

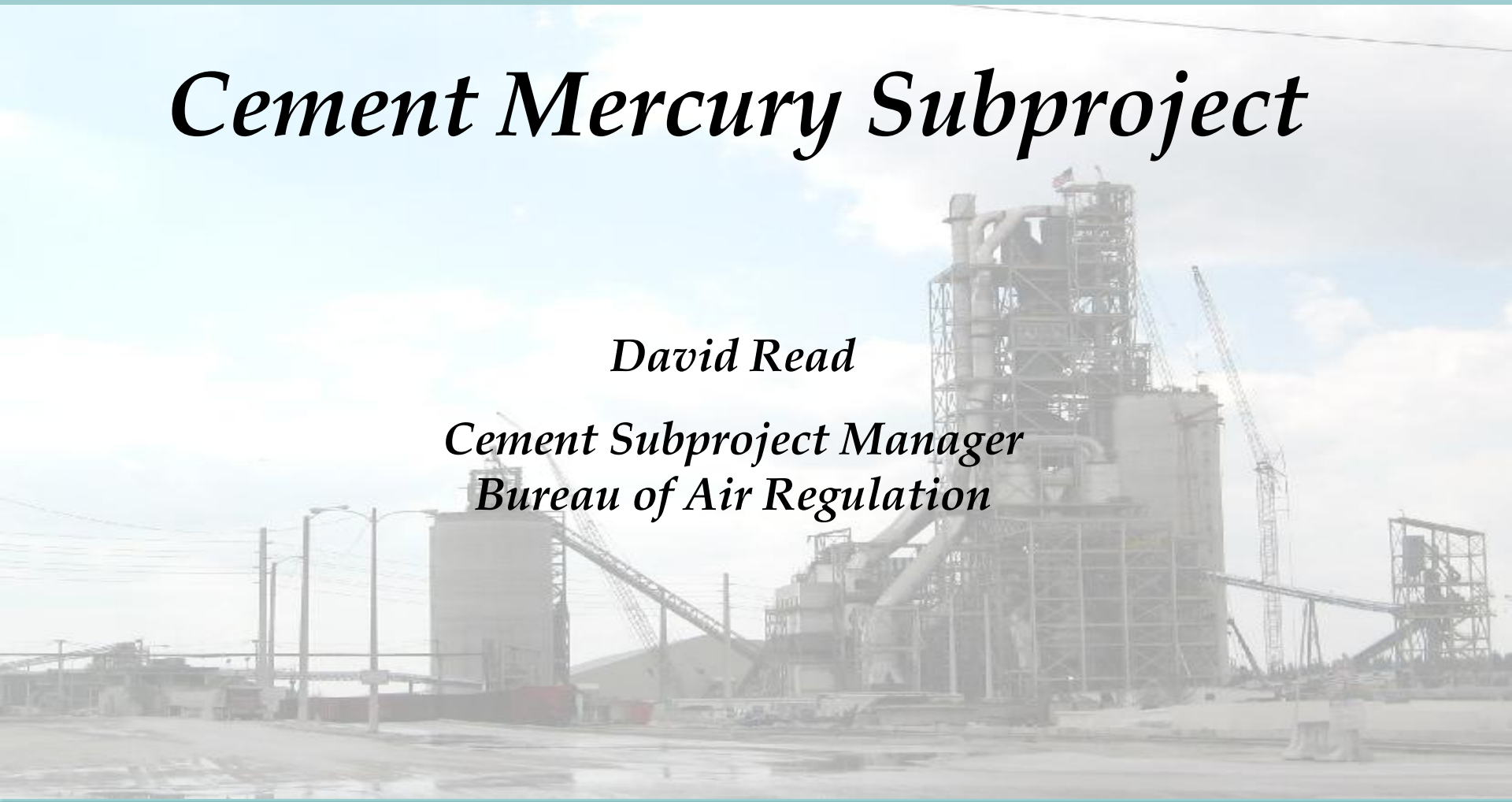


*Florida Department of
Environmental Protection*

Cement Mercury Subproject

David Read

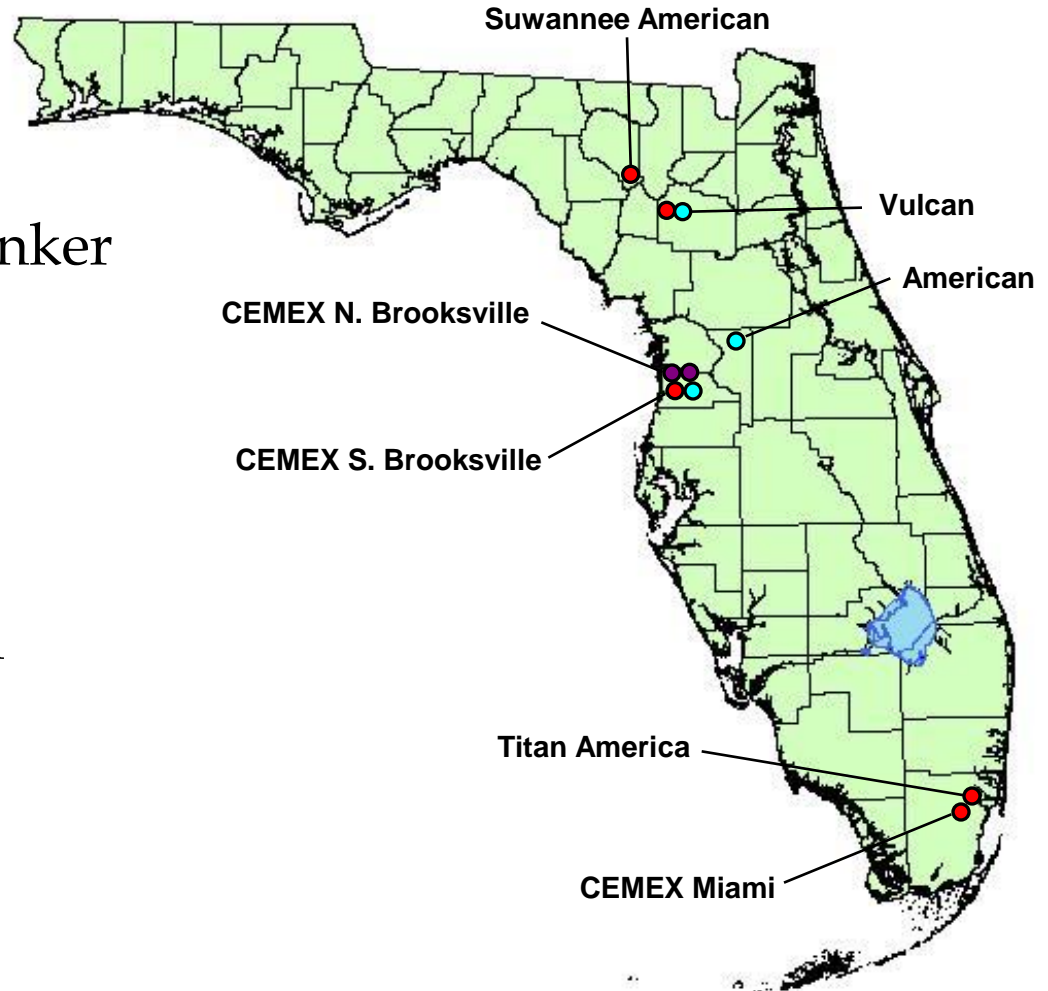
*Cement Subproject Manager
Bureau of Air Regulation*





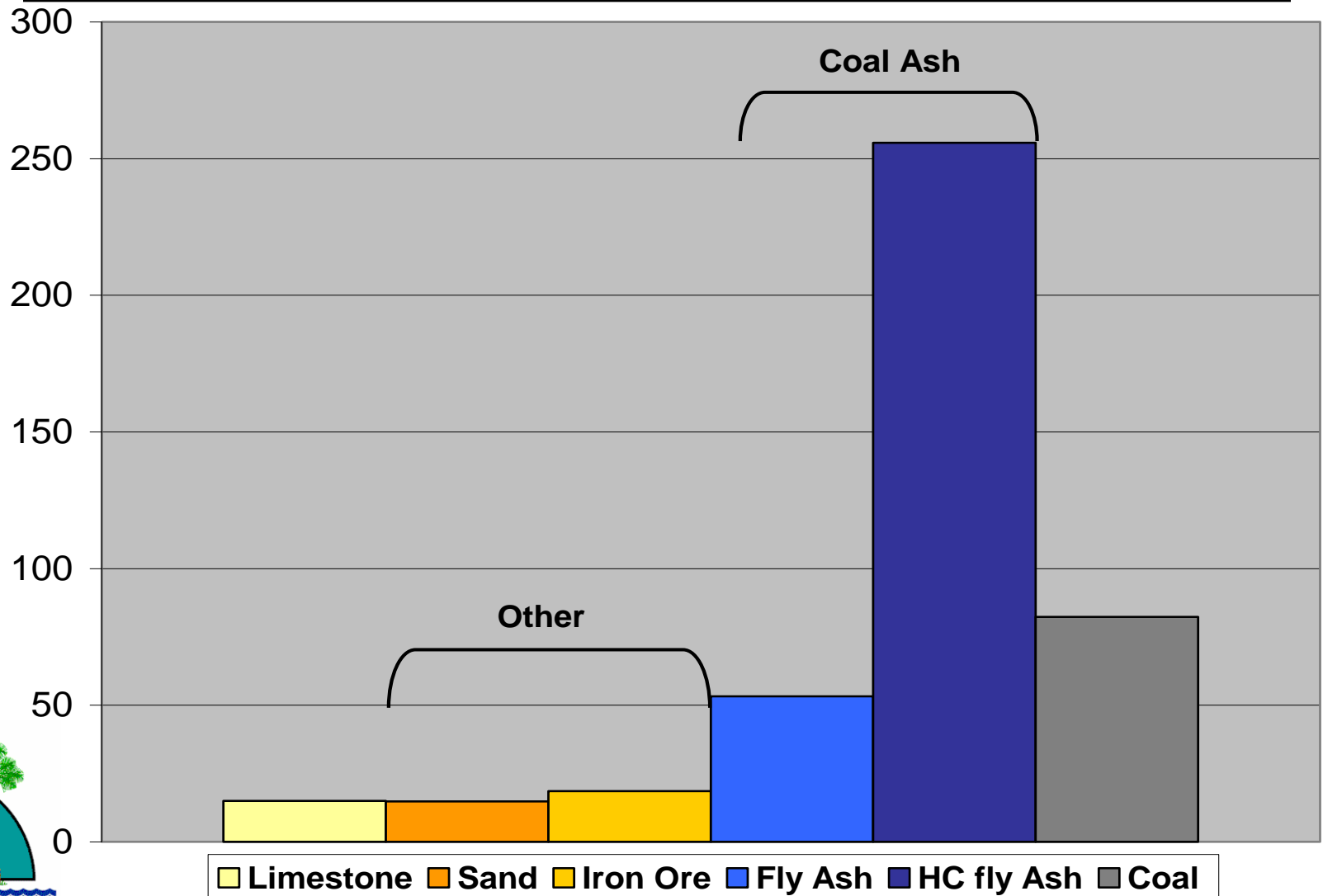
Florida Cement Industry

- 10,000,000 tons per year clinker
- Ten cement kilns
- Demand is down
- Five in operation
- Two are temporarily down
- Three at/near startup



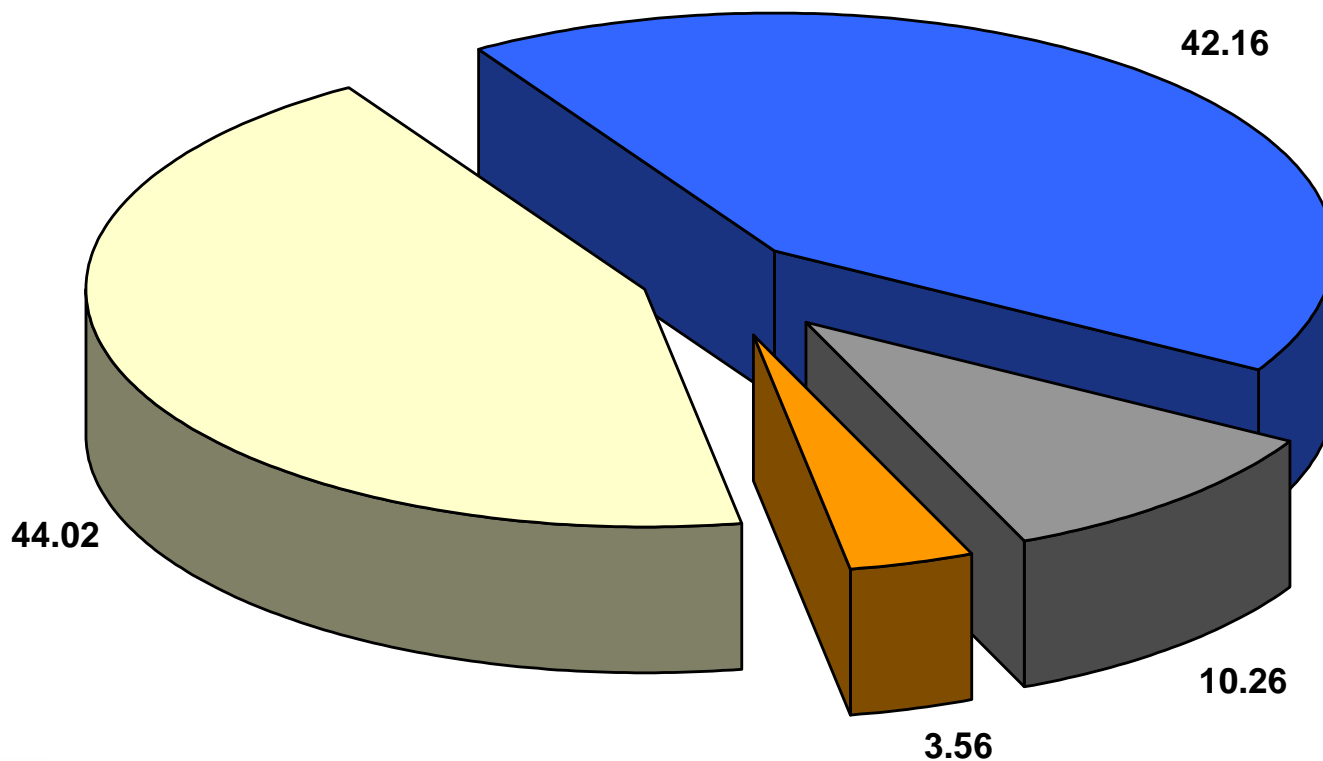
Fuel and Materials Hg - Plant A

Concentrations in parts per billion (ppb)



Fuel and Materials Hg - Plant A

Contribution to total emissions in percent (%)



Legend: Limestone Coal Ash Coal Other

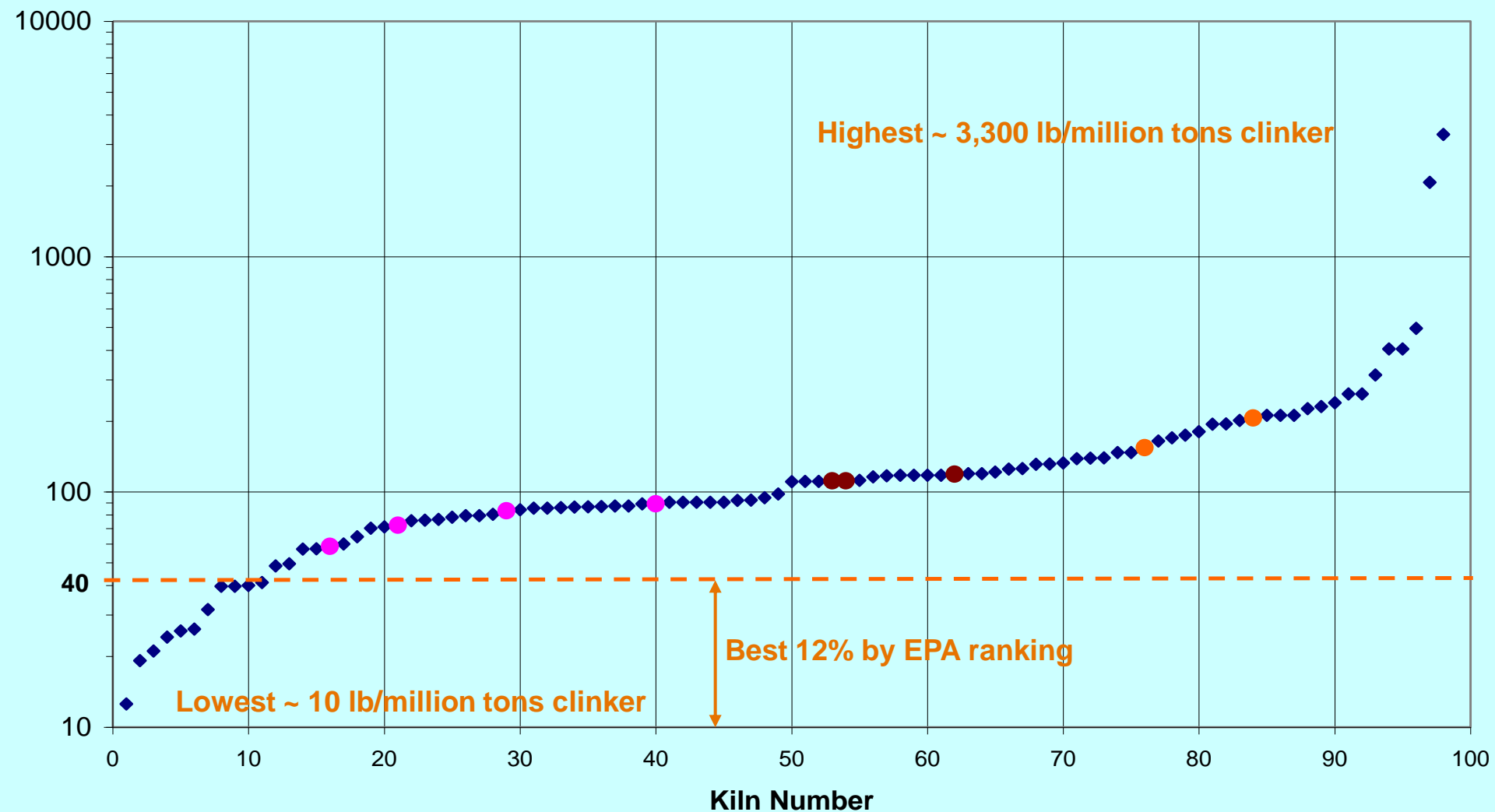




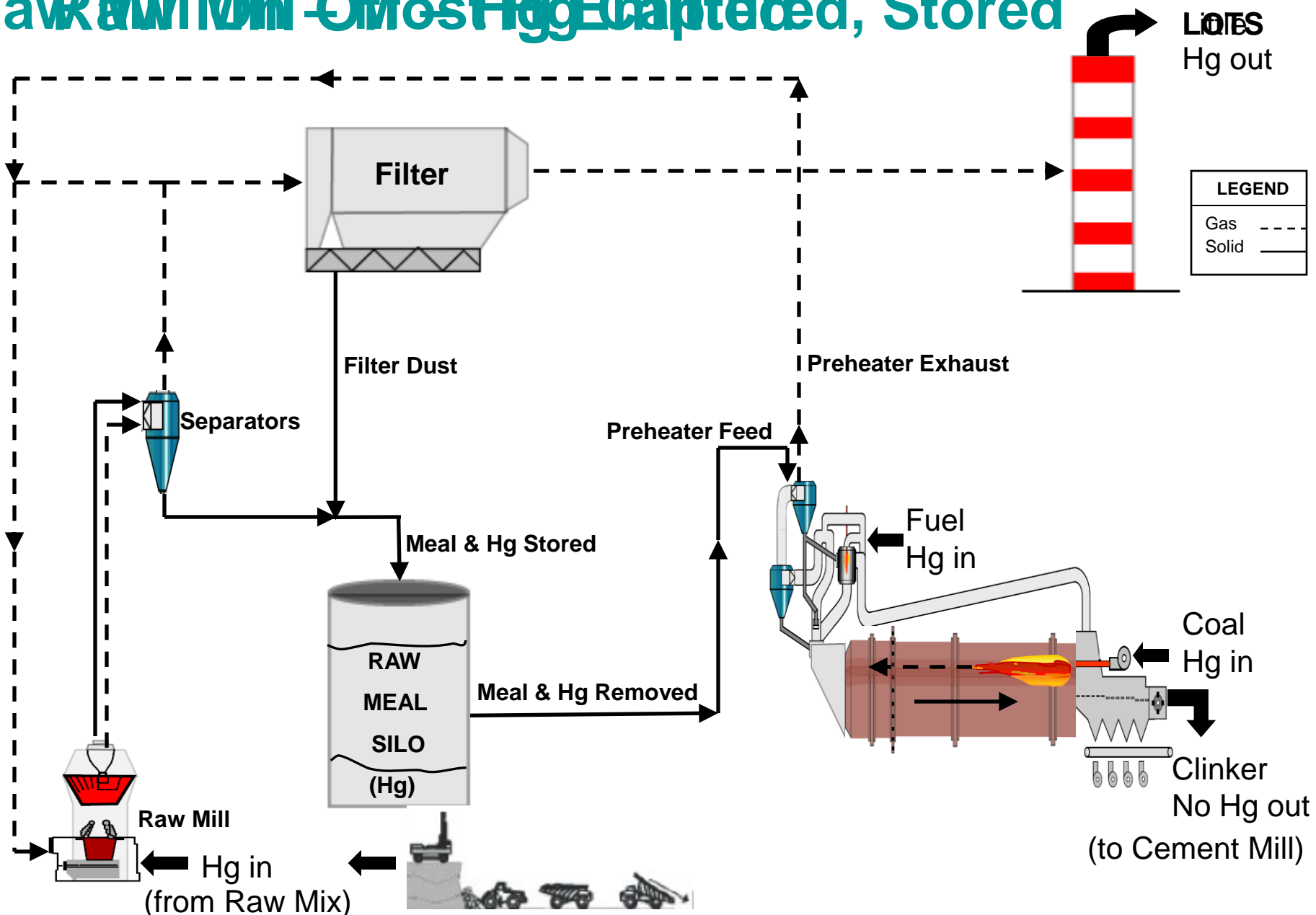
EPA and Florida Kiln Emission Estimates

in pounds (lb) of Hg per million tons of clinker

◆ U.S. Kilns ● FL Kilns (Mass Balance) ● New FL Kilns (Potential) ● FL Kilns (DEP Estimate)



Raw Mill - Off-Gas Captured, Stored



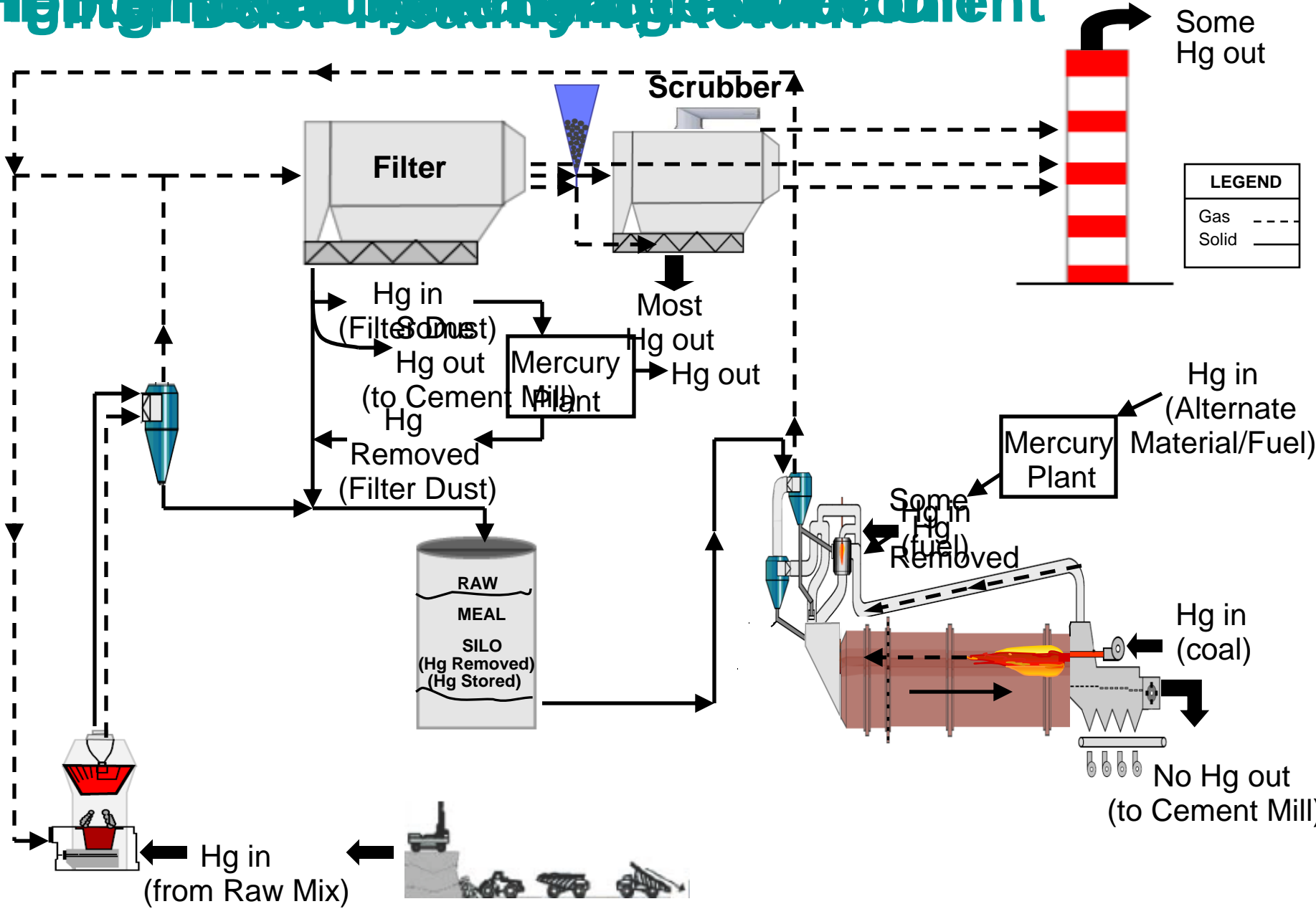


Hg Control Options

- Limit high carbon coal ash, raw materials/fuels Hg
- Add-on control equipment prior to stack
 - Baghouse, activated carbon (Norcem Brevik and Ash Grove Durkee, Oregon)
 - Wet Scrubber (such as for SO₂ in TXI Midlothian, Holcim Holly Hill)
- Heat and return filter dust, recover Hg in activated carbon
 - Much smaller gas volume than end-of-process controls (F.L. Smidth offers)
- Heat problem fuels/material, recover Hg in activated carbon
 - Also much smaller volume (F.L. Smidth describes in patent)
- Filter dust shuttling to cement product
 - Typically practiced in some European countries (allowed in Florida?)



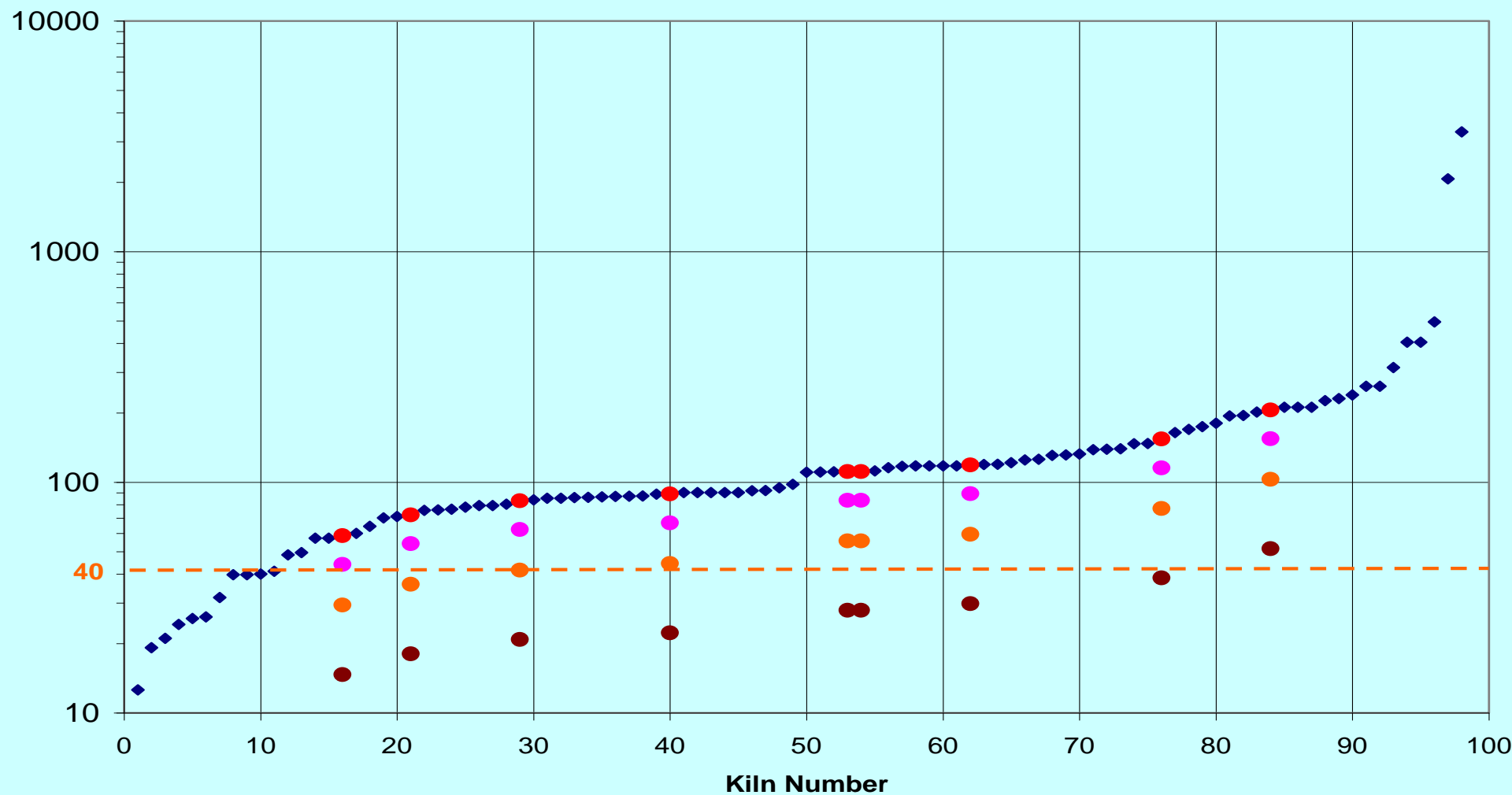
High Temperature Solid Fuel Combustion





Comparison of Florida Kilns with Best 12% at 25, 50, and 75% reduction from present estimates

◆ U.S. Kilns ● Florida Kilns ● FL 75% Reduction ● FL 50% Reduction ● FL 25% Reduction



Florida Cement Industry Summary

- Florida kilns emit ~ 100 lb Hg/million tons clinker
- At full capacity emissions will be ~ 1,000 lb Hg/year
- A well-controlled coal power unit emits < 20 lb Hg/year
- EPA will propose draft limit by March 31, 2009
- May need significant reductions to achieve EPA limit
- Start with more careful materials and fuel selection
- **Avoid high carbon fly ash (abated power plant emissions)**
- Shuttle filter dust to product to extent cement meets specs
- Treat problem alternative fuels/materials
- Only then get to end-of-process add-on controls





Additional Thoughts

- Need better data at some existing kilns
- Material testing, sorbent traps, Hg-CEMS
- Total Maximum Daily Load (TMDL) driver
- May require limits beyond EPA MACT*
- We ought to try out dust shuttling first
- We will visit FDOT** to see if allowed

* Maximum Achievable Control Technology

** Florida Department of Transportation

