

Mercury From Coal Emissions

Chem 456 00F

Senior Seminar



Joanna French

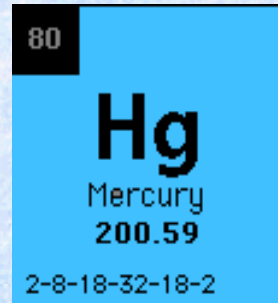
Gregory O'Neill

Jeffrey Smith





Where Do You Stand?



Mercury emitted from coal power plants represents a significant health concern.

Our Position	Agree	Disagree			
Joanna	✓				
Greg	✓				
Jeff	✓				



What Is Mercury?

Name	Mercury was the messenger of the ancient Roman gods. Hg comes from the Latin word, hydrargyrum, which means quicksilver.
Discovered By	Who Knows, but it has been used since the ancient times. Antoine Lavoisier of France categorized it in the late 1700's
Properties	Hg is the only liquid metal at room temperature and is a poor conductor of heat.

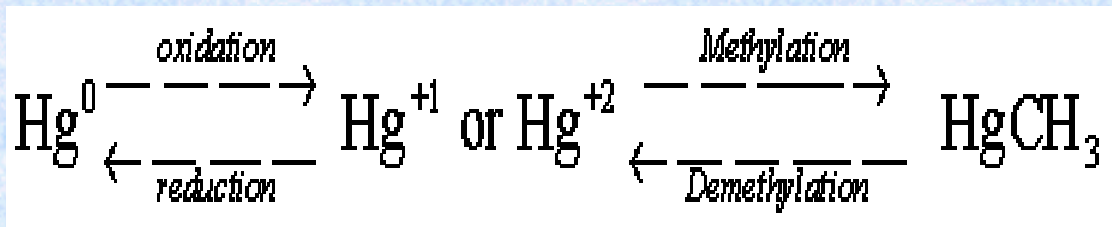


Mercury in the Environment

Exists in Three Forms

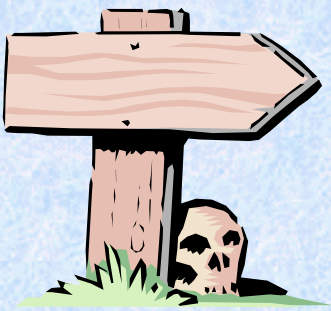
- Elemental
- Inorganic
- ☠ **Organic**

(methyl mercury)

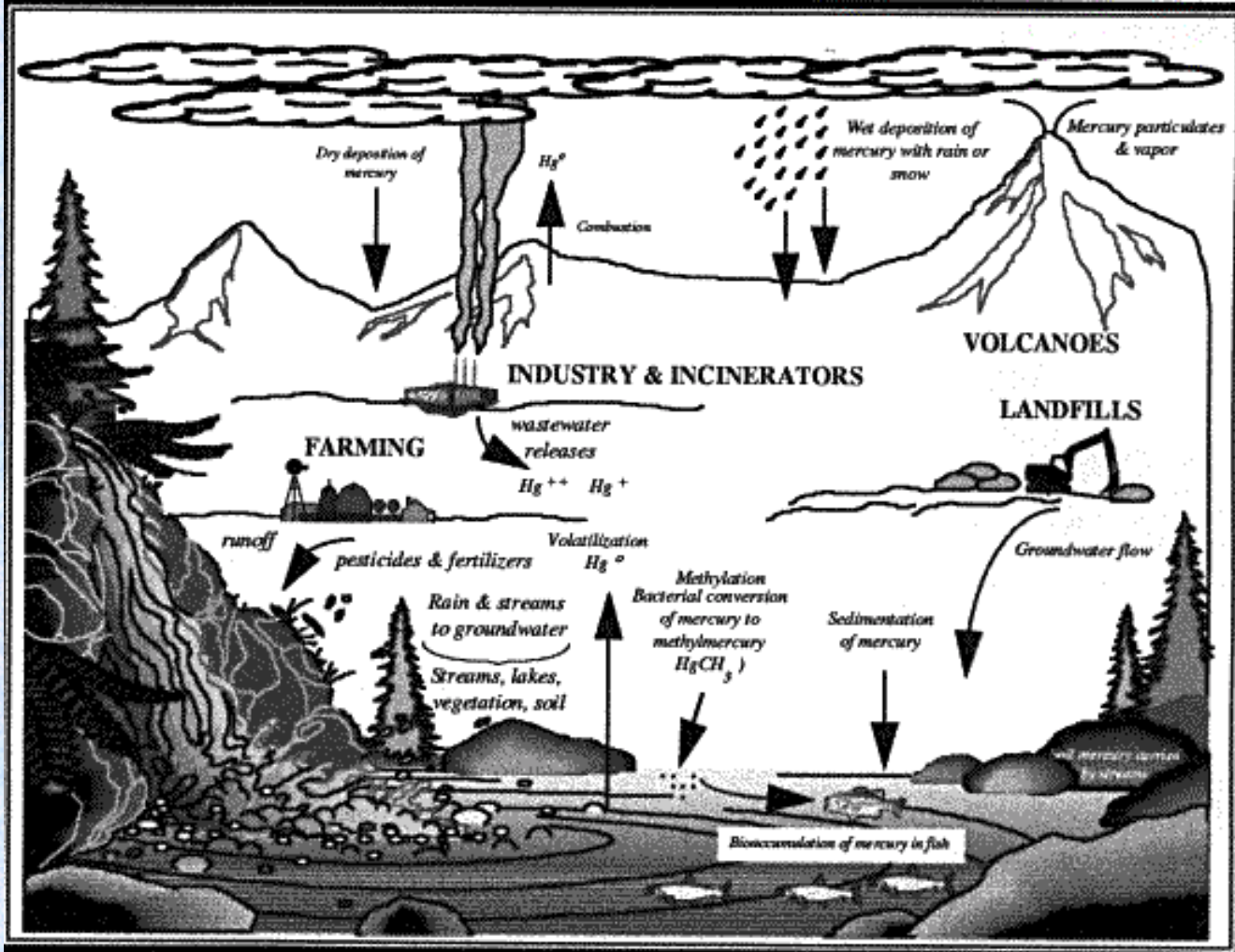


Methyl Mercury

- Highly soluble in water
- Easily transported by atmospheric rain
 - Accumulates in fish
- Rain can contain as much as 30x the EPA's safe level



How Hg Is Spread

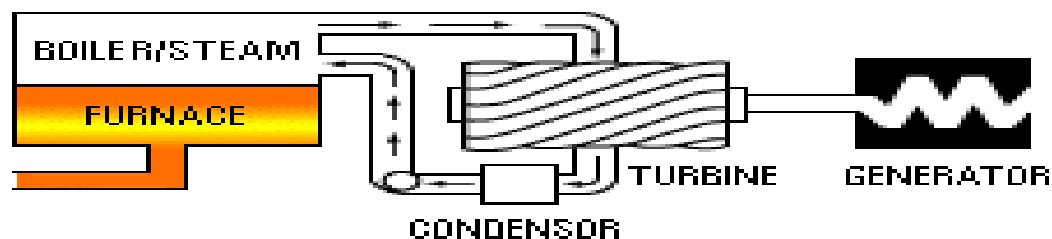




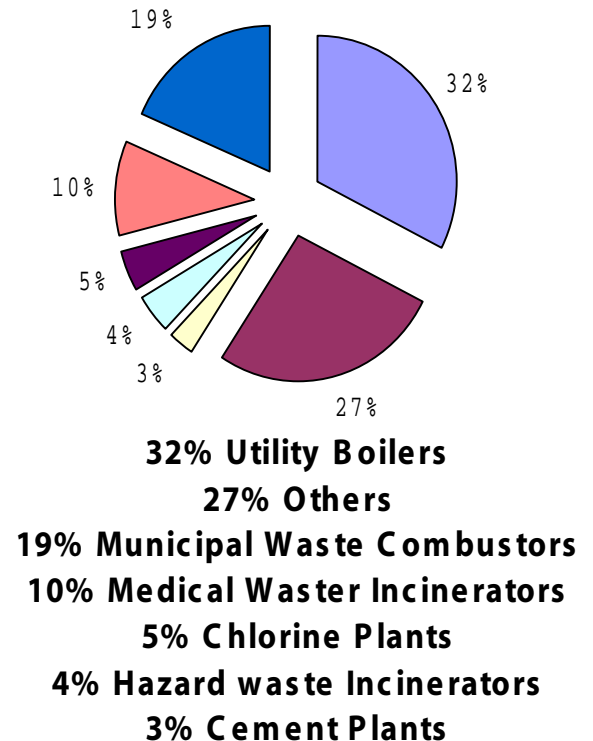
From Coal Emission

- Mercury is a trace element in coal (about 1ppm)
- 99.7% of the mercury in coal can be released into the atmosphere by combustion

COAL-FUELED GENERATION



Sources of Mercury Emission





Local Data

	State	(Estimated Mercury Air Pollution in pounds) ³
1	Pennsylvania	9,967
2	Texas	9,072
3	Ohio	7,881
39	Delaware	309

Plant	City	Total Mercury Released (pounds)	Mercury Air Pollution (pounds)
Indian River	Wilmington	227	161
Edge Moor	Millsboro	246	147



Health Effects

From Fish to Our Bodies

- ☠ Although the concentration of methyl mercury in our waters may be low, it bioaccumulates
- ☠ Methyl mercury binds tightly to the tissue proteins in fish we eat





Bodily Effects

Methyl mercury is a Neurotoxin

☠ Affects the brain and spinal cord

☠ It is completely absorbed by the digestive system

☠ Can cause tremors in the hands and as a numbness or tingling sensation of the lips, fingers, toes, or tongue, known as paresthesias

☠ Greater doses may result in sensory disturbances, deafness, blurred vision, decreased peripheral vision, speech difficulties, and an impaired level of consciousness

How much is too Much ?

☠ The estimated lethal dose of methyl mercury for a 70 kg (154 lb) person ranges from 20 to 60 mg per kilogram of body weight.





Conclusions

- Coal burning plants are the largest source of mercury pollution
- Large doses can lead to serious health disorders and even death
- Until the time when coal power plants are a thing of the past, please use less electricity