CIBO Boiler MACT Update

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June 9, 2010

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Proposed Rules

Boiler and Process Heater Major Source MACT- Sec. 112

- Applicable to all boilers and indirect fired process heaters
- Located at major HAP sites
  - >10 TPY single HAP; >25 TPY all HAPs

Boiler Area Source Rule

- Applicable to non-major HAP sources

Definition of Solid Waste Rule

- Determines what is solid waste for regulation under Sec.129 (CISWI)
- Or not solid waste and regulated under Boiler MACT
- Applicable to determination for all non-gaseous fuels that are non-traditional fossil fuels

CISWI Rule

- Sec. 129 replacement rule

Revised Rule- Major Source Boiler & Process Heater MACT

Proposed rule signed 4/29/2010

Issued in Federal Register on June 4, 2010

45 day comment period in proposed rule

- **Notice coming this week scheduling hearings and extending comment period to 60 days**
  - **Comments due on all rules August 4, 2010**

Final rule promulgation scheduled for 12/16/2010

Industry will request a comment extension for all 4 rules tied to a similar final promulgation date extension

Compliance date 3 years following promulgation in Fed. Reg.

- Final rule promulgation 12/16/2013 per current schedule
- One year extension per General Provisions if delays beyond control

Based on the proposal, litigation is almost certain

Hearing Schedule

Arlington, VA- June 15, 2010

- Crystal City Marriott
- 1999 Jefferson Davis Highway

Houston, TX- June 22, 2010

- Hilton Houston Hobby Airport
- 8181 Airport Boulevard

Los Angeles, CA- June 22, 2010

- Sheraton Los Angeles Downtown Hotel
- 711 South Hope Street

9:00AM until 8:00PM or later with lunch/dinner breaks

Oral testimony limited to 6 minutes per commenter

Major Source Boiler/Process Heater MACT

Applies to boilers and process heaters at major sources of hazardous air pollutants.

Affects 1,600 facilities and 13,555 boilers

- about 11,500 are gas fired boilers and process heaters

Emission limits, monitoring, testing for PM, HCl, Hg, CO, dioxin/furans

Will require addition of multiple controls and complex monitoring to meet proposed limits

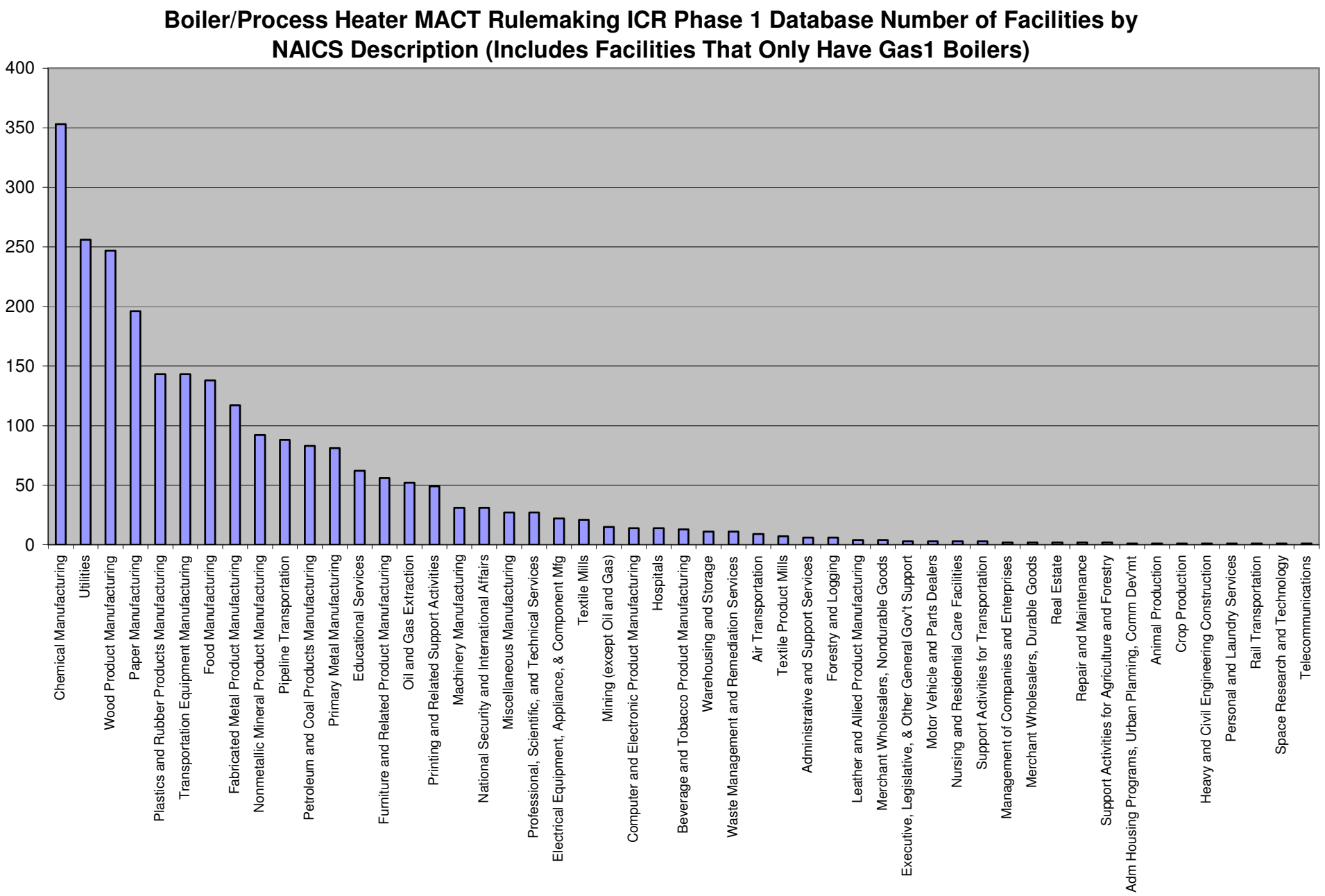
Limits based on fuel type for PM, HCl, Hg and by fuel type and boiler design for CO, dioxin/furan

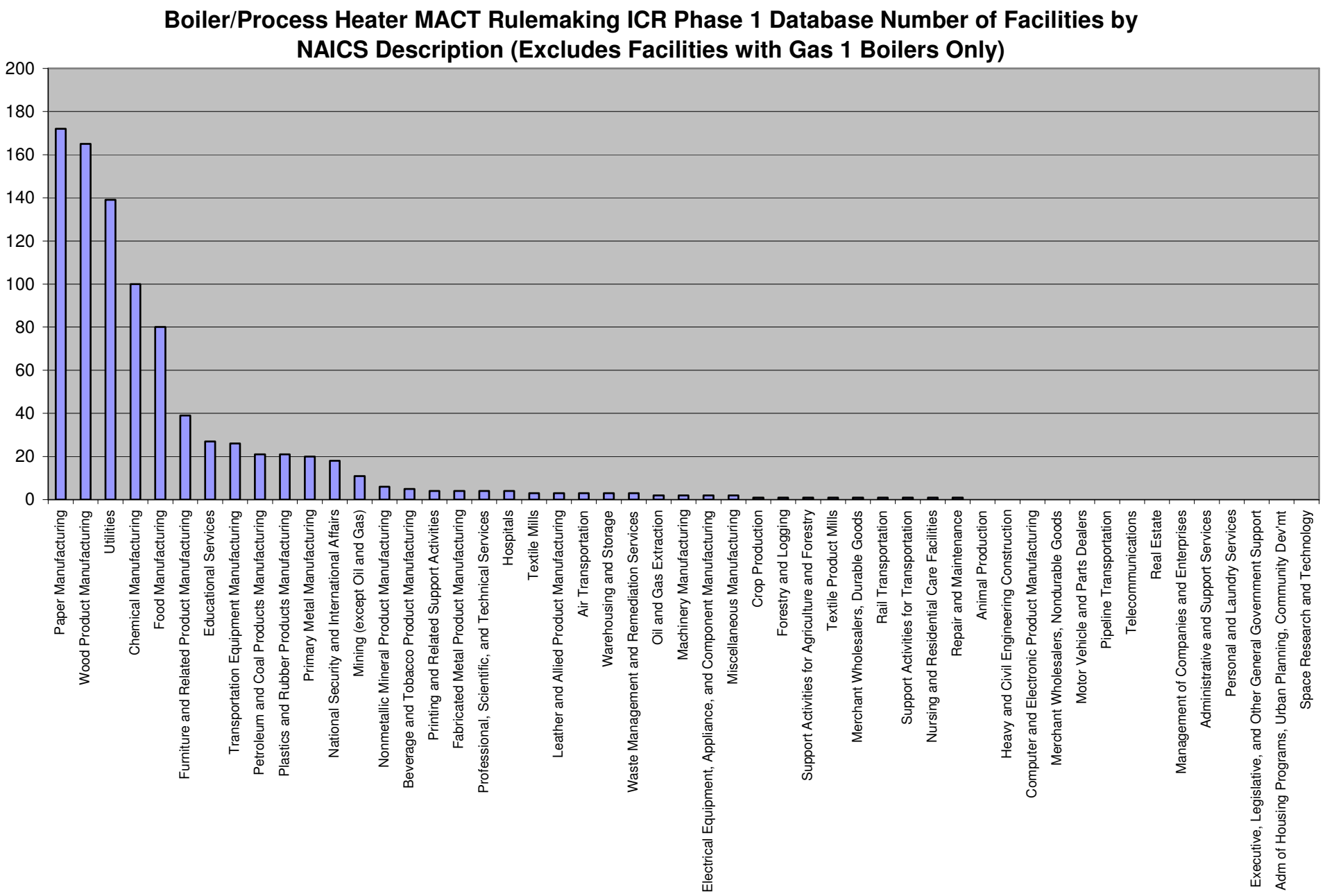
Breadth of Applicability

Major HAP source Boiler/Process Heater MACT

- Facilities in the Phase 1 database are shown in the next 2 charts
  - Identified by NAICS Code description
  - First chart- all facilities (a facility is a plant site, each with at least one unit)
  - Second chart- facilities excluding those that have only Gas1 fired units (natural gas or refinery gas)
    - i.e., these have at least one coal, biomass, liquid, Gas 2 (other gases) fired unit
- The point is that this rule has a huge impact on a tremendous number of facilities and units spread broadly across the economy- public and private sectors

ICI Boiler Area Source rule covers even more units located at all other non-major HAP sites


Boiler/Process Heater MACT Rulemaking ICR Phase 1 Database Number of Facilities by NAICS Description (Includes Facilities That Only Have Gas1 Boilers)
400
350
300
250
200
150
100
50
0
Chemical Manufacturing
Utilities
Wood Product Manufacturing
Paper Manufacturing
Plastics and Rubber Products Manufacturing
Transportation Equipment Manufacturing
Food Manufacturing
Fabricated Metal Product Manufacturing
Nonmetallic Mineral Product Manufacturing
Pipeline Transportation
Petroleum and Coal Products Manufacturing
Primary Metal Manufacturing
Educational Services
Furniture and Related Product Manufacturing
Oil and Gas Extraction
Printing and Related Support Activities
Machinery Manufacturing
National Security and International Affairs
Miscellaneous Manufacturing
Professional, Scientific, and Technical Services
Electrical Equipment, Appliance, & Component Mfg
Textile Mills
Mining (except Oil and Gas)
Computer and Electronic Product Manufacturing
Hospitals
Beverage and Tobacco Product Manufacturing
Warehousing and Storage
Waste Management and Remediation Services
Air Transportation
Textile Product Mills
Administrative and Support Services
Forestry and Logging
Leather and Allied Product Manufacturing
Merchant Wholesalers, Nondurable Goods
Executive, Legislative, & Other General Gov't Support
Motor Vehicle and Parts Dealers
Nursing and Residential Care Facilities
Support Activities for Transportation
Management of Companies and Enterprises
Merchant Wholesalers, Durable Goods
Real Estate
Repair and Maintenance
Support Activities for Agriculture and Forestry
Adm Housing Programs, Urban Planning, Comm Dev'mt
Animal Production
Crop Production
Heavy and Civil Engineering Construction
Personal and Laundry Services
Rail Transportation
Space Research and Technology
Telecommunications


Boiler/Process Heater MACT Rulemaking ICR Phase 1 Database Number of Facilities by NAICS Description (Excludes Facilities with Gas 1 Boilers Only)
200
180
160
140
120
100
80
60
40
20
0
Paper Manufacturing
Wood Product Manufacturing
Utilities
Chemical Manufacturing
Food Manufacturing
Furniture and Related Product Manufacturing
Educational Services
Transportation Equipment Manufacturing
Petroleum and Coal Products Manufacturing
Plastics and Rubber Products Manufacturing
Primary Metal Manufacturing
National Security and International Affairs
Mining (except Oil and Gas)
Nonmetallic Mineral Product Manufacturing
Beverage and Tobacco Product Manufacturing
Printing and Related Support Activities
Fabricated Metal Product Manufacturing
Professional, Scientific, and Technical Services
Hospitals
Textile Mills
Leather and Allied Product Manufacturing
Air Transportation
Warehousing and Storage
Waste Management and Remediation Services
Oil and Gas Extraction
Machinery Manufacturing
Electrical Equipment, Appliance, and Component Manufacturing
Miscellaneous Manufacturing
Crop Production
Forestry and Logging
Support Activities for Agriculture and Forestry
Textile Product Mills
Merchant Wholesalers, Durable Goods
Rail Transportation
Support Activities for Transportation
Nursing and Residential Care Facilities
Repair and Maintenance
Animal Production
Heavy and Civil Engineering Construction
Computer and Electronic Product Manufacturing
Merchant Wholesalers, Nondurable Goods
Motor Vehicle and Parts Dealers
Pipeline Transportation
Telecommunications
Real Estate
Management of Companies and Enterprises
Administrative and Support Services
Personal and Laundry Services
Executive, Legislative, and Other General Government Support
Adm of Housing Programs, Urban Planning, Community Dev'mt
Space Research and Technology

Phase 1 ICR Inventory Database

Number of boilers & process heaters in non-Gas 1 subcategories

Coal	578
Biomass	420
Liquid	803
Gas 2	199
Total	**2000**

Existing Unit Coal Fired Boiler Emission Limits

Coal Boilers (burning at least 10% coal or petcoke)

Compound	Original Existing MACT Limit	Proposed Rule	Units
PM	0.07	0.02	lb/MMBtu
HCl	0.09	0.02	lb/MMBtu
Hg	9E-06	3E-06	lb/MMBtu
Dioxin (TEQ basis) (no limit under original MACT)	Stoker/grate/other	0.003	TEQ ng/dscm @ 7% O2
	Pulverized Coal	0.004	TEQ ng/dscm @ 7% O2
	Fluidized Bed	0.002	TEQ ng/dscm @ 7% O2
Carbon Monoxide (no limit under original MACT for existing)	Stoker/grate/other	50	ppm @ 3% O2 as Propane
	Pulverized Coal	90	ppm @ 3% O2 as Propane
	Fluidized Bed	30	ppm @ 3% O2 as Propane

Note: TSM not included in proposed rule as alternative to PM

New Unit Coal Fired Boiler Emission Limits

Coal Boilers

Compound	Original MACT Limit	Proposed Rule	Units
PM	0.025	0.001	lb/MMBtu
HCl	0.02	6E-05	lb/MMBtu
Hg	3E-06	2E-06	lb/MMBtu
Dioxin (TEQ basis) (no limit under original MACT)	Stoker/grate/other	0.003	TEQ ng/dscm @ 7% O2
	Pulverized Coal	0.002	TEQ ng/dscm @ 7% O2
	Fluidized Bed	3E-05	TEQ ng/dscm @ 7% O2
CO (original new MACT limit of 400)	Stoker/grate/other	7	ppm @ 3% O2 as Propane
	Pulverized Coal	90	ppm @ 3% O2 as Propane
	Fluidized Bed	30	ppm @ 3% O2 as Propane

Existing Unit Biomass Fired Boiler Emission Limits

Biomass Boilers

Compound	Original Existing MACT Limit	Proposed Rule	Units
PM	0.07	0.02	lb/MMBtu
HCl	0.09	0.006	lb/MMBtu
Hg	9E-06	9E-07	lb/MMBtu
Dioxin (TEQ basis) (no limit under original MACT)	Susp burner/Dutch oven	0.03	TEQ ng/dscm @ 7% O2
	Fluidized Bed	0.02	TEQ ng/dscm @ 7% O2
	Fuel Cell	0.02	TEQ ng/dscm @ 7% O2
	Stoker/grate/other	0.004	TEQ ng/dscm @ 7% O2
Carbon Monoxide (no limit under original MACT for existing)	Susp burner/Dutch oven	1010	ppm @ 3% O2 as Propane
	Fluidized Bed	250	ppm @ 3% O2 as Propane
	Fuel Cell	270	ppm @ 3% O2 as Propane
	Stoker/grate/other	560	ppm @ 3% O2 as Propane

New Unit Biomass Fired Boiler Emission Limits

Biomass Boilers

Compound	Original NEW MACT Limit	Proposed Rule	Units
PM	0.025	0.008	lb/MMBtu
HCl	0.02	0.004	lb/MMBtu
Hg	3E-06	2E-07	lb/MMBtu
Dioxin (TEQ basis) (no limit under original MACT)	Susp burner/Dutch oven	0.03	TEQ ng/dscm @ 7% O2
	Fluidized Bed	0.007	TEQ ng/dscm @ 7% O2
	Fuel Cell	5E-04	TEQ ng/dscm @ 7% O2
	Stoker/grate/other	5E-05	TEQ ng/dscm @ 7% O2
Carbon Monoxide (original new MACT limit of 400)	Susp burner/Dutch oven	1010	ppm @ 3% O2 as Propane
	Fluidized Bed	40	ppm @ 3% O2 as Propane
	Fuel Cell	270	ppm @ 3% O2 as Propane
	Stoker/grate/other	560	ppm @ 3% O2 as Propane

Existing Unit Liquid Fired Boiler/PH Emission Limits

Liquid Fuel Boilers

Compound	Original Existing MACT Limit	Proposed Rule	Units
PM	NA	0.004	lb/MMBtu
HCl	NA	9E-04	lb/MMBtu
Hg	NA	4E-06	lb/MMBtu
Carbon Monoxide	NA	1	ppm @ 3% O2 as Propane
Dioxin (TEQ basis)	NA	0.002	TEQ ng/dscm @ 7% O2

New Unit Liquid Fired Boiler/PH Emission Limits

Liquid Fuel Boilers

Compound	Original MACT Limit	Proposed Rule	Units
PM	new large: 0.03	0.002	lb/MMBtu
HCl	new large: 0.0005	4E-04	lb/MMBtu
Hg	NA	3E-07	lb/MMBtu
Carbon Monoxide	400	1	ppm @ 3% O2 as Propane
Dioxin (TEQ basis)	NA	0.002	TEQ ng/dscm @ 7% O2

Gaseous Fuels

Gas 1

- Natural gas and/or refinery gas
- Natural gas definition
  - (1) A naturally occurring mixture of hydrocarbon and nonhydrocarbon gases found in geologic formations beneath the earth's surface, of which the principal constituent is methane; or
  - (2) Liquid petroleum gas
    - (Note- definition does not currently include the revised NSPS definition: (3) A mixture of hydrocarbons that maintains a gaseous state at ISO conditions. Additionally, natural gas must either be composed of at least 70 percent methane by volume or have a gross calorific value between 34 and 43 megajoules (MJ) per dry standard cubic meter (910 and 1,150 Btu per dry standard cubic foot).

Gas 2

- Gaseous fuels other than natural gas and/or refinery gas

Existing Unit Gas 2 Fired Boiler/PH Emission Limits

Units designed to burn other gases

Compound	Original Existing MACT Limit		Units
PM	NA	0.05	lb/MMBtu
HCl	NA	3E-06	lb/MMBtu
Hg	NA	2E-07	lb/MMBtu
Carbon Monoxide	NA	1	ppm @ 3% O2 as Propane
Dioxin (TEQ basis)	NA	0.009	TEQ ng/dscm @ 7% O2

New Unit Gas 2 Fired Boiler/PH Emission Limits

Units designed to burn other gases

Compound	Original MACT Limit		Units
PM	NA	0.003	lb/MMBtu
HCl	NA	3E-06	lb/MMBtu
Hg	NA	2E-07	lb/MMBtu
Carbon Monoxide	400	1	ppm @ 3% O2 as Propane
Dioxin (TEQ basis)	NA	0.009	TEQ ng/dscm @ 7% O2

Existing and New Gas 1- Natural Gas/ Refinery Gas Fired Boilers/Process Heaters

No emission limits

Annual tune-up required

- Also for units <10MMBtu/hr firing any fuel
- Also for metal processing furnaces (any gaseous fuels)
- Requirements are prescribed- minimize CO

Compliance Methods

PM, HCl, Hg, CO

- Annual emission testing- 4 hour minimum run time for all
  - Triennial testing if 3 years average ≤ 75% of limit
    - Percent was not in prior rule

Dioxin/Furan

- Annual emission testing

PM CEMS for coal, biomass, residual oil units > 250MMBtu/hr

CO CEMS for units > 100MMBtu/hr

- 30 day rolling average basis

Health Based Compliance Alternative

Prior rule included for HCl and for Mn within TSM

Proposal

- Does not include HBCA approach in the rule
- Does not provide a TSM alternative to PM limit
  - Therefore, no application for HBCA to Mn

Preamble includes discussion of health-based approaches

- EPA may be amenable to a health based off-ramp for HCl only
  - May need to consider HCl, Cl2, HCN emissions
- EPA not amenable to Mn approach

Continuous Compliance with Emission Limits

Fabric Filter Control

- Bag leak detection system with alarm ≤ 5% operating time per 6 months OR
- Opacity per COMS ≤ 10% on daily block average basis

ESP

- Opacity per COMS ≤ 10% on daily block average basis
- Maintain 12 hour block average secondary current and voltage or total power input at or above level during performance test (for units with wet scrubbers)

Wet scrubber

- Maintain 12 hour block average pressure drop and liquid flow rate at or above level during performance test
- Maintain 12 hour block average pH at or above level during performance test

Dry Scrubber or Carbon Injection

- Maintain 12 hour block average minimum sorbent or carbon injection rate at or above level during performance test

Fuel pollutant content

- Keep monthly records of fuel use- only burn fuel types and mixtures used to demonstrate compliance

Emissions Averaging

Included in the rule as a compliance option for PM, HCl, Hg

EPA intention to apply a 10% discount factor

- Discount factor was not in prior rule

Uses monthly compliance for first 12 months and then 12 month rolling average methodology

Fuel Analysis for Compliance

Can use fuel analysis for compliance with HCl, Hg emission limits based on Cl, Hg in fuel

- Very low limits make this very limited usefulness

SSM

No specific provisions for SSM

EPA contends emissions limits cover and allow for startup and shutdown periods

- Examples- daily block average for opacity; 12 hour block average operating limits; 30 day rolling average CO limit

EPA says malfunctions should not occur

- If they do and > limits, it is a deviation

No SSM Plan

Overall Major Source Requirement for Existing Boilers

One time energy assessment

- an in-depth assessment of a facility to identify immediate and long-term opportunities to save energy, focusing on the steam and process heating systems which involves a thorough examination of potential savings from energy efficiency improvements, waste minimization and pollution prevention, and productivity improvement

This is obviously an extension far beyond CAA authority into the entire plant

Major Concerns/Problems

Main Industry Concerns

Lack of health based compliance option

- Need option of risk analysis for HCl as a minimum
  - Many potential ways to address
- No TSM alternative standard to PM
  - Mainly an issue for biomass units
  - Potential TSM limit if follow EPA methodology below
    - Discuss further later

Results of analysis of TSM10 floor using the top PM performers:

Top performers based on the ERG MACT Floor memo

Category	Proposed PM	Old TSM	New TSM10	Increased Stringency
Coal	0.02	0.001	9.00E-04	1.1
Biomass	0.02	0.001	2.00E-04	5.0
Liquid	0.004	NA	2.00E-05	NA
Gas2	0.05	NA	3.00E-05	NA
All units lb/MMBtu				

Main Industry Concerns

Achievability of limits

- Coal/biomass combination boilers can't meet coal CO limits
- Ultra low CO limits for liquid and process gases
  - Landfill gas included with other/process gases
- Not sure how to meet dioxin limits
- Very low Hg/HCl limits
- No facilities meet all the limits, even the few with controls
- New source limits – will discourage (eliminate?) new boiler construction

Cost

- EPA estimates almost $10Billion capital cost
  - Easy to estimate 2-3 x that amount

EPA has Underestimated Boiler MACT Costs

RIA indicates that capital cost is $9.5 Billion

AF&PA/CIBO conservative analysis based on EPA database shows capital cost of at least $21B for all non- Gas1 units

Other estimates close to $50 Billion

Pulp and Paper: $4 B

Chemical: $4 B

Utilities: $3.5 B

Wood Products: $2 B

Food Mfg: $1.6 B

Primary Metal: $1 B

Furniture: $350 M

Dozens of other sectors

Boiler MACT Costs for Forest Products

HAPs/ Surrogates by Fuel type	PM/metals	Carbon Monoxide (CO)	Mercury/ Dioxin	HCl (acid gases)
Biomass $3.3B	**$1341M**	**$74M**	**$308M**	**$1542M**
Coal $1.9B	**$570M**	**$260M**	**$131M**	**$911M**
Oil $1.1B	**$421M**	**$144M**	**$68M**	**$499M**
Gas2 $31M	**$12M**	**$4M**	**$2M**	**$13M**
Total cost: $6.3 billion	$2.34B	$482M	$509M	$2.97B

Boiler MACT Controls Capital Costs for Chemical Manufacturing

HAPs/ Surrogates by Fuel type	PM/metals	Carbon Monoxide (CO)	Mercury/ Dioxin	HCl (acid gases)
Coal $910M	**$200M**	**$150M**	**$80M**	**$480M**
Oil $940M	**$300M**	**$175M**	**$85M**	**$375M**
Gas2 $1.9B	**$700M**	**$250M**	**$130M**	**$800M**
Total cost: $3.8 billion	$1.2B	$574M	$296M	$1.7B

Main Industry Concerns

Data being used to develop the standard

- Small number of boilers in subcategory in some cases
- Acknowledgement of emissions variability
- Need different statistical approach
- Extensive non-detect data drives limits very low
- Data must undergo through quality review

Natural gas/refinery gas fired units – work practices do make sense

- If EPA doesn't defend this approach, then $50 B higher compliance cost to meet their potential floor limits!
- Most Gas 2 units should be treated similarly
- However, there are issues with their work practice approach as well

Natural Gas/Refinery Gas Control Cost Savings Using Work Practice Approach

Sector	PM/metals	Carbon Monoxide (CO)	Mercury/ Dioxin	HCl (acid gases)
Chemical Manufacturing $7.8B (890 boilers in database)	**$3B**	**$873M**	**$436M**	**$3.5B**
Forest Products $3.4 billion	**$1.3B**	**$384M**	**$191M**	**$1.5B**
All Industry: >$50 billion	$19.5B	$5.8B	$2.9B	$23B

Achievability of Limits

Actual real- world boilers cannot meet all limits

- Limits on a pollutant-by-pollutant basis
- MACT being driven by math, not technology
- Consider more subcategories – limited use, wet/dry biomass, coal rank, large size cutoff (e.g., raise to 30 MM Btu/hr)
- Combination fuel boilers not necessarily representative of the subcategory
- New Source MACT limits are so low that new boilers will be hard to build
  - driven by single data point at limit of detection
  - RIA predicts ZERO new biomass and coal fired boilers

Data Issues

Not enough consideration of variability

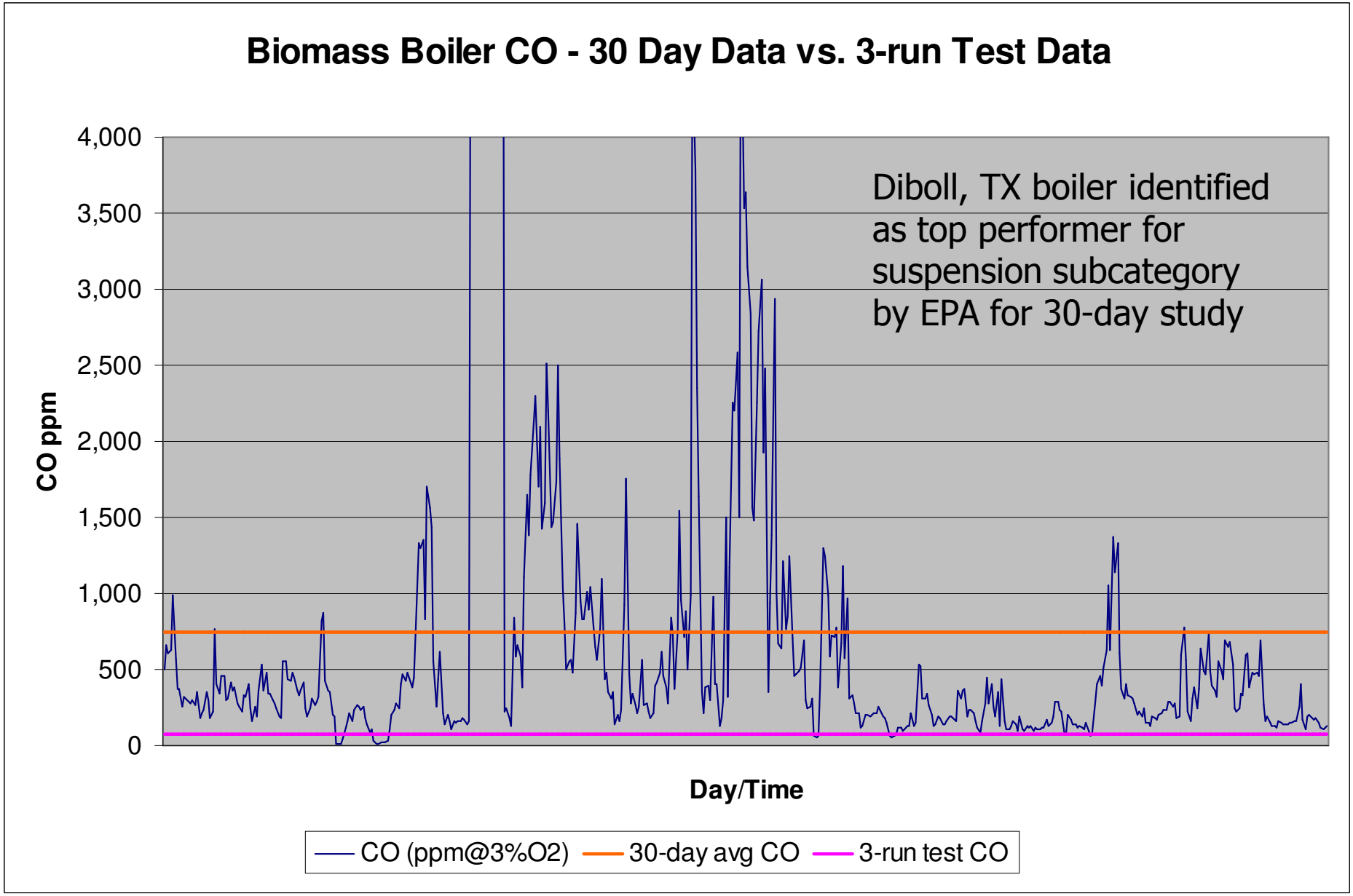
- CO - using only 3-run stack tests, even though CO highly variable for most boilers
- No fuel variability adjustment for some fuels/pollutants

1 or 2 boilers at non-detect drive dioxin trying to represent hundreds of boilers

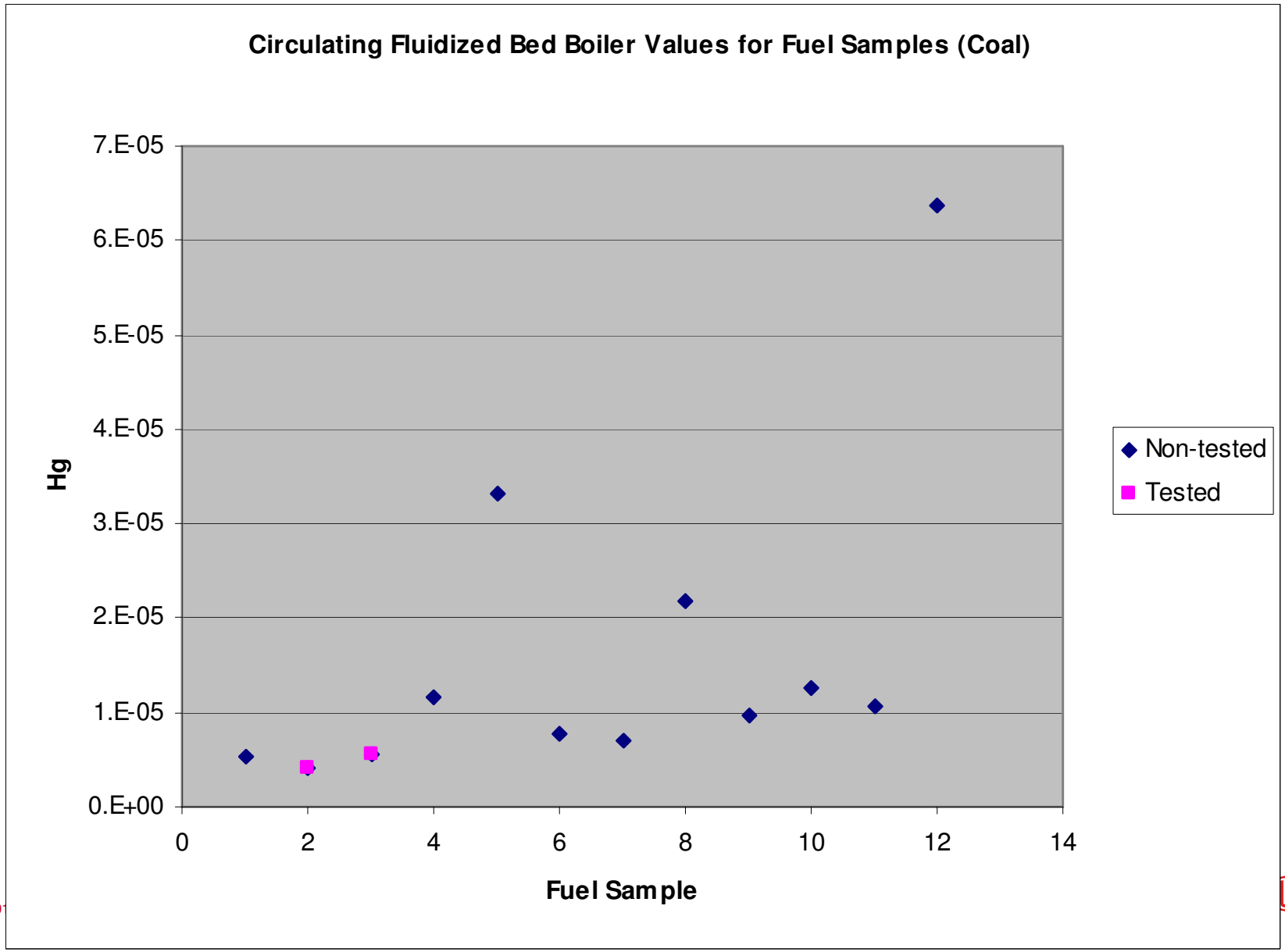
Little liquid data overall – very low limits

Need a better statistical approach given the data set doesn't represent the population and contains data skewed toward top performers

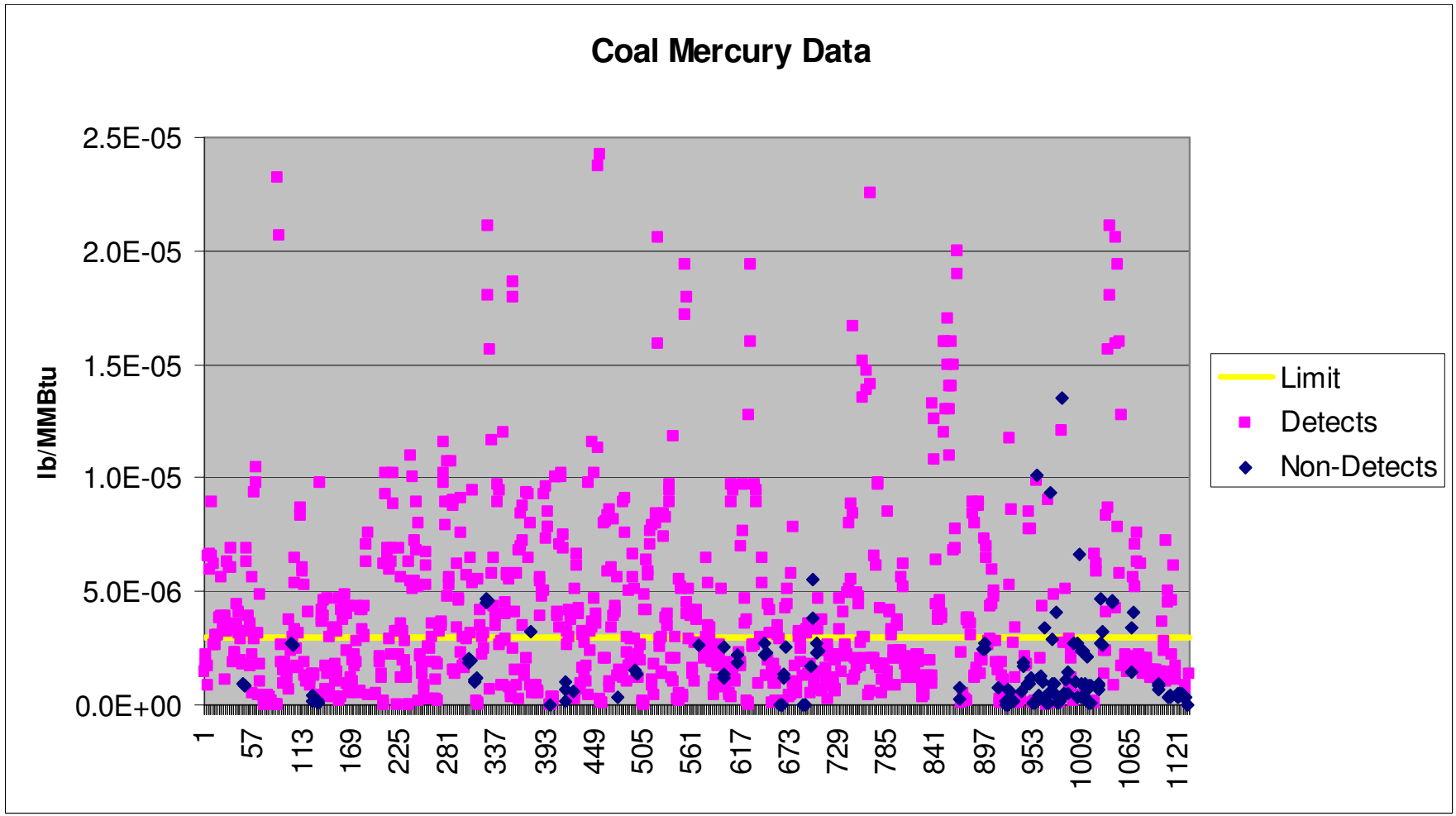
Variability Critical



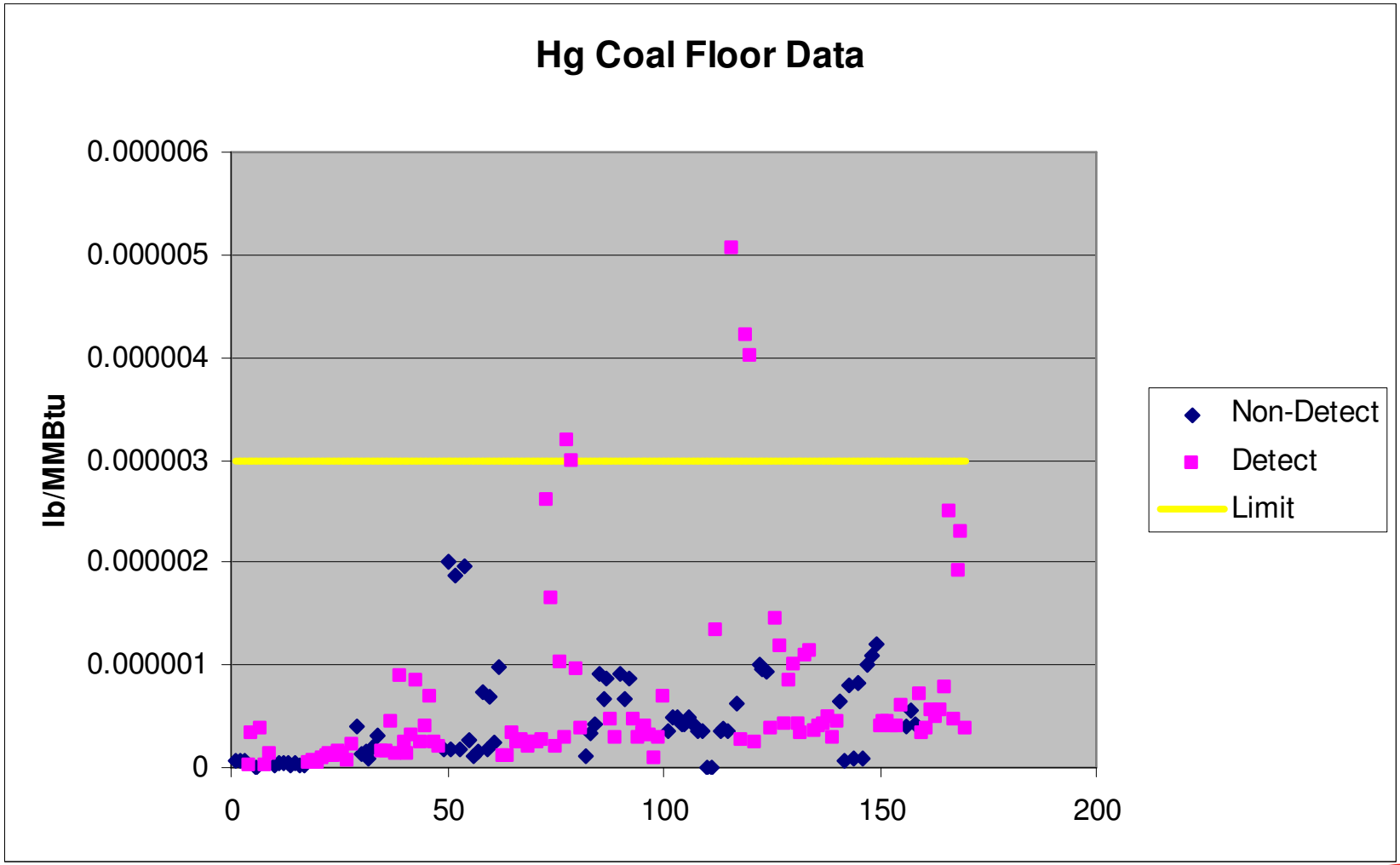
Fuel Content Variability Important to Consider



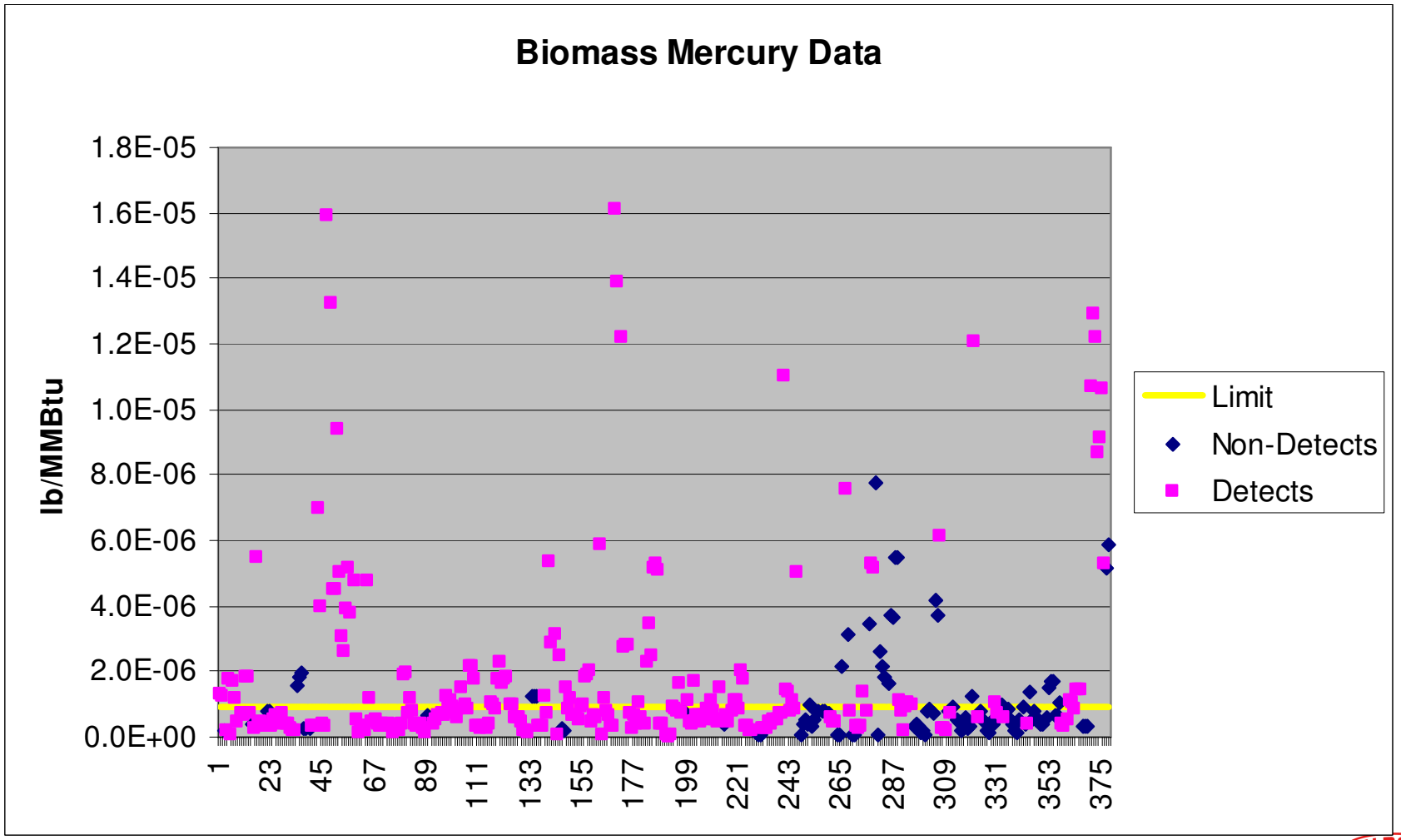
All Coal Mercury Run Data



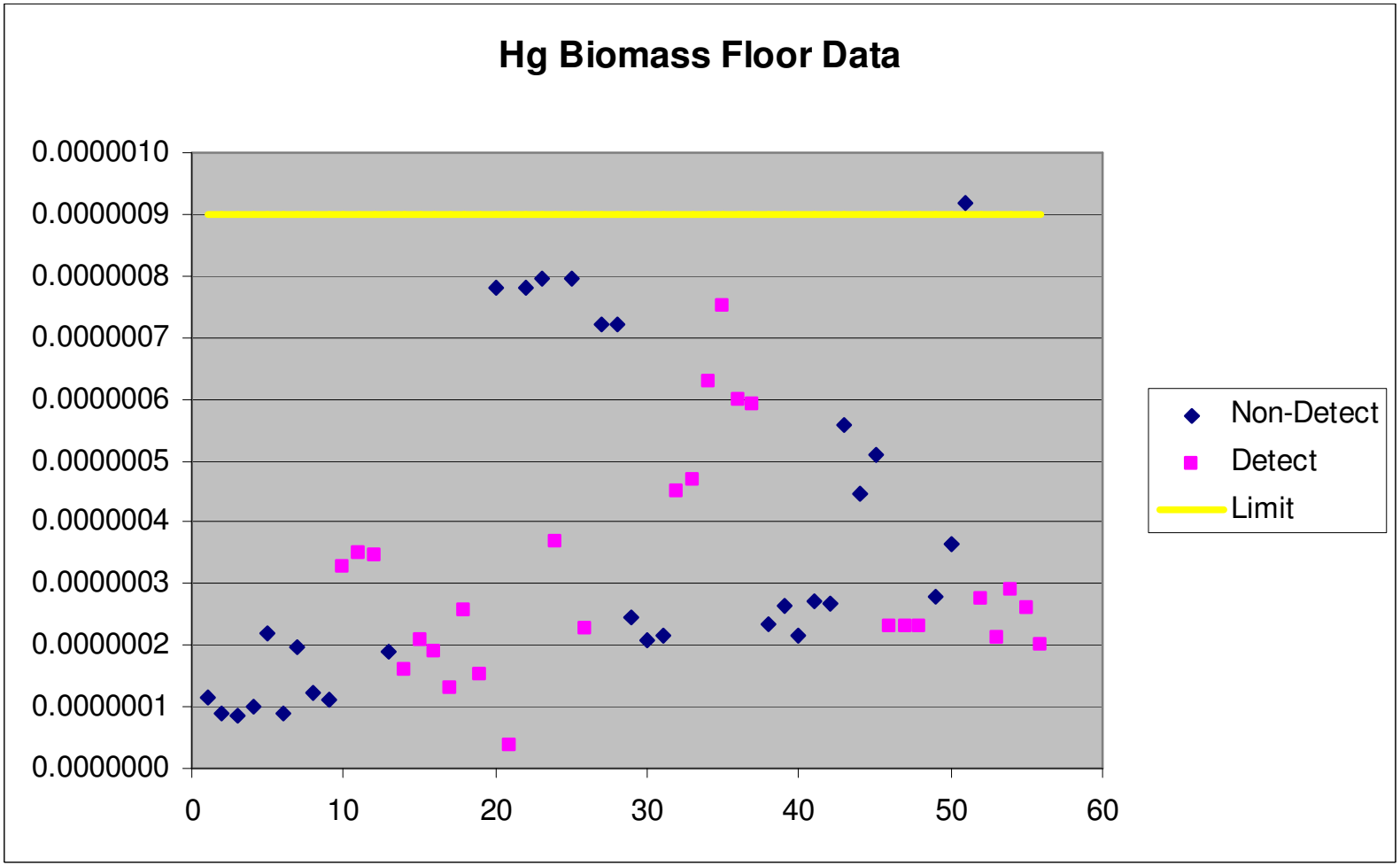
Hg Coal Floor Data- Top Performers



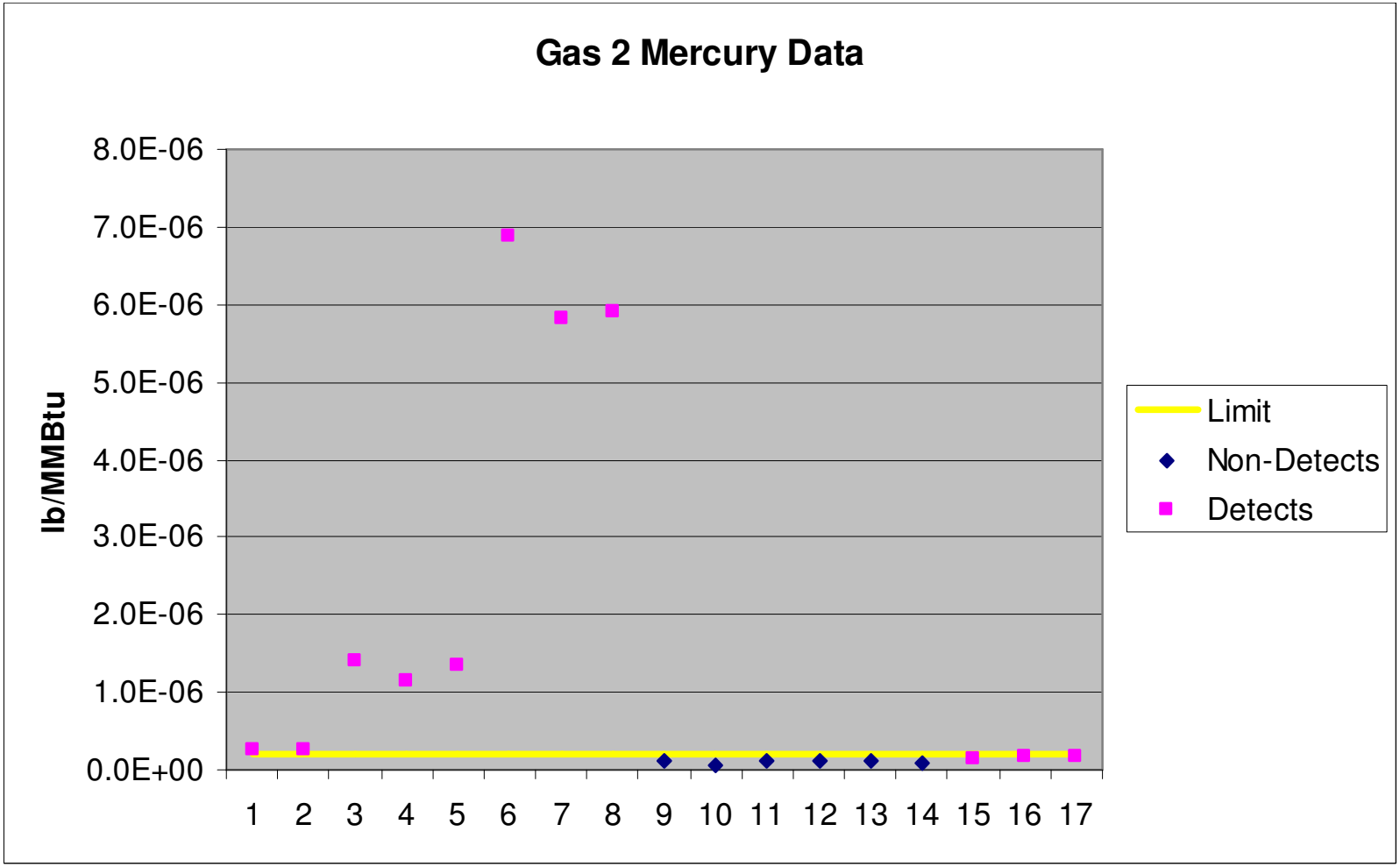
All Biomass Mercury Run Data



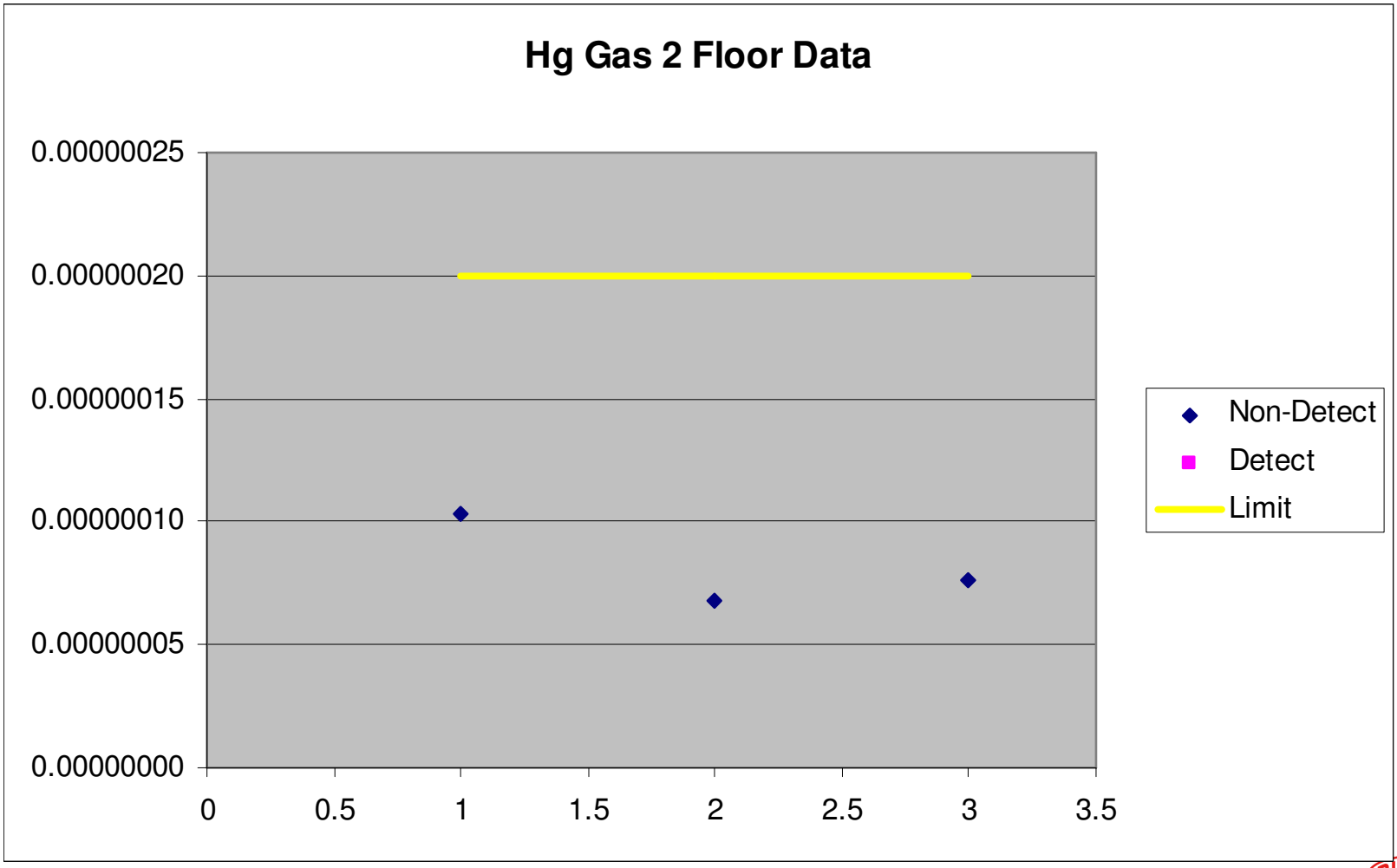
Hg Biomass Floor Data- Top Performers



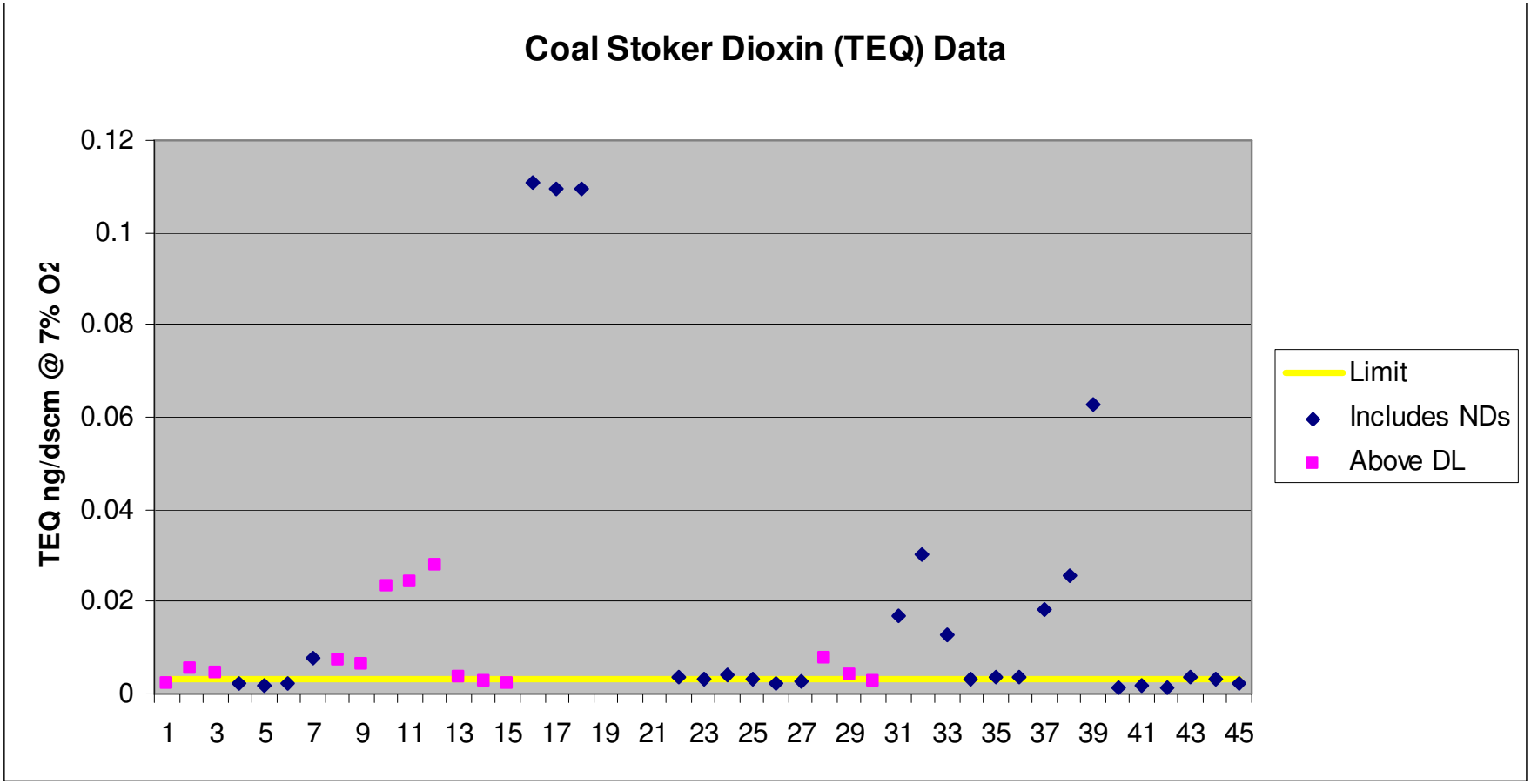
All Gas 2 Mercury Run Data



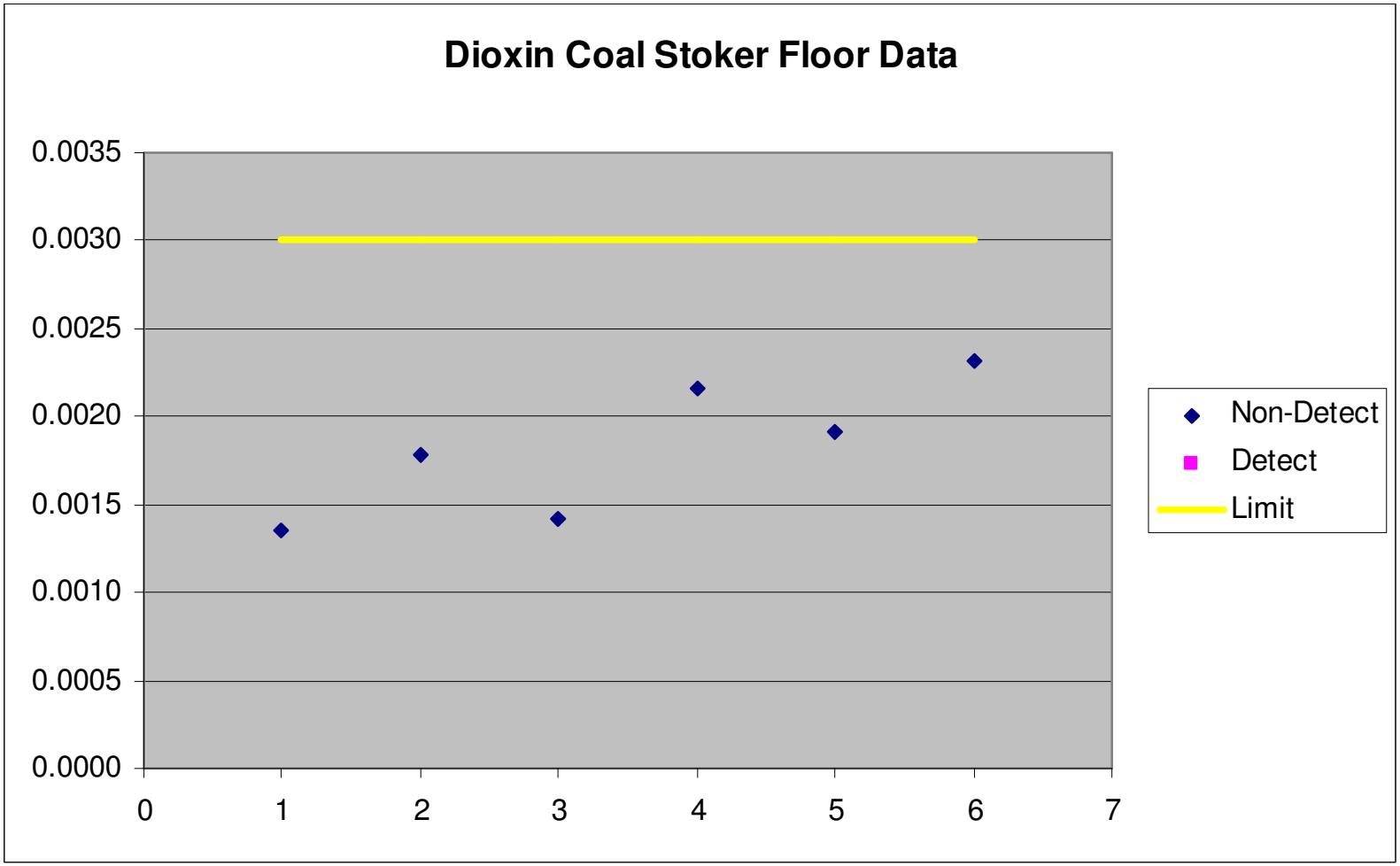
Hg Gas 2 Floor Data- Top Performers



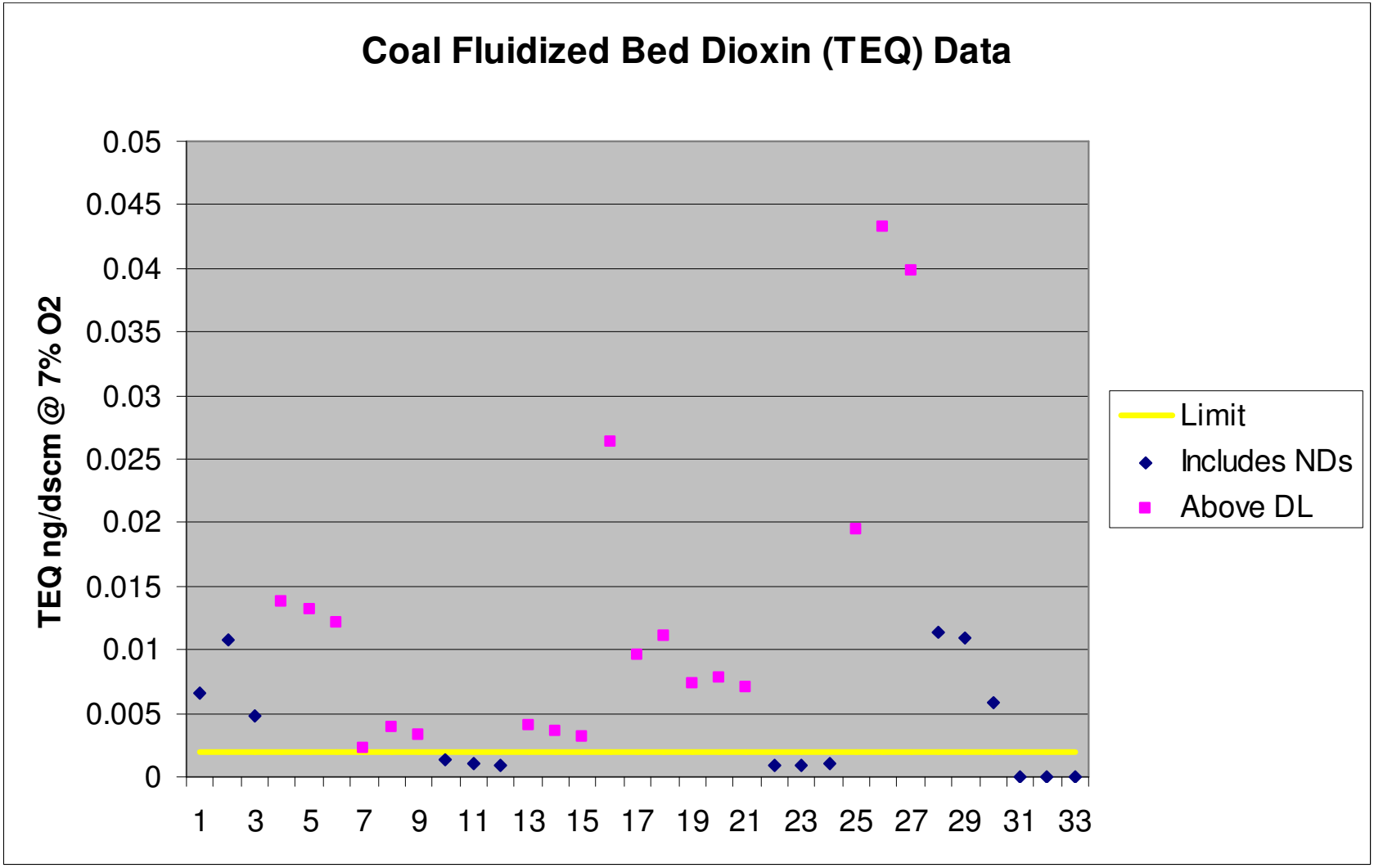
All Stoker Coal Dioxin/Furan Run Data



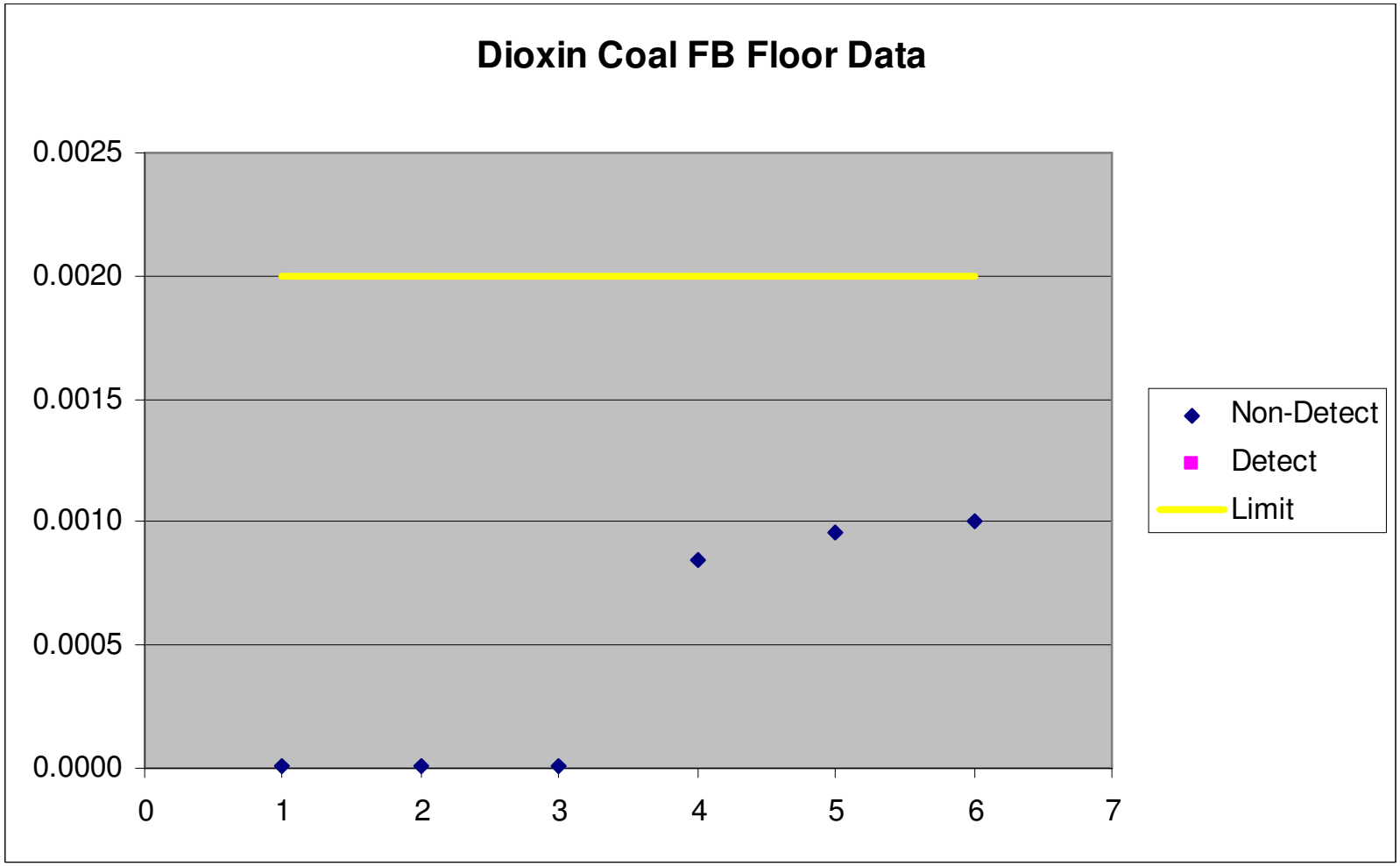
Stoker Coal D/F Floor Data- Top Performers



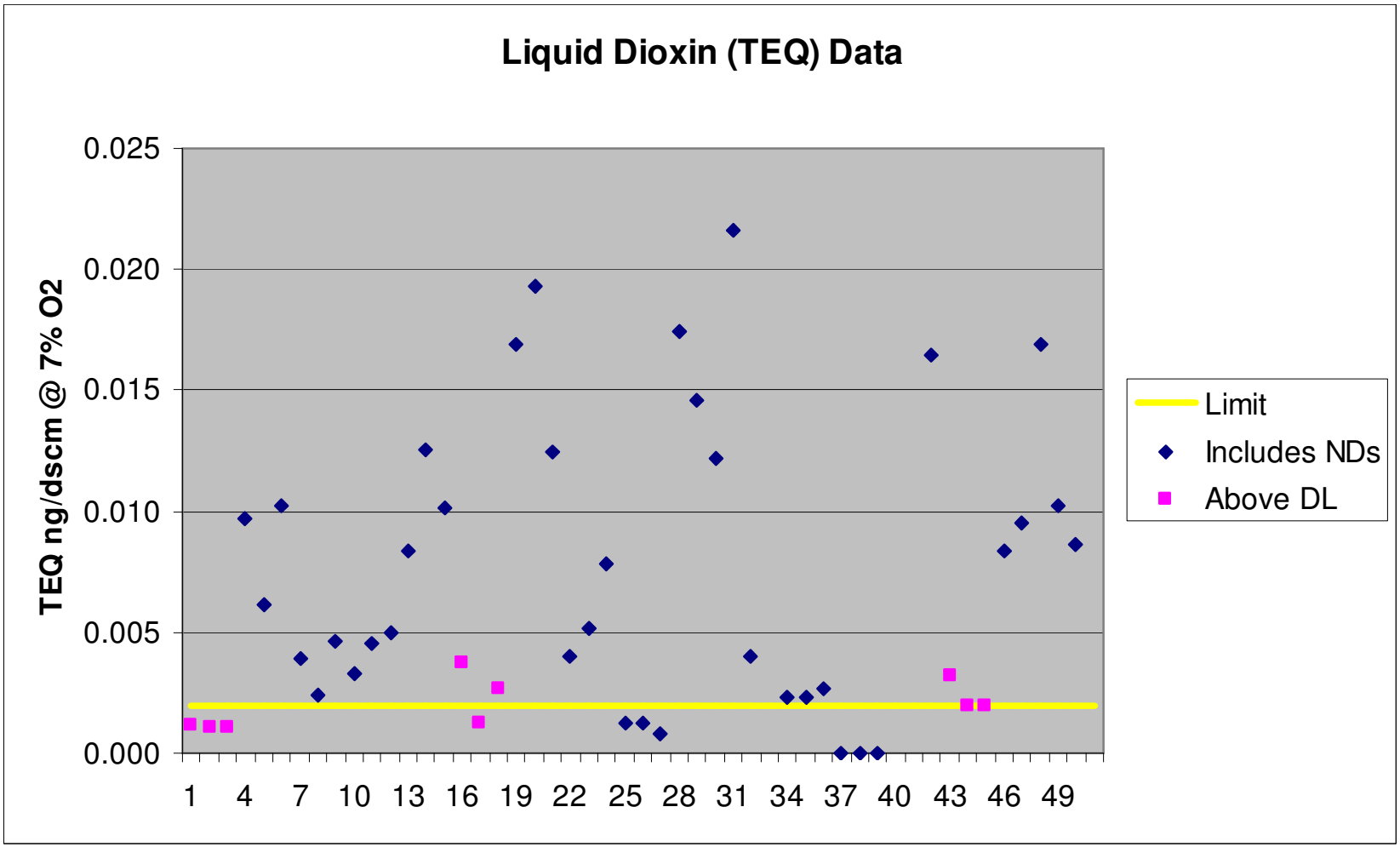
All FBC Coal Dioxin/Furan Run Data



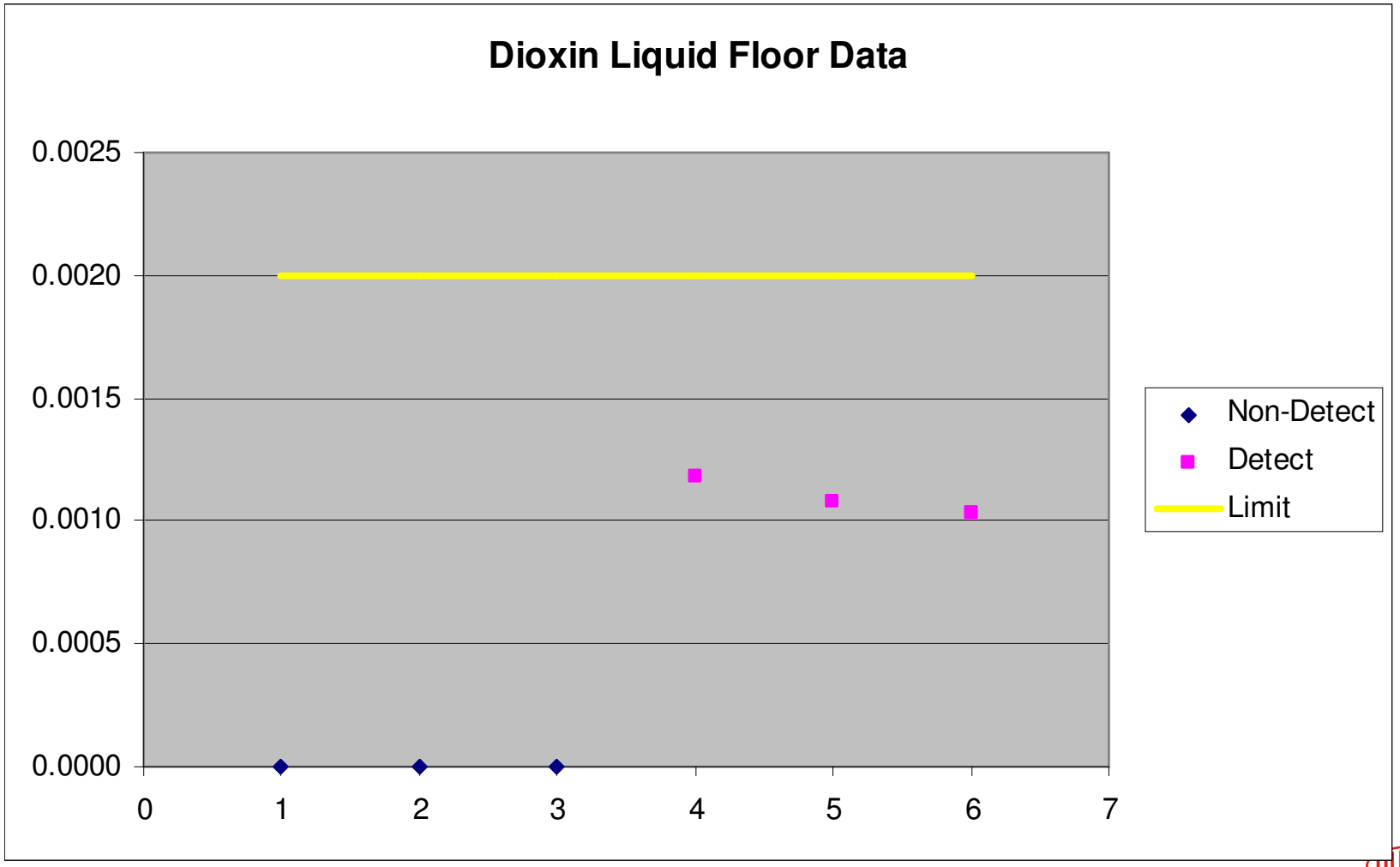
FBC Coal D/F Floor Data- Top Performers



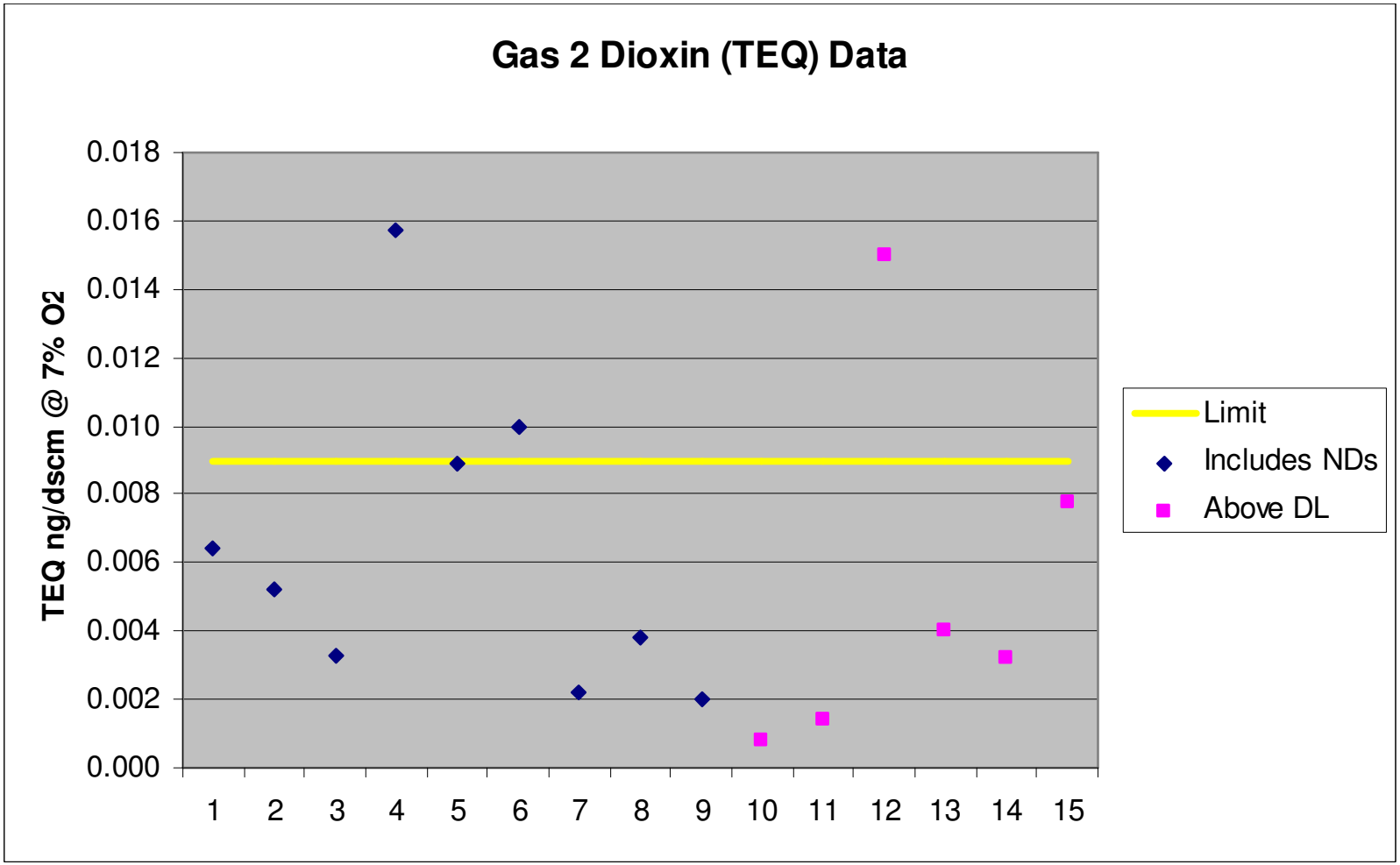
All Liquid Dioxin/Furan Run Data



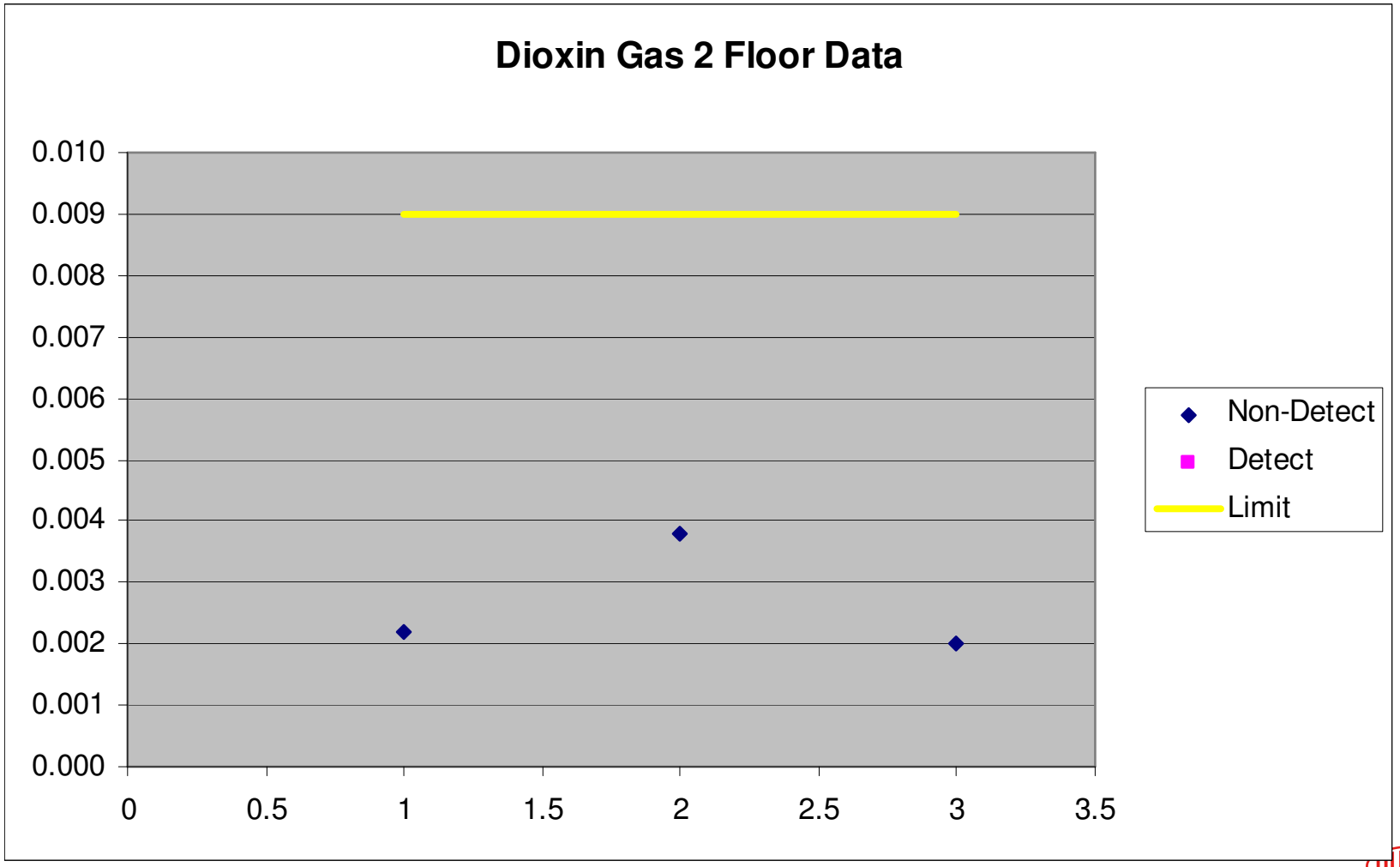
Liquid D/F Floor Data- Top Performers



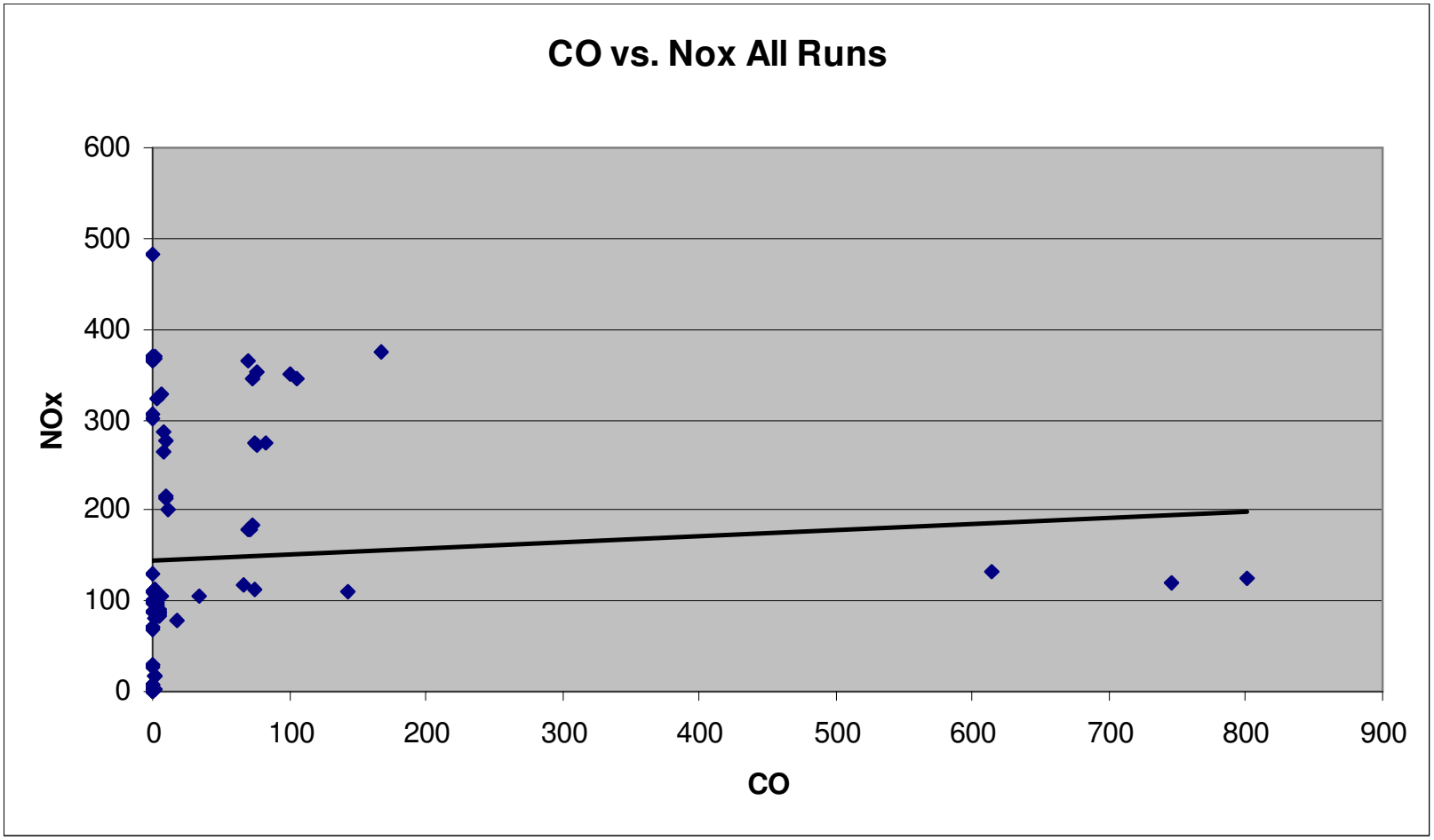
All Gas 2 Dioxin/Furan Run Data



Gas 2 D/F Floor Data- Top Performers



Liquid CO vs NOx for All Runs



Concerned Trade Groups- Working Together

American Forest & Paper Association
American Chemistry Council
American Coke & Coal Chemicals Institute
American Home Furnishings Alliance
American Iron and Steel Institute
American Municipal Power, Inc.
American Petroleum Institute
American Sugar Alliance
American Wood Council
Alliance of Automobile Manufacturers
Biomass Power Association
Brick Industries Association
Composite Panel Association
Corn Refiners Association
Council of Industrial Boiler Owners
Edison Electric Institute
National Association of Manufacturers
National Cotton Ginners Association
National Lime Association
National Oil Recyclers Association
National Oilseed Processors Association
National Petrochemical & Refiners Association
Ohio Municipal Electric Association
Pellet Fuels Association
Rubber Manufacturers Association
Society of Chemical Manufacturers and Affiliates
Treated Wood Council
U.S. Chamber of Commerce

Path Forward- all four rules

Individual trade association review and comment development

- Tremendous amount of information and data

Also joint comments on common issues

Leveraging resources

- URS contracts for data handling, statistics, and some comment development
- AECOM for HBCA, modeling, and toxicology issues
- Others

Major overall effort

Meetings with OMB prior to signing resulted in some positive changes to the proposal

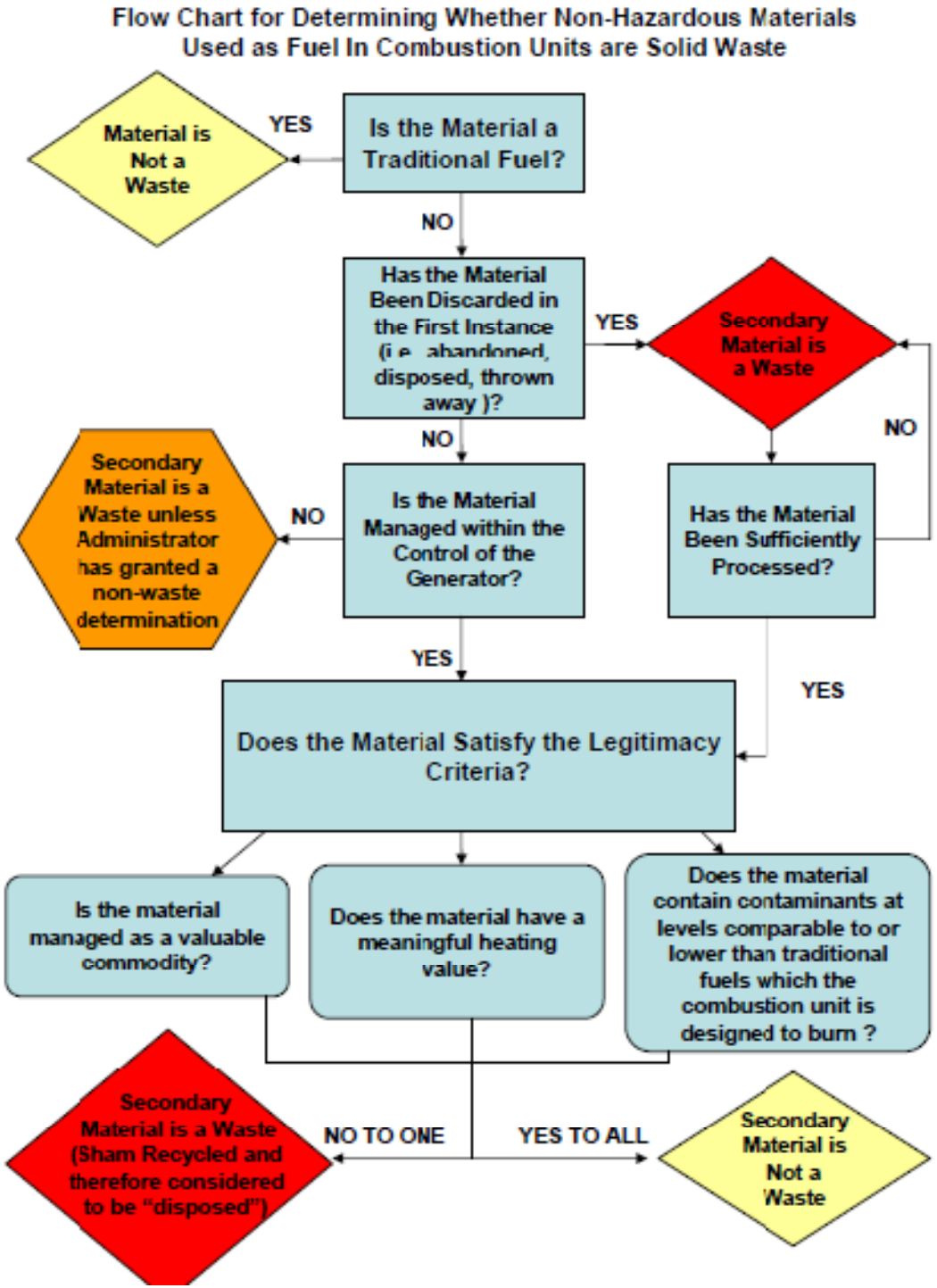
Also pressuring EPA with letters from Congress pressing for flexibility

Comments will lay the groundwork for litigation

CIBO Comment Preparation Discussion

Will review main comment concepts thus far separately

Solid Waste Definition Proposed Rule Fuel Flowchart



Solid Waste Definition Proposed Rule Ingredient Flowchart