

DOE-NETL's Mercury R&D Program



Mercury Control Technology R&D Program Review Meeting

*August 12-13, 2003
Pittsburgh, PA*

Carl O. Bauer
National Energy Technology Laboratory



Mercury Control Technology Meeting

Attendees

- **Electric Utilities**
 - Allegheny Energy
 - Alliant Energy
 - American Electric Power
 - Basin Electric
 - Cinergy
 - Detroit Edison
 - Dominion
 - Duke Energy
 - Edisons Electric Institute
 - EPRI
 - FirstEnergy
 - Great River Energy
 - Reliant Energy
 - Southern Company
 - Tennessee Valley Authority
 - We Energy
- **Coal/Related Industries**
 - Air Products
 - American Coal Ash Association
 - CONSOL Energy
 - Drummond
 - Lignite Research Council
 - KFX Inc.
 - Norit Americas
 - Peabody Energy
 - US Gypsum
- **Federal/State Environmental Agencies**
 - U.S. EPA
 - PA Dept of Environmental Protection
 - Allegheny County Health Department



National Energy Technology Laboratory



- **One of DOE's 17 national labs**
- **Government owned / operated**
- **Sites in:**
 - Pennsylvania
 - West Virginia
 - Oklahoma
 - Alaska
- **More than 1,100 federal and support contractor employees**



NETL Plays Key Role in Fossil Energy Supply, Delivery, and Use Technologies

Electric Power Using Coal



Coal Production



Environmental Control



V21 Next Generation



Carbon Sequestration

Clean Liquid Fuels



Exploration & Production



Refining & Delivery



Alternative Fuels



Future Fuels

Natural Gas



Exploration & Production



Pipelines & Storage



Fuel Cells



Combustion Turbines



Photo of hydrogen fueled car: Warren Gretz, NREL

TJF_Hg Meeting_8/12/03

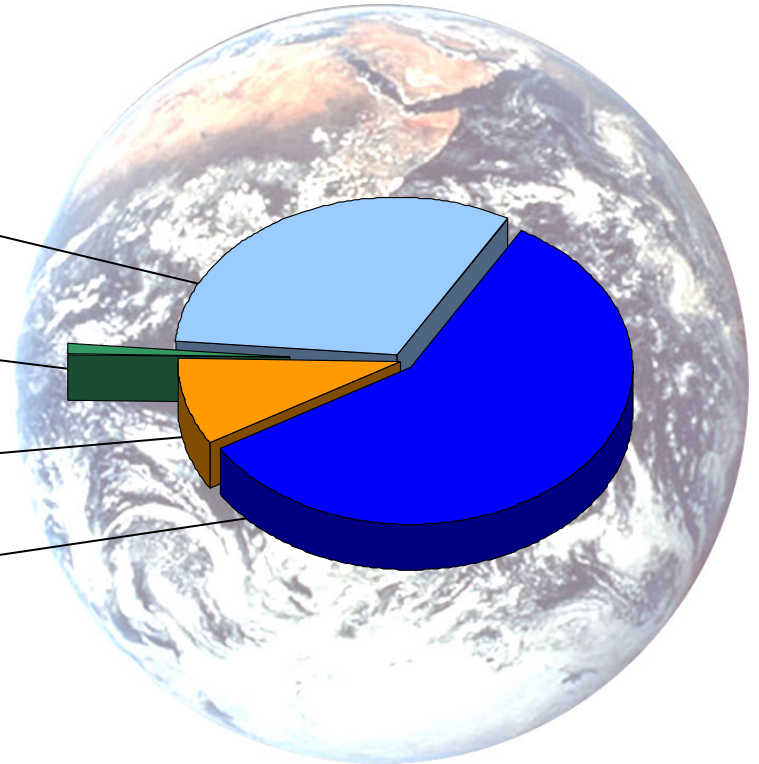
What We Do

- Shape, fund, and manage extramural R&D
- Conduct onsite research
- Support energy policy development



Global Mercury Emissions

Emissions from Natural Sources (Volcanoes, Forest Fires, etc.)	1540 tons
U.S. Coal-Fired Power Plants	48 tons
Re-Emission of Prior Anthropogenic Emissions	440 tons
New Anthropogenic Emissions*	2820 tons



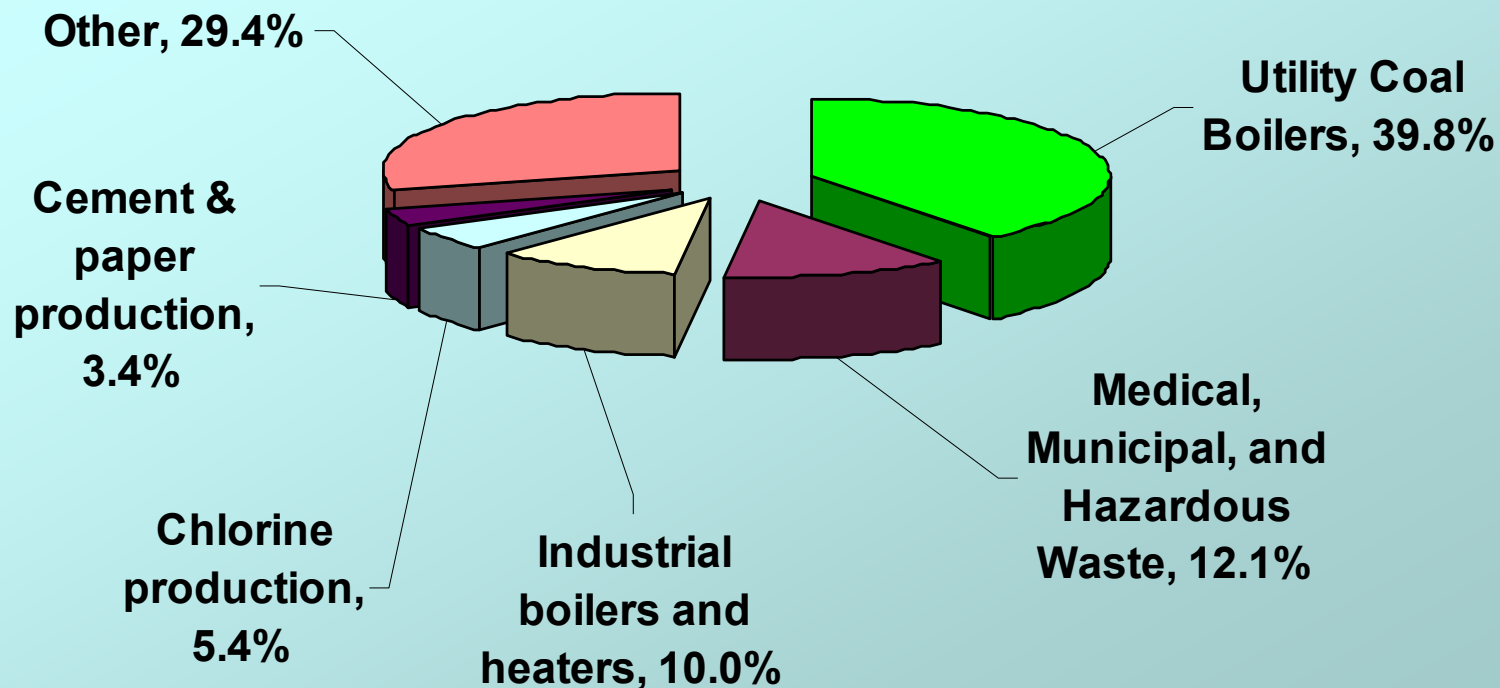
*Note: Does not include U.S. Coal-Fired Power Plant Emissions

It is estimated that U.S. coal-fired power plants emit approximately 1% of annual global mercury emissions



Source: UNEP Global Mercury Assessment, December 2002

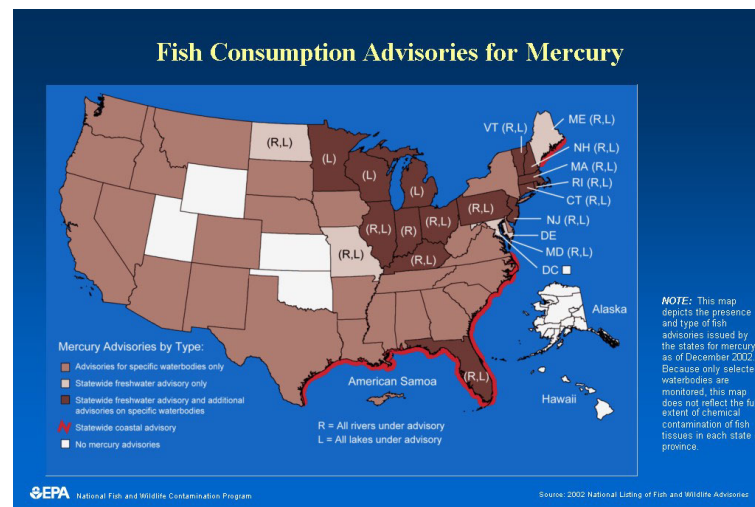
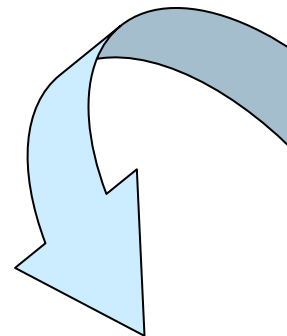
Estimated U.S. Anthropogenic Mercury Emissions



Source: Personal communication with U.S. EPA 7/16/03 1999 NEI Version 3.0

“Plausible Link”

- “...evidence for a plausible link between emissions of mercury from utilities and the methylmercury found in soil, water, air, and fish.”
- “Consequently, mercury emissions from coal-fired utilities may contribute to the potential exposures to mercury through consumption of contaminated fish.”



Source: EPA Fact Sheet for Utility Air Toxics Report to Congress, 2/24/98



Will Reductions in Power Plant Mercury Emissions Solve The Problem?

- ...“There remain uncertainties, however, about the extent of impacts directly attributable to mercury emissions from utilities.”

Source: EPA Fact Sheet for Utility Air Toxics Report to Congress, 2/24/1998

- ... “40% of mercury deposition in the continental United States is attributable to foreign sources.”
- ...“even if all feasible controls for Hg are implemented in the U.S., external sources will prevent attainment of water quality standards.”

Source: Terry Keating, U.S. EPA, Clean Air Report, 6/19/2003



Potential Mercury Regulations

EPA MACT Standards

- Likely high levels of Hg reduction
- Compliance: Dec. 2007

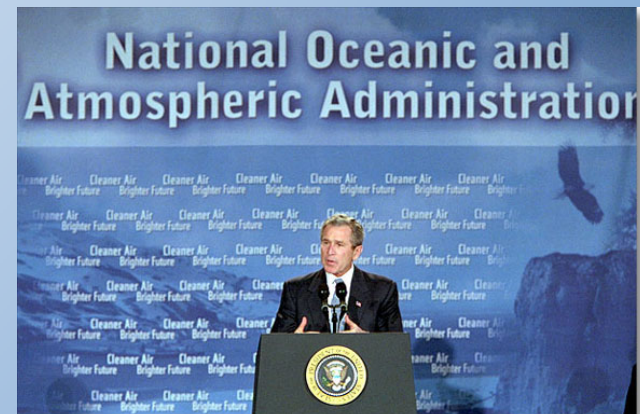
Alternative Multi-Pollutant Legislation in 2003

- Clean Power Act of 2003
S. 366 - Jeffords
- Clean Air Planning Act of 2003
S. 843 - Carper

***President Bush
Announcing Clear
Skies Initiative
February 14, 2002***

Clear Skies Act of 2003

- Re-introduced in House (HR. 999) and Senate (S. 485) on February 27, 2003
- 3-contaminant control
- 46% Hg reduction by 2010
- 69% Hg reduction by 2018
- Hg emission trading



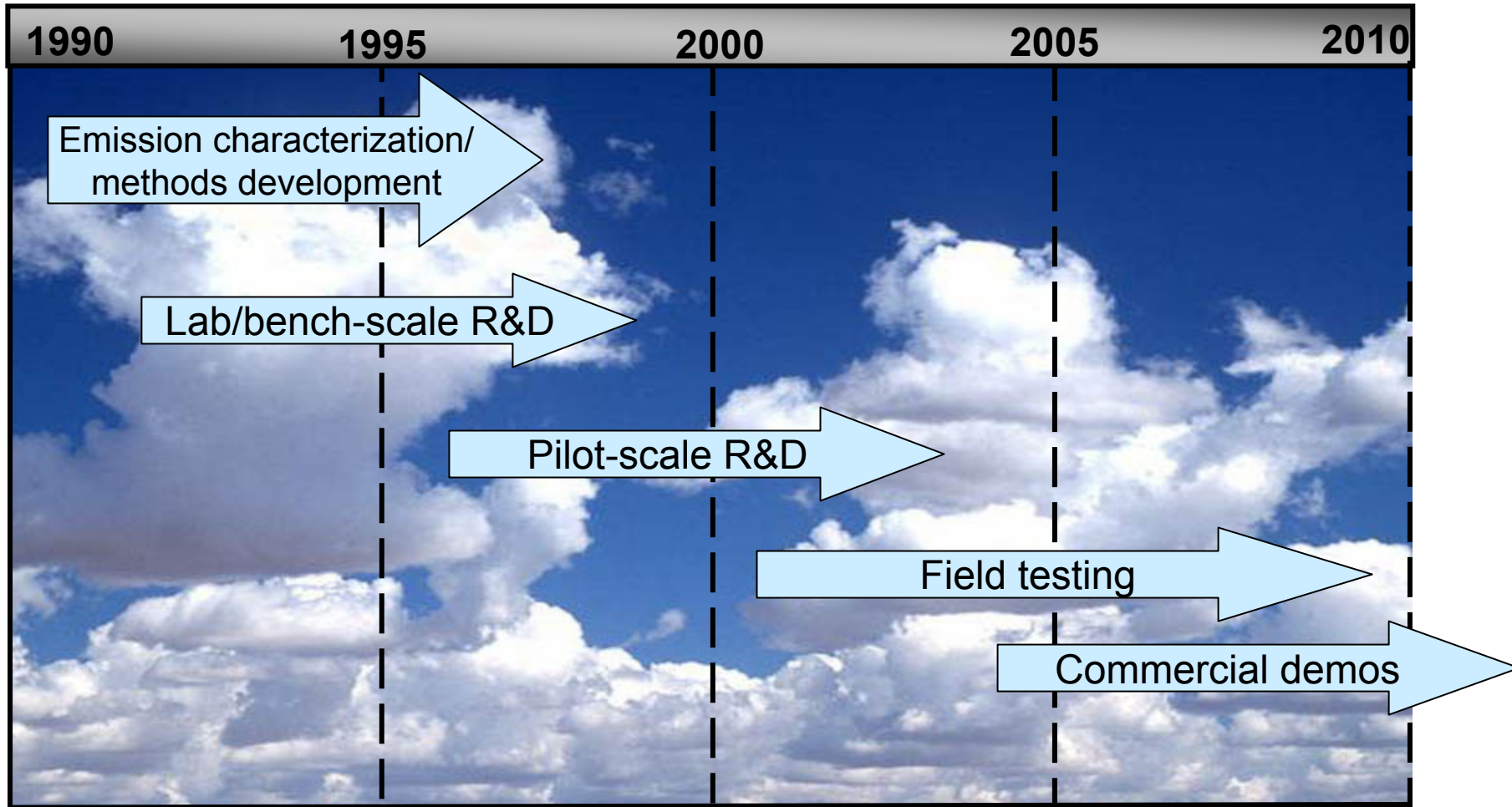
DOE-NETL Mercury R&D Program

- Driven by pending mercury regulations and policy decisions
- Develop advanced cost-effective control technologies
- Provide sound science and technical knowledge

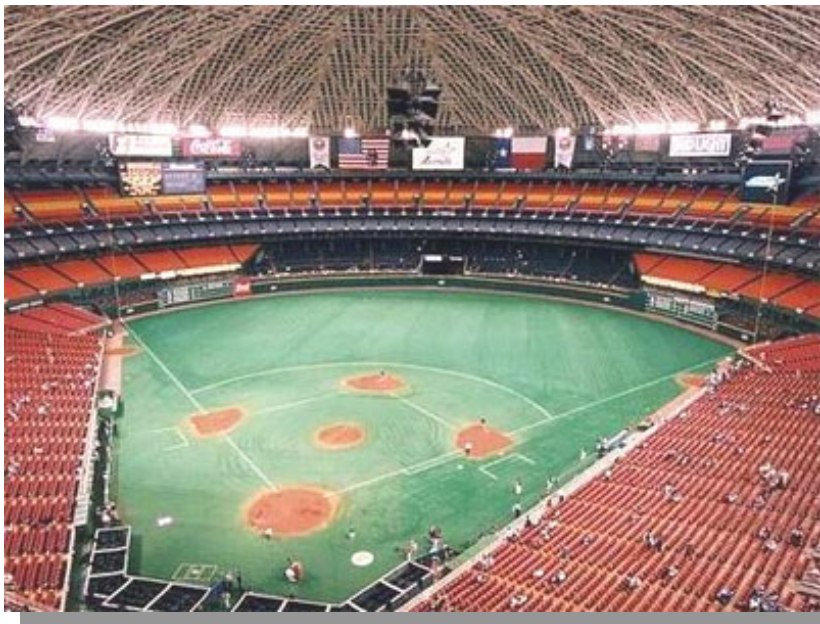


Skating to where the puck is going...

Mercury Technology R&D Pathway



Capturing Mercury Is Difficult!



*Houston
Astrodome*

Astrodome filled with 30 billion ping-pong balls

- **30 “mercury” balls**
- **Find and remove 27 “mercury” balls for 90% capture**

Program Success Built on Partnerships



*Jim Kilgroe (EPA),
Scott Renninger (NETL),
and George Offen (EPRI)
discussing strategy*

- **NETL works closely with industry, EPRI, EPA, and other stakeholders in planning and implementing its mercury control technology research program**

