Worldwide Pollution Control Association

Michigan Coal to Gas Seminar

June 5-6, 2012

Visit our website at www.wpca.info

TO MATS

4 Scenarios

No Fuel Change - Stay in MATS

Co-firing >10% - Stay in MATS

Co-firing <10% - Out of MATS

Natural Gas Primary - Out of MATS

HAPs Covered by MATS

Mercury
Non-mercury metallic HAPs
Acid gas HAPs
Organic HAPs

Performance testing, monitoring, work practices

Filterable PM Monitoring Options

	Initial Compliance	Ongoing Compliance
PM CEMS	30 day CEMS	CEMS w/annual RATA
PM CPMS	stack test	CPMS w/annual stack test
Stack test	stack test	quarterly stack test

Note: If monitoring total or individual HAP metals, quarterly stack testing is required

LEE: Stack test every three years

PM CEMS Example

PM CPMS Example

HCl/HF
Monitoring Options

	Initial Compliance	Ongoing Compliance
HCl/HF CEMS	30 day CEMS	CEMS w/annual RATA
Stack test	stack test	quarterly stack test
SO_2 CEMS[a]	30 day CEMS	CEMS w/annual RATA

[a] For units with FGD system only

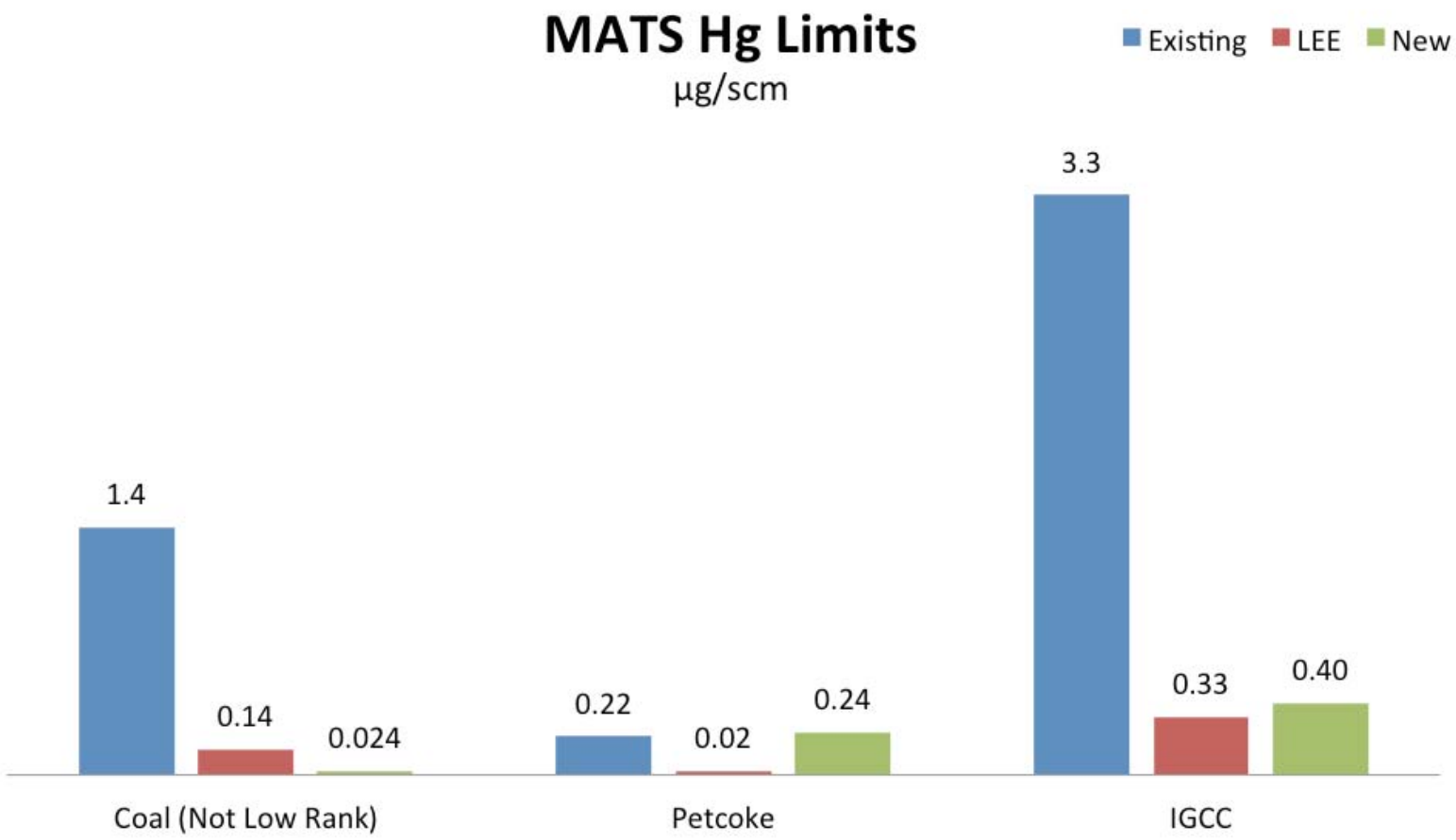
LEE: Stack test every three years

Mercury Monitoring Options

	Initial Compliance	Ongoing Compliance
Mercury CEMS	30 day CEMS	CEMS w/annual RATA
Sorbent Trap	30 day Sorbent Trap	Sorbent Trap w/annual RATA

LEE: Stack test every year

Mercury Detection Limits



Hg CEMS DL ≈ 0.5 µg/Nm^3

Hg Sorbent Trap DL ≈ 0.01 µg/Nm^3

Organic HAPs
Work Practice

	Initial Compliance	Ongoing Compliance
With Neural Net	Tune up	Tune up every 48 months
Without Neural Net	Tune up	Tune up every 36 months

LEE: Not Applicable

Low Emitting Units (LEEs)

LEE Limits

For mercury
<10% of limit
or
<29 lb/yr potential

For non-mercury HAPs
<50% of limit

LEE Limits

Category	Pollutant	Limit	
		lb/mmBtu	lb/MWh
1, 2, 4	Filterable PM	0.015	0.15
1, 2	Non-HAP Metals	0.000025	0.00025
4	Non-HAP Metals	0.0004	0.004
1, 2	HCl	0.001	0.01
4	HCl	0.001	0.005
1, 2	SO_2	0.1	0.75
1	Hg	0.12[a]	0.0013[b]
2	Hg	0.4[a]	0.004[b]
4	HF	0.0002	0.002

[a] lb/TBtu [b] lb/GWh


CASH
Dollars Cents
National

Hg Monitoring Costs[a]

	Type	EPA Estimate[b]	Reality[c]
Capital Costs	CEMS	$220,000	$300-400,000
	Sorbent trap	N/A	$100-150,000
Ongoing Costs[d]	CEMS	$77,000	$50-75,000
	Sorbent trap	N/A	$20-30,000

[a] Costs do not include stack or platform modifications

[b] From EPA CEMS Cost Model 03/07/07 w/ 10% inflation adjustment to 2012

[c] Vendor information

[d] Annual Costs. Without capital recovery

Filterable PM Monitoring Costs[a]

	Type	EPA Estimate[b]	Reality[c]
Capital Costs	CEMS	$190,000	$200-400,000
	CPMS	$190,000	$200-400,000
Ongoing Costs[d]	CEMS	$40,000	$40-80,000
	CPMS	$32,000	$35-50,000

[a] Costs do not include stack or platform modifications. Based on beta-gauge technology

[b] From EPA CEMS Cost Model 03/07/07 w/ 10% inflation adjustment to 2012

[c] Vendor and user information (rough estimates based on limited data)

[d] Annual Costs. Without capital recovery

HCl, HF, SO_2 Monitoring Costs[a]

	Type	EPA Estimate[b]	Reality[c]
Capital Costs	CEMS	$160,000	$100-200,000
Ongoing Costs[d]	CEMS	$22,000	$15-30,000

[a] Costs do not include stack or platform modifications. Costs are for a "typical" criteria pollutant and diluent system.

[b] From EPA CEMS Cost Model 03/07/07 w/ 10% inflation adjustment to 2012

[c] Vendor and user information (rough estimates based on limited data)

[d] Annual costs. Without capital recovery

Estimated Stack Test Costs

Test	Approximate Cost
Filterable PM (M5)	$7,600 - 11,400
HAPs Metals (M29)	$12,400 - 18,600
HCl/HF (M26, M26A)	$7,600 - 11,400
HCl (FTIR)	$15,200 - 23,400
Hg (M30B - 30 days)	$15,200 - 23,400
PM CEMS RATA (PS11)	$18,000 - 26,000
HCl CEMS RATA	$9,200 - $13,800

Note: Prices are for individual tests at a single location assuming no delays. Simultaneous testing with multiple methods may reduce overall costs. Actual testing costs will vary from these estimates based on site-specific conditions, variable travel costs, and current market conditions.

Interesting comparison...

Annual cost of quarterly stack tests: ~$40,000

Annual operating cost of PM CEMS: ~$40,000

Boiler tune ups estimated at

$75,000 - 90,000

Every 36-48 months

CleanAir®

sevans@cleanair.com

Photo: Edward James Photography