REINHOLD ENVIRONMENTAL Ltd.

2011 APC Round Table
& Expo Presentation

July 11-12, 2011, in Cleveland, OH / Hosted by FirstEnergy

NALCO Mobotec

Clean Air Act Utility MACT (MATS)

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Reinhold Conference
July 11, 2011

Upcoming EPA Regulations (from EPA CSAPR Brief)

- Cross-State Air Pollution Rule (**CSAPR**)
  - was CAIR, then CATR
  - Final July 2011 (last Wednesday)
- Ozone NAAQS Reconsideration
  - Final - End of July 2011
- Power Plant Mercury and Air Toxics Standards (**MATS**)
  - "**Utility MACT**"
  - Proposed March 2011/Final Nov 2011
- PM NAAQS
  - Propose Summer 2011
- Transport Rule II (NOx)
  - TBD

Clean Air Act

- Covered a bit of this during a CAA review at Reinhold's Conference (February 2011)
- It all starts with the CAA
- §109 – §111
  - NAAQS (National Ambient Air Quality Standards)
    - CO, Pb, NO_2, PM_{10}, $PM_{2.5}$, O_3, SO_2
    - Driven by non-attainment areas and transport
  - CAIR → CATR → **CSAPR**
    - NOx and SOx Cap-and-Trade (limited)
- §112
  - Air Toxics (HAPs)
    - 188 identified HAPs
    - Too many to practically measure, so surrogates are used
  - MACT → **MATS**
    - PM, HCl, Hg emission limits + CO and D/F as work practice standards

CAA – §109 - §110
NAAQS
CAIR
CATR
CSAPR

CROSS-STATE AIR POLLUTION RULE

CSAPR (short review)

- CSAPR?
  - Solutions for MACT/MATS overlap
- *Final* CSAPR Signed:
  - Wednesday July 6, 2011
- Reduce NOx and SOx with intrastate cap-and-trade
  - To reduce "fine particles ($PM_{2.5}$)" and "ozone" (NAAQS)
- Specifically to address "cross-state transport"
  - Goal: eliminate non-attainment zones, […] affordably

EPA's Process

- Upwind State Obligations based on:
  - The magnitude of an upwind state's contribution
  - The cost of reducing emissions
  - The air quality impacts of reductions (NAAQS impact)
- Modeling to set emission state budgets
  - Includes variability limits to assure obligations are met
- Three categories
  - SOx
    - Group 1 & Group 2
  - Annual NOx
  - Ozone Season NOx (NOx-OS)

EGU Allocations

- Set State Budgets, then Allocate EGU Credits:
  - 2006 – 2010 actual *Heat Input Basis* established
    - Determine EGU's proportion of State's total heat Input
  - Actual 2003 – 2010 historic emissions
    - Max annual determination
  - Iteration on heat input and maximum emissions
  - Done: Individual EGU Allocations
- New units are blended in, in two phases
- EGUs must hold credits or pay stiff penalties
  - 2-to-1 credits, or
  - EPA inflation-indexed per-day penalties (~$32k/day)
- Credits can be traded:
  - Existing EPA infrastructure: allowance management system (AMS)
  - Intrastate *versus* Interstate trading

Unit Level Allocations (page 1 of 99)

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Plant Name	State	ORIS ID	Boiler ID	SO2 Allocation 2012 (tons)	SO2 Allocation 2014 (tons)	NOx Annual Allocation 2012 (tons)	NOx Annual Allocation 2014 (tons)	NOx OS Allocation 2012 (tons)	NOx OS Allocation 2014 (tons)
AMEA Sylacauga Plant	Alabama	56018	1	0	0	9	9	9	9
AMEA Sylacauga Plant	Alabama	56018	2	0	0	10	9	9	9
Barry	Alabama	3	1	2,595	2,558	834	825	382	379
Barry	Alabama	3	2	2,553	2,516	820	812	380	376
Barry	Alabama	3	3	4,374	4,311	1,405	1,391	617	611
Barry	Alabama	3	4	5,721	5,639	1,838	1,819	949	941
Barry	Alabama	3	5	12,704	12,521	4,082	4,039	2,185	2,165
Barry	Alabama	3	6A	4	4	64	64	27	27
Barry	Alabama	3	6B	4	4	63	63	25	25
Barry	Alabama	3	7A	4	4	67	67	27	27
Barry	Alabama	3	7B	4	4	65	65	26	26
Calhoun Power Company I, LLC	Alabama	55409	CT1	3	3	20	20	18	18
Calhoun Power Company I, LLC	Alabama	55409	CT2	2	2	20	20	18	18
Calhoun Power Company I, LLC	Alabama	55409	CT3	3	3	23	23	20	20
Calhoun Power Company I, LLC	Alabama	55409	CT4	3	3	22	22	20	20
Charles R Lowman	Alabama	56	1	1,733	1,708	557	551	260	257
Charles R Lowman	Alabama	56	2	4,576	4,511	1,470	1,455	721	714
Charles R Lowman	Alabama	56	3	5,093	5,019	1,636	1,619	745	739
Colbert	Alabama	47	1	3,539	3,488	1,137	1,125	497	492
Colbert	Alabama	47	2	3,394	3,345	1,090	1,079	467	462
Colbert	Alabama	47	3	3,473	3,424	1,116	1,104	470	465
Colbert	Alabama	47	4	3,384	3,335	1,087	1,076	492	487
Colbert	Alabama	47	5	6,859	6,760	2,204	2,181	1,184	1,174
Colbert	Alabama	47	CCT1	2	2	1	1	1	1
Colbert	Alabama	47	CCT2	1	1	0	0	0	0
Colbert	Alabama	47	CCT3	1	1	0	0	0	0
Colbert	Alabama	47	CCT4	1	1	0	0	0	0
Colbert	Alabama	47	CCT5	0	0	0	0	0	0
Colbert	Alabama	47	CCT6	0	0	0	0	0	0
Colbert	Alabama	47	CCT7	1	1	0	0	0	0
Colbert	Alabama	47	CCT8	1	1	0	0	0	0
Decatur Energy Center	Alabama	55292	CTG-1	3	3	42	42	20	20
Decatur Energy Center	Alabama	55292	CTG-2	3	3	40	40	22	22
Decatur Energy Center	Alabama	55292	CTG-3	3	3	82	82	73	73
Discover	Alabama	55138	1A	0	0	2	2	2	2
Discover	Alabama	55138	1B	0	0	2	2	2	2
Discover	Alabama	55138	2A	0	0	2	2	2	2

Unit Level Allocations (page 61 of 99)

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Plant Name	State	ORIS ID	Boiler ID	SO2 Allocation 2012 (tons)	SO2 Allocation 2014 (tons)	NOx Annual Allocation 2012 (tons)	NOx Annual Allocation 2014 (tons)	NOx OS Allocation 2012 (tons)	NOx OS Allocation 2014 (tons)
Cape Fear	North Carolina	2708	2A	2	1	1	1	0	0
Cape Fear	North Carolina	2708	2B	2	1	1	1	0	0
Cape Fear	North Carolina	2708	5	1,300	539	464	379	195	161
Cape Fear	North Carolina	2708	6	1,840	763	656	537	273	225
Cliffside	North Carolina	2721	1	208	86	74	61	37	30
Cliffside	North Carolina	2721	2	214	89	76	63	33	27
Cliffside	North Carolina	2721	3	354	147	126	103	61	50
Cliffside	North Carolina	2721	4	359	149	128	105	58	48
Cliffside	North Carolina	2721	5	5,673	2,352	2,023	1,655	877	722
Craven County Wood Energy	North Carolina	10525	ES5A	134	134	291	238	137	113
Dan River	North Carolina	2723	1	422	175	150	123	74	61
Dan River	North Carolina	2723	2	440	183	157	128	81	67
Dan River	North Carolina	2723	3	1,088	451	388	318	173	142
Dan River	North Carolina	2723	4C	1	1	1	1	1	1
Dan River	North Carolina	2723	5C	0	0	1	1	1	1
Dan River	North Carolina	2723	6C	2	1	1	1	1	1
EPCOR USA North Carolina Roxboro	North Carolina	10379	BLR01A	104	43	37	30	25	20
EPCOR USA North Carolina Roxboro	North Carolina	10379	BLR01B	106	44	38	31	26	22
EPCOR USA North Carolina Roxboro	North Carolina	10379	BLR01C	106	44	38	31	26	21
EPCOR USA North Carolina Southport	North Carolina	10378	BLR01A	143	59	51	42	31	26
EPCOR USA North Carolina Southport	North Carolina	10378	BLR01B	143	59	51	42	30	25
EPCOR USA North Carolina Southport	North Carolina	10378	BLR01C	138	57	49	40	31	26
EPCOR USA North Carolina Southport	North Carolina	10378	BLR02A	144	60	51	42	32	27
EPCOR USA North Carolina Southport	North Carolina	10378	BLR02B	151	63	54	44	34	28
EPCOR USA North Carolina Southport	North Carolina	10378	BLR02C	133	55	48	39	30	25
Edgecombe Genco, LLC	North Carolina	10384	BLR01A	83	83	131	107	63	52
Edgecombe Genco, LLC	North Carolina	10384	BLR01B	82	82	130	106	62	51
Edgecombe Genco, LLC	North Carolina	10384	BLR02A	110	110	132	108	61	50
Edgecombe Genco, LLC	North Carolina	10384	BLR02B	103	103	126	103	59	49
Elizabethtown Power	North Carolina	10380	UNIT1	14	6	5	4	1	1
Elizabethtown Power	North Carolina	10380	UNIT2	16	7	6	5	2	2
G G Allen	North Carolina	2718	1	1,507	625	537	440	223	183
G G Allen	North Carolina	2718	2	1,527	633	545	445	243	200
G G Allen	North Carolina	2718	3	2,575	1,068	919	751	404	333
G G Allen	North Carolina	2718	4	2,436	1,010	869	711	368	303
G G Allen	North Carolina	2718	5	2,542	1,054	907	742	402	331
H F Lee Steam Electric Plant	North Carolina	2709	1	694	288	247	202	106	87

EPA Projected NOx and SOx Credits

	Emission Allowance Prices (2007$/ Ton)	
	2012	2014
Annual SO_2 Group 1 Trading Program	$1,000	$1,100
Annual SO_2 Group 2 Trading Program	$600	$700
Annual NO_x Trading Program	$500	$600
Ozone Season NO_x Trading Program	$1,300	$1,500

SOx Group One: WI, MI, IA, MO, IL, IN, KY, TN, OH, NY, PA, NJ, MD, VA, NC
= any state that touches: IL, OH, PA, VA (except DE)

SOx Group Two: MN, NE, KS, TX, AL, GA, SC

NOx Annual:
Group 1 + Group 2

NOx Ozone Season:
Group 1 + Group 2 + (OK, AR, LA, MS, FL) - (MN & NE)

Supplemental Notice of Proposed Rulemaking (SNPR)

- "Iowa, Kansas, Michigan, Missouri, Oklahoma, and Wisconsin significantly contribute to nonattainment [...] in other states."

- May-October Ozone Season (2011) NOx caps
  - Included in allocations
  - Parallel/equivalent with other Ozone Season States

- Timing:
  - Final Rule in November 2011
  - Compliance May 2012

- EPA to propose FIPs

CAA – §112
HAPS – NESHAP
AIR TOXICS
MACT
MATS

POWER PLANT MERCURY AND AIR TOXICS STANDARDS

Important Dates

- Utility MACT (MATS)
  - Draft rule issued March 16, 2011
  - Expected Promulgation November 2011
  - Three-Year Compliance from promulgation of the final rule
    - Expected to be December 2014
    - One year extensions can be granted on a case-by-case basis

- Boiler, CISWI, SSI MACTs
  - Promulgation = February 23, 2011
  - Rule "stayed" until April 2012 (?)
  - Compliance 3 years + one-year case-by-case delay (?)

Utility MACT Regulates EGUs

- Electric generating units (EGUs) are:
  - Fossil fuel fired
  - More than 25MWe
  - Selling power to the grid
- Cogeneration units can be defined as EGU
  - Combined heat and power
  - Slightly different definition, must sell:
    - > 25 MWe of "potential" power + > 1/3 of actual power
- Only considering retrofits rules
  - No coverage of new boilers or the new NSPS rules

EPA Compliance Cost Estimates

Estimated Number of Affected Units (Coal Fired only)	Capital Costs
1,200	$10,000,000,000
Average	$8.3M/boiler

<u>525 Power Plants:</u>
1200 affected coal-fired boilers
150 affected oil-fired boilers

10 GW of coal expected to retire (2%)
Small older units

CAA Process to Determine Emission Limits

- Health Based Methods (for HCl) were rejected by the EPA because ample margin of safety could not be established
  - Statement: this is the administrator's judgment
- Technology Based Methods
  - Emission limit = MACT Floor =
    - The average of the 12% best performing units
    - Separately determined for each fuel/configuration
- Since < 100% of the data is known, statistics are used:
  - Small data set = "Student's t-test" distribution
  - Normality tested by kurtosis, skewness, and goodness of fit
    - Based on results, either a normal or log-normal fit is used
  - MACT Floor = Upper Prediction Limit w/99% confidence
    - Typically well above average of the 12% best performing units

Fuel/Configuration Subcategories

- Coal-fired EGUs:
  - Category 1: EGUs designed for coal > 8300 Btu/lb
    - Anthracite, bituminous, subbituminous, and refuse coal
  - Category 2: EGUs designed for coal < 8300 Btu/lb
    - Mine-mouth lignite coal (beyond-the-floor likely)
  - Note the word "designed", which is potentially different from "firing"
- Oil-fired EGUs:
  - Category 1: EGUs designed to burn liquid oil
  - Category 2: EGUs designed to burn solid oil-derived fuel (pet coke)
    - EPA is requesting comments regarding putting pet coke under "coal"
- IGCC EGUs:
    - Integrated gasification combined cycle electric utility steam generating unit is an electric utility steam generating unit that burns a synthetic gas derived from coal or solid oil-derived fuel in a combined cycle gas turbine

Coal Definition

- Coal is:
  - Anthracite, bituminous, sub-bituminous, lignite, coal refuse
- Also Coal:
  - Synthetic fuels derived from coal for the purpose of creating useful heat including but not limited to, coal derived gases (not meeting the definition of natural gas), solvent-refined coal, coal-oil mixtures, and coal-water mixtures
- Coal Refuse:
  - Any by-product of coal mining, physical coal cleaning, and coal preparation operations (e.g. culm, gob, etc.) containing coal, matrix material, clay, and other organic and inorganic material with an ash content greater than 50%-wt and a heating value less than 6,000 Btu per pound, dry
  - Even if coal refuse was a waste, if it is reprocessed like non-waste coal refuse, then it is no longer a waste

Proposed Coal Limits

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- Proposed Limits:
  - PM 0.030 lb/MMBtu (total PM)
    - Includes both filterable and condensable PM
    - Will be very difficult for ESPs to get there
    - EPA expects 70% of boilers to use fabric filters
  - HCl 0.002 lb/MMBtu (~1.4 ppm @ 6% O_2 wet)
    - DSI where there isn't already WFGD/DFGD
    - Some DFGD expected
  - Hg 1 lb/TBtu >8300 Btu fuel
  - Hg 4 lb/TBtu <8300 Btu fuel (beyond-the-floor)
    - Fuel and backend dependent (equipment & temperature)
  - CO and D/F
    - Work Practice Standards (GCP – Good Combustion Practice)

Proposed Liquid Oil Limits

- Proposed limits (liquid oil) – different from solid fuel
  - Metals 30 lb/TBtu (includes Hg)
  - HCl 0.0003 lb/MMBtu (~0.2 ppm @ 6% O_2 wet)
  - HF 0.0002 lb/MMBtu
  - Organic HAP (CO and D/F)
    - Work Practice Standards (GCP – Good Combustion Practice)
- Will DSI be used for oil-fired units?
  - PM capture device issues…

Proposed Solid Oil-Derived Fuel Limits (Pet Coke)

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- Proposed limits (for any amount of pet coke)
  - PM 0.2 lb/MMBtu
    - Much higher then for coal (0.03 lb/MMBtu)
  - HCl 0.005 lb/MMBtu (~3.5 ppm @ 6% O_2 wet)
    - Slightly higher than for coal (0.002 lb/MMBtu)
  - Hg 0.2 lb/TBtu
    - Much lower than for coal (1.0 lb/TBtu)
  - CO and D/F
    - Work Practice Standards (GCP – Good Combustion Practice)
- EPA is considering reclassifying pet coke as coal
  - Limits when co-firing pet coke with coal is unclear

Biomass is not in Utility MACT

- Coal fired if
  - > 10% coal per year heat input for 3 years, **or**
  - > 15% coal heat input for one year
- Utility MACT only covers “Fossil Fuel Fired”
- Biomass (and NG) are not regulated under Utility MACT
- Biomass EGUs will likely fall under Boiler MACT
  - This is not entirely clear
  - Boiler MACT is overall less stringent
  - EPA to address boilers that change MACT qualifications
  - EPA to address common stack mixed boilers (e.g., oil + coal)
    - The more stringent emission limit for both units?

Solid Waste Materials

- If an EGU burns ANY solid waste, it must comply to the CISWI MACT for the following six months
- Solid wastes are regulated under CAA section 129
  - CISWI MACT
  - http://www.epa.gov/ttn/atw/129/ciwi/ciwipg.html
- Solid waste is defined by RCRA
  - Resource Conservation and Recovery Act
  - http://www.epa.gov/epawaste/nonhaz/define/index.htm

Compliance Measurements

- CEMs allowed for Hg, (HCl or SO_2), and PM
  - Alternatives allowed
- Certification is every 5 years
  - Compliance requires monthly-averaged reporting
- Specified measurement quality assurance processes
- Detailed daily fuel records, reportable to EPA
  - Partially to determine if any waste is burned (CISWI MACT)
  - EPA is pushing use of existing NOx and SO_2 reporting structure

Specific Compliance

- PM compliance
- Acid gas compliance
- Hg compliance
- Work Place Standards for CO and D/F

PM Compliance

- PM is a surrogate for non-Hg HAP metals
- PM CEMs for non-mercury HAP metals compliance
  - PM CEMs only measure filterable PM
  - Compliance requires total PM (filterable + condensable)
  - During testing, CEM PM is correlated to total PM
  - A new PM CEMs operational limit is then established
- A very difficult standard to meet
  - For existing coal, PM limit = 0.03 lb/MMBtu
  - 10 ppm of SO_3 = 0.03 lb/MMBtu condensable PM
    - Other condensable PM sources (e.g., ammonium chloride)
  - Could spell the end of sulfur burners for ESP improvement
    - Big (positive) impact on ACI for Hg – Other ESP additives might see use
- Fabric filters may be needed for high SO_3 emitting sites

Alternative PM Compliance

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- Alternative to PM CEMs
  - Bi-monthly measurements (monthly if no PM device; e.g., oil)
- Option 1: Total non-Hg HAP testing
  - Total non-Hg metals < 40.0 lb/Tbtu
- Option 2: Individual non-Hg metals testing
  - Antimony, Sb < 0.6 lb/Tbtu
  - Arsenic, As < 2.0 lb/Tbtu
  - Beryllium, Be < 0.2 lb/Tbtu
  - Cadmium, Cd < 0.3 lb/Tbtu
  - Chromium, Cr < 3.0 lb/Tbtu
  - Cobalt, Co < 0.8 lb/Tbtu
  - Lead, Pb < 2.0 lb/Tbtu
  - Manganese, Mn < 5.0 lb/Tbtu
  - Nickel, Ni < 4.0 lb/Tbtu
  - Selenium, Se < 6.0 lb/Tbtu

PM Compliance Solutions

- Fabric Filters (Bag Houses) are the obvious 100% solution
- Many cold side ESPs meet proposed requirements
- Wet ESPs are often discussed by the EPA as having a lot of HAP co-benefit.
  - Expensive and have not seen broad installation
- Tuning marginal ESP units
  - Modification (new TR sets, larger plate separation, more fields)
  - Chemical additives to improve ash resistivity
  - Combustion modifications to reduce LOI and ash carry over
  - Fuel switch (e.g., lower ash fuel)
  - Derate (worse case)
- Beware that other "MACT Solutions" might help or hurt ESP
  - For example, trona injection for HCl capture.

Acid Gas Compliance

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- HCl is a HAP and a surrogate for acid gases
- HCl CEMs is used for acid gas compliance
- Alternative 1: FGD installed = use SO_2 CEMs
  - You must have, and always operate, a WFDG or DFGD
  - SO_2 CEMs used for acid gas compliance
  - SO_2 limit is 0.2 lb/MMBtu (80 ppm @ 6% O_2 wet)
- Alternative 2: No HCl CEMS + no FGD
  - Monthly EPA Method 26 or 26A testing

HCl Compliance Solutions

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- Desulphurization systems get HCl as co-benefit
  - Means that very low HCl is required
  - But maybe not due to health based standards
  - The answer to this will drive the solutions
- Ultimate solution: WFGD (then DFGD)
- Duct (or Dry) Sorbent Injection (DSI)
  - Trona
  - Sodium Bicarbonate
  - Hydrated Lime (or other calcium-based sorbents)
- Other chemical additives (duct or furnace)
  - Magnesium chemistries
  - Duct injection, furnace injection, or fuel additives
- Fuel switching or blending
- Wet ESPs too

Mercury Compliance

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- Hg is a bioaccumulating HAP
- Three options
  - Mercury CEMS
    - Continuous – 30 day average
  - Sorbent Traps
    - EPA 30B
    - Averaged over 28-30 days
    - One trap pair must be less than 14 days
  - Low mercury fuel (low emitting EGU)
    - Certification and routine fuel analyses required
- Extensive details in Appendix A of the proposed rule

Mercury Compliance Solutions

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- Halogen Oxidizers
- Activated Carbon Injection
  - Can ruin ash sales and affect ESP
  - Beware high SO_3, which interferes
- Alkali injection
  - Usually as a co-benefit from other technologies
- Proprietary sorbents
  - Many in development
  - Goal is usually to preserve ash sales
- Co-benefit from acid gas reduction
  - Scrubbers (wet or dry) and DSI
  - Need oxidizers
  - Watch out for water regulations

CO and Dioxin/Furan Compliance

- Work Practice Standards
  - GCP = Good Combustion Practice; as follows:

- Inspect burner (Fix if needed)
- Inspect flame pattern (Fix if needed)
- Inspect fuel-to-air control (Fix if needed)
- Optimize for CO and NOx
- Measure CO and NOx
- Document
  - CO & NOx before and after
  - Description of corrective actions
  - Maintain a record of fired fuels

CO Compliance Solutions (Work Practice Solutions / GCP)

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- Tuning, Tuning, Tuning
- Combustion Modifications
  - Burner modifications
  - Boosted OFA systems
- Fuel distribution (eliminate roping)
- CO catalyst (expensive? unproven with coal?)
- Chemical additives
- Fuel switching or co-firing

Dioxin / Furans Compliance Solutions (Work Practice Solutions / GCP)

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- ACI + wESP is the gold standard for MSW incinerators
  - ACI alone will still work well
- "Good Combustion Practices" is sufficient for low D/F
  - D/F primarily is "grown" in the back pass
  - Eliminating precursors, reduces D/F formation
- Co-benefits?
  - SCR? WFGD? Catalytic bags? (e.g., Gore Remedia)
- Fuel management (low Cl or high VM?)
- Testing is very expensive
  - $3k - $5k per data point + 1 month turnaround
- Not a lot of vendors providing guarantees right now

Startup and Shutdown

- Considered part of routine operation
  - Occur infrequently with EGUs
  - Often use NG or oil (cleaner than coal)

- Since the emission standards are 30 day averages and startup and shutdown are routine:
  - Startup and shutdown emissions are
    - Regulated and included in 30-day averaging

Malfunctions

- Defined as: “sudden, infrequent, and not reasonably preventable failure of air pollution control and monitoring equipment, process equipment or a process to operate in a normal or usual manner…”
- Emissions during malfunction are not regulated
- Each Malfunction needs to be documented and reported to EPA
- The EPA will determine an appropriate response based on:
  - Good faith efforts to reduce the likelihood of malfunction
  - Root cause analyses to ascertain and rectify excess emissions
  - Was it, in fact, “sudden, infrequent, not reasonably preventable”?
  - OR was it “caused in part by poor maintenance or careless operation”?
- EPA is proposing an affirmative defense to civil penalties for exceedances of emission limits that are caused by malfunctions

Malfunction "Affirmative Defense"

No penalty (which can be significant) if a timely notification to the EPA showing the following:

(1) The excess emissions:

(i) Were caused by a sudden, infrequent, and unavoidable failure of air pollution control and monitoring equipment, process equipment, or a process to operate in a normal or usual manner; and

(ii) Could not have been prevented through careful planning, proper design or better operation and maintenance practices; and

(iii) Did not stem from any activity or event that could have been foreseen and avoided, or planned for; and

(iv) Were not part of a recurring pattern indicative of inadequate design, operation, or maintenance; and

(2) Repairs were made as expeditiously as possible when the applicable emission limitations were being exceeded. Off-shift and overtime labor were used, to the extent practicable to make these repairs; and

(3) The frequency, amount and duration of the excess emissions (including any bypass) were minimized to the maximum extent practicable during periods of such emissions; and

(4) If the excess emissions resulted from a bypass of control equipment or a process, then the bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; and

(5) All possible steps were taken to minimize the impact of the excess emissions on ambient air quality, the environment and human health; and

(6) All emissions monitoring and control systems were kept in operation if at all possible, consistent with safety and good air pollution control practices; and

(7) All of the actions in response to the excess emissions were documented by properly signed, contemporaneous operating logs; and

(8) At all times, the facility was operated in a manner consistent with good practices for minimizing emissions; and

(9) A written root cause analysis has been prepared

Low Emitting EGU (LEE)

- Some EGUs are currently in compliance
  - HCl and Hg
  - Firing low chlorine & low mercury fuel + good PM
- Full compliance testing required every five years
- Monthly fuel testing required
  - Must demonstrate low Cl and Hg
  - Cl and Hg to be below level established during compliance testing
- Also monitor specified operating parameters, <u>as applicable</u>
  - Chlorine in fuel
  - Scrubber pressure drop, pH, and liquid flow rate
  - DSI sorbent flow rate
  - ESP voltage and current
  - FF bag leak detection system (BLDS) sensor output

Emission Averaging

- Common site emission averaging allowed for:
  - PM, HF, HCl, non-Hg HAP metals, or Hg
- Existing EGUs must:
  - Be in the same subcategory (fuel/configuration)
  - Owned & controlled by one group, located on contiguous properties
- Despite averaging, individual unit emissions cannot exceed historical values
- Two tests:
  - "Can not exceed"
    - Averaging is done on the basis of the "maximum heat input capacity"
    - Maximum steam production rate can be used
  - "Does not exceed"
    - Averaging is done on the basis of the "actual heat input"
    - Actual steam production can be used
- Monthly compliance (year 1) then 12-month rolling averages
- Units sharing a common stack may be treated as one unit

Output Based Emission Limit

- All emission limits are in either
  - lb/MMBtu or lb/MWh
- EPA assumes a heat rate of 10,000 Btu/kWh
  - Since 10,000 Btu/kWh = 10 MMBtu/MWh (= 0.01 TBtu/GWh)
- Therefore, the difference between the lb/MMBtu and lb/MWh emission limits is a factor of 10
- For example (existing coal > 8300 Btu/lb):
  - PM limit: 0.03 lb/MMBtu or 0.3 lb/MWh
  - HCl limit: 0.002 lb/MMBtu or 0.02 lb/MWh
  - Hg limit: 1 lb/TBtu or 0.01 lb/GWh (mistake in the rule)
- Strategy for Utilities
  - If the actual heat rate is above 10,000 Btu/kWh then use lb/MMBtu
  - If the actual heat rate is below 10,000 Btu/kWh then use lb/MWh

Thank You

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