

# Mercury Reduction

Senate Environment &  
Natural Resources  
Committee  
December 8, 2005

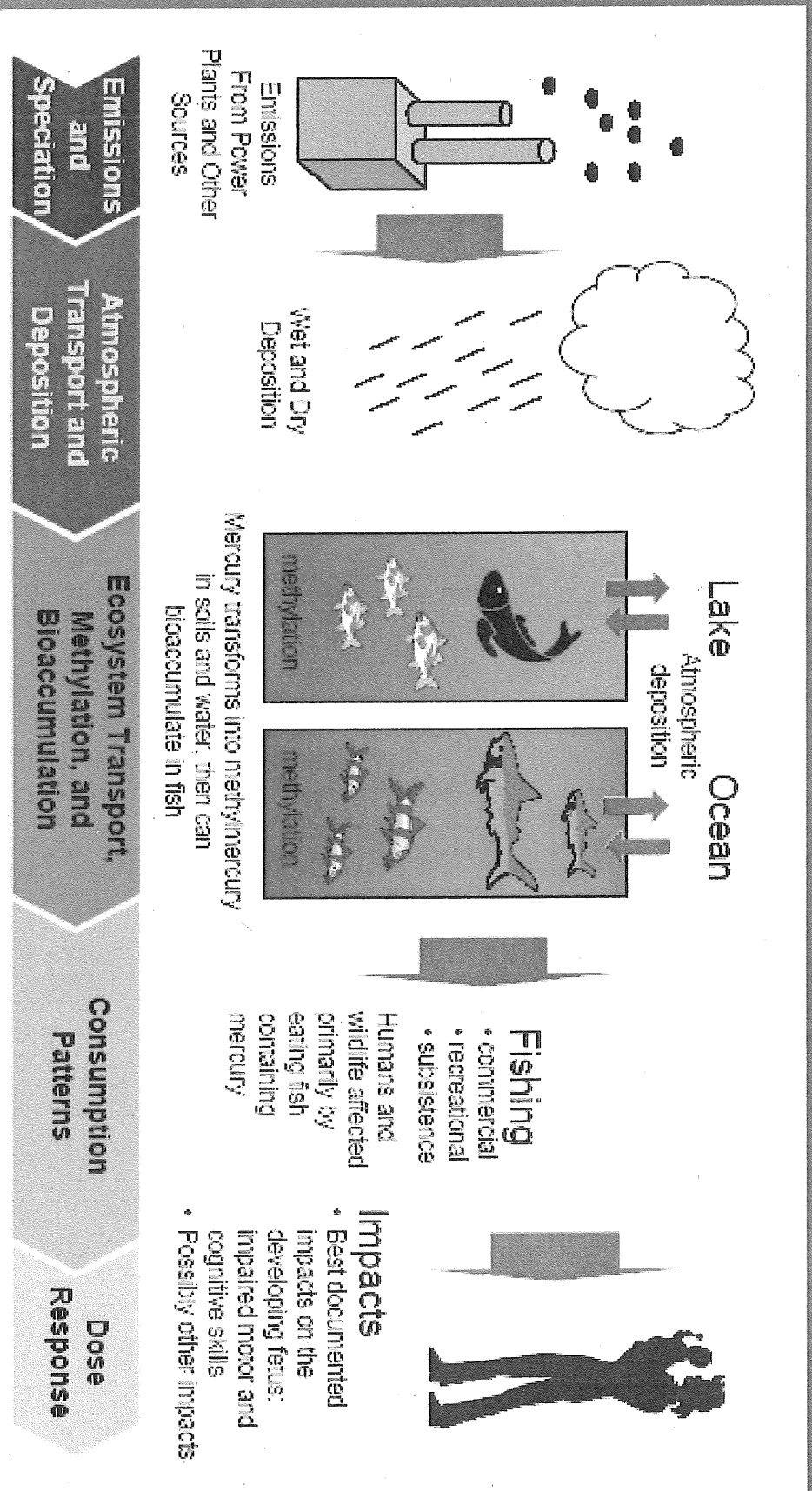
Minnesota Pollution Control Agency



# Mercury Reduction

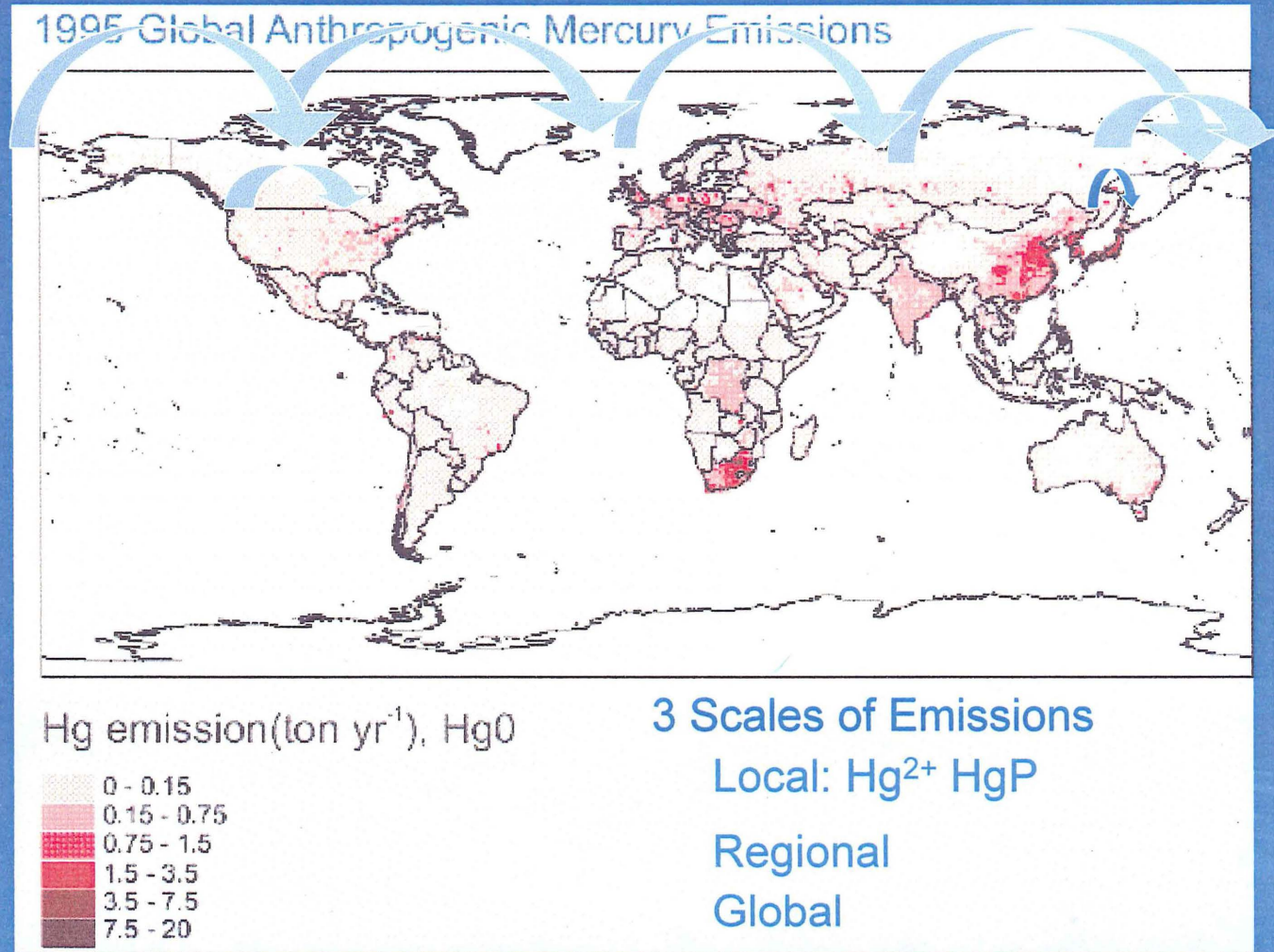
- Minnesota has been and will continue to be a national leader
- National and global reductions are critical
- More reductions in Minnesota are necessary
- Minnesota Challenge: clear choices – tough decisions regarding cost, timing & feasibility
- Minnesota's 93% Mercury Reduction Goal

# Mercury Exposure Pathway



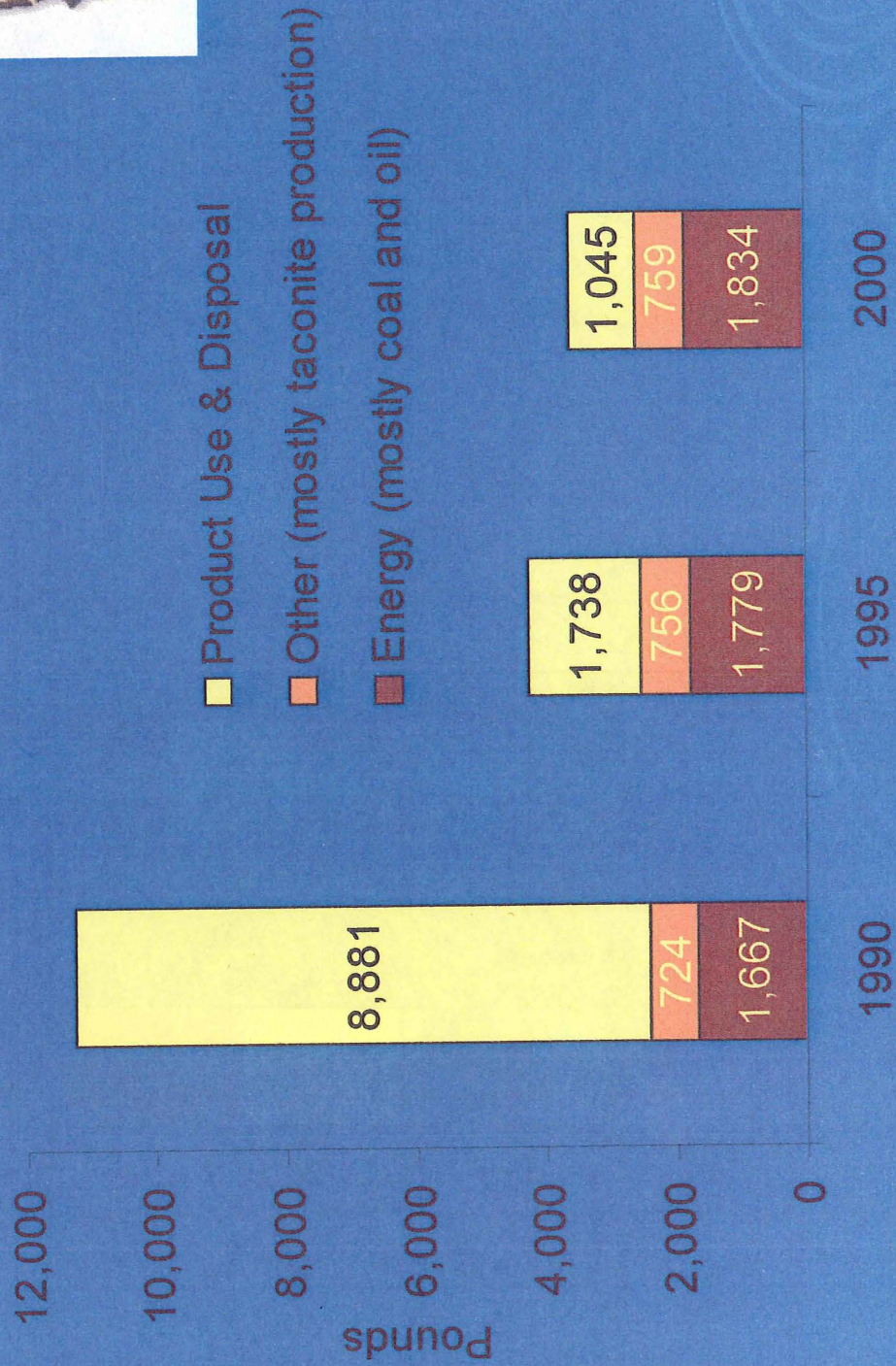
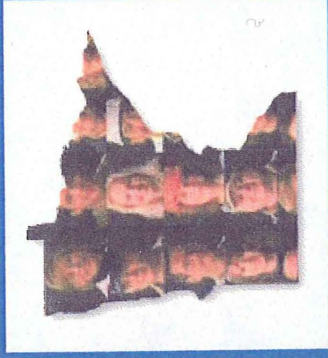


# Spatial Distribution of Global Emissions $\text{Hg}^0$



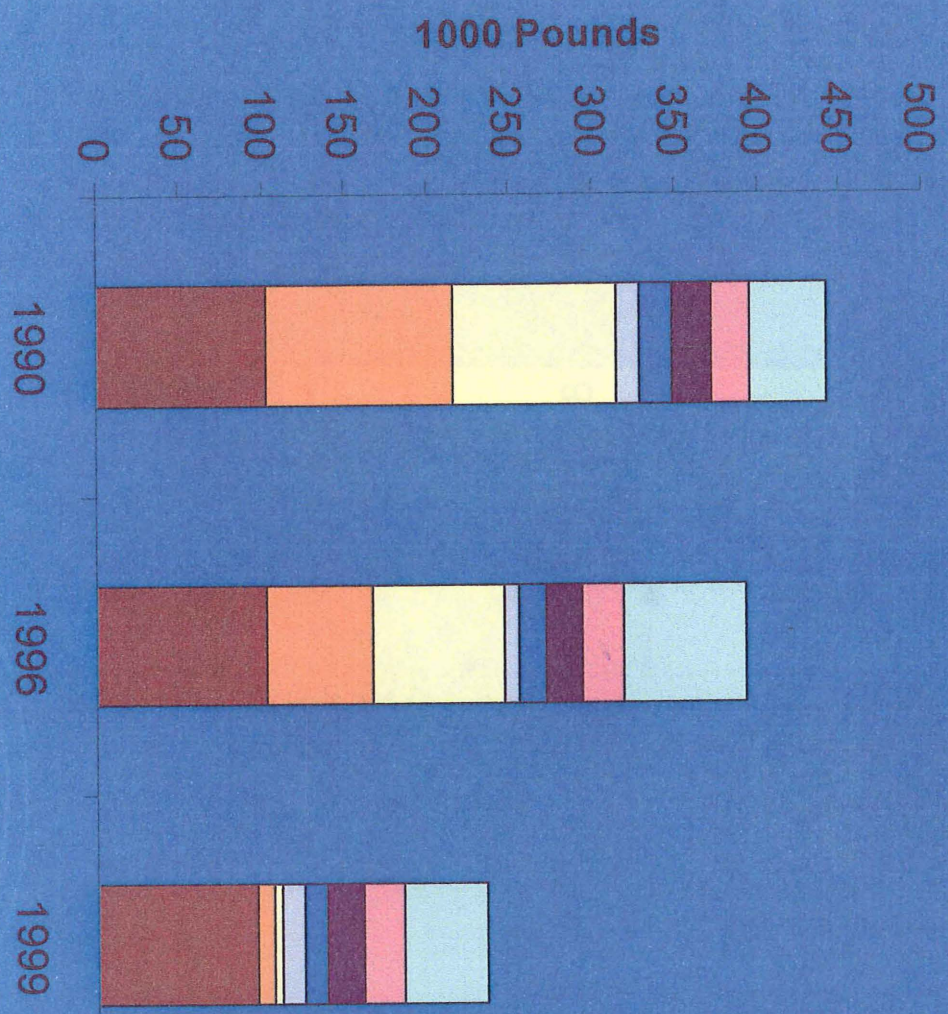


# Mercury Emissions: Minnesota





# Mercury Emissions: U.S.



- Other
- Institutional Boilers
- Gold Mines
- Chlorine Production
- Hazardous Waste Incineration
- Medical Waste Incinerators
- Municipal Waste Combustors
- Utility Coal Boilers

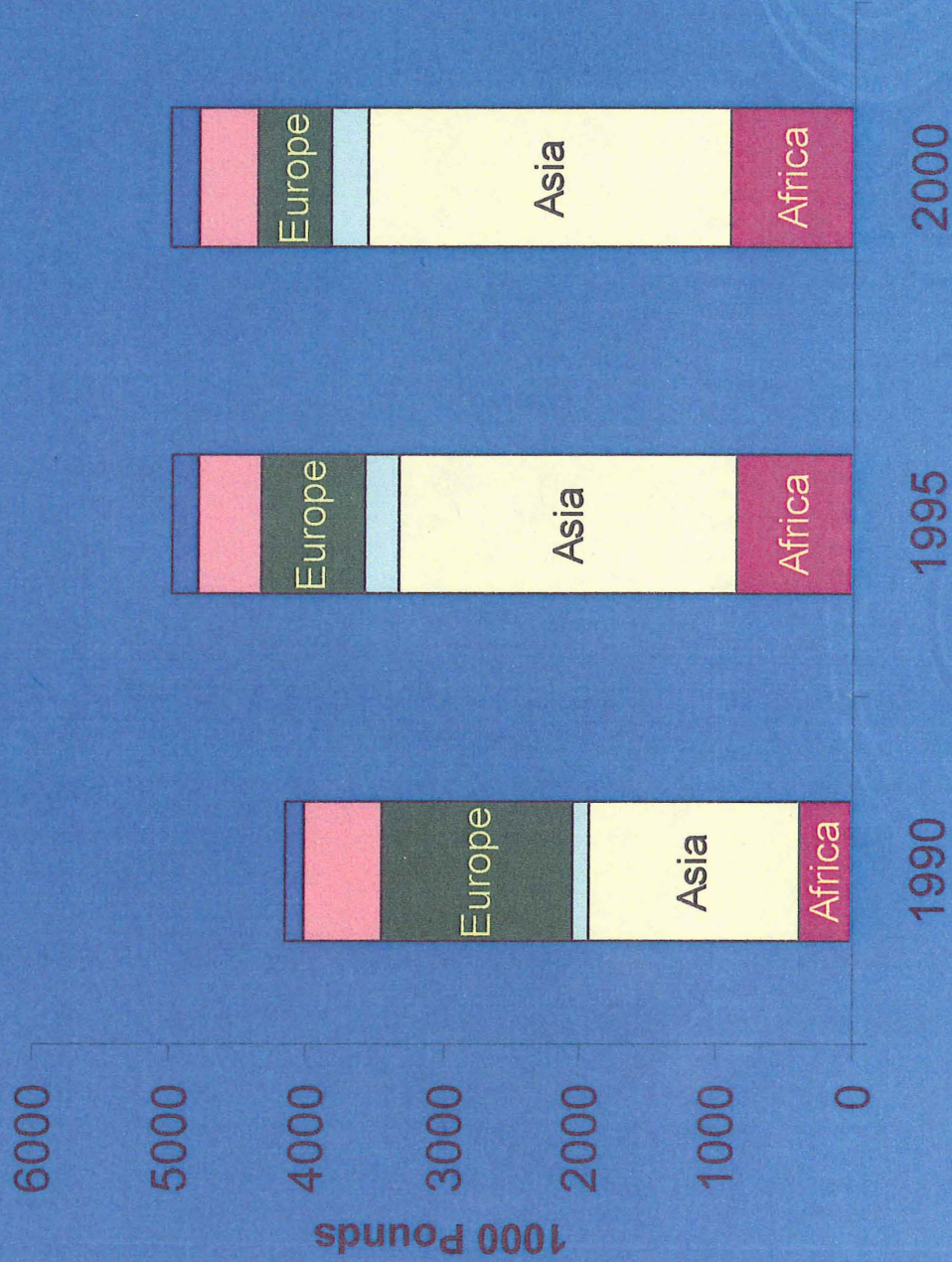
Source: Fish Advisories Briefing FINAL 082404v1 .ppt; EPA 1990, 1996 NTI and EPA 1999 NEI. Short tons per year. Adjusted for gold mines in 1990 and 1996.



# Mercury Emissions: Worldwide



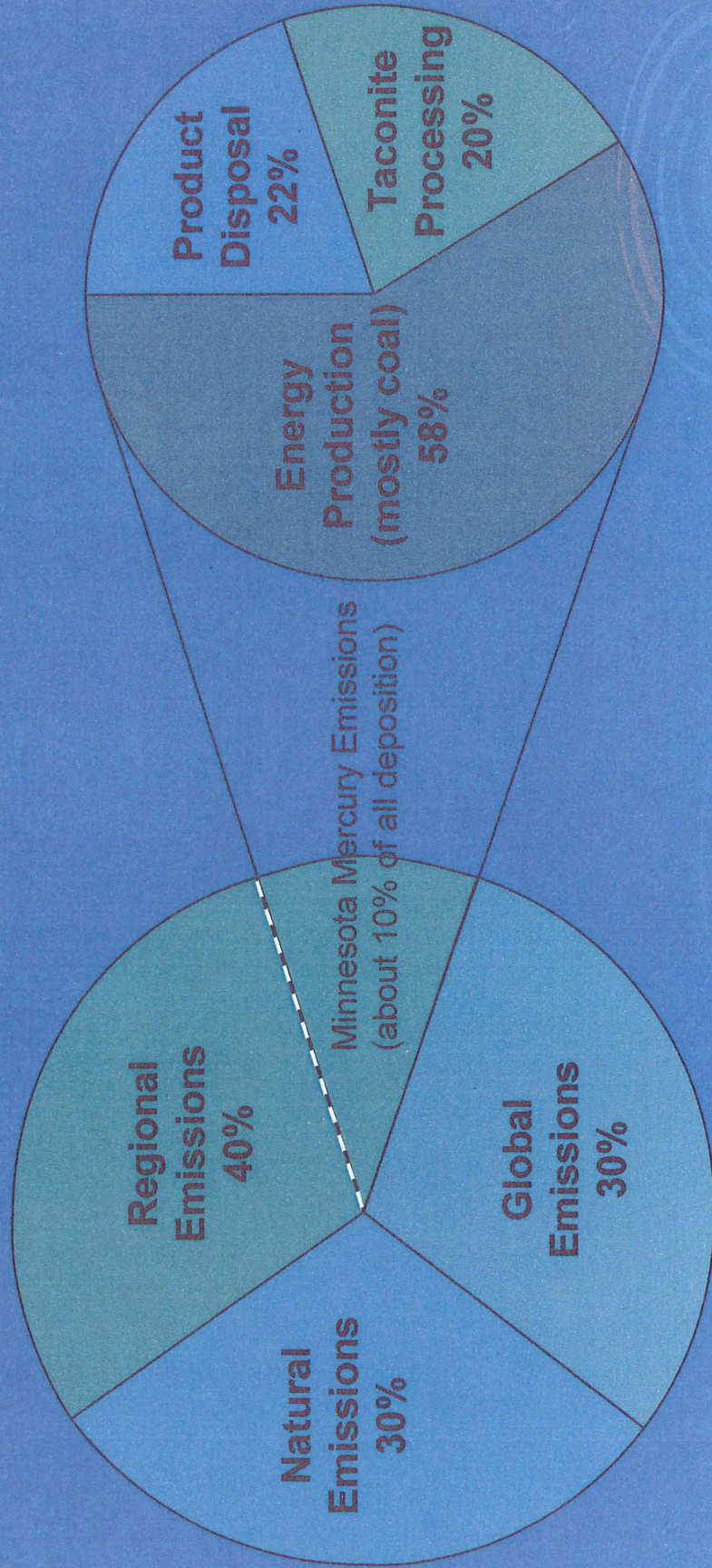
- South America
- North America
- Europe
- Australia
- Asia
- Africa



Source: Pacyna et al. 2003 presentation, Ann Arbor, MI

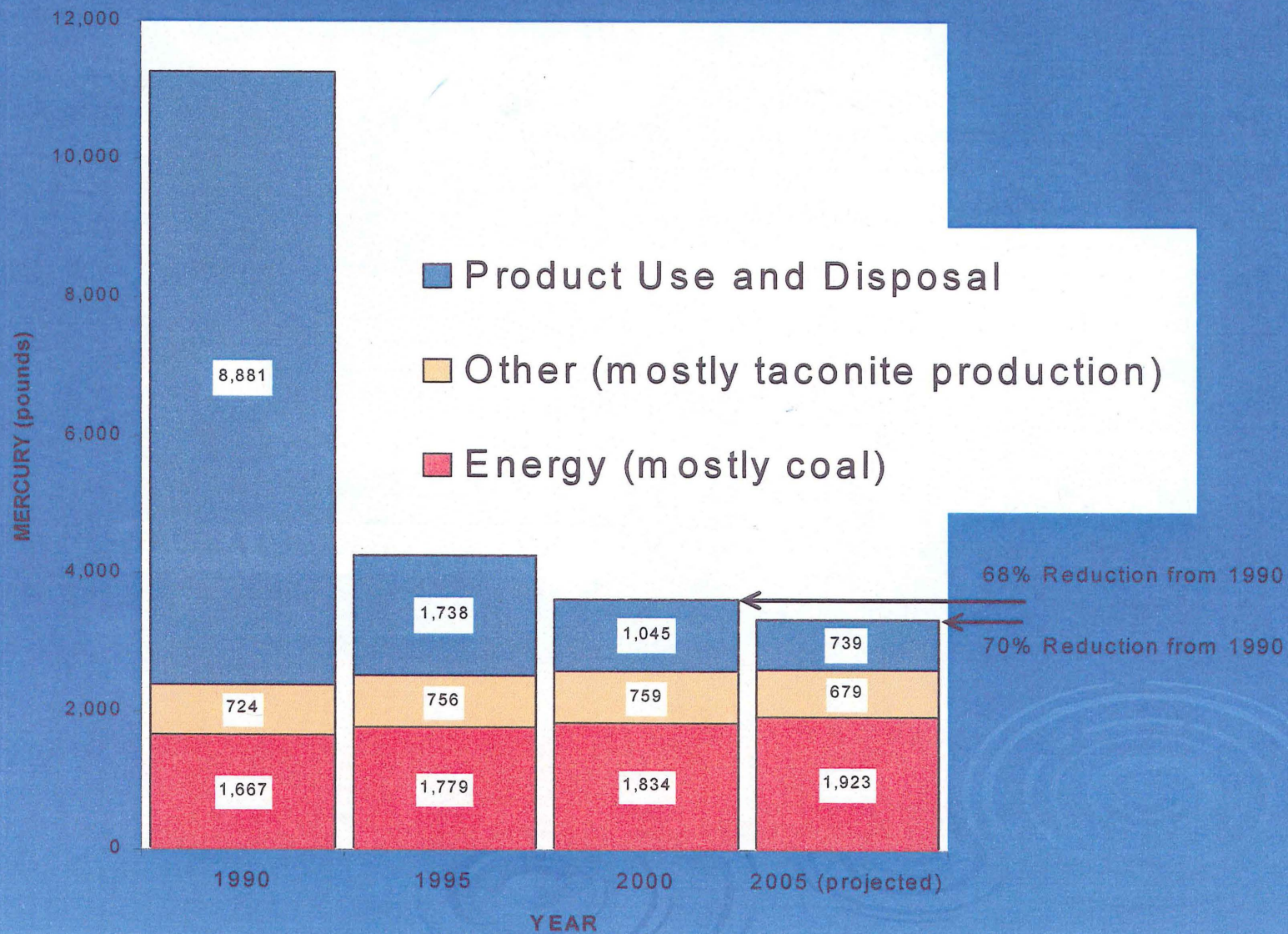


# Sources of Atmospheric Mercury Deposition to Minnesota



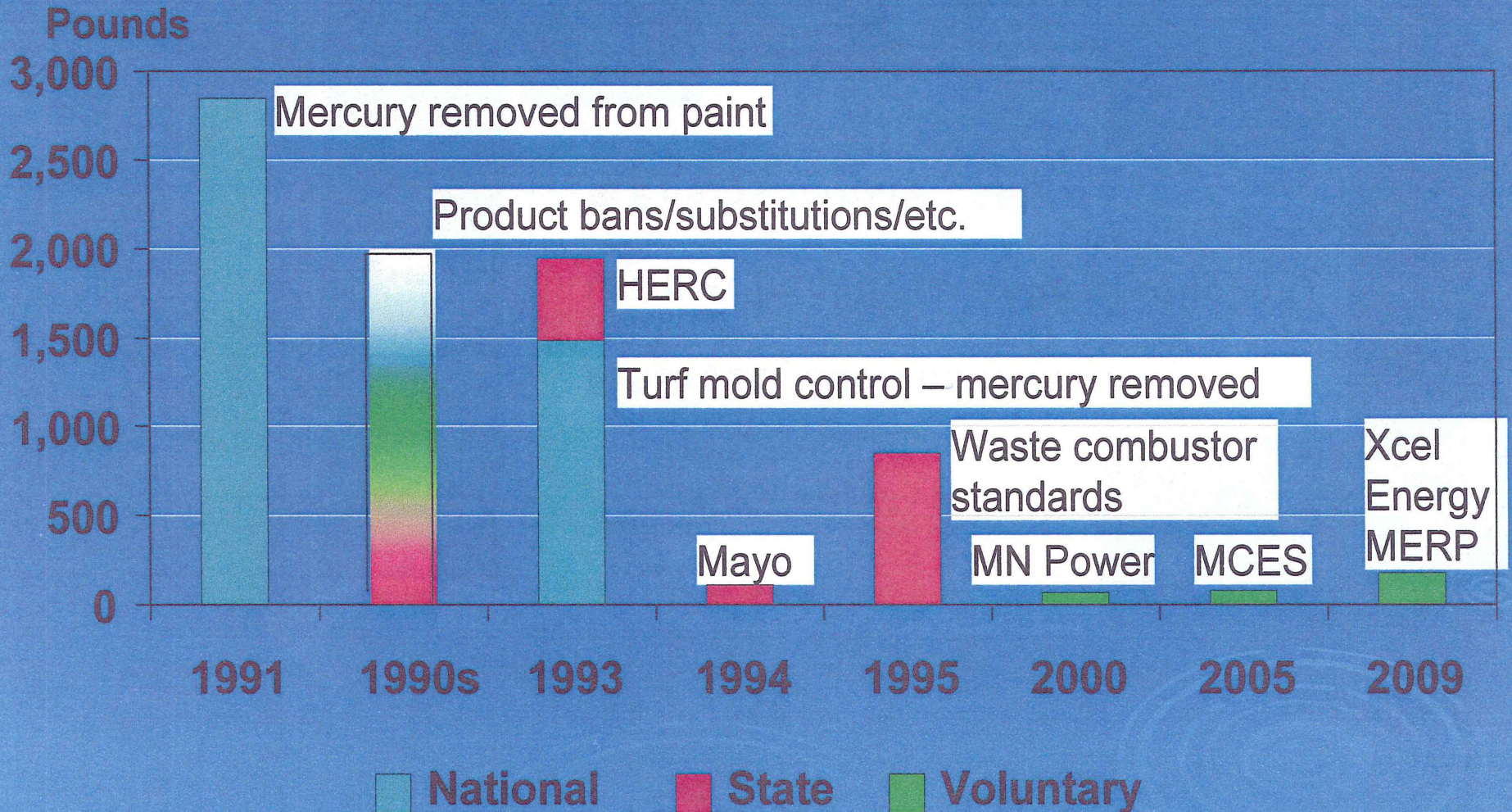


# Mercury Air Emissions by Sector 1990 – 2005





# Annual Reductions in Air Emissions from Selected Activities





# 2005 Mercury Conclusions

## Minnesota

- 90% of the mercury deposited in MN comes from air emissions sources outside the state.
- MN emissions declined 70% since 1990:
  - Product-related releases declined by 92%.
  - Taconite emissions are down by 6%.
  - Energy production increased by 15%.
- Based on new information 1990 product emission estimates and reductions increased.
- Scientific work in the last five years allowed MPCA to establish reduction goal of 93% (from 1990 levels) that is protective of human health.



# Mercury TMDL Study

Assess and List Impairments

TMDL Study Draft

(What is required to return the water to compliance with standards.)

Public Comment (90 days, 2 extensions)

MPCA Board

Contested Case Hearing/ Address Comments

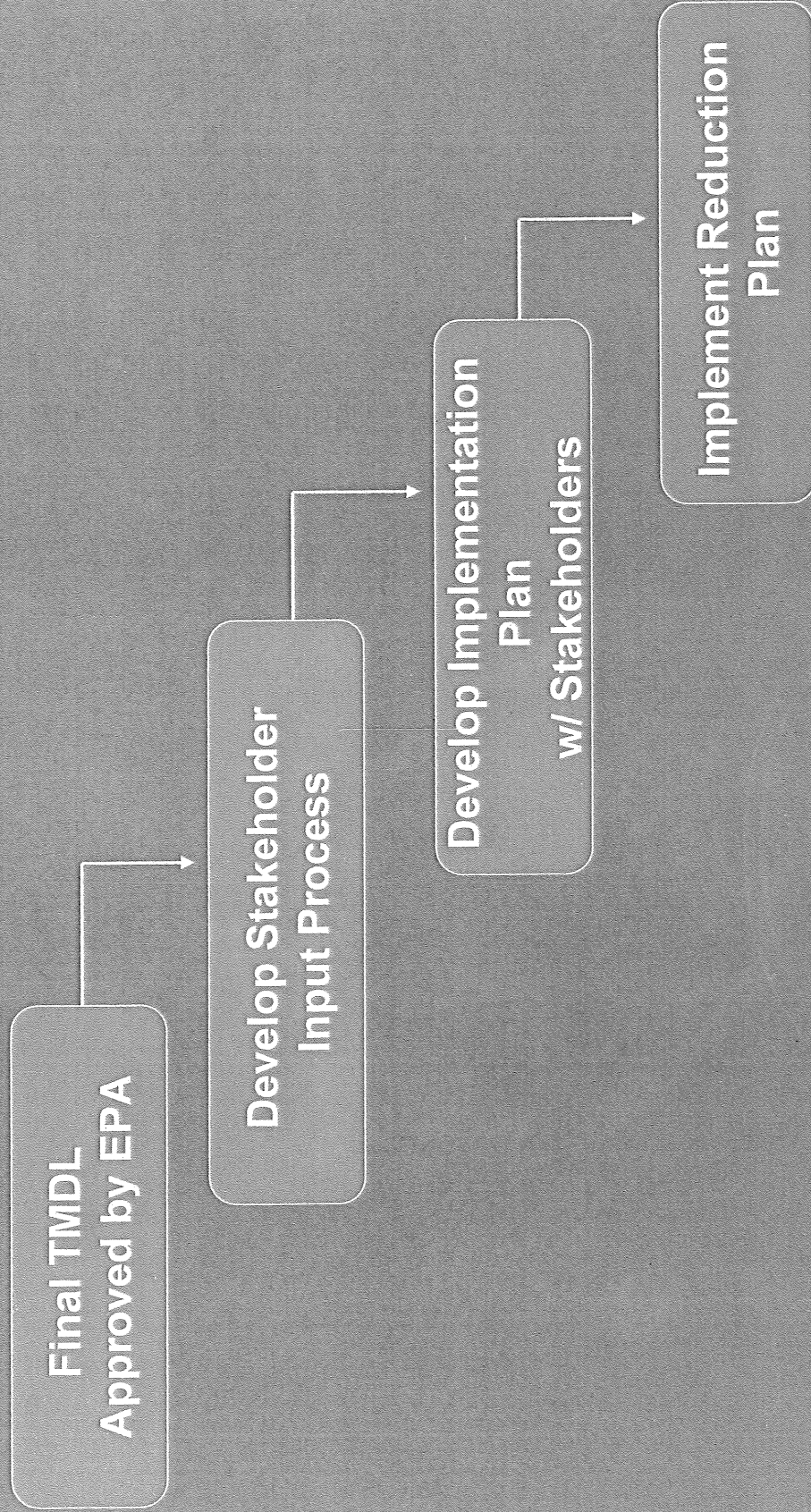
MPCA Board

TMDL Final Study – EPA Approval

Begin TMDL Implementation Planning



# Mercury TMDL Implementation









# Star Tribune

## State eased its limits in mercury plan

Pollution agency gave an early look to industry, not to environmentalists

By Tom Meersman  
Star Tribune Staff Writer

The Minnesota Pollution Control Agency last year weakened a statewide proposal to reduce smokestack mercury emissions after giving utility and industry officials an early, behind-the-scenes opportunity to suggest revisions.

While discussing the draft plan with major mercury emitters, including Minnesota Power and Xcel Energy, MPCA officials last fall refused to meet with environmental groups that support tough regulation of the toxic heavy metal. At one point, an MPCA official told environmental groups that there was nothing to talk about.

Mercury-contaminated fish have been found in more than 800 Minnesota lakes and many rivers, prompting health warnings to limit consumption.

Internal agency documents

**Mercury:** A toxic traveler from air to water, from fish to people, **A18**

show that an MPCA draft plan in October called for specific mercury-reduction targets in 2015 and later years. After showing that proposal to industry officials, MPCA officials dramatically rewrote it, eliminating the target dates and making other key changes. The plan does not require emission controls.

Top MPCA officials defended their decision to give industries early access to the proposal, saying that affected companies' views are important and that environmentalists could comment later. The plan to eventually reduce mercury emissions by 93 percent was made public in December, and is now open for comments from anyone.

**MPCA continues on A18**

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## How big industries helped to shape plan on controlling mercury

In late 2004, industries that emit mercury advised the Minnesota Pollution Control Agency on a plan to control the air pollutant. State officials refused to meet with environmental leaders during the industry review.

- Sept. 22:** MPCA official cancels mid-October meeting scheduled with environmental groups that want tough mercury regulation, saying the agency has "nothing more to talk about" until possibly November.
- Oct. 8:** After an inquiry by Minnesota Chamber of Commerce consultant Mike Robertson, MPCA agrees to meet with industry officials about the draft mercury-control plan.
- Oct. 21:** MPCA sends the draft to Robertson for industry review. It calls for specific reductions by 2015, 2025 and 2035 but leaves open whether they will be mandated.
- Oct. 26:** Representatives of Xcel Energy, Minnesota Power, US Steel, Northshore Mining and other firms meet with MPCA officials to discuss the draft plan in St. Paul.
- Oct. 27:** Internal e-mail from MPCA Assistant Commissioner Lisa Thorvig says the agency will address industry issues and submit changes to the chamber's Robertson.

**From:** Thorvig, Lisa  
**Subject:** FW: MPCA handouts for Chamber Mercury TMDL Presentation and Discussion on Oct. 26.

*... I told Mike that once we have revised language, I'd get it to him to share with Chamber members. I'm going to ask him to collate their comments and send them to me so that we can finalize the language to put in the draft TMDL\*...*

- Nov. 3:** E-mail from MPCA scientist Howard Markus to an agency administrator says Ann Seha, MPCA assistant commissioner for air policy, ordered big changes in the draft plan.

**From:** Markus, Howard  
**Subject:** FW: TMDL Air Reductions for Hg\*\*

*...yesterday about 2:30 Seha told Jackson to blow up this format and start over from step one with a different approach; things seem a little chaotic right now...*

- Nov. 10:** In an internal e-mail, MPCA research scientist Bruce Monson praises agency engineer Anne Jackson's new draft, but he wonders whether the state should impose mercury emissions controls.

**From:** Monson, Bruce  
**Subject:** RE: An expanded Hg TMDL Reduction goals.

*...would it be helpful in making our case if we tabulated the states with these new or proposed regulatory controls, along with their emission targets (or % reductions) and dates? This would emphasize that there is plenty of precedence for regulatory controls now (but we are being restrained)?*

- Nov. 15:** MPCA's Markus calls environmental leaders to propose a Dec. 3 meeting with agency officials to discuss the draft mercury plan.

# Agency denies undue pressure

## MPCA from A1

"We were very cognizant about talking to industry ahead of talking to others," said Lisa Thorvig, MPCA assistant commissioner for water policy.

A Minnesota Chamber of Commerce consultant who participated in the industry discussions with MPCA said he assumed that environmental groups would get an opportunity to present their views.

One group that hoped to influence MPCA officials about mercury is the Minnesota Center for Environmental Advocacy, and last August the group's leaders believed MPCA's door would be open for discussions. Then the MPCA canceled four meetings with the center and other environmental groups between August and early December.

The cancellations made the groups suspicious. To find out what was going on, the center made a request under the state public records law for MPCA documents and e-mails about the process. The center furnished copies of the documents to the Star Tribune.

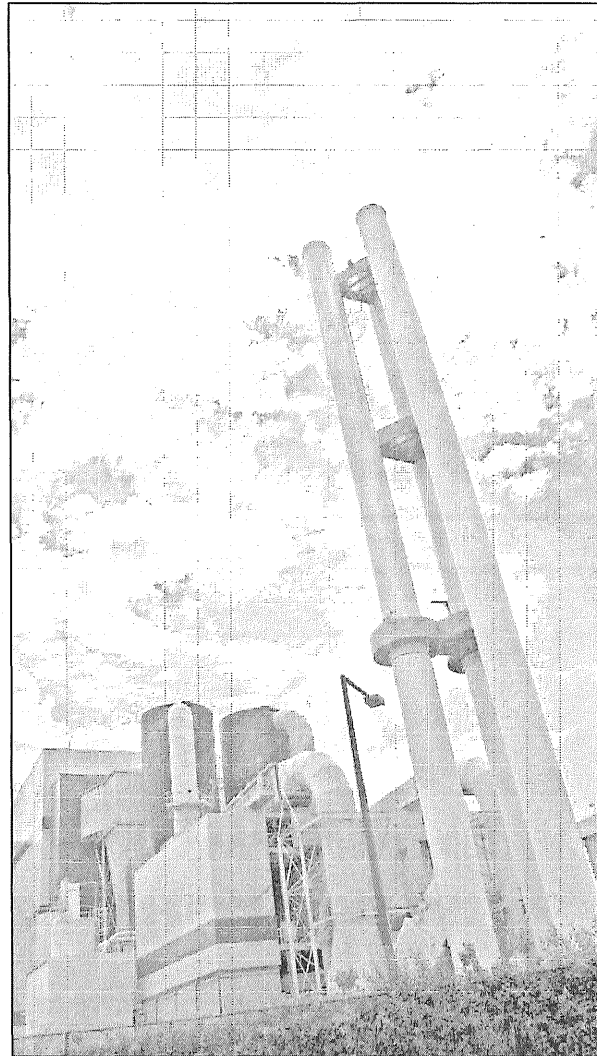
"Minnesota has changed from being a leader to being in the pocket of industry," said Kris Sigford, water policy director for the center, which is based in St. Paul. "It has written a plan designed to do nothing."

Separately, environmentalist Len Anderson requested information that MPCA had given to industry last October. MPCA sent him a PowerPoint presentation. Later, Anderson said, he learned that the presentation had been altered to omit key information about mercury-reduction deadlines.

"That was a deliberate deception that they thought they could get by with," Anderson said.

The MPCA contends that the changes to the presentation were minor.

It's not the first time environmentalists have complained about industry groups having an inside track in setting policy. National environmental groups were not invited to meetings that Vice President Dick Cheney convened in 2001 to formulate proposals for a federal energy policy. And environmentalists discovered earlier this year that the Environmental Protection Agency inserted language from utility lobbyists into a proposed mercury rule published in the Federal Register.

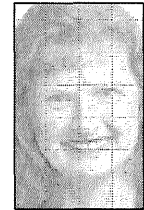


Bruce Bisping/Star Tribune

The Hennepin County garbage burner near downtown Minneapolis has greatly reduced mercury emissions since 1990. Most coal-burning power plants in Minnesota have not reduced emissions of the heavy metal, which is toxic.



Ann Seha of the Pollution Control Agency said changes were needed because of flaws in earlier versions.



"We were very cognizant about talking to industry ahead of talking to others" said Lisa Thorvig of the PCA.

cause the industry had influence over the process. "The things that were said to us were treated like any other public comment," said Ann Seha, assistant commissioner for air policy.

She said the plan, which must be approved by federal officials, states the scientific basis and need for mercury reductions. The way to achieve mercury reductions will be outlined and debated in the future, she said.

"It's a big decision when you might require reductions and how much we should do," Seha said, "especially when you might require reductions that ... will directly show up in Minnesotans' electric rates."

Environmentalists say the mercury pollution also carries a cost — to tourism and to public health — that MPCA is not considering. "You'd think the agency would want to present some of that information and lay it out to the public so that we could compare the costs and look at the options," said Patience Caso, water policy coordinator for Clean Water Action, another group shut out of the early review process. "It just seems like they've already made some drastic changes after talking only to industry."

### Industry pleased

Mike Robertson, environmental policy consultant for the state Chamber, said that industries affected by the mercury plan were pleased with the MPCA approach.

"I wouldn't characterize anything we did as us trying to write their document or dictate what they should do," he said.

Industries are concerned about mercury regulation, Robertson

"Minnesota has changed from being a leader to being in the pocket of industry. It has written a plan designed to do nothing."

— Kris Sigford, water policy director for Minnesota Center for Environmental Advocacy in St. Paul.



- Dec. 1:** MPCA cancels Dec. 3 meeting with environmental lists. New draft of the plan is circulated within the agency. It does not contain target dates for mercury reductions.
- Dec. 3:** Agency officials send plan to chamber and give industry a one-week deadline to make final comments.
- Dec. 16:** Mercury draft plan posted on the MPCA website. Deadlines for reductions have been removed and replaced with undated Target #1, Target #2 and Target #3. It does not call for immediate mandatory controls on industry.
- Dec. 17:** MPCA officials meet with environmental leaders in St. Paul to discuss mercury draft plan, which is now open for public comments.

\*A TMDL or Total Maximum Daily Load is the maximum amount of a pollutant that a water body can receive and still meet state water quality standards. Percentages of this daily load are allocated to various pollution sources such as power plants and the taconite industry.

\*\*Hg is the chemical symbol for mercury.

**October 2004 proposal contains specific deadlines, reductions:**

Mississippi and Targets (% reduction from 2000)			
2005	2010	2015	2035
Interim goal of 40% reduction	Interim goal of 70% reduction	Interim goal of 70% reduction	Final goal of 95% reduction
Support development of regulations (10% electric)	Support development of regulations (30% taconite, 30% electric)	Support development of regulations (70% from all sources)	Support development of regulations (95% from all sources)

**December 2004 plan contains target emissions, but no dates for reductions:**

1990 Emissions	2000 Emissions	Target #1	Target #2	Target #3
1,667	724	724	558	442
723	756	558	290	137
8,081	1,245	475	399	330
11,272	3,838	1,799	1,190	785

The rest-of-state emission reductions reach 65% from 1990. Target #1 must be reached. Target #2 must be reached. Target #3 must be reached.

Source: Internal e-mails, public documents, interviews with participants.

**Weakening the plan**

Mercury is a potent toxin that is emitted into the air, eventually settles on land or waterways, then accumulates in fish tissue. Its presence in Minnesota lakes and rivers has prompted fish consumption advisories because small amounts can damage the brain and nervous systems of people who eat contaminated fish.

Federal law requires states to develop plans to cut back mercury emissions from in-state sources. In Minnesota, those sources represent only part of the problem — 90 percent of airborne mercury comes from out-of-state sources.

Minnesota began working on a long-range control plan more than a year ago. One early draft envisioned progressive reduction targets to 2035. It left open whether reductions would be voluntary or mandatory.

According to internal MPCA e-mails and documents, officials began weakening the plan almost immediately after meeting with utility, mining and other industry leaders at the Minnesota Chamber of Commerce on Oct. 26. Revisions of the plan and informal discussions with industry officials continued for seven weeks.

Each revision deleted more information that supported specific deadlines and mandatory reductions. Officials removed references to Wisconsin's new rule for controlling mercury, which requires four

**What's next**

The Minnesota Pollution Control Agency has proposed a long-range plan to reduce mercury emissions.

**Comments:** Written comments about the draft plan will be accepted until Aug. 17. Mail responses to Howard D. Markus, Minnesota Pollution Control Agency, 520 Lafayette Road N., St. Paul, MN, 55155-4194. Or e-mail: howard.markus@pca.state.mn.us.

**Approval:** After making any changes based on the comments, the agency will submit the plan to federal officials later this year for final review and approval.

**Full plan:** www.startribune.com/341

major utilities to reduce mercury emissions by 40 percent by 2010 and 75 percent by 2015.

MPCA workers also took out paragraphs that said technology is now available to remove significant amounts of mercury from certain kinds of power plants. They dropped language suggesting that mercury emissions are expected to increase if mandatory controls aren't placed on sources like coal-fired power plants.

In the draft plan made public in

**Who had access?**

The Minnesota Chamber of Commerce requested a meeting with the Minnesota Pollution Control Agency to discuss a proposed statewide mercury reduction plan before it was released to the public. According to the sign-up sheet, the following companies and organizations were represented at the Oct. 26, 2004, meeting:

- Barr Engineering Co.
- Flint Hills Resources
- Great River Energy
- Ispat Inland Mining Co.
- Minnesota Power
- Metropolitan Council Environmental Services
- Northshore Mining Co.
- Otter Tail Power Co.
- PolyMet Mining Corp.
- US Steel
- Western Lake Superior Sanitary District
- Xcel Energy

said, because most of Minnesota's fish contamination is caused by out-of-state sources. State companies can't ignore the problem, but reducing mercury in fish depends far more on federal action, he said.

Two Minnesota utilities are reducing mercury emissions, although overall levels from power plants and boilers in the state have increased over the past decade. Xcel will stop emitting mercury at two metropolitan-area power plants as they are converted from coal to cleaner natural gas. Minnesota Power reduced mercury emissions by switching to a different type of coal and is testing technology to remove even more.

"We're looking for what will be effective for the environment, and what will be cost effective for our ratepayers," said Margaret Hodnik, Minnesota Power's director of public affairs. She declined to comment on deadlines that were removed from the MPCA plan.

The utilities' voluntary efforts don't impress Anderson, the environmentalist who follows mercury issues related to the Great Lakes. He said garbage burners and medical waste incinerators have been required to make huge reductions in their mercury emissions, but that power companies and mining operations have done little.

"Each year they stall means millions of dollars in their pockets," he said.

Tom Meersman is at meersman@startribune.com.

December, specific deadlines had been deleted. Failure to achieve goals would not necessarily trigger government action. And mercury reductions in Minnesota were tied not to dates, but to whether the federal government achieves national reductions, something that's difficult to measure and may not succeed for decades.

One top MPCA official said the changes were needed because earlier drafts had problems, not be-

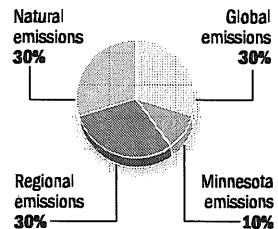
**Mercury: A toxic traveler from air to water, from fish to people**

Mercury is a major water pollutant that comes almost entirely from the air. Power plants, industry and man-made products are the source of most airborne mercury, which is carried great distances before being deposited on land, lakes and rivers.

**Pollutant without borders**

Most of Minnesota's mercury pollution comes from other places, including natural sources such as volcanoes. Some of Minnesota's mercury emissions end up in other states.

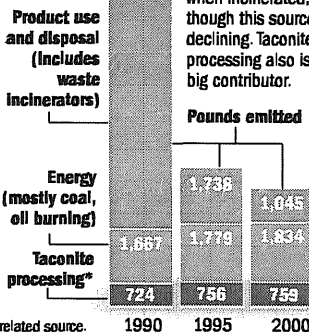
**Sources of mercury deposited in Minnesota**



\*Category includes 13 lbs. from an unrelated source.

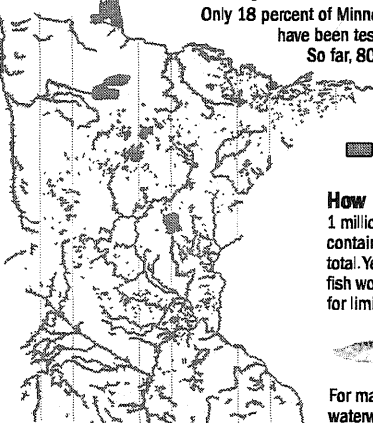
**Minnesota emissions**

Burning coal is a major mercury source. Mercury also is released from products when incinerated, though this source is declining. Taconite processing also is a big contributor.



**Mercury in fish**

Only 18 percent of Minnesota's 5,500 fishing lakes have been tested for mercury in the fish. So far, 808 lakes and 391 stretches of rivers exceed the fish-mercury limit of 0.2 parts per million.



Mercury-contaminated waters (in blue)

**How much is too much?**

1 million average-size northern pike contain just 1 lb. of mercury in total. Yet the concentration in each fish would be high enough to call for limits on eating them.



For maps and a list of impaired waterways, go to www.startribune.com/339.

**Harm to humans**

Mercury is toxic to the human nervous system. Eating contaminated fish is a major source of exposure.



**Adults:** Symptoms include trembling hands and numbness or tingling in the lips, tongues, fingers or toes. This can occur long after exposure. Higher levels of mercury affect walking, vision, speech and hearing.

**Fetuses and young children:** Their developing nervous systems make them far more sensitive to mercury than adults. Exposure may cause learning problems, including delays in walking or talking.

**Consumption advice:** The state Health Department issues specific advice for lakes and rivers. For many mercury-contaminated waters, the advice is one meal of fish per week or one meal per month, depending on the size and species. For details, go to www.startribune.com/338.

Sources: Minnesota Pollution Control Agency, Minnesota Health Department, Mark Boswell/Star Tribune



MINNESOTA

# MPCA sticks by mercury plan

## But agency extends comment period

BY DENNIS LIEN  
*Pioneer Press*

Despite pressure from environmental groups, the Minnesota Pollution Control Agency refused Thursday to halt its controversial mercury-reduction plan and jump-start an earlier version.

Rather, it extended a public-comment period an additional 30 days, until Oct. 18, and offered the groups several ways to influence the plan, which maps out how the state proposes to cut emissions of the toxic metal in coming years and by how much.

The decision by MPCA Commissioner Sheryl Corrigan was released in an e-mail to environmental groups. It followed a contentious meeting a week ago in which two dozen environmental groups asked the agency to stop the proposal it has been developing and reinstate a specific timetable for reducing state mercury emissions.

The groups were upset that the agency pulled the timetable last year after a meeting with industry and utility officials. That was during a period in which the groups contended the MPCA had been excluding them from the process.

The agency defended that move, saying that several meetings with environmental groups already had been held and that the timetable should be added later, after the federal government approves the general plan.

The groups, who aren't challenging the agency's scientific assumptions or its goal to cut mercury emissions by 93 percent, said they were disappointed with the agency's response.

"They are going to continue with what we see as a flawed document that's a result of a flawed process," said Kris Sigford, water-quality director for the Minnesota Center for Environmental Advocacy.

"They are going to continue with what we see as a flawed document that's a result of a flawed process."

*Kris Sigford, of the Minnesota Center for Environmental Advocacy, about the MPCA's mercury-reduction plan*

Besides extending the public-comment period, the agency scheduled a Sept. 15 meeting with environmental groups that will include a representative from the regional office of the Environmental Protection Agency.

Mercury is a potent neurotoxin that is particularly dangerous to fetuses, infants and children. It occurs naturally but also is released into the air from coal-fired power plants, taconite plants and other sources, eventually falling to earth and accumulating in lakes, rivers and fish. Its presence in Minnesota lakes and rivers has led to widespread fish-consumption advisories.

The MPCA has long contended that anything done in the state represents only a small part of the problem. For example, it said 90 percent of the mercury that falls in Minnesota comes from outside the state's borders. Moreover, it has projected that statewide mercury emissions this year will have been cut 70 percent from 1990, from 11,262 pounds to 3,175 pounds.

Most of those reductions, however, have been the result of federal actions, such as banning mercury from paints. Statewide utility emissions, meanwhile, have been largely unchanged.

*Dennis Lien can be reached at [dlien@pioneerpress.com](mailto:dlien@pioneerpress.com) or 651-228-5588.*



**Meeting Mercury TMDL Air Reduction Targets and  
Implementation Options  
DRAFT October 26, 2004 DRAFT**

Minnesota's Draft TMDL for mercury calls for the MPCA to implement actions to reduce in-state mercury air emissions sources by 93% from 1990 levels. This document outlines proposed short-term actions and longer-term emission-reduction targets and strategy options to achieve this reduction by 2035.

**Short-Term Actions:**

**2005 Legislative Report (10/15/05).**

- Review the current mercury reduction strategy and determine to what degree voluntary programs have lowered mercury emissions.
- Evaluate likelihood of federal regulatory actions and proposals will result in reductions from Minnesota facilities; research possible state-level regulatory alternatives to achieve reductions.

**Proposed for 2005**

- Work with air emission sources to develop a monitoring and reporting protocol with the goal of better quantifying annual mercury emissions. This is needed to improve the quality of Minnesota's air emissions inventory which will be used to track progress at meeting reduction targets.
- Develop and implement effective policies to require new and expanding facilities with air emissions of mercury to reduce mercury emissions to the greatest extent feasible.

**Emissions Reduction Targets and Strategies:**

To achieve a 93% reduction in overall emissions from 1990 levels by 2035, the MPCA proposes sector-specific reduction targets for the energy, taconite and products sectors. Interim targets for 2015 are considered to be technologically achievable by the MPCA. In order to meet the reasonable assurance requirement of the TMDL, regulatory actions are introduced if the 2015 targets are not met.

To put the reduction targets into a more meaningful context, the reduction targets are calculated from a 2000 baseline. The final reduction target of 785 pounds represents a 93% reduction from 1990 levels and a 78% reduction from 2000 levels.

**Energy Sector**

- **Targets and Milestones:** 83% reduction from 2000 levels by 2035 with interim goals of 64% reduction by 2015 and 70% by 2025. These targets include electric utilities (70% interim reduction by 2015) and petroleum refining and industrial boilers/heaters (70% interim reduction by 2025).



- **Implementation:**

**Option 1:** If federal proposals are not finalized or if federal actions by the end of 2005 do not call for significant reductions from Minnesota sources, begin to enact a regulation similar to Wisconsin's law which caps utility emissions at current levels, and sets interim and overall emissions limits (40% reduction by 2010, 80% by 2018).

**Option 2:** Continue with voluntary reductions. If the energy sector doesn't appear to be on track to a 64% reduction by 2015, implement a sector Cap and Trade program that is designed to achieve a 70% sector reduction by 2025 and an 83% reduction by 2035.

**Basis for Interim Goal:** By 2015, mercury emission reductions of about 70% can be achieved in the utility sector with the installation and operation of sorbent injection systems (activated carbon or other "novel" sorbents). With EPA's adoption of the industrial boiler/process heater rule that imposes a mercury emissions limit on boilers and heaters ("industrial boiler NESHAP"), a 30% reduction from commercial/institutional/industrial boilers and heaters is expected. The interim goal also challenges the petroleum sector to achieve 30% reduction in emissions within this timeframe so that final sector goals can be achieved.

**Comments:** Without regulatory requirements for control, emissions from electricity production are expected to increase due to increased electricity use and new projects. Modeling conducted for EPA's current proposal for reducing mercury from coal-fired utilities shows that current proposed regulations will not result in any meaningful reductions from Minnesota sources. Reductions at utilities alone will not reach proposed final targets. Consequently, other sources in the energy sector such as petroleum refining, will also require reductions.

### **Taconite Sector**

- **Targets and Milestones:** 83% reduction from 2000 levels by 2035 with interim goals of 30% reduction by 2015 and 60% reduction by 2025. These targets include taconite sector coal use.
- **Implementation**

**Option 1:** Beginning in 2005, require 30% reductions in emissions through permitting and consider additional regulatory reductions to meet targets in 2015 and beyond.



**Option 2:** Continue with voluntary reductions. Evaluate progress; if an industry-wide reduction of 30% isn't achieved by 2015 and 60% by 2025; implement regulatory options, including a cap on sector emissions.

**Basis for 2015 Interim Goal:** US Steel, in its recent proposed permit modification for its facility in Keewatin, indicated that a 30% reduction in air emissions is achievable through process modifications. The MPCA believes that with ongoing research and expected equipment changes to comply with the taconite NESHAP, a sector-wide reduction of 30% is technically achievable.

**Comments:** The MPCA has received proposals for new and expanded mining projects which would increase sector emissions back to at least year 2000 levels. Research needs to continue. Funding mechanisms need to be identified to allow continued research into cost effective mercury reduction options for this sector.

### Product Sector

- **Targets and Milestones:** Reduction of 68% from 2000 levels by 2025 with an interim target of 55% reduction from 2000 levels by 2015.

- **Implementation**

**Option 1:** Beginning in 2005, establish emission limits for steel mini-mills, crematories.

**Option 2:** Monitor federal regulatory efforts and voluntary reductions for steel mini-mills, crematories. If federal action addressing mini-mills and crematories are not in place by 2015, implement state regulations.

**Basis for Interim Goal:** Mercury use in products and associated emissions will continue to decline, with some exceptions. Additional reductions are possible from the steel mini mill and crematory sectors.

**Comments:** The MPCA and MOEA will continue seeking opportunities to eliminate mercury, e.g. auto switch initiatives, HHW programs, dental community best management practices. Despite dramatic declines in mercury emissions from the purposeful use of mercury, continued efforts to identify and reduce emissions from this sector must continue in order to achieve the final reduction goal. EPA is currently considering regulating steel mini-mills like North Star Steel, with an expected proposal date of 2006. NSS is a significant source in the purposeful use category. Crematory mercury emissions are on the rise and are one of the few remaining sources that may have a significant local effect on mercury deposition due to the form of mercury released. EPA is also considering regulating this sector but proposal date is unknown.



## Summary of Sector Milestones and Targets

Sector	Milestones and Targets (% Reduction from 2000)				
	2005	2010	2015	2025	2035
<b>Energy</b> (Electric utility, other coal, Petroleum)	<ul style="list-style-type: none"> <li>Monitor and evaluate progress in reaching reduction targets.</li> <li>Work with EPA to support development of federal actions that would result in reductions from all states.</li> </ul>		<b>Interim goal of 64% reduction</b> or regulation (70% electric utility, 30% petroleum, 30% industrial boilers).	<b>Interim goal of 70% reduction</b> or regulation (70% from all energy sources)	<b>Final target of 83 % reached</b>
<b>Product</b>	<ul style="list-style-type: none"> <li>Evaluate the likelihood of in-state reductions resulting from federal actions.</li> </ul>		<b>Interim goal of 55 % reduction</b> or regulation.	<b>Final target of 68% reduction</b> (96% from the 1990 baseline).	
<b>Taconite</b>	<ul style="list-style-type: none"> <li>Consider state action if voluntary and federal actions do not appear to be sufficient to meet targets.</li> </ul>		<b>Interim goal of 30% reduction</b> or regulation.	<b>Interim goal of 60% reduction</b> or regulation.	<b>Final target of 83% reduction reached</b>
<b>All Sectors</b>			<b>54%</b>	<b>67%</b>	<b>78%</b>
<b>Regulatory action if not within % of interim goal</b>					



For the NE region, new/growth permits will focus on trading, either with [1] air sources for sulfur reductions and/or mercury reductions, [2] stormwater sediment reductions, and/or [3] inflow/infiltration (I/I) reductions. Bio-P is also an important option.

The exception to the *de minimus* provisions for the WLA portion of this TMDL originates with the water quality rules for the Lake Superior Basin, Chapter 7052, and the GLI Guidance from which it was derived. Provisions for the phase-out of mixing zones for existing dischargers by March 23, 2007, and for not allowing mixing zones for new or expanded dischargers at commencement of discharge are specific to GLI and Chapter 7052. These provisions apply when establishing a TMDL. Therefore, all dischargers in the Basin will initially or eventually need to meet the 1.3 ng/l mercury water quality standard and mass caps as a waste load allocation for their discharge.

### **11.4 Implementation for Load Allocation**

Minnesota clearly is dependent upon other areas to reduce emissions, and Minnesota has set an example that other areas should emulate. Minnesota has, through both voluntary and regulatory approaches, reduced mercury emissions by 68% between 1990 and 2000 (See section 5.3.1), and the MPCA expects to meet the mandated reduction goal of 70% by 2005. (The 68% reduction of the 1990 mercury emissions is equal to 73% of the mercury TMDL reduction goal.) Mercury reductions outside the State have not been quantified, although USEPA reports national emissions have been reduced at least 45% between 1990 and 1999 (See section 5.3.1).

Attempting to reduce Minnesota's fish contamination by exporting more of our emissions—through higher stacks or intentional conversion of divalent mercury emissions to elemental mercury—invites other areas to also export mercury, which probably would result in greater fish contamination in Minnesota. Therefore, Minnesota's mercury TMDL emission reduction strategy is to calculate the percent reduction that is needed and reduce mercury emissions by that degree without regard for where the emissions will be deposited.

To maintain economic fairness while focusing on meeting water quality standards, the Agency will employ a phased approach to achieve a goal of 789 pounds of mercury emitted from all Minnesota sources. Short-term actions, check-in points, and future action options are described below. The sector-specific reduction milestones will be used as guideposts by the MPCA to decide whether reductions are on track in the future. If emission reductions are not on track, the MPCA will review the current state of knowledge about mercury deposition and control options and costs, and develop a strategy to obtain further reductions to achieve the milestone. The strategy will contain regulatory controls as necessary to reach target goals.

Recognizing the overall goal of reducing mercury deposition in the state, one sector might reduce more than the sector goal, while another sector is not able to reduce as much, yet the reduction strategy may still achieve its goal. The same is true for the ratio of in-state to out-of-state reductions. If national, international, and other state reductions are large enough, those reductions may obviate the need for some reductions in Minnesota. This is important because over the past decade Minnesota has reduced mercury emissions using cost-effective steps that others may not yet have taken.

Section 12 outlines the mercury reduction programs underway in Minnesota, nationally, and internationally. It provides the assurance that several robust mercury control programs are well-established and have been very effective. Section 5 provides context that fish tissue concentrations have been in decline in recent years, mercury emissions are trending down in all relevant emission inventories, and that reduced sulfate concentrations from sulfur dioxide emission reduction programs may magnify the benefit of reduced mercury emissions.

After finalizing and submitting this TMDL to USEPA for approval, the MPCA will begin to work with stakeholders to develop an implementation plan. As explained above, the implementation plan is not a



formal requirement of the TMDL process. The TMDL is expected to contain an outline of the specific implementation planning needed to meet the TMDL goal. The MPCA expects to conduct in-depth implementation planning in 2005-2006 after this TMDL is approved. The implementation planning process will need to involve a careful review of the cost and efficacy of technically available control options, and the development of federal regulations that would reduce mercury emissions from source categories like power plants, mini-mills and industrial boilers.

### 11.4.1 Short-term Actions

#### New and Expanding Sources of Mercury to the Atmosphere

To limit growth of mercury emissions because of construction of **new** or **expanding** emission sources in Minnesota, the MPCA will develop a permitting strategy for new and/or expanding air emissions sources of mercury that considers the following:

- Establishing an appropriate facility *de minimus* emissions rate
- Requiring new or expanding sources to use state-of-the-art mercury control technology if the *de minimus* rate is not feasible/achievable/possible
- Investigating how to allow offsetting reductions

#### Develop Monitoring and Reporting Protocol

The MPCA will work with air emission sources to develop a monitoring and reporting protocol with the goal of better quantifying annual mercury emissions. An improved Minnesota air emissions inventory is needed to track progress at meeting reduction targets.

#### Current Reduction Strategies

The MPCA will continue to employ strategies already in place as described below to continue the trend of decreased air emissions. The MPCA expects interim and final targets will be met, especially considering pending federal regulations and a strong commitment to voluntary reductions by existing facilities.

**Continue existing state regulations and programs to collect mercury.** Existing regulations, including product bans, disposal requirements and pollution control equipment at waste combustors will continue to reduce product-sector emissions. Additionally, the MPCA and the Minnesota Office of Environmental Assistance continues to identify and provide education to industrial sectors and Minnesota citizens about proper storage and management of mercury-bearing wastes.

**Support voluntary reductions.** Under the MPCA's current mercury strategy, the MPCA expects facilities to voluntarily reduce air emissions whenever possible. The MPCA will continue to work with air emission sources to encourage reductions.

**Encourage the development of federal regulations:** MPCA believes that a national program regulating mercury emissions from existing and future emission sources holds the most promise, by addressing the substantial contribution by sources outside of Minnesota to Minnesota water bodies while minimizing competitive disadvantages that a state-level only regulation could create. The MPCA will continue to work with EPA to implement control standards/programs that require substantial reductions from electric utilities, steel mini-mills, crematories and other emissions sources across the country. The MPCA filed detailed comments with USEPA in 2004 urging promulgation of strong federal mercury reduction requirements for the electric power sector.

**Evaluate impacts of federal regulations.** The MPCA will continue to assess the impacts of federal actions to inform potential additional state regulatory actions. In particular, the MPCA will closely follow the development and implementation of the federal mercury emission reduction program for power



plants: the Clean Air Mercury Rule. The Implementation Plan will thus be able to consider the effect of that standard on power plant emissions. At the same time, USEPA is finalizing a new regulation that would reduce sulfur dioxide emissions in the eastern US by 70%. MPCA will continue to investigate whether sulfur dioxide reductions of this scale will magnify the effect of mercury emission reductions, and the impact of the program on Minnesota's reduction targets.

**Investigate regional state cooperation.** In the absence of strong federal regulations, reductions in Minnesota may be more effectively and equitably achieved by cooperating with other states in the region to develop strategies to reduce emissions sources. The MPCA will actively coordinate the above strategies and consider regional regulations if needed to meet reduction targets.

## 11.4.2 Reduction Targets and Milestones

Substantial reductions are necessary from existing sources to achieve a 93% reduction in overall anthropogenic emissions from 1990 levels. To initiate development of an implementation plan, the MPCA has set overall and sector-specific reduction targets (Table 12) for the in-state energy, taconite and products sectors with interim outcome-based targets. These targets will guide the MPCA in its implementation planning. They will aid in establishing set intervals for the MPCA to evaluate progress, reviewing recent developments in controlling mercury emissions, and assessing on new strategies.

An example of ways that future federal regulations might affect Minnesota's goals is the proposed mercury cap and trade program. Mercury emission control on power plants is expensive, and becomes more expensive as the reduction target moves from 70% to 80% to 90%. The Acid Rain program of the 1990 Clean Air Act Amendments showed that a cap and trade program is extremely cost-effective in meeting emission reduction targets because it drives reductions to the place where larger, cheaper reductions can be made. The USEPA has adopted a cap and trade program as the basis for the Clean Air Mercury Rule (issued March 15, 2005). In the Mercury TMDL implementation plan, the MPCA will consider the appropriateness of keeping a state sector target if the national trading program will assure that the national power sector will reach an adequate percentage reduction in mercury emissions.

**Table 12 Summary of Reduction Targets**

Sector	1990 Emissions	2000 Emissions	Target #1	Target #2	Target #3
Energy	1,667	1,834	675	470	313
Material Processing	723	758	550	280	138
Products	8,881	1,045	475	350	338
All sources	11,272	3,638	1,700	1,100	789

For Target #1, when the national emission reductions are expected to reach 65% from 1990, the state target of 1700 pounds [Target #1] must be reached. If the state target is not met, regulatory tools will be developed as necessary to reach target goals, unless achieved national reductions exceed their target and obviate the need for some of the state reductions.

For Target #2, when the national emission reductions are expected to reach 80% from 1990, the state target of 1100 pounds [Target #2] must be reached. If the state target is not met, regulatory tools will be developed as necessary to reach target goals, unless achieved national reductions exceed their target and obviate the need for some of the state reductions.

For Target #3, when the national emission reductions are expected to reach 93% from 1990, the state target of 789 pounds [Target #3] must be reached. If the state target is not met, regulatory tools will be developed as necessary to reach target goals, unless achieved national reductions exceed their target and obviate the need for some of the state reductions.

### 11.4.3 Regulatory Actions

The MPCA has identified potential regulatory options for ensuring reasonable progress towards achieving the targets of the TMDL, some of which were selected from the 1999 Mercury Contamination Reduction Initiative Advisory Council's *Source Reduction Feasibility and Reduction Strategies (SRFRS) Committee Report on Options & Strategies for Reducing Mercury Releases*<sup>5</sup>. If current reduction strategies, including upcoming federal regulations and voluntary measures, under-achieve by not reaching interim or final target goals, the agency will need to consider further voluntary strategies and enact regulatory approaches to meet TMDL reduction requirements to ensure that the final reduction target are reached. These strategies might include:

- Technology-based limits for emissions sources
- Establish a sector-level cap
- Establish a state-level cap and trade system
- Impose fees on mercury emissions

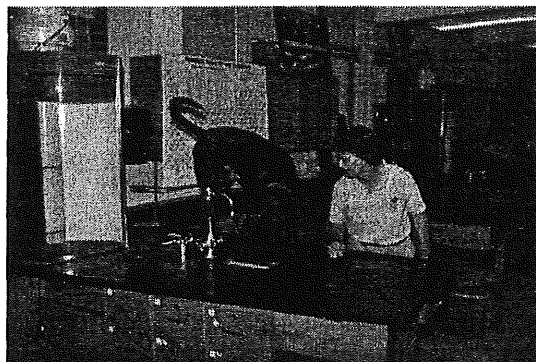
## 12 Reasonable Assurance

### 12.1 Assurances Occur at Multiple Levels

A complete TMDL evaluation requires reasonable assurance that the impaired waters will attain water quality standards. When water point sources dominate as pollutant sources, reasonable assurance is straightforward: implement reduction in NPDES permits. This is not the case when nonpoint sources are the major source of the pollutant. For this Minnesota Mercury TMDL, there are reasonable assurances in the past actions on state, federal, and international levels that had a measurable affect on sources of mercury. Can we also see a measurable affect on environmental concentrations of mercury, and especially on the endpoint: mercury in fish? The first subsection below summarizes what reasonable assurances we can determine from research and monitoring of mercury in the environment. Other aspects of reasonable assurance are present and future decisions: will actions to reduce mercury contamination continue, and what new or proposed actions will reduce mercury? Subsections below summarize what we consider positive steps to reduce mercury on the three governmental levels.

### 12.2 State Level Assurances

Minnesota has been a national leader in reducing mercury releases to the air, water and land since the early 1990s. The state employs an array of voluntary, regulatory, incentive-based and educational tools that involve local governments, state agencies and businesses. In concert with similar initiatives on the Federal level, Minnesota's efforts have contributed to a 70% reduction in mercury emissions over the last 13 years (Table 13). The Minnesota Mercury Emissions Inventory (Appendix C) describes the specific statewide mercury emissions in 1990, 1995, and 2000. The MPCA mercury emission inventory has an earlier baseline and is more inclusive than the USEPA inventory. The USEPA inventory tends to exclude sources that are more difficult to quantify or verify. The best example of such a source is the large amounts of mercury that must have volatilized from latex paint until it was no longer added to paint after 1992.



Carol Hubbard and Clancy inspecting a classroom for mercury

<sup>5</sup> MPCA, 1999. available at <http://www.pca.state.mn.us/air/mercury-mn.html#initiative>





# MINNESOTA'S PROPOSED REGIONAL MERCURY TMDL

Howard Markus, Bruce Monson, Edward Swain,  
Ned Brooks, & Anne Jackson  
Environmental Analysis & Outcomes Division  
Minnesota Pollution Control Agency





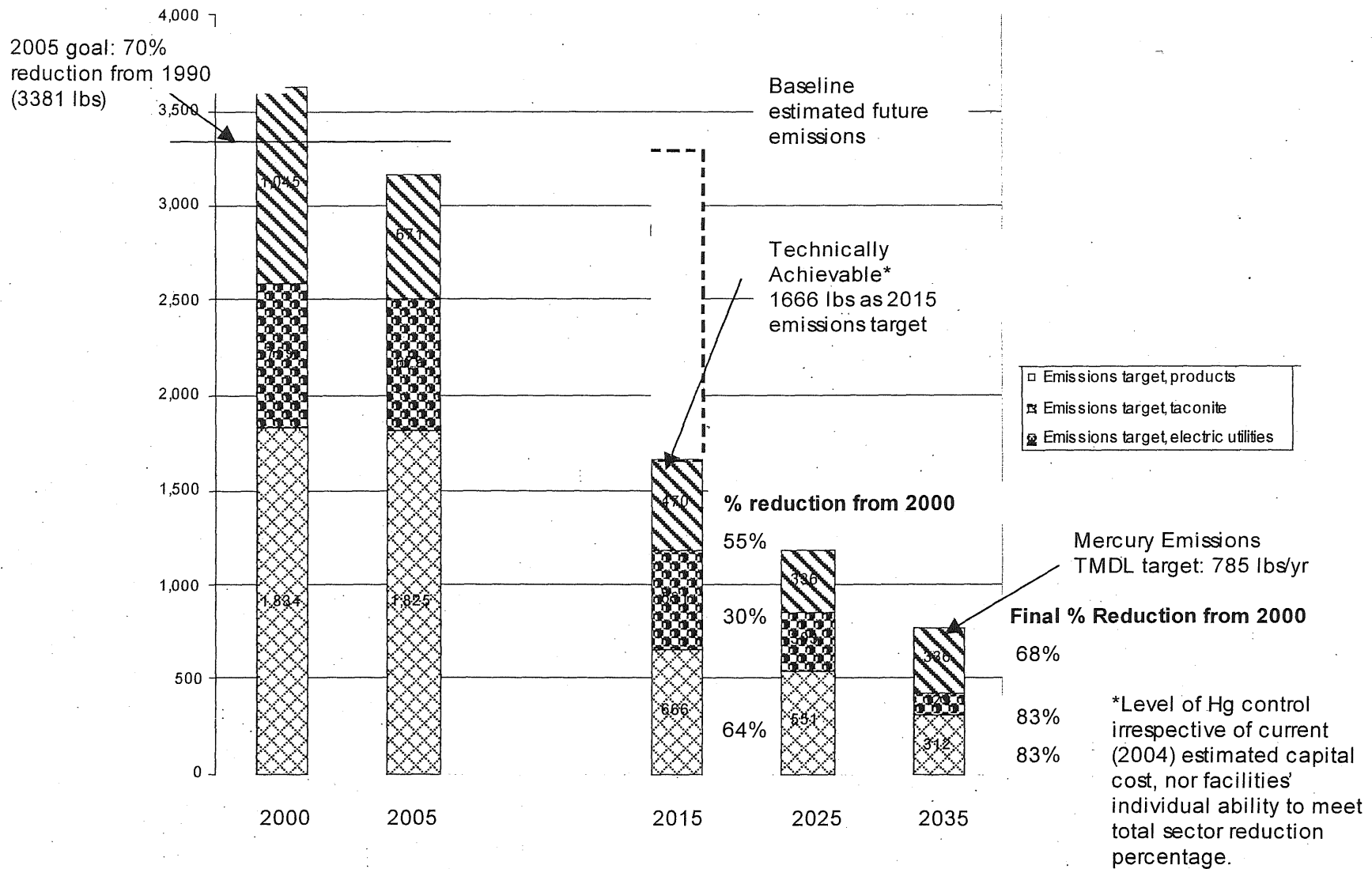
This slide was altered in the presentation sent to Len Anderson

## Air Sources of Mercury

- 93% Hg reduction required from 1990 levels
- 20 year schedule estimated for the energy sources to achieve their reduction goal
- 30 year schedule estimated for the mining sources to achieve their reduction goals
- Both sectors will have interim goals that, if not met, will trigger an enhanced regulatory approach



### Minnesota Mercury Emissions Targets (TMDL) 2005-2035





# MINNESOTA'S PROPOSED REGIONAL MERCURY TMDL

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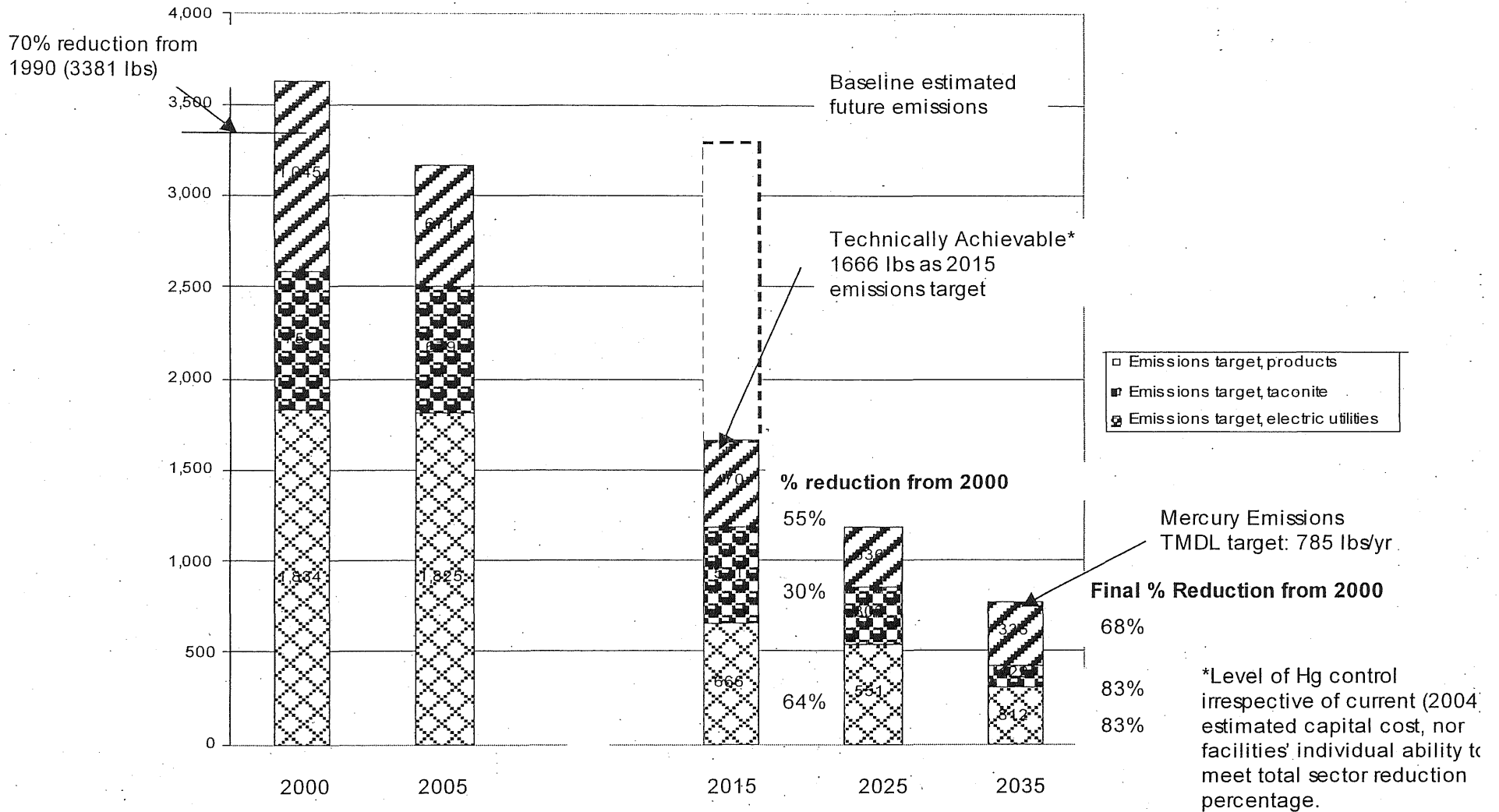
This slide was altered from the Chamber presentation

**DRAFT**

## **Air Sources of Mercury**

- 93% Hg reduction required from 1990 levels
- The energy and mining sectors will have interim goals that, if not met, will trigger an enhanced regulatory approach

### Minnesota Mercury Emissions Targets (TMDL) 2005-2035





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**From:** Thorvig, Lisa  
**Sent:** Tuesday, November 23, 2004 6:23 PM  
**To:** Seha, Ann; Sandusky, Mike; Markus, Howard; Brooks, Ned; Jackson, Anne; Hora, Marvin  
**Subject:** FW: St. Louis River Mercury TMDL Group

I nominate Howard. What do others of you think? Do we also need a manager?

How would you like to handle the meeting with the Chamber and the powerpoint presentation? My initial reaction is that we send them the powerpoint we intend to use in the presentation we make to them. Perhaps it's the same powerpoint.

Thanks, Lisa

-----Original Message-----

**From:** Carey, Patrick  
**Sent:** Tuesday, November 23, 2004 4:06 PM  
**To:** Jackson, Anne; Monson, Bruce; Hora, Marvin; Thorvig, Lisa  
**Cc:** Raudys, Leo; Hanson, Suzanne; Lohse-Hanson, Carri  
**Subject:** St. Louis River Mercury TMDL Group

I want to update you on what happened at yesterday's meeting of the St. Louis River (SLR) Mercury TMDL Work Group's Steering Committee and ask for your help on a couple questions/issues that were brought up.

In attendance were Keith Hanson (MnPower), Joe Stepan (WLSSD), Nancy Costa (Fond du Lac), Len Anderson (citizen/enviro), Gary Glass (citizen/science), Howard McCormick (SLR Citizens Action Committee), Yvonne Rutford (group secretary), and me. Their goal at the meeting was to develop the agenda for their next Board Meeting to be held December 16th, 9:00-12:00 in MPCA Duluth Office conf. room. After much discussion, here's the draft board meeting agenda they came up with:

- MPCA Mercury TMDL Update
- 2004/2005 board elections
- WARMF Model Update
- Industry TMDL Perspective
- Barr Report Update

The bulk of what they are interested in is the MPCA TMDL Update. They want to devote 1.0 - 1.5 hours to that topic. They want more detail-----status, content, schedule, and how the TMDL may impact permitting issues (Polymet, Excelsior, Mn Nugget were specifically mentioned). They asked me if I could ask you folks working on the TMDL if one of you could come up to the meeting on Dec. 16 to provide the update. Can someone come up to provide the update?

Second, they would like to be more involved in the development of the TMDL. While I told them that we would be doing public meetings to get input, they are still feeling left out and want a more-

involved forum for getting updates and providing input in the process earlier rather than later. They asked me to pass this message on.

Lastly, Keith Hanson told them about the Chambers meeting with the MPCA several weeks ago. This didn't go over very well with the enviros in the group-----i.e., characterized as the chamber dictating to MPCA what they want. I did tell them that we meet with different stakeholders from various sides of the issues as we develop our products. They asked me if I could forward a copy of the MPCA's powerpoint presentation that was given to the Chamber. I said I would ask!?

That's the scoop and flavor from up here. So, can you folks please give me answers or direction related to the questions/issues above? Thanks. -Pat



---

**From:** Bethel Anderson [mailto:bander@callta.com]

**Sent:** Sunday, December 05, 2004 9:41 PM

**To:** Carri Lohse-Hanson

**Cc:** Bill Hilty; sen.becky.laurey@senate.mn; Carey, Patrick; gary glass; Markus, Howard; Jane Reyer

**Subject:** Lack of transparency

At our last St Louis River Mercury TMDL meeting we asked for more transparency from the MPCA in regards to mercury TMDL deliberations and how load allocations relate to permitting. Some of us got what we asked for and some did not. The MPCA invited the Minnesota Chamber down to the St Paul office and they received just that kind of information. No environmental organizations have been given such consideration. I asked for a printed copy of that presentation. I have been ignored. I believe broad taxpayer participation in such important decisions leads to a fairer and more just society. It is time for the MPCA to give up the long held position that broad public participation in mercury allocations is in some way threatening to them.

Respectfully submitted, Len Anderson

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**From:** Thorvig, Lisa  
**Sent:** Monday, December 06, 2004 9:42 AM  
**To:** Markus, Howard  
**Cc:** Seha, Ann; Sandusky, Mike; Lohse-Hanson, Carri; Carey, Patrick; Hora, Marvin; Brooks, Ned  
**Subject:** Mercury TMDL  
**Importance:** High

Howard – Please update for accuracy the slide show we presented to the Chamber and get it to Carri to give to the Lake Superior group since it will be the slide show used for presentation on Dec. 16<sup>th</sup>.

Also, I would like our goal to be to get the draft mercury TMDL on our website by December 16<sup>th</sup> so that Howard, et. al. can provide this to the Lake Superior group on the 16<sup>th</sup> as well.

Thanks, Lisa

-----Original Message-----

**From:** Markus, Howard  
**Sent:** Monday, December 06, 2004 7:44 AM  
**To:** Thorvig, Lisa; Seha, Ann  
**Subject:** FW: Lack of transparency  
**Importance:** High

-----Original Message-----

**From:** Lohse-Hanson, Carri [mailto:Carri.Lohse-Hanson@state.mn.us]  
**Sent:** Monday, December 06, 2004 7:40 AM  
**To:** Markus, Howard; Carey, Patrick  
**Cc:** Hora, Marvin; Sandusky, Mike; Brooks, Ned  
**Subject:** RE: Lack of transparency  
**Importance:** High

Uh oh - now I'm on the hook and a Minnesota senator has been copied on the complaint addressed to me. Howard, as we discussed last Friday, PLEASE can't we get a copy of that presentation to Len? If you're going to give them the same presentation as the Chamber on the 16th, what harm would be done?

-----Original Message-----

**From:** Bethel Anderson [mailto:bander@callta.com]  
**Sent:** Sunday, December 05, 2004 9:41 PM  
**To:** Lohse-Hanson, Carri  
**Cc:** Bill Hilty; sen.becky.laurey@senate.mn; Carey, Patrick; gary glass; Markus, Howard; Jane Reyer  
**Subject:** Lack of transparency

At our last St Louis River Mercury TMDL meeting we asked for more transparency from the MPCA in regards to mercury TMDL deliberations and how load allocations relate to permitting. Some of us got what we asked for and some did not. The MPCA invited the Minnesota Chamber down to the St Paul office and they received just that kind of information. No environmental organizations have been given such consideration. I asked for a printed copy of that presentation. I have been ignored. I believe broad taxpayer participation in such important decisions leads to a fairer and more just society. It is time for the MPCA to give up the long held position that broad public participation in mercury allocations is in some way threatening to them.

Respectfully submitted, Len Anderson





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## Commissioner's Response to Star Tribune Article on MPCA's Mercury Reduction Plan

Having reduced mercury emissions in Minnesota by 70% between 1990 and 2005, the MPCA has prepared a draft plan that seeks to establish a 93% mercury reduction goal to guide future emission reductions. The draft plan -- called a Total Maximum Daily Load (TMDL) -- would make Minnesota the first state in the country to establish such an ambitious goal.



An article in Sunday's (July 31, 2005) Star-Tribune misrepresented a number of key elements in our TMDL and related implementation program. This message seeks to clarify several issues raised in the article, as well as to provide details on our efforts to gain stakeholder input.

Despite criticisms by a few environmental group representatives quoted in the story, there has been ample opportunity for input by environmental organizations and the general public.

Since April 2004, MPCA staff consulted with various representatives of different environmental organizations on eight occasions on the development of the TMDL. The specific dates were April 29, 2004; May 15, 2004; July 16, 2004; August 16, 2004; September 16, 2004; October 15, 2004; September 7, 2004; December 16, 2004; April 7, 2005; and May 10, 2005. This information was provided to the Star-Tribune but not included in the story.

At these meetings, we received input from representatives of Clean Water Action, Mercury Free Minnesota, Sierra Club, Izaak Walton League and the National Wildlife Federation.

The Minnesota Center for Environmental Advocacy (MCEA), a critic cited in the Sunday article, did not come to any of the planned environmental stakeholder meetings, even though they were invited each time.

Late in the process, two MCEA representatives contacted the MPCA. We arranged a special meeting on May 10, 2005, to accommodate their request to have input. The MCEA missed an entire year of meetings through their own choice.

The purpose of our meeting with industry leaders was to give them a heads up

on changes they will need to make in their operations. Alerting affected parties about pending environmental initiatives is standard practice. Whenever we draft new rules or policies we seek early input from parties affected by the rules. Recent examples include statewide feedlot rules, septic system rules and municipal infrastructure rules.

In addition to the meetings with interested parties on the development of the draft TMDL, the MPCA has held eight public meetings to receive public comment on the document. These meetings were held on July 14 and 15 in St. Paul; two meetings on July 18 in Duluth; July 19 in Brainerd; July 20 in Detroit Lakes; July 21 in Marshall; and July 25 in Rochester.

Since December 16, 2004, the mercury TMDL has been posted on the MPCA website with instructions on how the public can submit comments. We will continue to receive public comments until August 17. After the comment period closes, we will respond to all comments, make changes to the draft document, and submit a final for approval by the U.S. Environmental Protection Agency.

The Sunday story referenced an early working draft of the TMDL that included some tentative target dates for implementation of the mercury reduction plan. The timetable was not included in the draft document that was made available for public review for three reasons: 1) implementation is not part of the TMDL process, which lays out a scientific justification for the reduction strategy and sets goals; 2) we need time to understand the impact of the recently adopted federal Clean Air Mercury Rule (CAMR), which will reduce power-plant mercury emissions in the U.S. by 70%; and 3) the technology needed to achieve the reductions is not yet commercially available.

Once the TMDL is approved by the federal government, a state must prepare a detailed reduction implementation plan. The MPCA has not yet developed this plan, and has always intended to use an open stakeholder process when it does so in the future. We provided this information to the Star-Tribune, but it was not reported. The plan will evaluate what options are technically and economically feasible to implement, and at what time. We will have one year to complete the implementation plan, and all will be invited to take part.

The newspaper claimed the MPCA "eased limits" in the TMDL as a result of pressure from industry representatives. In fact, the MPCA made absolutely no change to its proposed reduction of 93%, which is a very aggressive target that clearly distinguishes our agency as an environmental leader. No other state has set such an aggressive goal.

Most importantly, let's not lose sight of the fact that Minnesota continues to be a leader in mercury reductions. Our state programs have reduced mercury by 70%. Our TMDL calls for an overall reduction of 93%, which is a first in the nation proposal. Significantly, our TMDL also puts pressure on the federal government to seek nationwide reductions in mercury.

We look forward to working with environmental groups, industry leaders and citizens as we move ahead with our plan. Our goal of a 93% reduction is only attainable if all parties work together.



We encourage you to review the draft Statewide Mercury Total Maximum Daily Load (TMDL) Pollutant Reduction Plan on the MPCA's Web site.

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This page was last updated August 1, 2005

If you have suggestions on how we can improve this site, or if you have questions or problems, please contact us.

If you have questions or problems with this Web site, contact [webmaster@pca.state.mn.us](mailto:webmaster@pca.state.mn.us)

Minnesota Pollution Control Agency, 520 Lafayette Road, St. Paul, MN 55155-4194

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