Boiler/Process Heater MACT; Industrial Boiler Area Source MACT; CISWI; Solid Waste Definition

CIBO Discussion

March 9, 2010

Schedule

- All rules will be proposed (signed) on April 15, 2009
- BPH package to OMB on 3/12/10
- Area Source Rule to OMB likely at the same time
- CISWI to OMB 3/15/10
- OSW Def of Solid Waste rule to OMB 3/8/10 - 3/19/10

Boiler/Process Heater MACT Rule Applicability

Boiler/Process Heater MACT Broad Applicability- 1 of 2

List of NAICS Codes in the "Facility" Table of the Boiler MACT Database

NAICS	Count Of NAICS	NAICS Description	Percent of Total
111	1	Crop Production	0.1%
113	1	Forestry and Logging	0.1%
115	1	Support Activities for Agriculture and Forestry	0.1%
211	7	Oil and Gas Extraction	0.7%
212	10	Mining (except Oil and Gas)	1.0%
221	113	Utilities	11.8%
311	81	Food Manufacturing	8.5%
312	4	Beverage and Tobacco Product Manufacturing	0.4%
313	11	Textile Mills	1.2%
314	1	Textile Product Mills	0.1%
316	1	Leather and Allied Product Manufacturing	0.1%
321	154	Wood Product Manufacturing	16.1%
322	140	Paper Manufacturing	14.7%
323	4	Printing and Related Support Activities	0.4%
324	64	Petroleum and Coal Products Manufacturing	6.7%
325	146	Chemical Manufacturing	15.3%
326	26	Plastics and Rubber Products Manufacturing	2.7%
327	13	Nonmetallic Mineral Product Manufacturing	1.4%
331	31	Primary Metal Manufacturing	3.2%
332	8	Fabricated Metal Product Manufacturing	0.8%

Boiler/Process Heater MACT Broad Applicability- 2 of 2

List of NAICS Codes in the "Facility" Table of the Boiler MACT Database

NAICS	Count Of NAICS	NAICS Description	Percent of Total
333	4	Machinery Manufacturing	0.4%
335	3	Electrical Equipment, Appliance, and Component Manufacturing	0.3%
336	35	Transportation Equipment Manufacturing	3.7%
337	20	Furniture and Related Product Manufacturing	2.1%
339	4	Miscellaneous Manufacturing	0.4%
481	3	Air Transportation	0.3%
482	1	Rail Transportation	0.1%
486	12	Pipeline Transportation	1.3%
488	1	Support Activities for Transportation	0.1%
493	1	Warehousing and Storage	0.1%
541	4	Professional, Scientific, and Technical Services	0.4%
561	1	Administrative and Support Services	0.1%
562	4	Waste Management and Remediation Services	0.4%
611	26	Educational Services	2.7%
622	2	Hospitals	0.2%
623	1	Nursing and Residential Care Facilities	0.1%
811	1	Repair and Maintenance	0.1%
921	1	Executive, Legislative, and Other General Government Support	0.1%
928	14	National Security and International Affairs	1.5%
	955		100.0%

BPH Emissions Controls in Place

BPH MACT Database- Controlled Units- Coal Fired Units

					Acid Gas
				Controlled	Controlled
Coal Boilers			Cumulative	Cumulative	Cumulative
URS Std Control	CountOfURS Std Control	Percent	Percent	Percent	Percent
ESP	196	38.5%	38.5%	38.5%	
Fabric Filter	163	32.0%	70.5%	70.5%	
Cyclone or Multiclone	47	9.2%	79.8%	79.8%	
Wet Scrubber	27	5.3%	85.1%	85.1%	5.3%
Dry Sorbent Injection and Fabric Filter	23	4.5%	89.6%	89.6%	9.8%
No Control	15	2.9%	92.5%		
Dry Scrubber and ESP	8	1.6%	94.1%	91.2%	11.4%
Dry Scrubber and Fabric Filter	8	1.6%	95.7%	92.7%	13.0%
ESP and Wet Scrubber	7	1.4%	97.1%	94.1%	14.3%
Dry Sorbent Injection and ESP	5	1.0%	98.0%	95.1%	15.3%
Duct Sorbent Injection and Fabric Filter	5	1.0%	99.0%	96.1%	16.3%
Dry Scrubber	1	0.2%	99.2%	96.3%	16.5%
Duct Sorbent Injection and ESP	1	0.2%	99.4%	96.5%	16.7%
Electrified Filter Bed	1	0.2%	99.6%	96.7%	
Fabric Filter and Wet Scrubber	1	0.2%	99.8%	96.9%	16.9%
Furnace Sorbent Injection and ESP	1	0.2%	100.0%	97.1%	17.1%
Total	509	100.0%			

BPH MACT Database- Controlled Units- Coal Fired Units with Acid Gas Controls

			Controlled
Coal Boilers Acid Gas Control			Cumulative
URS Std Control	CountOfURS Std Control	Percent	Percent
Wet Scrubber	27	31.0%	31.0%
Dry Sorbent Injection and Fabric Filter	23	26.4%	57.5%
Dry Scrubber and ESP	8	9.2%	66.7%
Dry Scrubber and Fabric Filter	8	9.2%	75.9%
ESP and Wet Scrubber	7	8.0%	83.9%
Dry Sorbent Injection and ESP	5	5.7%	89.7%
Duct Sorbent Injection and Fabric Filter	5	5.7%	95.4%
Dry Scrubber	1	1.1%	96.6%
Duct Sorbent Injection and ESP	1	1.1%	97.7%
Fabric Filter and Wet Scrubber	1	1.1%	98.9%
Furnace Sorbent Injection and ESP	1	1.1%	100.0%
Total	87	100.0%	

BPH MACT Database- Controlled Units- Biomass Fired Units

				Controlled
Wet Biomass, Dry Biomass, or Bagasse Boilers and Controls			Cumulative	Cumulative
URS Std Control	CountOfURS Std Control	Percent	Percent	Percent
ESP	142	41.6%	41.6%	41.6%
Cyclone or Multiclone	84	24.6%	66.3%	66.3%
Wet Scrubber	80	23.5%	89.7%	89.7%
Electrified Filter Bed	11	3.2%	93.0%	93.0%
No Control	10	2.9%	95.9%	
Fabric Filter	6	1.8%	97.7%	94.7%
ESP and Wet Scrubber	4	1.2%	98.8%	95.9%
Dry Scrubber	2	0.6%	99.4%	96.5%
Dry Scrubber and ESP	1	0.3%	99.7%	96.8%
Dry Sorbent Injection and Fabric Filter	1	0.3%	100.0%	97.1%
Total	341	100.0%		

BPH MACT Database- Controlled Units- Liquid Fired Units

				Controlled
All Liquid Boilers			Cumulative	Cumulative
URS Std Control	CountOfURS Std Control	Percent	Percent	Percent
No Control	198	87.6%	87.6%	
ESP	10	4.4%	92.0%	4.4%
Fabric Filter	5	2.2%	94.2%	6.6%
Wet Scrubber	5	2.2%	96.5%	8.8%
Cyclone or Multiclone	3	1.3%	97.8%	10.2%
Dry Scrubber	3	1.3%	99.1%	11.5%
Duct Sorbent Injection and Fabric Filter	1	0.4%	99.6%	11.9%
Scrubber (unknown)	1	0.4%	100.0%	12.4%
Total	226	100.0%		

BPH MACT Database- Controlled Units- Light/Heavy Liquid Fired Units

				Controlled
Light Liquid Boilers			Cumulative	Cumulative
URS Std Control	CountOfURS Std Control	Percent	Percent	Percent
No Control	109	93.2%	93.2%	
ESP	6	5.1%	98.3%	5.1%
Scrubber (unknown)	1	0.9%	99.1%	6.0%
Wet Scrubber	1	0.9%	100.0%	6.8%
Total	117	100.0%		
				Controlled
Heavy Liquid Boilers			Cumulative	Cumulative
URS Std Control	CountOfURS Std Control	Percent	Percent	Percent
No Control	89	81.7%	81.7%	
Fabric Filter	5	4.6%	86.2%	4.6%
ESP	4	3.7%	89.9%	8.3%
Wet Scrubber	4	3.7%	93.6%	11.9%
Cyclone or Multiclone	3	2.8%	96.3%	14.7%
Dry Scrubber	3	2.8%	99.1%	17.4%
Duct Sorbent Injection and Fabric Filter	1	0.9%	100.0%	18.3%
Total	109	100.0%		

BPH MACT Database- Controlled Units- Gas Fired Units

				Controlled
Gas1 Boilers			Cumulative	Cumulative
URS Std Control	CountOfURS Std Control	Percent	Percent	Percent
No Control	977	96.9%	96.9%	
ESP	12	1.2%	98.1%	1.2%
Cyclone or Multiclone	6	0.6%	98.7%	1.8%
Fabric Filter	6	0.6%	99.3%	2.4%
Wet Scrubber	4	0.4%	99.7%	2.8%
Dry Scrubber and Fabric Filter	3	0.3%	100.0%	3.1%
Total	1008	100.0%		
				Controlled
Gas 2 Boilers			Cumulative	Cumulative
URS Std Control	CountOfURS Std Control	Percent	Percent	Percent
No Control	94	96.9%	96.9%	
Dry Sorbent Injection and Fabric Filter	2	2.1%	99.0%	2.1%
ESP	1	1.0%	100.0%	3.1%
Total	97	100.0%		

Boiler/Process Heater MACT Rule Issues

BPH MACT Issues- Data

- Errors in converting ERT submitted data to the database
  - O2 correction/subtraction
- Detection level issues
  - Phase 2 required reporting of each of 5 M29 Hg fractions at DL instead of zero per M29
    - Likely not followed for Phase 1 data
  - Leads to lower apparent Hg emission rate

Data Handling

- EPA likely evaluating existing source MACT Floor:
  - Select best 12% of sources based on lowest emission three-run average test
  - Use all test runs for those units to determine 99% confidence level UCL
    - Use average or lognormal average based on skewness and kurtosis of data
  - Apply variability factor to that result based on variability for those 12% top performing units
    - Details and resultant units, Floors unknown until proposal
  - Consider additional variability factors based on 30-day CEMS testing primarily for CO/THC

Emission Limits

- Selected pollutants
  - Initial indications
    - PM as surrogate for metal HAPs
    - HCl as surrogate for inorganic HAPs
    - Mercury
    - CO or THC as surrogate for organic HAPs
    - Dioxins/Furans as TEQ
- Applicable fuels
- Emission limits
- CO vs THC
- Averaging basis

Subcategories

- Coal
- Biomass
- Liquid
- Gas1
- Gas2
- Limits applicable to all units >10MMBtu/hr
- No differentiation for firetube boilers

Number of Floor Units Methodology

- ≥ 30 units in subcategory
  - Average emission limitation achieved by best performing 12% of existing sources for which the Administrator has emissions information
    - 100 units with data- average of 12 units
    - 42 units with data- 5 units
    - ≤ 8 units with data- 1 unit
- < 30 units in subcategory
  - Average emission limitation achieved by best performing 5 sources for which the Administrator has or could reasonably obtain emissions information

112(d)(4) Provisions

- HBCA was in prior rule
- Will not be proposed
  - To be mentioned in the Preamble
- Ability to comment?

Achievability

- Emission rate limits vs control technology availability and capability
- MACT on MACT
  - All data being used regardless of timing/controls
  - Is an issue for HCl New Source Floor

Compliance Issues

- Emissions testing requirements
- Emissions averaging
- SSM

Preliminary Floor Evaluations

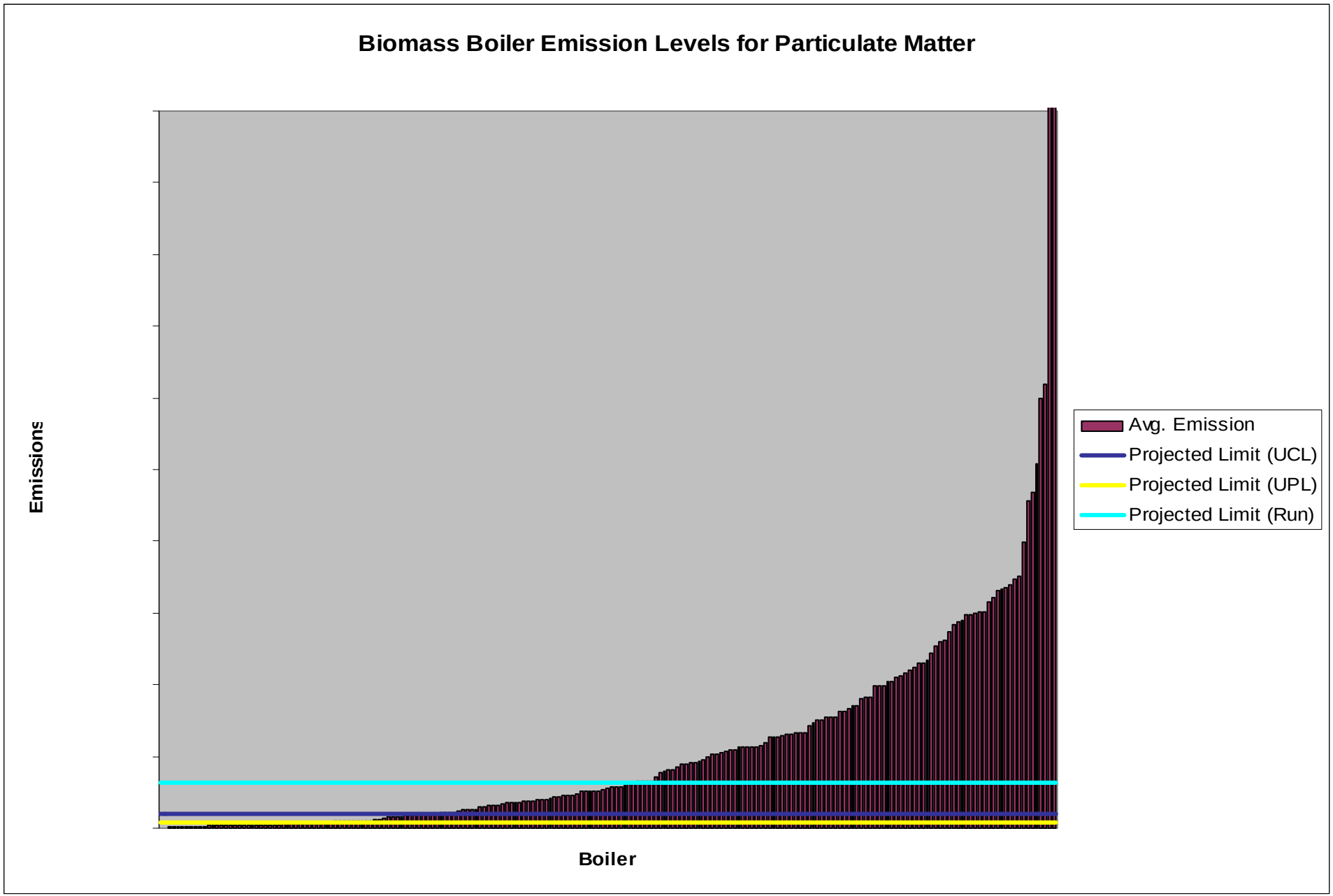
Preliminary Floor Coal Fired Units Prior to Variability Factors with Prior Test Average Method

Fuel	Coal	Coal	Coal	Coal	Coal	Coal
Mix	10%	10%	10%	10%	10%	10%
Boiler Type or Analysis Type	ALL	ALL	ALL	ALL	ALL	ALL
Pollutant	**PM**	**TSM-10**	**HCl**	**Hg (12%)**	**THC**	**TEQ**
Count	154	15	118	113	14	15
Standard Deviation	2.0E-03	1.7E-06	1.4E-03	2.0E-07	1.3E-01	4.7E-04
Confidence Interval	4.1E-04	1.2E-06	3.2E-04	4.9E-08	9.1E-02	3.1E-04
Average	2.7E-03	4.6E-06	1.1E-03	2.2E-07	3.0E-01	8.5E-04
Average+Confidence Int.	3.1E-03	5.8E-06	1.4E-03	2.7E-07	3.9E-01	1.2E-03
Minimum Value	4.0E-05	2.3E-06	1.4E-05	1.6E-09	1.2E-01	2.0E-06
Maximum Value	9.0E-03	8.1E-06	9.9E-03	9.8E-07	5.9E-01	1.4E-03
Skew	0.73	0.27	3.84	1.50	0.56	-1.20
99UCL	7.36E-03	9.17E-06	4.29E-03	6.96E-07	6.49E-01	2.07E-03
99UCL Exponent(ln(emissions))	1.93E-02	1.22E-05	1.37E-02	2.49E-06	9.61E-01	1.99E-01
99UPL	5.41E-03	7.49E-06	2.96E-03	4.97E-07	5.22E-01	1.62E-03
99UPL Exponent(ln(emissions))	7.28E-03	8.30E-06	3.66E-03	7.13E-07	6.07E-01	1.88E-02
Old Boiler MACT	7.0E-02	1.0E-03	9.0E-02	9.0E-06	N/A	N/A
Units	lb/MMBtu	lb/MMBtu	lb/MMBtu	lb/MMBtu	ppm@ 3%O2 as Propane	ng/dscm@ 7%O2
Increased Stringency (normal)	9.51	109.09	21.00	12.93	N/A	N/A
Increased Stringency (lognormal)	3.62	82.26	6.55	3.62	N/A	N/A
New Unit MACT Floor	2.37E-04	2.67E-06	1.50E-05	2.00E-08	9.61E-01	3.02E-06
Date of Update	2/9/2010	2/10/2010	2/17/2010	2/17/2010	2/17/2010	2/10/2010
Time of Update	10:31	10:55	11:00	11:00	11:25	3:46
Total Boilers	367	33	NA	NA	NA	36
Note	0	Less than 5	0	0	0	0
# Boilers in 12% (or 5 Boiler) Floor	41	5	32	26	5	5

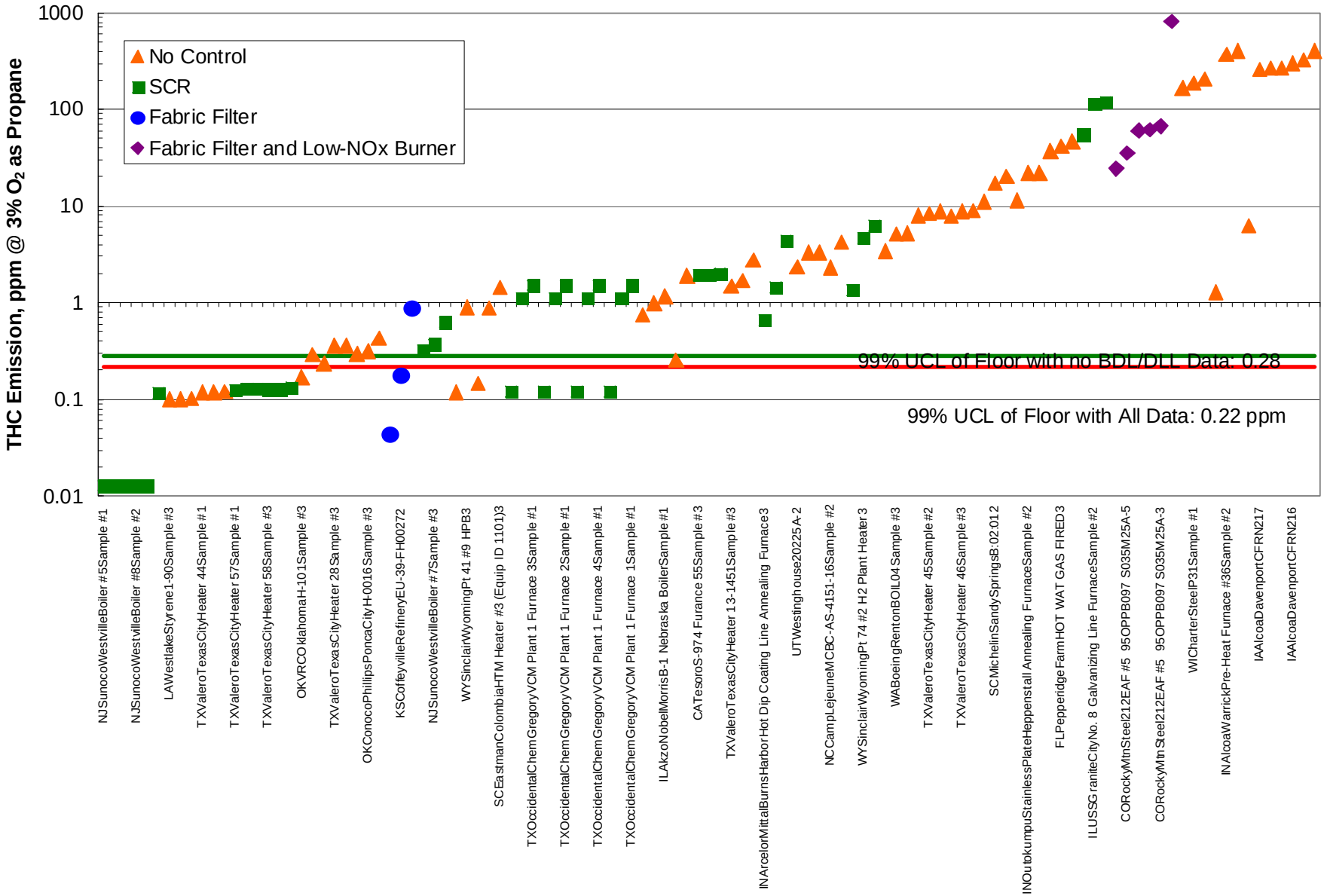
Preliminary Floor Liquid Fired Units Prior to Variability Factors with Prior Test Average Method

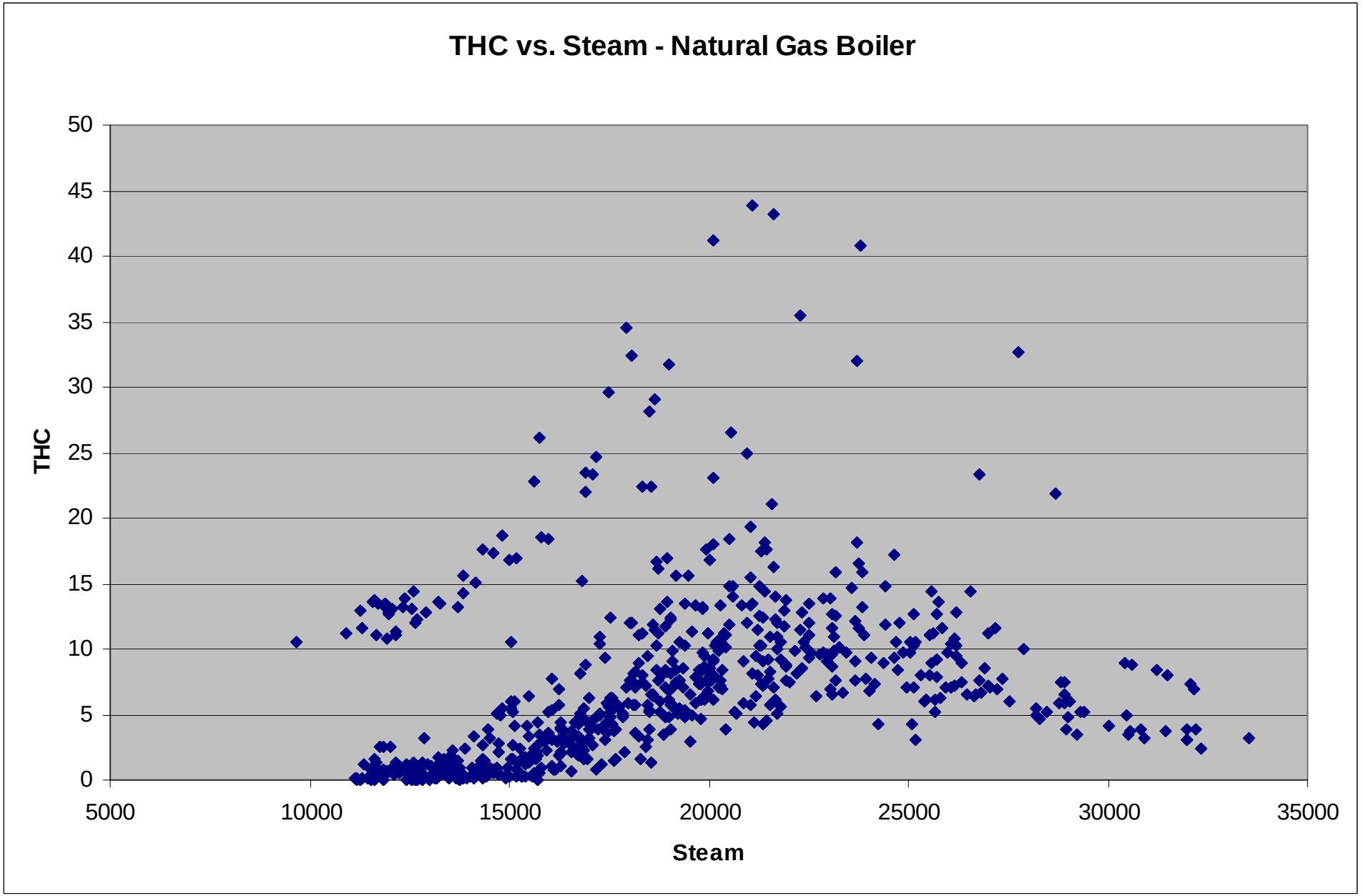
Fuel	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid
Mix	10%	10%	10%	10%	10%	10%
Boiler Type	ALL	ALL	ALL	ALL	ALL	ALL
Pollutant	PM	TSM-10	HCl	Hg (12%)	THC	TEQ
Count	33	15	18	15	16	15
Standard Deviation	7.6E-04	5.9E-05	1.9E-04	2.3E-08	2.0E-01	9.0E-04
Confidence Interval	3.4E-04	3.9E-05	1.1E-04	1.6E-08	1.3E-01	6.0E-04
Average	1.4E-03	6.0E-05	2.2E-04	4.6E-08	2.7E-01	1.3E-03
Average+Confidence Int.	1.7E-03	9.9E-05	3.4E-04	6.2E-08	4.0E-01	1.9E-03
Minimum Value	8.8E-05	1.9E-06	9.6E-05	4.8E-09	1.1E-01	2.7E-06
Maximum Value	4.0E-03	1.7E-04	6.2E-04	8.1E-08	7.5E-01	2.6E-03
Skew	1.12	0.56	1.78	-0.62	1.18	0.01
99UCL	3.24E-03	2.15E-04	7.02E-04	1.07E-07	7.85E-01	3.66E-03
99UCL Exponent(ln(emissions))	6.76E-03	1.68E-03	8.96E-04	3.92E-07	1.23E+00	4.04E-01
99UPL	2.50E-03	1.58E-04	5.22E-04	8.48E-08	5.93E-01	2.79E-03
99UPL Exponent(ln(emissions))	3.33E-03	3.59E-04	4.89E-04	1.62E-07	6.39E-01	3.28E-02
Old Boiler MACT	3.0E-02	NA	5.0E-04	NA	NA	NA
Units	lb/MMBtu	lb/MMBtu	lb/MMBtu	lb/MMBtu	ng/dscm@ 7%O2	ppm@ 3%O2 as Propane
Increased Stringency (normal)	9.27	NA	0.71	NA	NA	NA
Increased Stringency (lognormal)	4.44	NA	0.56	NA	NA	NA
New Unit MACT Floor	3.87E-03	1.24E-05	1.00E-04	1.07E-07	1.29E-01	7.29E-06
Date of Update	2/11/2010	2/11/2010	2/11/2010	2/11/2010	2/11/2010	2/11/2010
Time of Update	1:17	1:49	11:09	10:47	1:39	10:30
Total Boilers	NA	NA	NA	NA	NA	NA
Note	0	12% is Les	12% is Les	12% is Les	Less than 5 Boi	Less than 5 Bo
# Boilers in 12% (or 5 Boiler) Floor	10	5	5	5	5	5

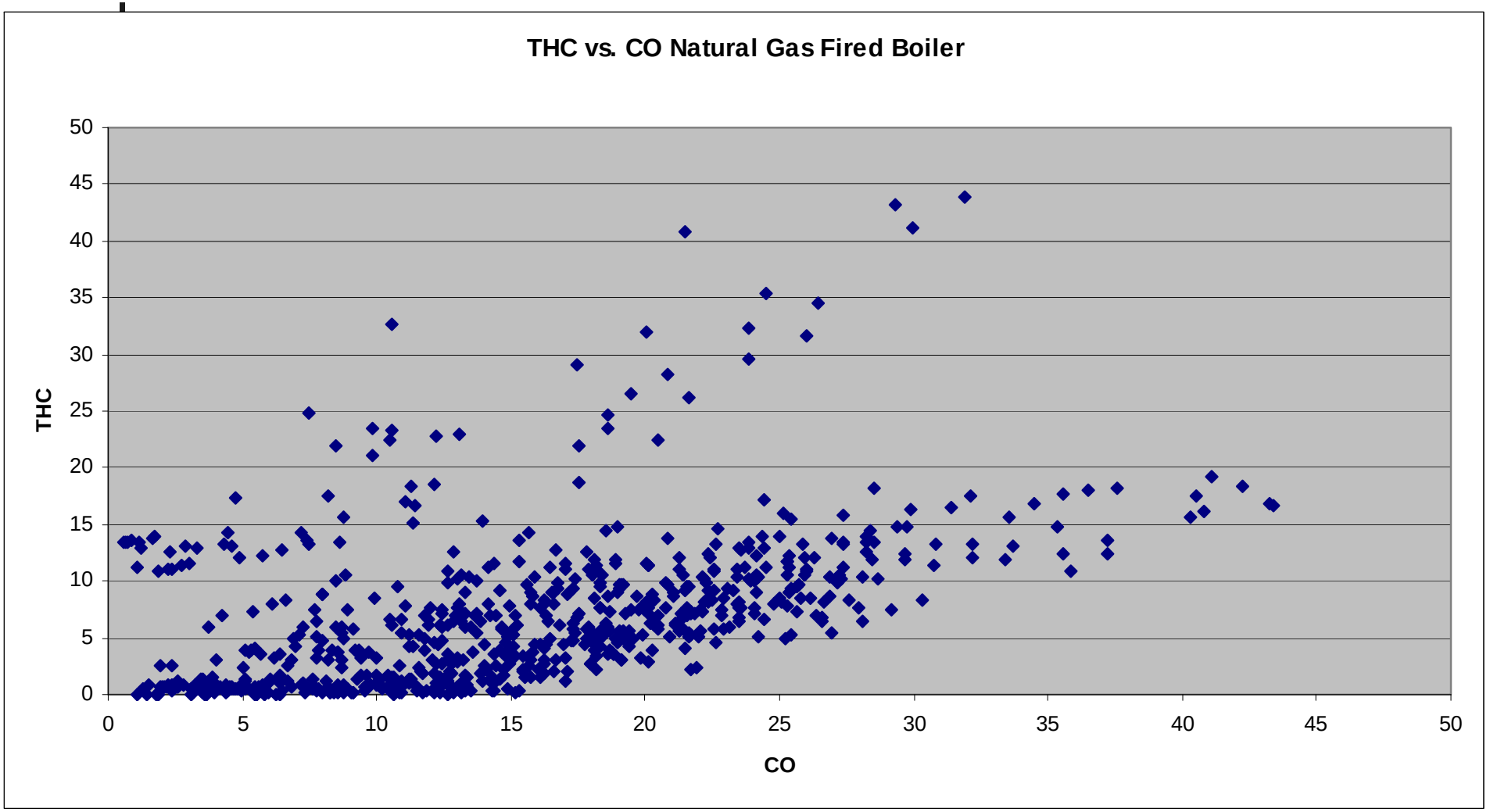
Biomass Boiler Emission Levels for Particulate Matter

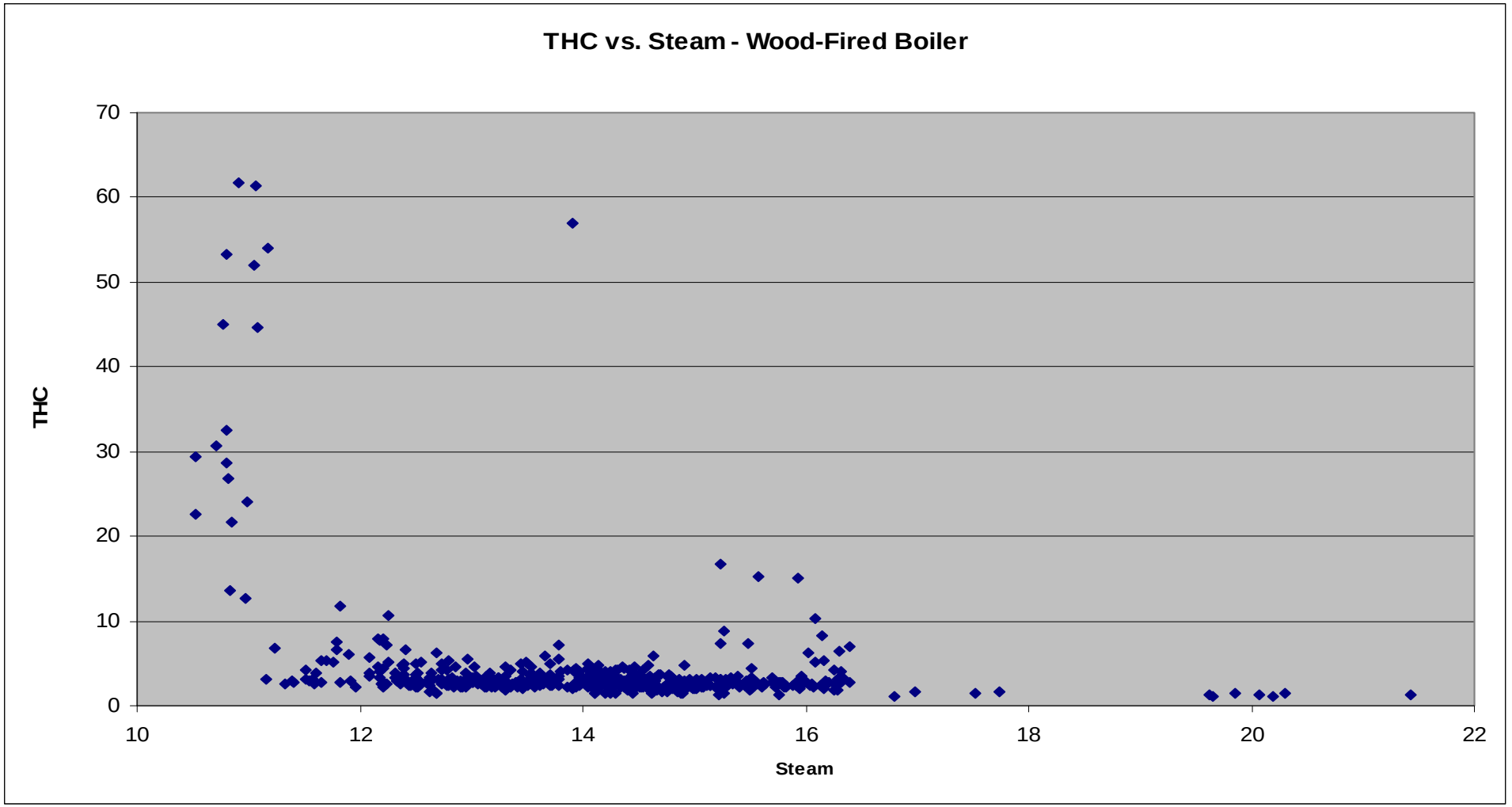


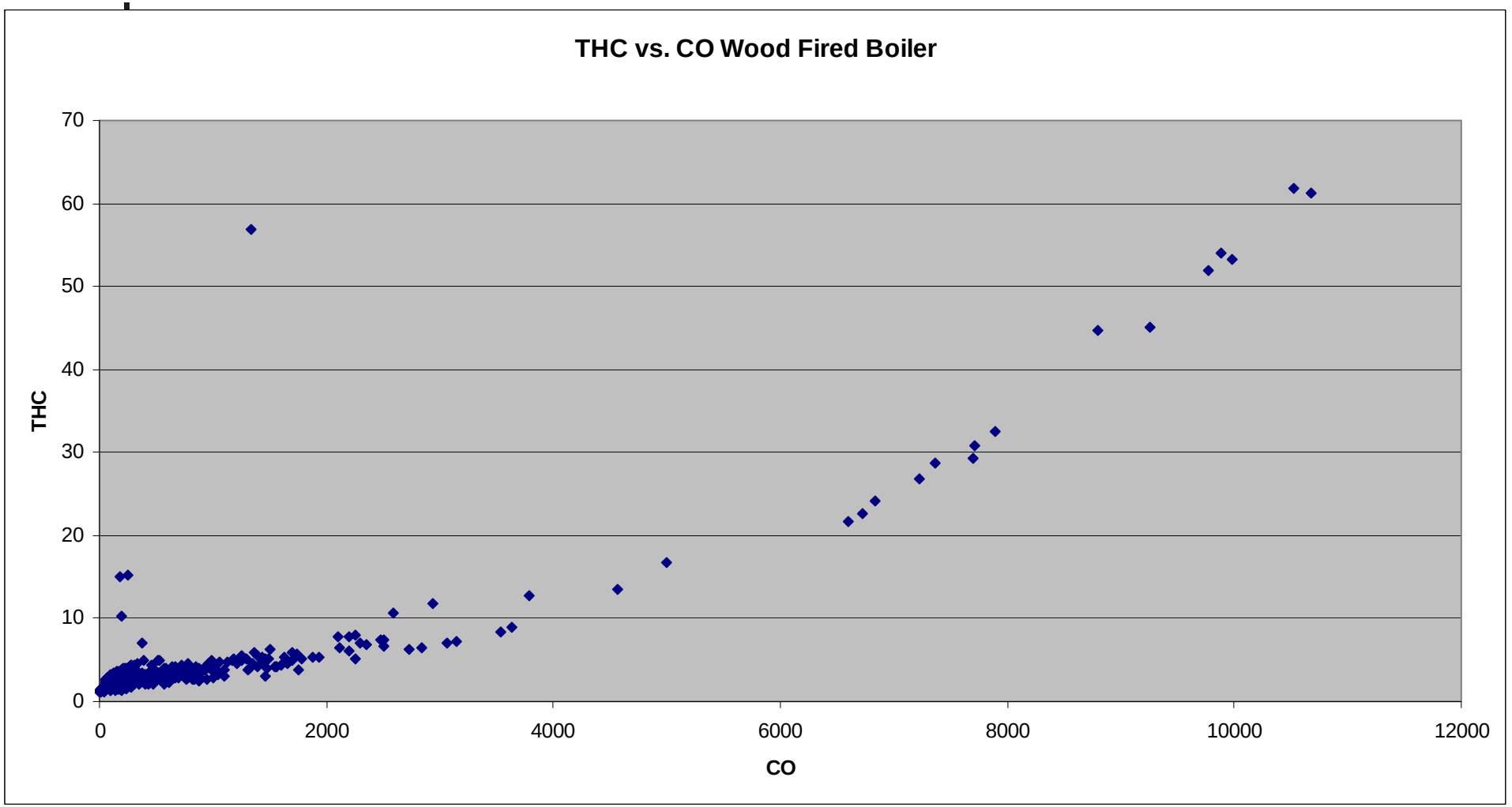
Gas Boiler THC data

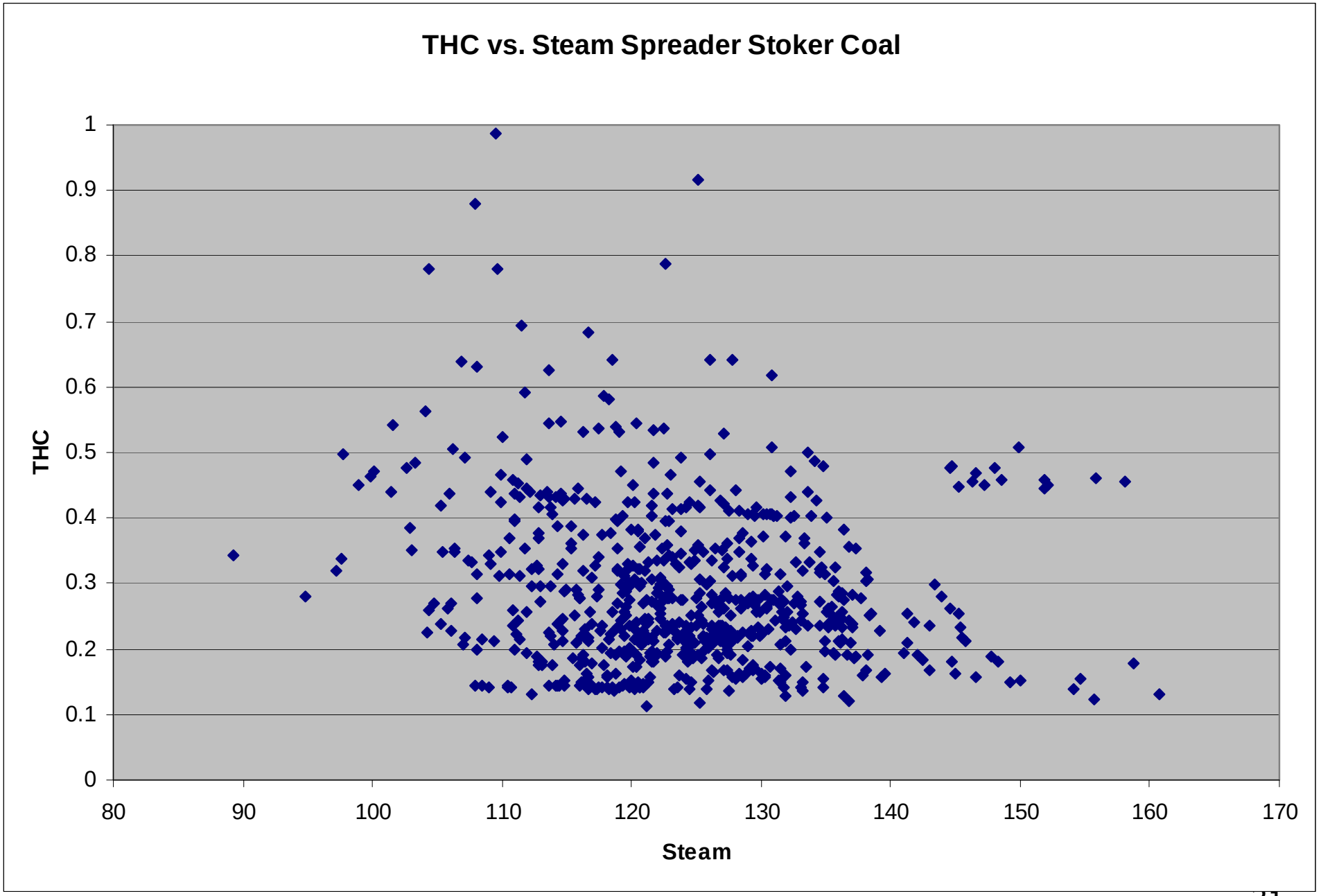


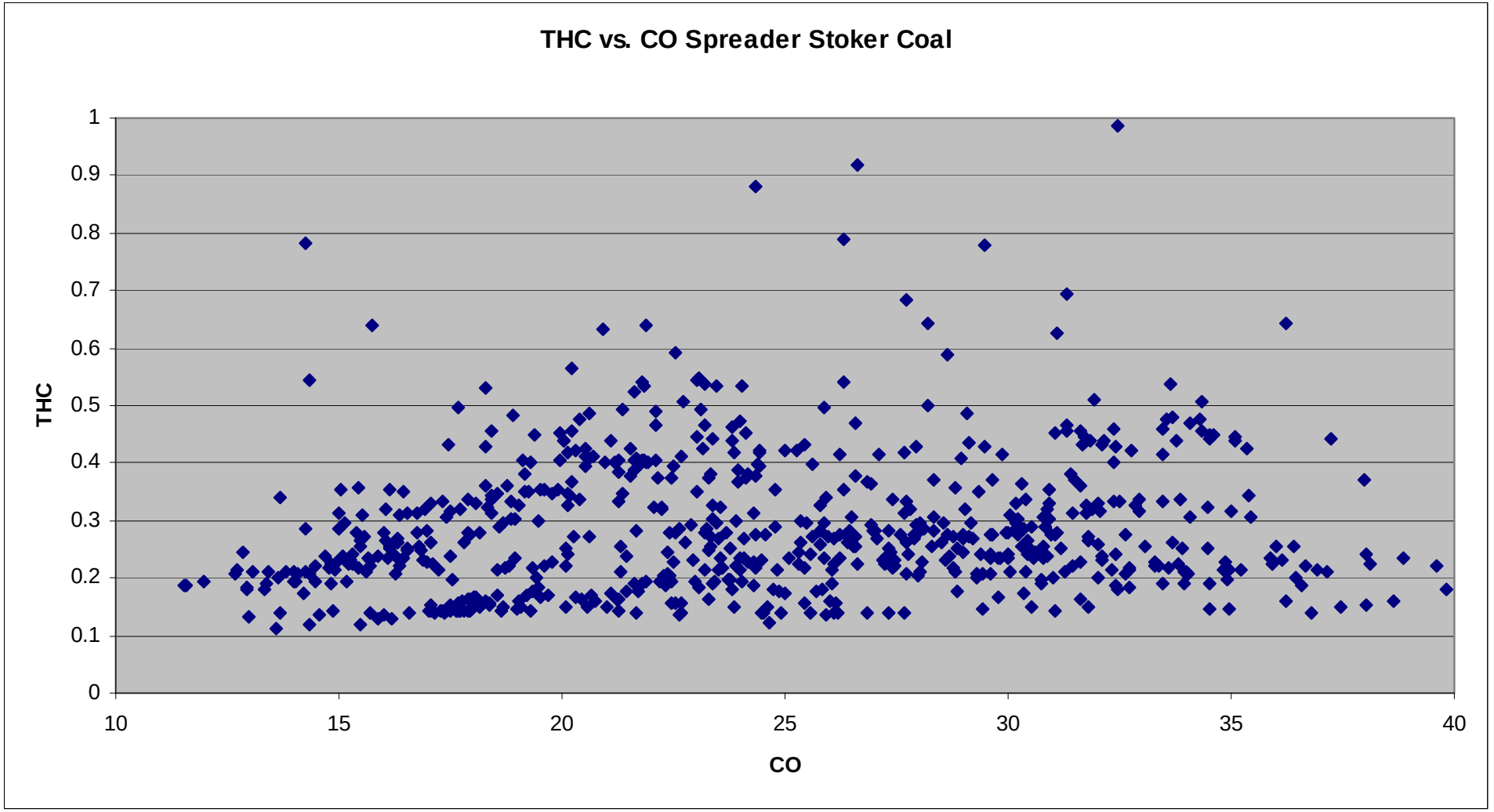

THC vs. Steam - Natural Gas Boiler
THC
50
45
40
35
30
25
20
15
10
5
0
5000
10000
15000
20000
25000
30000
35000
Steam


THC vs. CO Natural Gas Fired Boiler
THC
CO
0
5
10
15
20
25
30
35
40
45
50


THC vs. Steam - Wood-Fired Boiler
THC
70
60
50
40
30
20
10
0
10
12
14
16
18
20
22
Steam

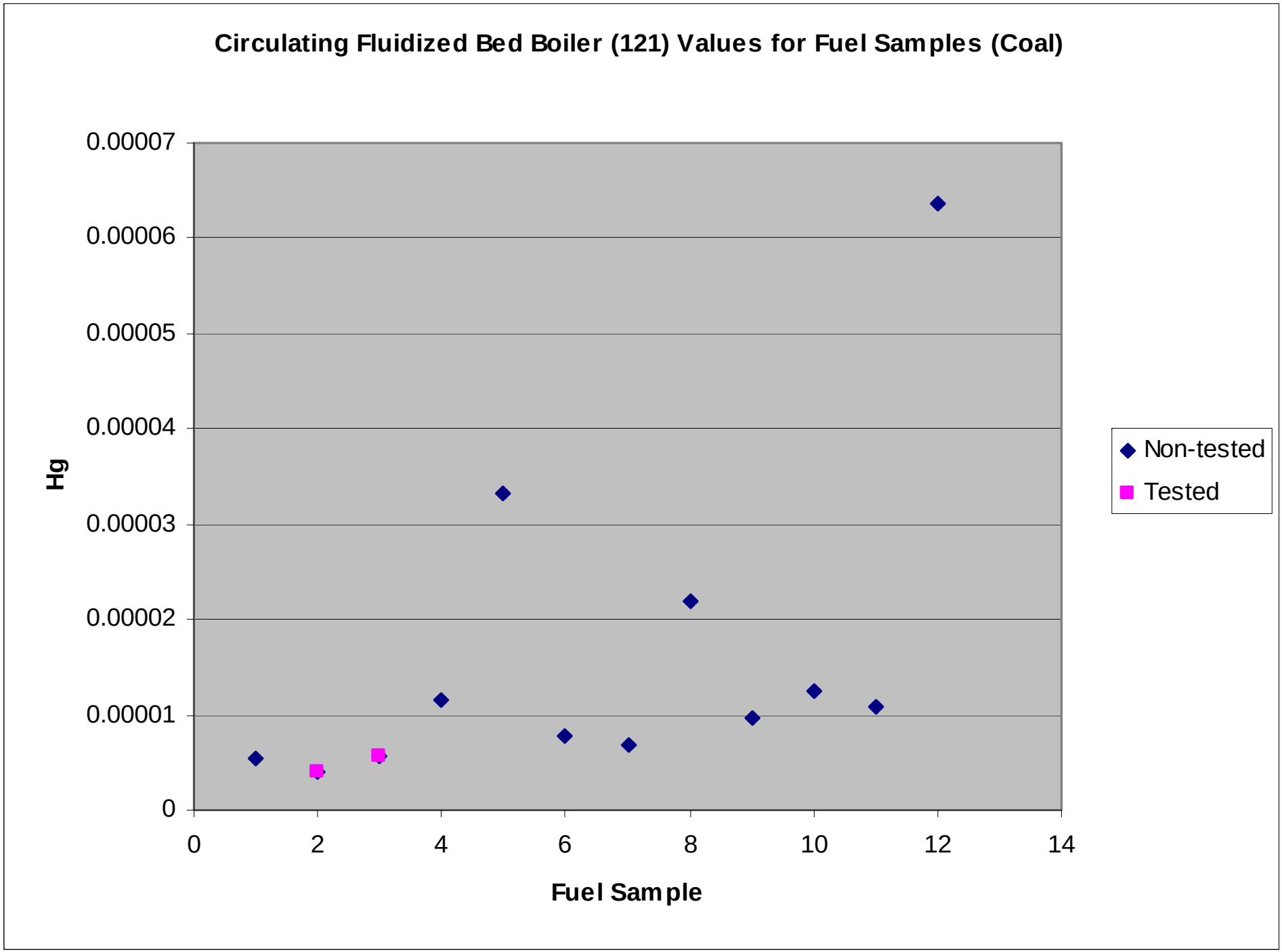

THC vs. CO Wood Fired Boiler
70
60
50
40
30
20
10
0
THC
0
2000
4000
6000
8000
10000
12000
CO


THC vs. Steam Spreader Stoker Coal
THC
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
80
90
100
110
120
130
140
150
160
170
Steam


THC vs. CO Spreader Stoker Coal
THC
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
10
15
20
25
30
35
40
CO

THC Data (ppm@3%O2), Stack Test vs. 30-day Data

		99 UCL for THC		
Facility	Hourly Data	Normal Operation Only	Daily Average Data	Stack Test Avg
AR Domtar	343.91	59.82	130.00	1.07
CA Tesoro			10.59	1.96
TX Diboll	12.41		19.06	
VA Phillip Morris	47.93	13.77	34.40	4.75
WA Boeing	104.01		59.08	4.61
WV DuPont	0.71		0.52	


Circulating Fluidized Bed Boiler (121) Values for Fuel Samples (Coal)
0.00007
0.00006
0.00005
0.00004
0.00003
0.00002
0.00001
0
Hg
0
2
4
6
8
10
12
14
Fuel Sample
Non-tested
Tested