than $116 billion in total economic output;
- Supported more than one million jobs;
- Created more than $30.1 billion in household income (wages and salaries);
- Added more than $1.9 billion in sales tax revenues;
- Added more than $470 million in state income tax revenues; and
- Generated more than $4.88 billion in federal income tax revenues.

Five of the top ten states with the most lake acres under mercury advisory, Minnesota, Wisconsin, Florida, Michigan, and Texas, are also in the top ten for the amount of money spent towards recreational fishing. In addition, two of the ten states with the largest number of river miles under advisory, Florida and Ohio, are also in the top ten for spending on fishing. In fact, nine of the 19 states with statewide mercury advisories covering all of their inland lakes or rivers, Florida, Illinois, Michigan, Minnesota, Missouri, New Jersey,

Introduction

Fishing is an important source of food in the United States. Health professionals routinely urge people to eat fish as part of a healthy, well-balanced diet. Additionally, across the country, fish are a source of free food for low-income populations. Populations such as certain Native American tribes and Asian Americans eat fish as a substantial part of their diet.[1]

But is all this fish really good for people? This was a question that Dr. Jane Hightower, a researcher from the California Pacific Medical Center, sought to answer when she surveyed her patients over the course of a year. She tested the mercury levels of those who reported eating more than two servings of fish a week. What she discovered was startling. Nine out of ten people had high mercury levels.[2] Of a group of 89 patients, 63 had blood mercury levels at more f

The Growing Threat of Mercury Contamination

Mercury Accumulation in Fish

When power plants and other facilities burn coal for electricity, they emit mercury from their smokestacks into the air. Rain then washes some of this mercury out of the air onto land and into waterways, where certain microorganisms convert it into methylmercury, a form that is especially toxic for humans and wildlife.

Methylmercury is a persistent bioaccumulative toxin. Fish absorb this form of mercury as it passes over their gills and they feed on the organisms. As larger fish eat smaller fish, mercury concentrations increase, or bio-accumulate. Fish at the top of the aquatic food chain have mercury levels at approximately 1 to 10 million times greater than the levels in the surrounding waters.[5] This is why larger, older predator fish have the highest concentrations of mercury.

Mercury from smokestacks not only contaminates nearby waterbodies, but also those far from the source. Once emitted, mercury can remain in the atmosphere for up to one year. When the mercury comes into contact with oxidizing chemicals such as ozone, it becomes water-soluble. It is in this form that it is deposited as rain or snow. It can then be re-emitted (volatized) from waterbodies and deposited elsewhere. This continuous re-emission makes mercury pollution a local, regional, and global problem.

The principal way that people are exposed to mercury is through fish consumption.[6] Mercury also can pass through the placenta and expose developing fetuses. Infants can ingest mercury from breast milk when mothers have eaten contaminated fish.

Mercury is found in the filet portion of the fish (the muscle). Thus, skinning or trimming the fat from the fish does not reduce the mercury content. The only way to avoid mercury when eating fish is to avoid mercury-contaminated fish.

Fish Consumption Advisories: Mercury Levels Unsafe for Humans

To address the public health threats posed by mercury pollution, state and tribal health departments – as well as the Food and Drug Administration (FDA), which has federal jurisdiction for commercially bought and sold fish – have, for years, issued fish consumption advisories. In addition to mercury, fish advisories are issued for other contaminants, such as PCBs. Advisories involve a complex assessment taking into consideration the level of contamination in a fish species, the size of the fish, how often an individual eats that particular species, and the health risk posed by consumption.

The fish consumption advisory approach

EPA does not issue fish consumption advisories; rather, states are left with the responsibility. State systems for issuing fish consumption advisories vary widely from state to state, resulting in a situation that is confusing for consumers and often inadequately protects the health of a growing fetus or child. Many states do not monitor their waterbodies. Many states use inadequately low thresholds to determine whether an advisory should be issued. Finally, the advice that states give their consumers about how much fish should be consumed varies widely. Recent surveys have shown that nearly all states inadequately protect the health of sensitive subpopulations from mercury exposure.[7]

EPA does issue guidance to the states on the criteria to use in developing advisories. Part of this guidance includes a reference dose, which is the level below which EPA does not expect adverse health effects to occur over a lifetime of exposure. The EPA reference dose-level is set at 0.1 micrograms of mercury per kilogram of body

half can of tuna) with mercury concentrations between 0.10 and 0.15 parts per million (ppm)[a] to stay well below the reference dose.[8] At 0.10 to 0.15 ppm, the average person should eat no more than one to two large servings (at approximately eight ounces each) per week of fish to stay within safe limits.[b] At larger portions, or at higher contamination levels, consumption must be further reduced.[9] EPA recommends that pregnant women, women who could become pregnant, women nursing, and young children limit consumption to one meal per week (of eight ounces of uncooked fish for adults, which amounts to 1 1/3 cans of tuna, or a half can for a young child at an assumed three ounce serving size).

Mercury concentrations greater than one part per million, or the "action level," in fish are

[a] A "part per million" is a unit of measurement for mercury and other contaminants in fish. It is the equivalent to one mg/kg.

Table A. Average Mercury Concentrations in Popular Freshwater Fish

PPM	Fish species
.0005-**8.94**	Largemouth Bass
.005-**3.34**	Small Mouth Bass
.005-**2.14**	Yellow Perch
.014-**2.81**	Eastern Chain Pickerel
.005-**2**	Lake Trout
.005-**16**	Walleye
.005-**4.4**	Northern Pike

Note: This table represents the range of average mercury concentrations measured in 43 states. Mercury levels that trigger mercury advisories vary from state to state.

Source: EPA, 2001

Table B. Sampling of Commercially-Sold Fish Without FDA Advisories and Hypothetical Recommended Consumption Limits (for average male)

Fish Species	(PPM)	Average (PPM)	Hypothetical Recommended Fish Meals Per Month
Grouper (Mycteroperca)	0.05-1.35	0.43	No more than two
Tuna (fresh or frozen)	ND-1.30	0.32	No more than three
*Lobster Northern (American)	0.05-1.31	0.31	No more than three
Grouper (Epinephelus)	0.19-0.33	0.27	No more than three
*Halibut	0.02-0.63	0.23	No more than four
*Sablefish	ND-0.70	0.22	No more than four
*Pollock	ND-0.78	0.20	No more than four
*Tuna (canned)	ND-0.75	0.17	No more than five
*Crab Blue	0.02-0.50	0.17	No more than five
*Crab Dungeness	0.02-0.48	0.18	No more than five

Based on EPA reference dose. See footnote b for formula. Assumed average fish-meal size is eight ounces (one can of tuna is 6 ounces), average human weight is 70 kg, and a month is 30.44 days.
* Indicates popularly consumed fish

Source: FDA, 2001

Report Findings: A Growing Number of Waterways Under Advisory

Currently, 43 states[g] have issued advisories for mercury-contaminated fish, warning the general population or sensitive subpopulations to reduce or avoid consumption. This demonstrates nearly a 60% increase over the 27 states with active advisories in 1993.

Based on our analysis of active advisories in 2002, this translates into 2,148 mercury advisories in effect for at least:

- 12,111,733 acres of lakes (including statewide advisories), or almost 30% of all lake acres;
- 453,101 miles of river (including statewide advisories), or almost 13% of all river miles;
- 15,639 miles of coastal areas (not including statewide advisories);
- 2,333 miles of our Great Lake coasts and tributaries; and
- 166,534 acres of bayou.

See Table E for a state-by-state breakdown of river miles and lake acres under mercury advisory. Refer to Append i

and Texas, also have issu

Mercury Contamination Threatens the Recreational Fishing Industry

Mercury contamination is a threat to recreational fishing—a vital piece of our national and state economies. Recreational fishing is a multi-billion dollar industry. In 2001, the most recent year for which the data is available, approximately 34.1 million Americans took a total of 437 million fishing trips and spent 557

Addressing the Problem at the Source

Sources of Mercury Pollution

Mercury that endangers our health and

Not only is controlling mercury feasible, but the costs are relatively low. In a 1997 report to Congress, EPA estimated that a 90% reduction target would cost coal-fired power plants a total of $5 billion annually. Two years later, in its multi-pollutant benefit report, the estimate for a 70-90% reduction was revised downward to $2.7 billion. Now it is estimated that costs could be as low as $360 million for specific mercury control options.[43] This amounts to a fraction of the $250 billion-plus the utility industry generates in revenue each year.

Cutting Mercury Emissions from Coal-Burning Power Plants: It's Time for EPA to Act

After years of delay, the Environmental Protection Agency could act as early as this year to deliver 90% reductions in mercury pollution from power plants through stringent implementation of the existing Clean Air Act.

The electric and coal industries have been wildly successful in avoiding mercury regulations. The 1990 Clean Air Act amendments required EPA to conduct additional studies on mercury pollution from power plants before regulating mercury emissions.

EPA has completed two major reports for Congress. The first report, released in 1997, found that between 1% and 3% of women of childbearing age eat sufficient amounts of fish to be at risk from mercury exposure.[44] This number has been revised upward in subsequent studies.[45] In 1998, a second report established a plausible link between coal-fired power-plant mercury emissions and the mercury found in soil, water, air, and fish.[46]

The electric and coal industries have consistently argued that more scientific research is needed before reductions should be required. To counter the growing pressure to regulate the industry, utilities have argued that there are still uncertainties about the toxicological effects of mercury. In 1998, due to heavy industry pressure, Congress inserted language into the EPA appropriations bill directing the Agency to postpone regulation until another study was conducted on the health impacts of mercury.

The result was a 2000 report completed by the National Research Council that verified previous EPA findings on the toxicological impacts of mercury. These reports prompted a 2000 EPA announcement that mercury regulation was warranted.

Since that time, EPA has been meeting with state, industry, and environmental community stakeholders, who have been providing input to EPA as it drafts regulations. According to the Clean Air Act, the agency must issue "maximum achievable control technology" (MACT) standards for each coal-fired power plant, with compliance due by the end of 2007. This means that the standard must be set at a level being achieved by the best-controlled sources. Given the acknowledged availability of technologies that can achieve a 90% reduction, the legal standard should be set at that level. This would result in nationwide emission levels of about five tons per year, while ensuring that every coal-burning power plant in every community would meet stringent emission limits.

The Bush Administration's Air Pollution Plan Promises Higher Mercury Emissions

Unfortunately, the Bush administration's air pollution plan would eliminate the current regulatory system. The administration's so-called "Clear Skies" plan proposes a radical new regime for mercury control, one that will result in less progress and more contamination for a much longer time.

Instead of plant-by-plant controls at levels achievable with the most aggressive control technology, the Bush administration proposes to cap mercury at 26 tons in 2010 and 15 tons in

Table I. Increase in Mercury Emissions in Bush Administration Plan over Current Clean Air Programs

Existing Clean Air Act *(with 90% reductions)*[47]	5 tons per year by 2008[48]
Bush Administration Air Pollution Plan	2010-2018 21 tons/yr more mercury
Increase allowed by Bush Plan over Clean Air Act programs	After 2018 10 tons/yr more mercury
% Increase allowed by Bush Plan over existing Clean Air Act programs.	2010-2018 520% as much mercury After 2018 300% as much mercury
Delay allowed by Bush Plan over existing Clean Air Act programs	Up to 10 year delay

current law and the Bush proposal is that the administration would allow emissions trading for mercury, an unprecedented move since there has never before been a trading program for a pollutant that is a persistent bioaccumulative toxin. An emissions-trading approach could result in the development of toxic hot spots in communities where power plant owners purchase credits rather than reduce emissions.

In defending its proposal, EPA disavows its earlier statements on what is likely to occur under the Clean Air Act.[49] Essentially, EPA justifies weakening the law by arguing that it does not intend to faithfully implement the current law.

Conclusion and Recommendations

Once mercury is in the food supply, it puts all of our health at risk, but especially sensitive subpopulations such as children, pregnant women, and those who consume large amounts of fish—such as recreational anglers. The increasing number and breadth of mercury advisories indicates the vast extent of the mercury contamination problem. In addition to compromising public health, this pollution is a threat to recreational fishing—a vital piece of our national and state economies.

Efforts to strengthen, not weaken, mercury protections—especially from mercury's largest unregulated source, power plants—are needed. These efforts will ensure that all Americans, including recreational fishers, are protected form mercury:

1) U.S. EPA should faithfully implement the Clean Air Act to reduce mercury emissions from power plants by at least 90% from existing levels; and

2) The Bush administration should abandon its so-called "Clear Skies" proposal.

Methodology

This section details the methodology used to derive this report's data on fish advisories for mercury contamination, contained primarily in Table E and Appendix E. This data details the number of states that have issued mercury advisories, the number of advisories per state, and the number of acres or miles of a particular type of waterbody that are under advisory per state. While the EPA does the same analysis for advisories and areas under advisory, nationwide, the agency does not do a similar calculation by state. The data in this report does not necessarily mirror similar data calculations by the states, which may use different data and methodologies. This data is intended to be a general reference for the extent of mercury contamination and should not be relied upon for advice for fish consumption. People should consult EPA and their state department of health to determine how much fish, if any, can be safely consumed.

Data Source and Parameters: EPA provided us with data on active mercury fish consumption advisories for specific species in all waterbodies between December 31, 2001 and December 31, 2002. Excluded from the summary data in Table E and Appendix E, but provided by the EPA, are advisories issued by territories, such as American Samoa. In a separate data set, EPA provided data on active "no restriction" advisories and statewide advisories.

Geographic Area of Waterbodies Under Fish Consumption Advisory by State: This report follows EPA in using th

across the state.

We chose to eliminate the results for Utah due to data irregularities.

Comparing states. The major limitation for any proxy for mercury-contamination extent based on mercury consumption advisories is that there is no uniform testing across states for mercury contamination or uniform standards for issuing advisories. Some states are far more precautionary than others for the standard they use for fish contamination, the amount of monitoring of fish within water bodies, and the

Appendix A. Active Statewide Fish Consumption Advisories for Mercury Pollution (2002)

State	Advisory	Advisory Extent	Advisory Type	Year Issued	Species	Species Size	Restriction/ Population Covered
AL	Statewide: Gulf Of Mexico Coastal And Estuarine Waters	Statewide	Coastal	1996	mackerel-king	< 39"	Restricted Consumption - General pop.
AL	Statewide: Gulf Of Mexico Coastal And Estuarine Waters	Statewide	Coastal	1996	mackerel-king	> 39"	No Consumption - General pop.
CT	Statewide: All Rivers And Lakes	Statewide: All freshwater rivers and lakes	Statewide	1996	all fish except trout		Restricted Consumption - General pop.
CT	Statewide: All Rivers And Lakes	Statewide: All freshwater rivers and lakes	Statewide	1996	all fish except trout		Restricted Consumption - Subpop.(s)
CT	Statewide: All Rivers And Lakes	Statewide: All freshwater rivers and lakes	Statewide	1996	trout	> 15"	Restricted Consumption - Subpop.(s)
FL	Statewide: All Coastal Waters	Statewide	Coastal	1993	amberjack-greater		Restricted Consumption - General pop.
FL	Statewide: All Coastal Waters	Statewide	Coastal	1993	bluefish		Restricted Consumption - General pop.
FL	Statewide: All Coastal Waters	Statewide	Coastal	1993	cobia		Restricted Consumption - General pop.
FL	Statewide: All Coastal Waters	Statewide	Coastal	1993	jack-crevalle		Restricted Consumption - General pop.
FL	Statewide: All Coastal Waters	Statewide0	7.98		-7.98	0	304.4397

State	Advisory	Advisory Extent	Advisory Type	Year Issued	Species	Species Size	Restriction/ Population Covered
MD	Statewide: Lakes and Impoundments	same as above	Statewide	2001	sunfish-bluegill		Restricted Consumption - General pop.
MD	Statewide: Rivers and Streams	Statewide: All rivers and streams	Statewide	2001	bass-largemouth		Restricted Consumption - General pop.
MD	Statewide: Rivers and Streams	Statewide: All rivers and streams	Statewide	2001	bass-smallmouth		Restricted Consumption - General pop.
ME	All waters	Statewide: All fresh waters, lakes, ponds, rivers, and streams.	Statewide	1994	all other fish		Restricted Consumption - General pop.
ME	All waters	Statewide: All fresh waters, lakes, ponds, rivers, and streams.	Statewide	1994	all other fish		No Consumption - Subpop.(s)
ME	All waters	Statewide: All fresh waters, lakes, ponds, rivers, and streams.	Statewide	1994	salmon-Atlantic-landlocked		Restricted Consumption - General pop.
ME	All waters	Statewide: All fresh waters, lakes, ponds, rivers, and streams.	Statewide	1994	salmon-Atlantic-landlocked		Restricted Consumption - Subpop.(s)
ME	All waters	Statewide: All fresh waters, lakes, ponds, rivers, and streams.	Statewide	1994	trout-brook		Restricted Consumption - General pop.
ME	All waters	Statewide: All fresh waters, lakes, ponds, rivers, and streams.	Statewide	1994	trout-brook		Restricted Consumption - Subpop.(s)
ME	Statewide: All Coastal And Estuarine Waters	Statewide	Coastal	1994	bass-striped		Restricted Consumption - Subpop.(s)
ME	Statewide: All Coastal And Estuarine Waters	Statewide	Coastal	1994	bass-striped		Restricted Consumption - General pop.
ME	Statewide: All Coastal And Estuarine Waters	Statewide	Coastal	1994	bluefish		Restricted Consumption - General pop.
ME	Tribal Statewide - coastal waters	Tribal Statewide - coastal waters	Statewide	2002	all other fish		Restricted Consumption - General pop.
ME	Tribal Statewide - coastal waters	Tribal Statewide - coastal waters	Statewide	2002	shellfish-lobster-american (hepatopancreas/tomalley)		Restricted Consumption - General pop.

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State	Advisory	Advisory Extent	Advisory Type	Year Issued	Species	Species Size	Restriction/ Population Covered
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	bass-smallmouth		Restricted Consumption - Subpop.(s)
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	crappie-black	> 9"	Restricted Consumption - Subpop.(s)
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	crappie-black	> 9"	Restricted Consumption - General pop.
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	crappie-white	> 9"	Restricted Consumption - General pop.
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	crappie-white	> 9"	Restricted Consumption - Subpop.(s)
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	muskellunge		Restricted Consumption - General pop.
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	muskellunge		Restricted Consumption - Subpop.(s)
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	perch-yellow	> 9"	Restricted Consumption - General pop.
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	perch-yellow	> 9"	Restricted Consumption - Subpop.(s)
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	pike-northern		Restricted Consumption - General pop.
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	pike-northern		Restricted Consumption - Subpop.(s)
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	walleye		Restricted Consumption - General pop.
MI	Statewide: All Lakes (Inland)	Statewide: Inland lakes	Statewide	1993	walleye		Restricted Consumption - Subpop.(s)
MN	Statewide: All Lakes (Unmonitored)	Statewide	Statewide	1999	all other fish		Restricted Consumption - General pop.
MN	Statewide: All Lakes (Unmonitored)	Statewide	Statewide	1999	all other fish	< 20"	Restricted Consumption - Subpop.(s)
MN	Statewide: All Lakes (Unmonitored)	Statewide	Statewide	1999	all other fish	> 20"	No Consumption - Subpop.(s)
MN	Statewide: All Lakes (Unmonitored)	Statewide	Statewide	1999	all panfish		Restricted Consumption - Subpop.(s)
MO	Statewide	Statewide: All waters	Statewide	2001	bass-largemouth	> 12"	No Consumption - Subpop.(s)
MS	Statewide: Gulf Of Mexico Coastal And Estuarine Waters	Statewide	Coastal	1998	mackerel-king	> 39"	No Consumption - General pop.
MS	Statewide: Gulf Of Mexico Coastal And Estuarine Waters	Statewide	Coastal	1998	mackerel-king	33-39"	Restricted Consumption - General pop.
NC	Statewide: All Coastal And Estuarine Waters	Statewide: Atlantic Ocean	Coastal	2000	mackerel-king	All sizes	No Consumption - Subpop.(s)
NC	Statewide: All Coastal And Estuarine Waters	Statewide: Atlantic Ocean	Coastal	2000	mackerel-king	All sizes	Restricted Consumption - General pop.

State	Advisory	Advisory Extent	Advisory Type	Year

State	Advisory	Advisory Extent	Advisory Type	Year Issued	Species	Species Size	Restriction/ Population Covered
ND	Statewide: All lakes and rivers	same as above	Statewide	2001	perch-yellow	>11 in	Restricted Consumption - General pop.
ND	Statewide: All lakes and rivers						

State	Advisory	Advisory Extent	Advisory Type	Year Issued	Species	Species Size	Restriction/ Population Covered
TX	Gulf Of Mexico	Statewide: All waters off the Texas coast (Jefferson, Chambers, Galveston, Brazoria, Matagorda, Calhoun, Refugio, Aransas, San Paticio, Nueces, Kleberg, Kenedy, Willacy, and Camerson counties).	Coastal	1997	mackerel-king	> 43"	No Consumption - General pop.
TX	Gulf Of Mexico	same as above	Coastal	1997	mackerel-king	37-43"	Restricted Consumption - Subpop.(s)
TX	Gulf Of Mexico	same as above	Coastal	1997	mackerel-king	37-43"	Restricted Consumption - General pop.
VT	Statewide: All Waters	Statewide	Statewide	1995	all fish except bullhead and sunfish-pumpkinseed		Restricted Consumption - Subpop.(s)
VT	Statewide: All Waters	Statewide	Statewide	1995	all fish except bullhead and sunfish-pumpkinseed		Restricted Consumption - General pop.
VT	Statewide: All Waters	Statewide	Statewide	1995	walleye		No Consumption - Subpop.(s)
WI	Statewide - All lakes	Statewide: All lakes	Statewide	2000	all fish		Restricted Consumption - Subpop.(s)
WI	Statewide - All lakes	Statewide: All lakes	Statewide	2000	all other fish		Restricted Consumption - General pop.

Appendix B. Money Spent on Recreational Fishing in Each State (2001)[50]

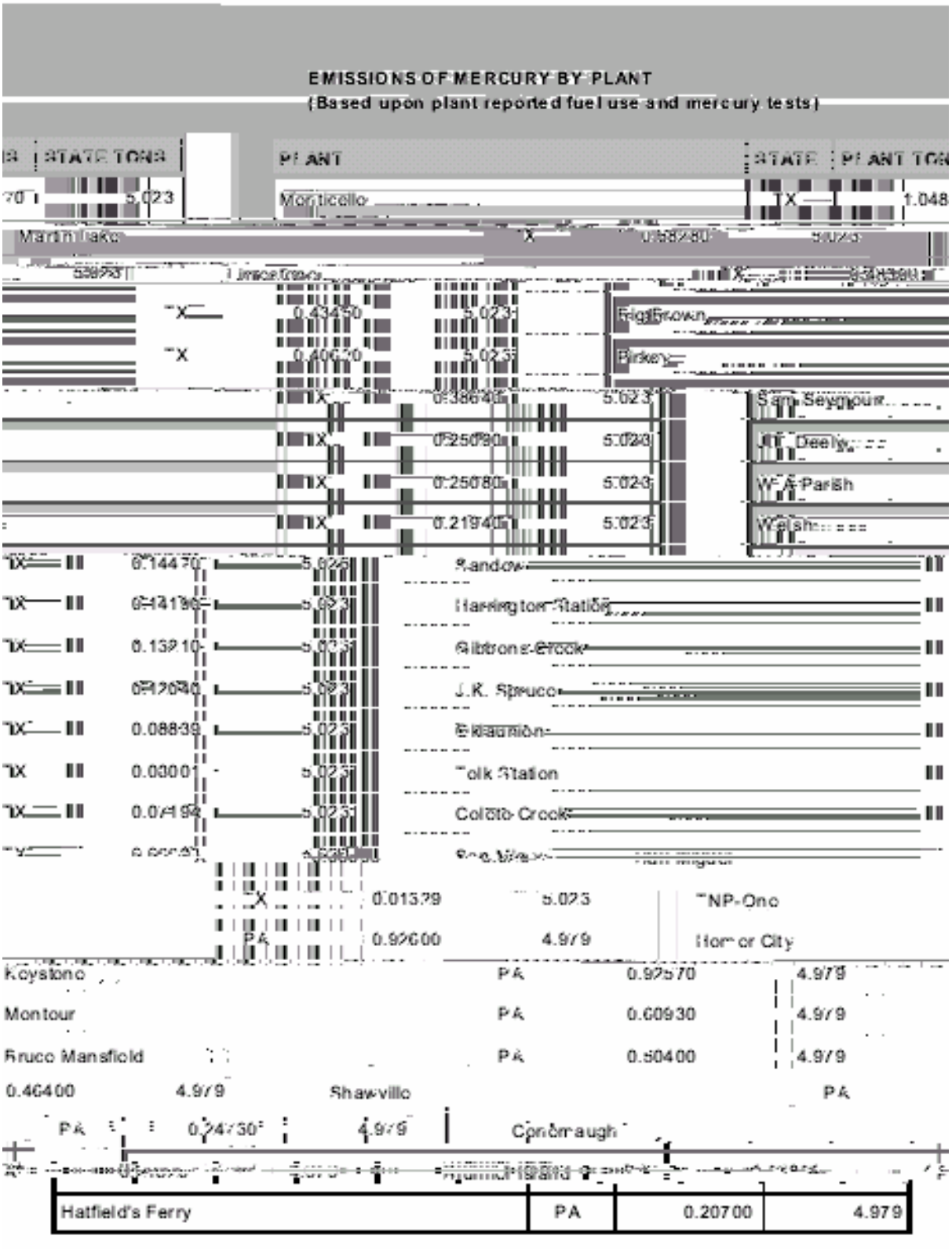
Rank	State	Money Spent on Recreational Fishing
1	FL	$4,083,409,000
2	CA	$2,029,581,000
3	TX	$1,950,902,000
4	MN	$1,284,522,000
5	NC	$1,118,028,000
6	NY	$1,073,019,000
7	WI	$1,005,149,000
8	WA	$853,761,000
9	MI	$838,558,000
10	OH	$761,619,000
11	MO	$745,514,000
12	AL	$723,467,000
13	LA	$703,373,000
14	NJ	$699,826,000
15	CO	$645,891,000
16	OR	$601,780,000
17	IL	$598,376,000
18	AK	$537,355,000
19	PA	$580,351,000
20	SC	$558,731,000
21	KY	$544,660,000
22	GA	$543,504,000
23	IN	$518,863,000
24	VA	$517,802,000
25	TN	$480,221,000

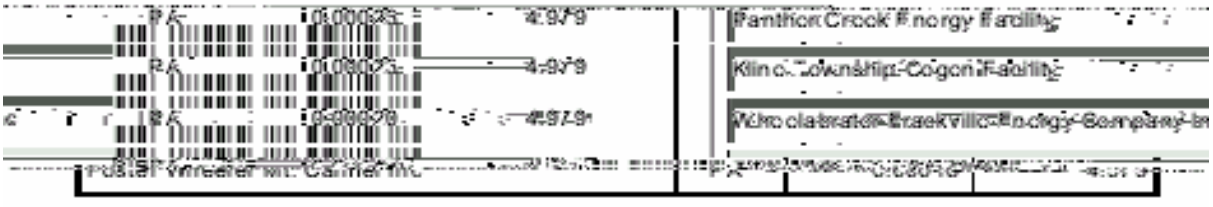
Rank	State	Money Spent on Recreational Fishing
26	MD	$480,185,000
27	OK	$476,019,000
28	MA	$464,991,000
29	AR	$445,778,000
30	UT	$392,617,000
31	IA	$335,878,000
32	AZ	$336,293,000
33	ID	$310,872,000
34	MT	$292,050,000
35	ME	$250,939,000
36	CT	$224,139,000
37	NV	$216,721,000
38	WY	$211,530,000
39	MS	$210,697,000
40	KS	$192,629,000
41	SD	$182,480,000
42	NM	$176,476,000
43	NH	$164,634,000
44	ND	$159,023,000
45	NE	$146,359,000
46	HI	$107,002,000
47	RI	$105,649,000
48	WV	$102,281,000
49	VT	$92,536,000
50	DE	$69,956,000

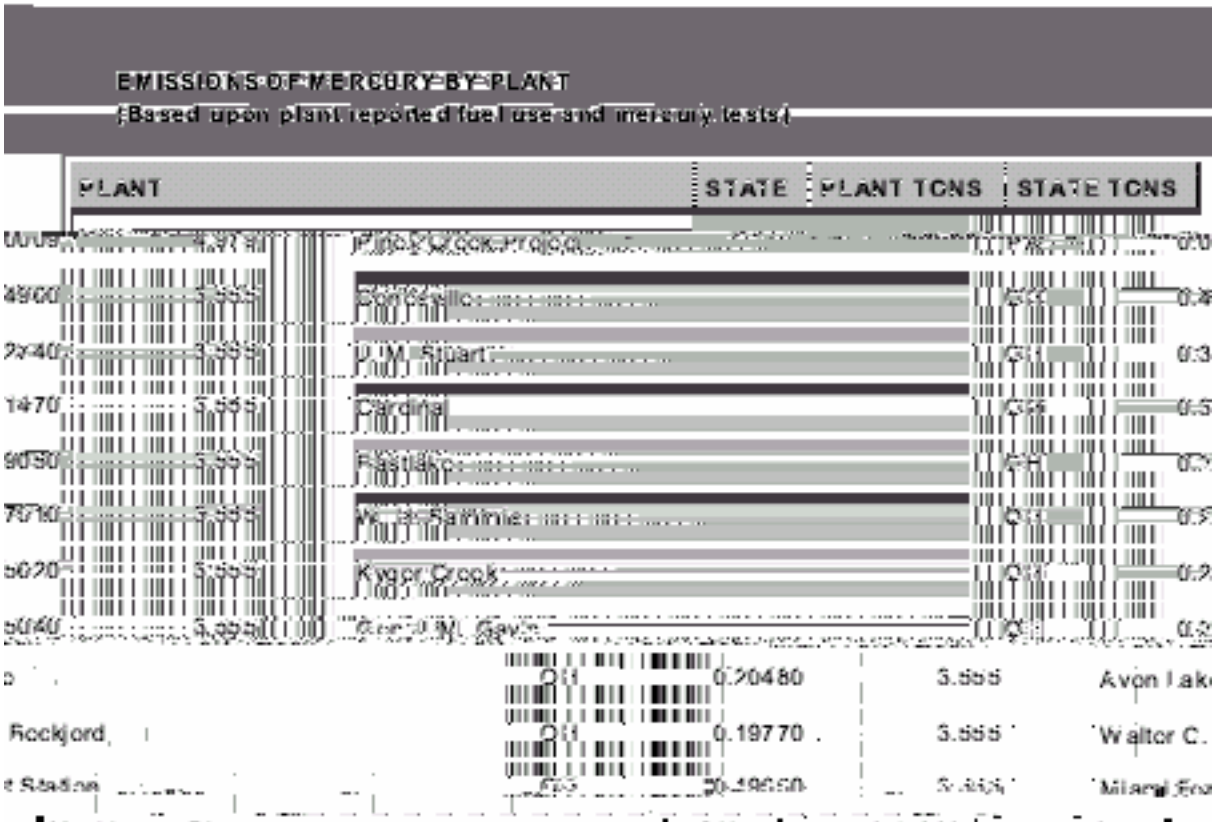
Appendix C. Mercury Emissions from Power Plants: by State (1999)[51]

Rank	State	Tons	Pounds		Rank	State	Tons	Pounds
1	Texas	5.023	10,046		26	South Carolina	0.534	1,068
2	Pennsylvania	4.979	9,958		27	New York	0.514	1,028
3	Ohio	3	O552	1	T58			

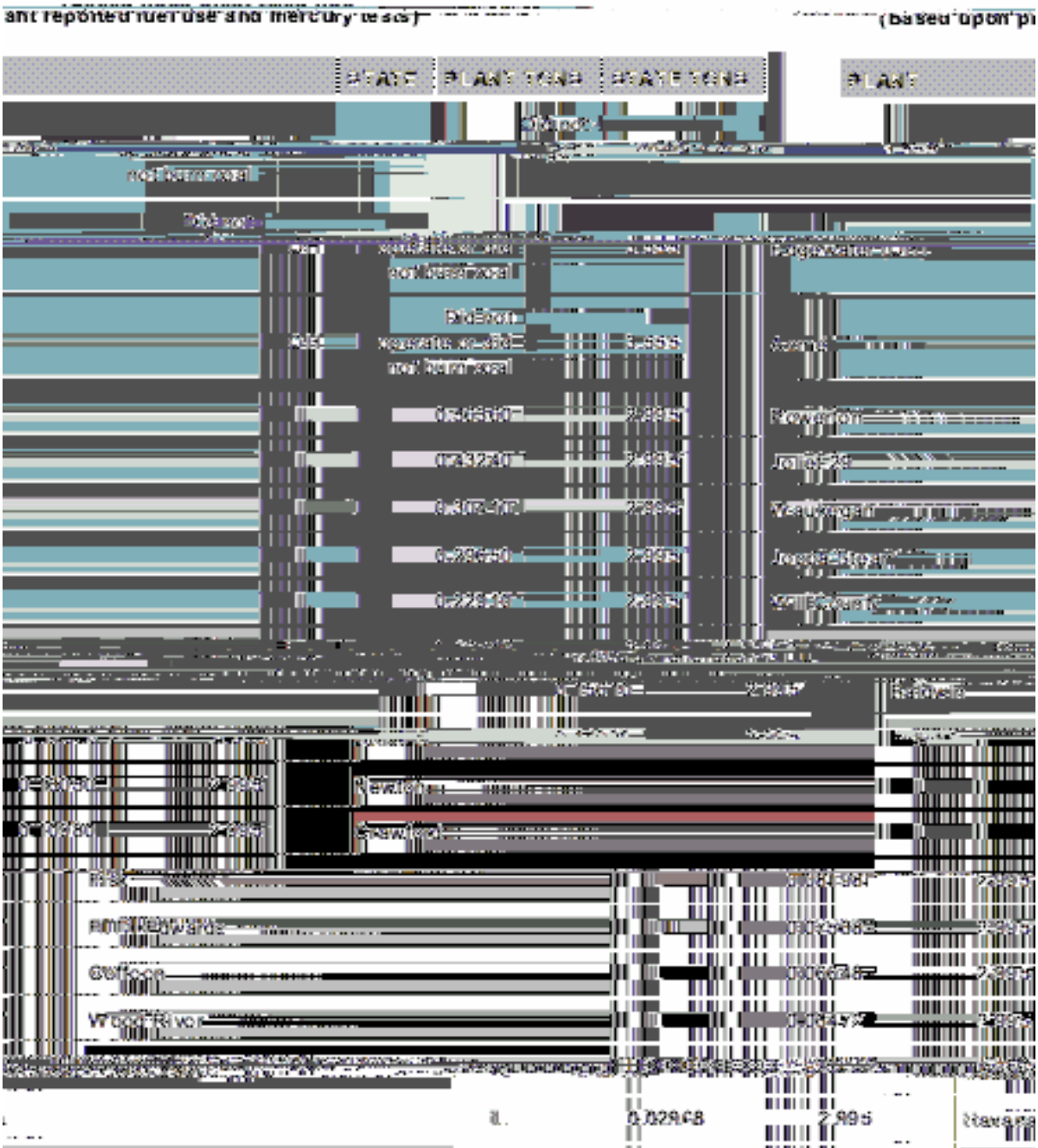
Appendix D. Mercury Emissions by Power Plant (1999)[52]



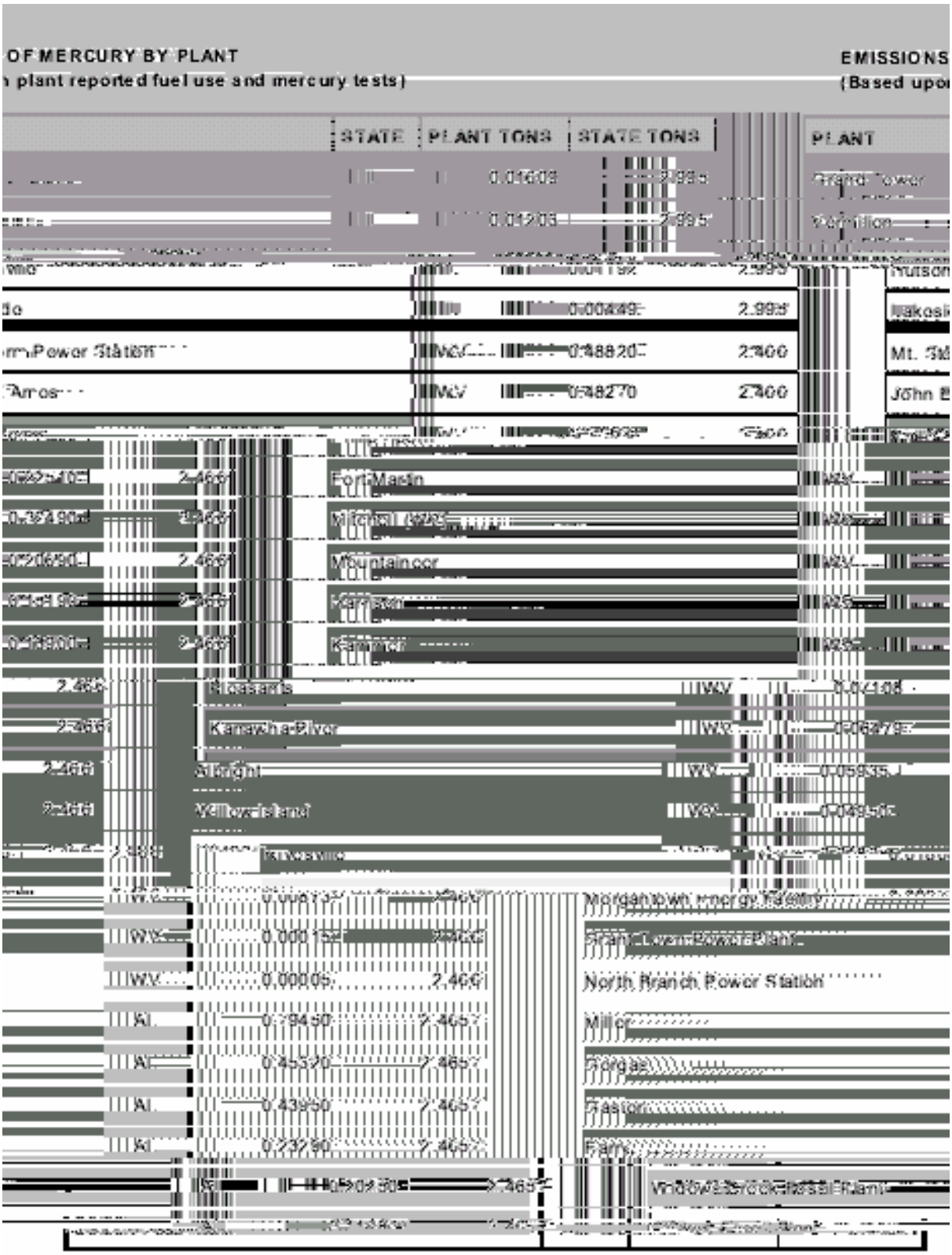

Panther Creek Energy Facility

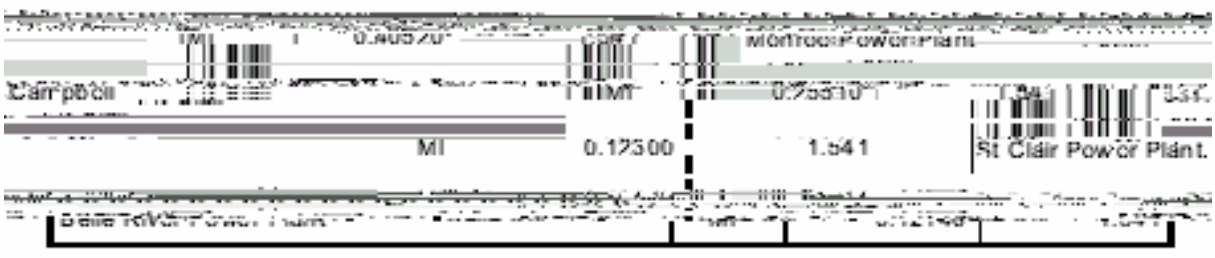


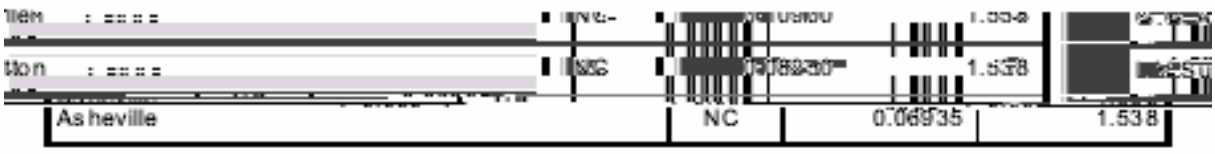
Muskingum River	OH	0.15820	3.555
Bay Shore	OH	0.13120	3.555
Killen	OH	0.09550	3.555
W. H. Zimmer Station	OH	0.08767	3.555
Niles	OH	0.07993	3.555
Richard H. Gorsuch	OH	0.06684	3.555
R. E. Burger	OH	0.06274	3.555
Ashtabula	OH	0.05633	3.555
Picway	OH	0.02940	3.555
O. H. Hutchings	OH	0.01889	3.555
Lake Shore	OH	0.00304	3.555
Hamilton	OH	0.00078	3.555
Toronto	OH	Did not operate or did not burn coal	3.555

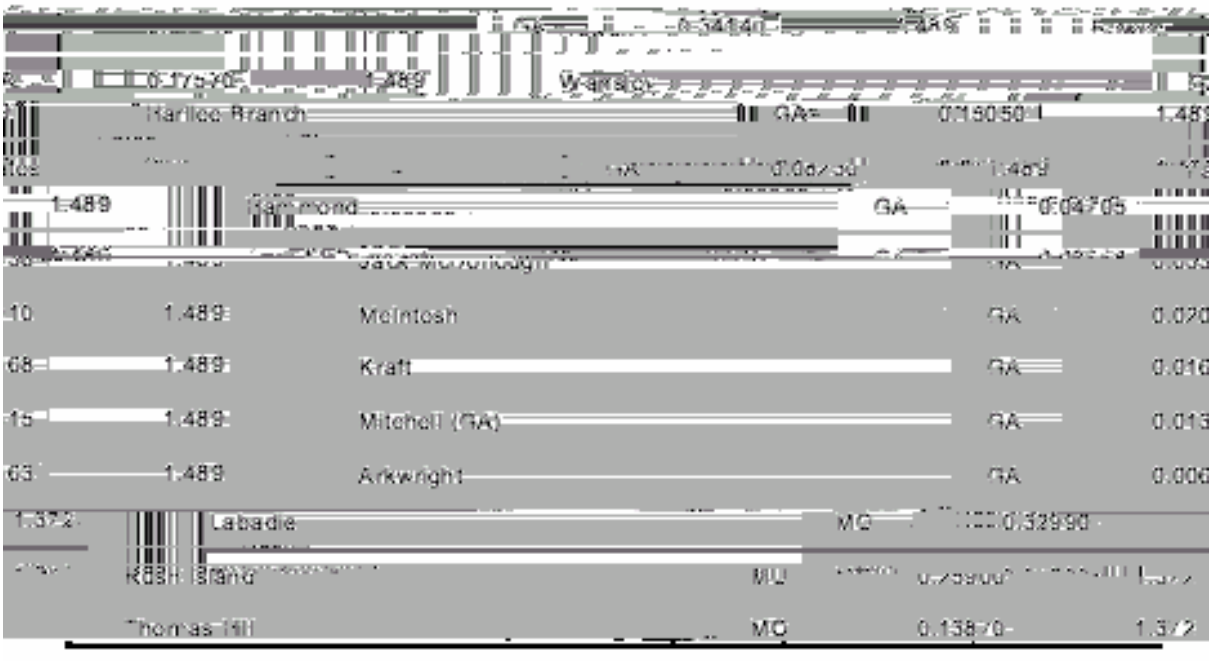


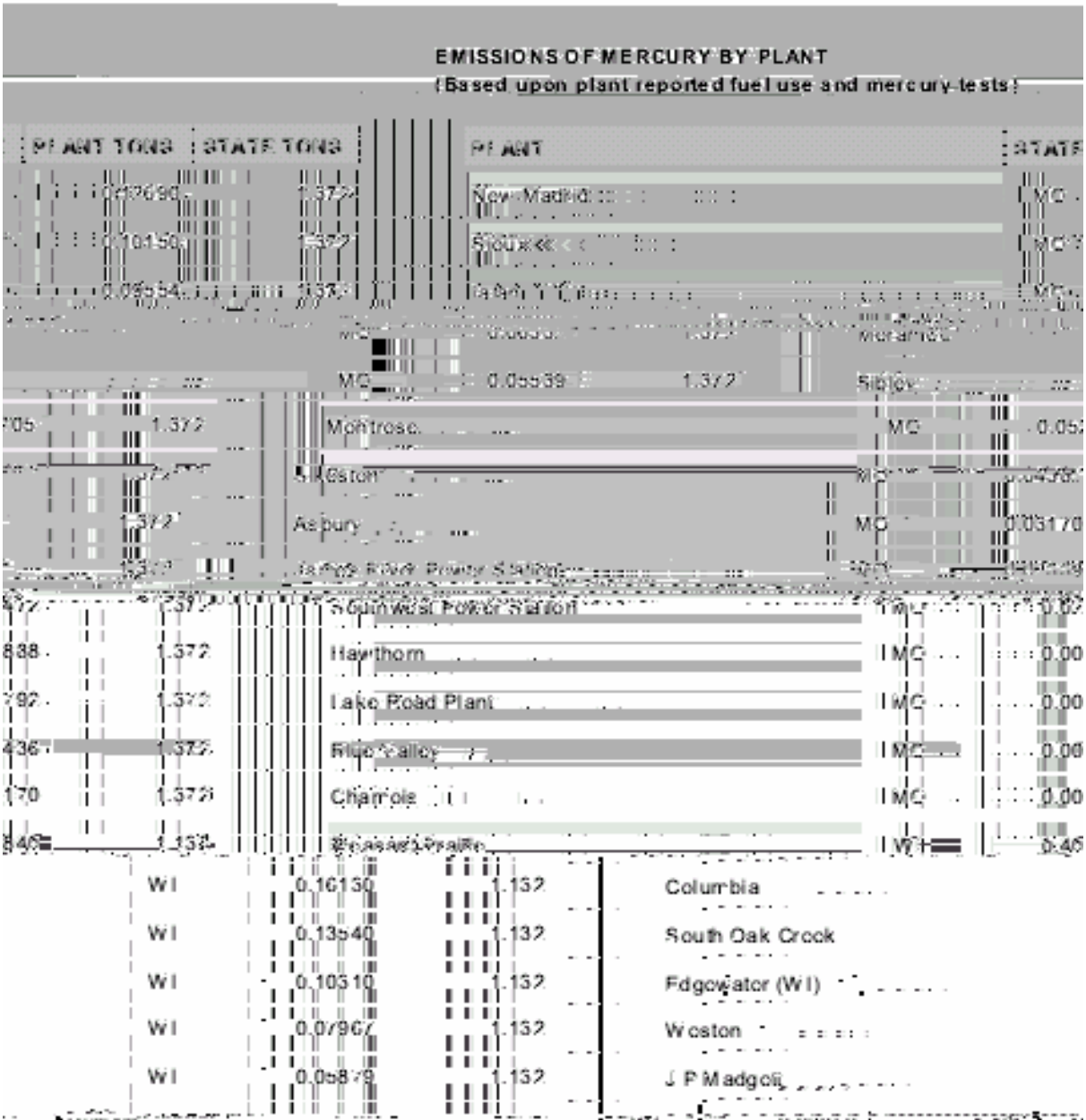
Hennepin	IL	0.02968	2.995
Dallman	IL	0.02792	2.995
Meredosia	IL	0.02587	2.995
Duck Creek	IL	0.01735	2.995


OF MERCURY BY PLANT
plant reported fuel use and mercury tests)
EMISSIONS
(Based upo
STATE
PLANT TONS
STATE TONS
PLANT
Fort Martin
Kanawha River
Morgantown Energy Associates
North Branch Power Station
Miller
Morgan
Easton
Fairn


MI
0.17300
1.541
St Clair Power Plant.


Asheville
NC
0.068735
1.538


Harlico Branch
GA
1.489
Raymond
GA
10
1.489
McIntosh
GA
68
1.489
Kraft
GA
15
1.489
Mitchell (GA)
GA
63
1.489
Arkwright
GA
Lebadie
MO
Thomas Hill
MO



Pulliam	WI	0.03650	1.132
Nelson Dewey	WI	0.03654	1.132
Genoa	WI	0.03229	1.132
Port Washington	WI	0.02779	1.132
Valley	WI	0.02756	1.132
Rock River	WI	0.01010	1.132

Y BY PLANT

ed fuel use and mercury tests)

EMISSIONS OF MERCUR

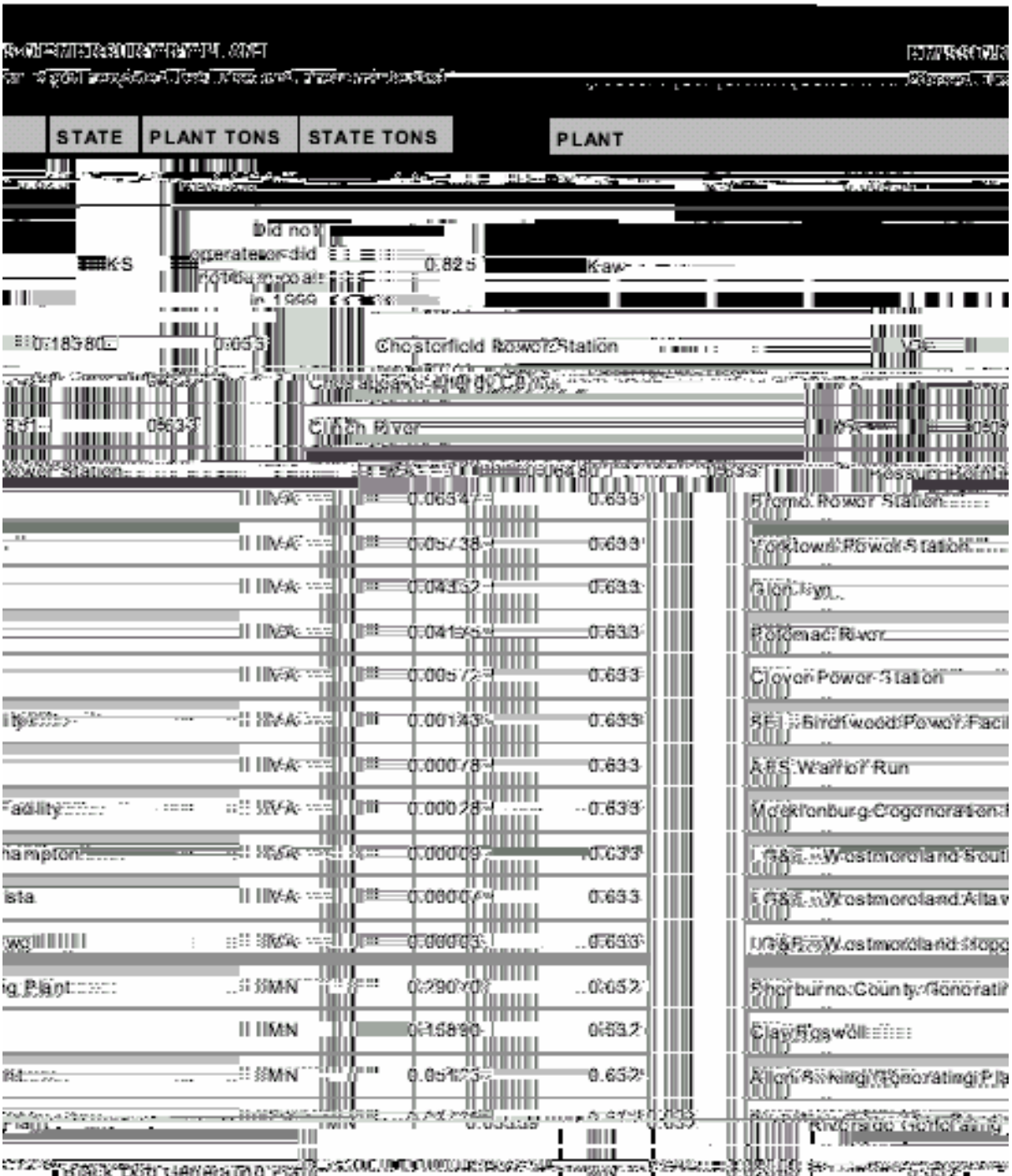
(Based upon plant report

STATE	PLANT	STATE
0.975	Prairie Creek	
0.975	Riverside	
IA	0.00593	0.975
	Fair Station	
0.22590	Crystal River	FL
0.15010	Big Bend	
FL	0.08784	0.961
0.961	St. Johns River Power Park	FL
0.961		FL
FL	0.04626	0.961
FL	0.01284	0.961
	Deerhaven	
FL	0.00715	0.961
	Cedar Bay Generating Company L.P.	
FL	0.00715	0.961
	Scholz	
	Indiantown Cogeneration Facility	

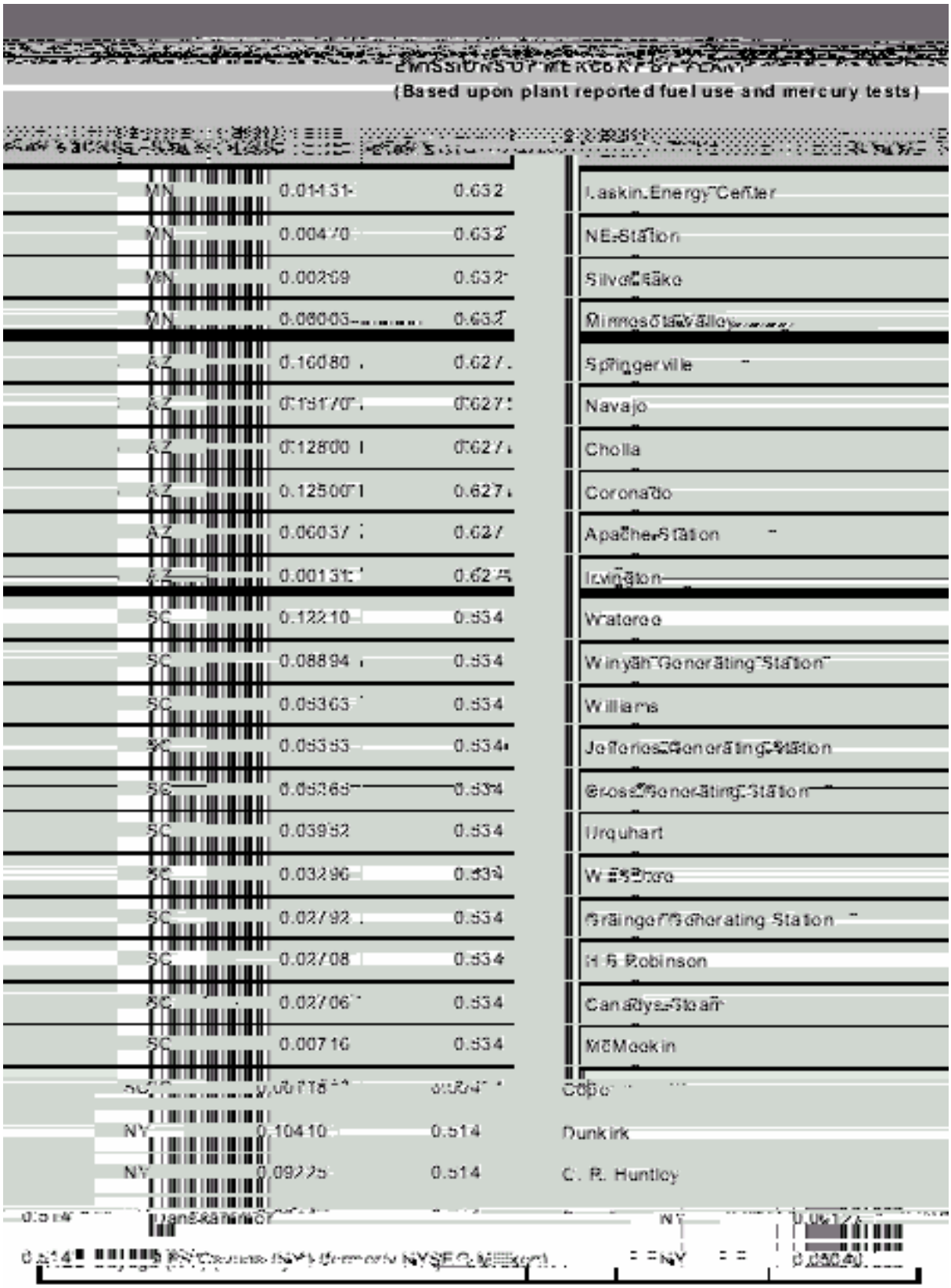
MISSIONS OF MERCURY BY PLANT

Based upon plant reported fuel use and mercury tests)

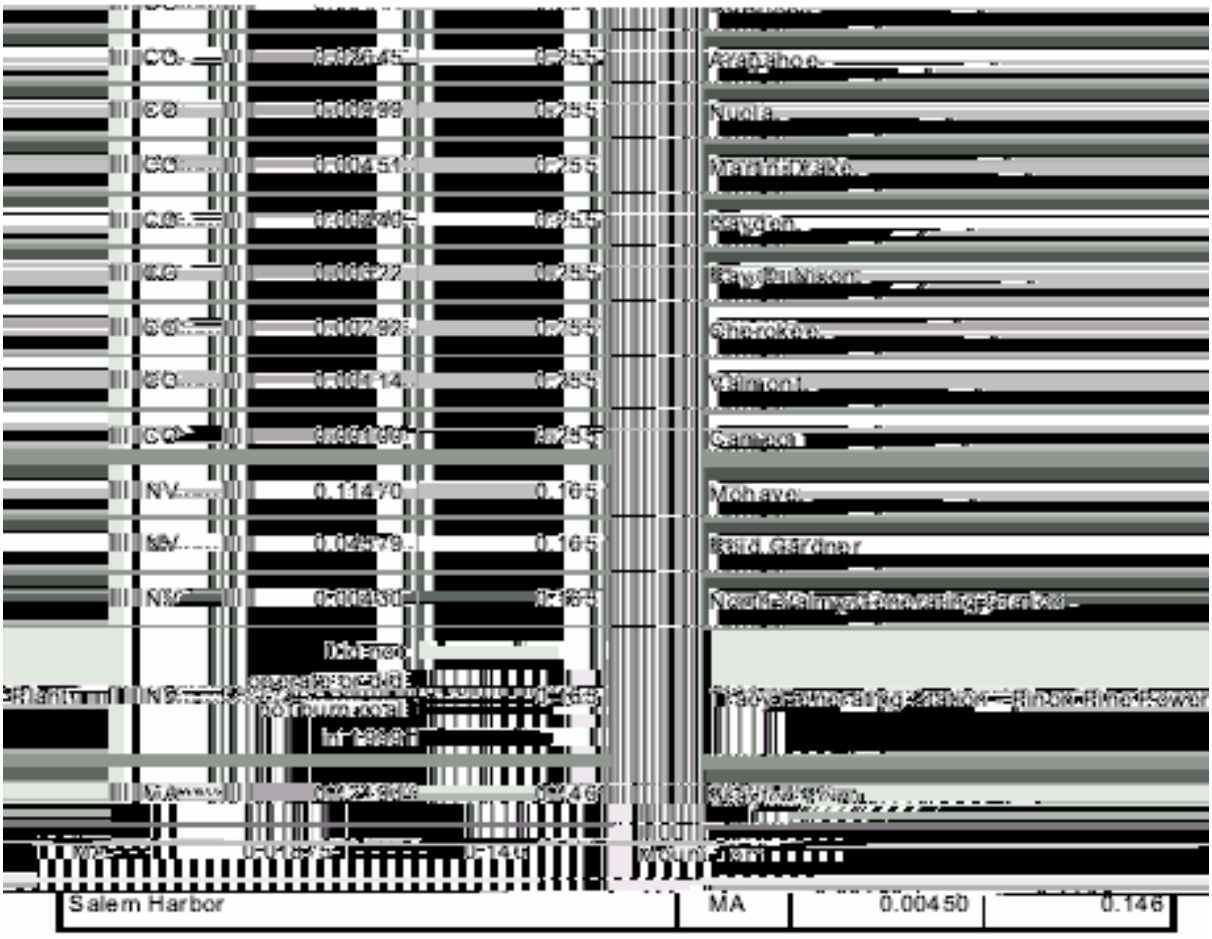
PLANT	STATE	PLANT TONS	STATE TONS
[illegible] Bridger	WY	[illegible]	[illegible]
Laramie River Station	WY	[illegible]	[illegible]
Dave Johnston	WY	[illegible]	[illegible]
[illegible]	WY	[illegible]	[illegible]
Naughton	WY	[illegible]	[illegible]
Neil Simpson 2	WY	[illegible]	[illegible]
Brandon Shores	MD	[illegible]	[illegible]
Chalk Point	MD	[illegible]	[illegible]
Morgantown	MD	[illegible]	[illegible]
Dickerson	MD	[illegible]	[illegible]
H.A. Wagner	MD	[illegible]	[illegible]
C.P. Crane	MD	[illegible]	[illegible]
R. Paul Smith	MD	[illegible]	[illegible]
AES Shady Point Inc.	OK	[illegible]	[illegible]
Muskogee	OK	[illegible]	[illegible]
Sooner	OK	[illegible]	[illegible]
[illegible]	OK	[illegible]	[illegible]
Northeastern	OK	[illegible]	[illegible]
Hugo	OK	[illegible]	[illegible]
Jeffrey Energy Center	KS	[illegible]	[illegible]
[illegible]	KS	[illegible]	[illegible]
Lawrence	KS	[illegible]	[illegible]
Tecumseh	KS	0.03211	0.825
[illegible]	KS	[illegible]	[illegible]
Nearman Creek	KS	0.02508	0.825
Quindaro	KS	0.02156	0.825

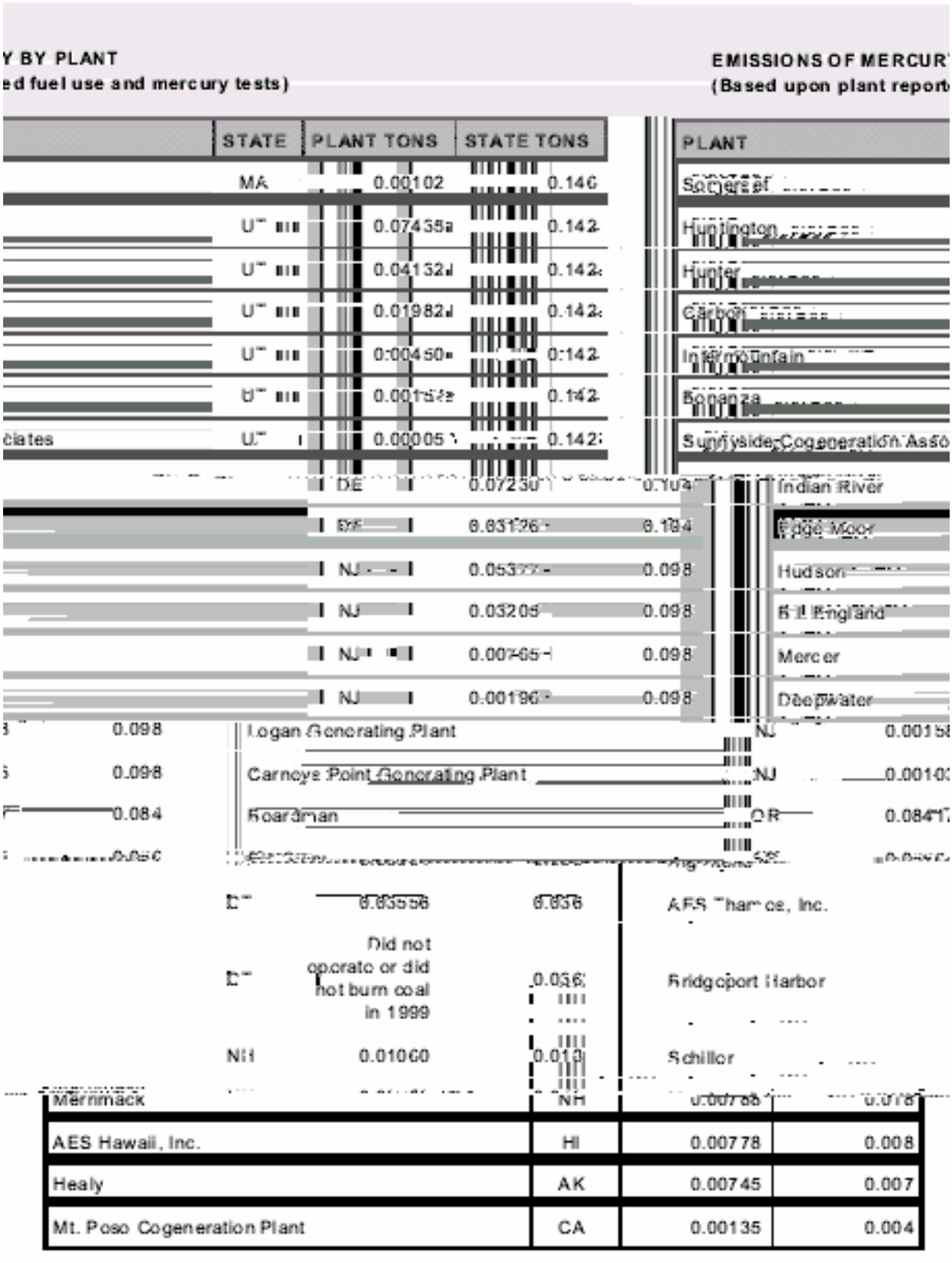


Hoot Lake	MN	0.02184	0.632
High Bridge Generating Plant	MN	0.02087	0.632

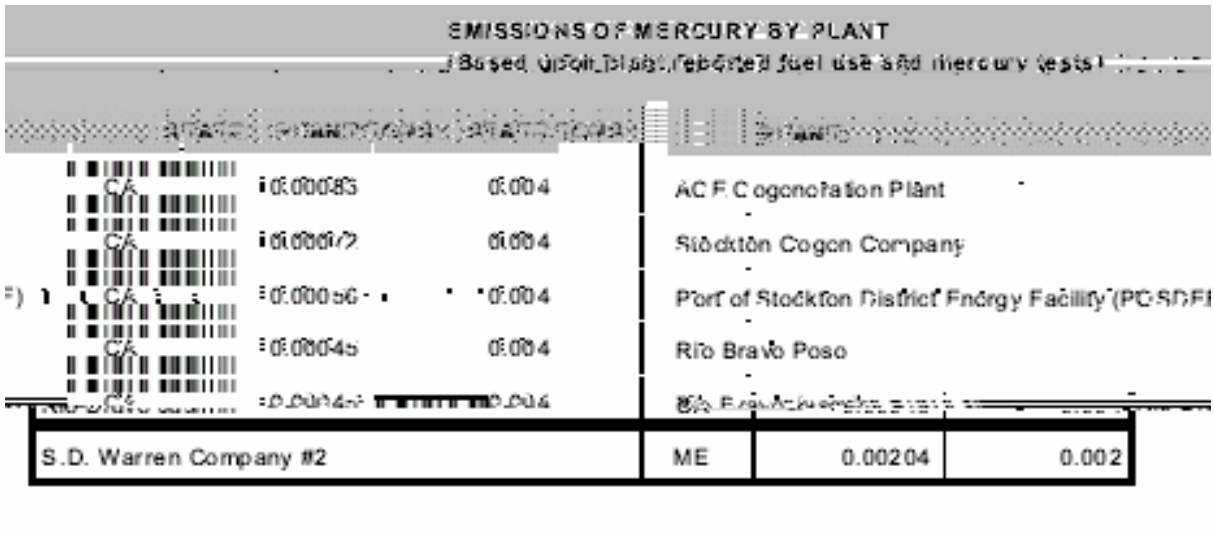

(Based upon plant reported fuel use and mercury tests)
MN 0.01131 0.632 Laskin Energy Center
MN 0.00470 0.632 NE Station
MN 0.00209 0.632 Silver Lake
MN 0.08003 0.632 Minnesota Valley
AZ 0.16080 0.627 Springerville
AZ 0.15170 0.627 Navajo
AZ 0.12800 0.627 Cholla
AZ 0.12500 0.627 Coronado
AZ 0.06037 0.627 Apache Station
AZ 0.00131 0.627 Irvington
SC 0.12210 0.554 Wateree
SC 0.08894 0.554 Winyah Generating Station
SC 0.05363 0.554 Williams
SC 0.05353 0.554 Jefferies Generating Station
SC 0.05265 0.554 Cross Generating Station
SC 0.03952 0.554 Urquhart
SC 0.03296 0.554 Wateree
SC 0.02792 0.554 Grainger Generating Station
SC 0.02708 0.554 H B Robinson
SC 0.02706 0.554 Canadys Steam
SC 0.00716 0.554 McMeekin
NY 0.10410 0.514 Dunkirk
NY 0.09225 0.514 C. R. Huntley

	[illegible]	[illegible]	[illegible]	Independence
	0.0500999	0.50	[illegible]	Flint Creek
	[illegible]	0.503	[illegible]	Big Cajun 2
	[illegible]	0.505	[illegible]	R.S. Nelson
	[illegible]	0.505	[illegible]	Dolet Hills Power Station
	[illegible]	0.503	[illegible]	Rodemacher Power Station Unit #2
MT	0.043570	0.471		Colstrip
MT	0.01584	0.471		JE Corette
MT	0.010	0.471		[illegible]
MT	0.009900	0.471		Lewis & Clark
NE	0.152	0.417		Gerald Gentleman Station
NE	0.10540	0.417		Nebraska City
NE	0.08959	0.417		North Omaha
NE	0.03408	0.417		Sheldon
NE	0.01583	0.417		Platte
NE	[illegible]	[illegible]		Whelan Energy Center


Salem Harbor
MA
0.00450
0.146



AES Hawaii, Inc.	HI	0.00778	0.008
Healy	AK	0.00745	0.007
Mt. Poso Cogeneration Plant	CA	0.00135	0.004


EMISSIONS OF MERCURY BY PLANT
Based on Plant Reported Fuel Use and Mercury Tests
CA
0.000085
0.004
ACF Cogeneration Plant
CA
0.000072
0.004
Stockton Cogen Company
CA
0.000056
0.004
Port of Stockton District Energy Facility (PCSDEF
CA
0.000045
0.004
Rio Bravo Poso
CA
0.004
S.D. Warren Company #2
ME
0.00204
0.002

End Notes

[1] U.S. EPA, 1997b. Mercury Study Report to Congress, Volume VII: Characterization of Human and Wildlife Risks from Mercury Exposure in the United States.
[2]

[36] EPA, Utility Air Toxics Determination, available at http://www.epa.gov/mercury/actions.htm#utility
[37] *Id.*
[38] *Id.*
[39] *Id.*
[40] EPA, Emission Data by Plant, located at http://www.epa.gov/mercury/actions.htm#utility
[41] *See*, EPA Mercury MACT Presentation to EEI, December 2001.
[42] Discussion Document of the Department of Energy, the Electric Power Research Institute, and the Coal Utilization Research Council, Clean Coal Technology Roadmap, Performance Targets.
[43] National Wildlife Federation, Factsheet, June 2002, "Mercury Control Options for Power Plants."
[44] U.S. EPA, *supra*, note 1.
[45] See Centers for Disease Control, *supra*, note 21.
[46] U.S. EPA, 1998. Utility Air Toxics Study Report to Congress, av.9( )ɣ.1Opry Mcs Study