

# MATS

# EMISSION CALCULATIONS

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# MATS Emission Calculations

- Monitoring Configuration
- Calculation of Hourly and 30-boiler operating day averages
- Emissions Averaging

# Monitoring of Emissions

- Common Stacks
  - Measure in duct of each unit, or
  - Measure in common stack & assign emission rate to each unit that shares stack
    - If non-affected units share same stack, attribute all emissions to affected unit(s)

# Monitoring of Emissions

- Multiple Stacks (common control device)
  - Measure in each stack or
  - Measure pollutants in one stack and monitor flow and dilution rates in all stacks
- Multiple Stacks (multiple control devices)
  - Measure in each stack & calculate flow-weighted average pollutant rates for the unit

# Monitoring of Emissions

- Bypass Stacks
  - Measure in each stack (main and bypass) or
  - Measure only in main stack and consider bypass hours a deviation from the monitoring requirements
    - *“if it is not feasible to certify and quality-assure the data from a monitoring system on the bypass stack”*

# Monitoring of Emissions

- Hourly data is recorded for all periods of operation
- Calculate an hourly average even for startup or shutdown periods
  - Any hour that includes any startup/shutdown time is treated as a full hour of startup/shutdown
- No Missing Data Substitution
- No Bias Adjustment Factors

# Hourly Averages - CEMS

- For calculation of hourly averages, MATS Rule refers to other Subparts or Programs (“Quadrant Rule”)
  - Part 75 CEMS – Use Part 75 validation (75.10(d)(1))
  - Hg, HCl, HF – Use Part 60 validation (60.13(h)(2))
  - PM CEMS – NOT SPECIFIED
    - Presumed oversight – use Part 75 or Part 60 validation
    - If using the Part 63 General Provisions (63.8(g)), need at least two data points with each representing a 15 minute period. Does not address operation in only one quadrant of the hour.

# Hourly Averages – Sorbent Traps

- Sorbent Trap Special Considerations
  - Single Sorbent Trap System (all periods of operation including SU/SD)
  - Two Sorbent Trap Systems
    - Limited SU/SD may occur over a quarter
  - Concentration from the set of traps is used for each hour of the measurement period (up to 14 operating days)
  - When switching traps report the average (arithmetic or time-weighted) for the hour if more than one set of traps is used
  - Remember – Need to switch traps shortly after end of quarter to have analysis for reporting purposes



# Hourly Averages – Sorbent Traps

- Sorbent Trap Special Considerations
  - If stack flow monitor data is missing, what value is used to establish sample flow rate?
    - Some sources use last valid flow value
    - Some sources use unit load and assumed flow-to-load ratio.
    - In recent discussions, EPA has indicated that these hours DON'T count against the 5% or 5 hourly ratios that may differ by more than  $\pm 25\%$  of the reference ratio

# Hourly Averages- Derived Rates

- Calculate MATS emission rates using the valid hourly average concentrations and other necessary systems
- If certified backup monitoring systems are available, those systems can be used to report hourly MATS concentration data
- If one parameter is missing (CEMS or other necessary component), the hour is considered missing and a deviation from the monitoring requirements

# Hourly Averages- Derived Rates

- Some Part 75 “presumed representative” values are not considered substitute data and MAY be used for MATS calculations
  - Diluent cap values (only during MATS SU/SD periods)
  - SO<sub>2</sub> concentration value of 2.0 ppm during hours when very low sulfur fuels are combusted
  - Default minimum flow rate value of 1000 scfh if flow rate is too low to be registered by stack flow monitor
  - Negative hourly SO<sub>2</sub> or moisture replaced with zero
  - Default moisture values

# Hourly Averages- Derived Rates

- Some Part 75 “valid” data is NOT acceptable for MATS:
  - If a linearity check is not conducted on a SO<sub>2</sub> monitor with a span value of 30 ppm or less
  - For SO<sub>2</sub> monitors with a default high range value, not valid if 200% of MPC is reported
  - For SO<sub>2</sub>, CO<sub>2</sub>, and flow not valid if the full-scale range of the analyzer is exceeded

# 30 Day Averages

- Updated at the end of each boiler operating day
- Average of quality assured hours (not average of days)
- No minimum data availability requirement in order to calculate a valid 30-day average

$$E_{30\text{-day}} = \frac{\sum_{i=1}^n (E_h)_i}{n}$$

# 30 Day Averages

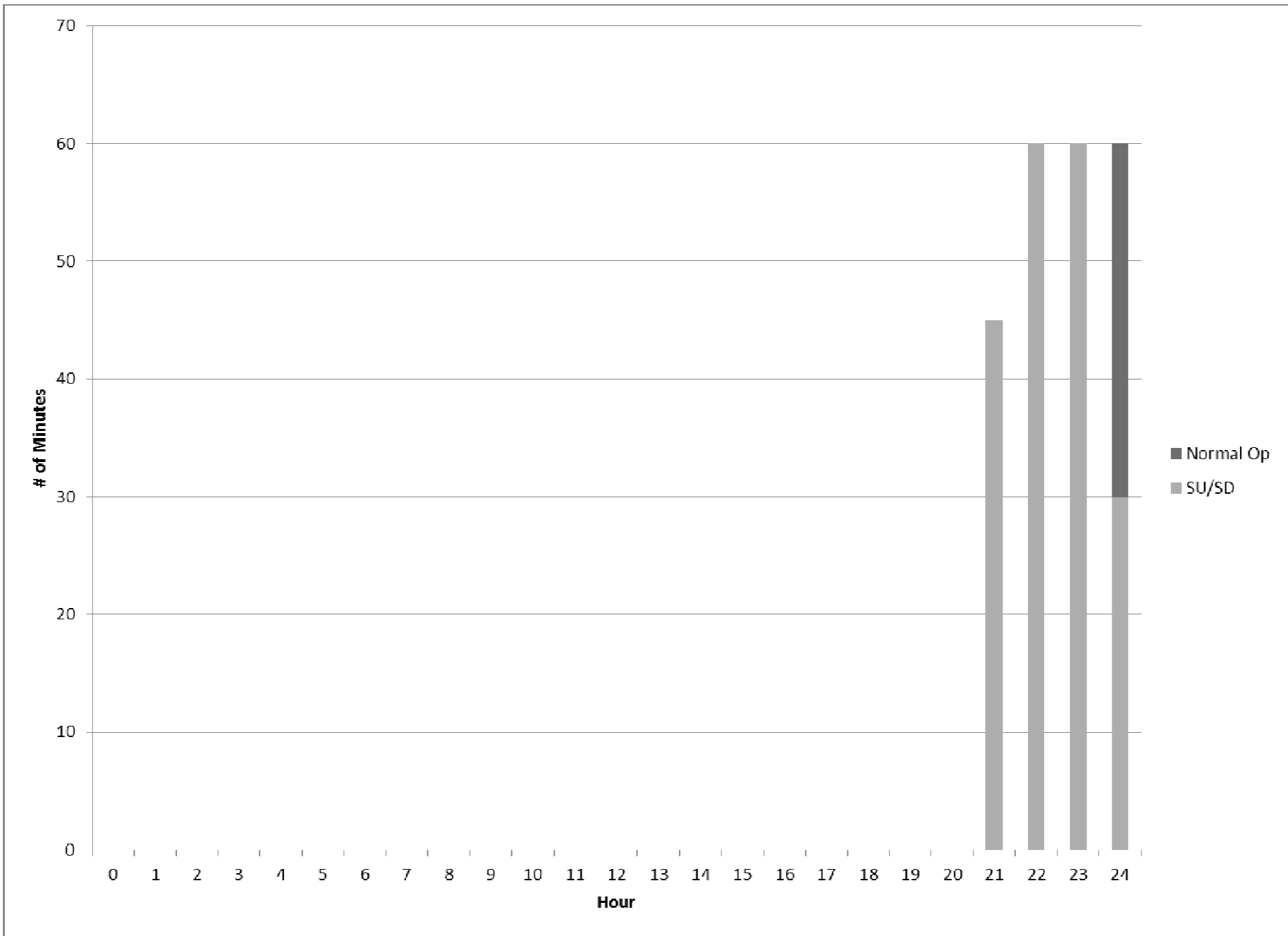
- Boiler Operating Day – 24-hour period (midnight to midnight) during which fuel is combusted at any time, excluding startup periods or shutdown periods
  - If all hours are startup/shutdown, it is not a boiler operating day
  - If one hour is normal operation, it is a boiler operating day and the appropriate hours for that day are included in 30-day average

# 30 Day Averages

- Boiler Operating Day

## ***THE PLOT THICKENS***

- If all hours are startup/shutdown, it is not a boiler operating day, but
- “You may choose to use one sorbent trap monitoring system to demonstrate compliance with the mercury emissions limit at all times (including startup periods and shutdown periods)”





# 30 Day Averages

- Common Stack Monitoring
  - Common stack boiler operating day is any calendar day during which any of the units combusts fuel, excluding startup and shutdown (any units in normal operation)
  - Common stack hourly values can only be excluded for startup/shutdown if none of the units are in normal operation

# 30 Day Averages

- Bypass Stack Monitoring
  - If both the main and bypass stack are monitored, 30-boiler operating day averages include both hourly averages from main stack and bypass stack
  - Rule does not specifically address simultaneous operation of main and bypass stack, but would use multiple stack (flow-weighted) procedures
  - If bypass stack is unmonitored, 30-day average is based only on main stack

# Summary of Calculations

- Is it a valid hour?

***Hourly validity is independent of SU/SD status***

- Is it a boiler operating day?

***Boiler Operating Day if one full hour during the day is “Normal Operation”***

***Partial hours of SU/SD are considered SU/SD***

- Which hours are included in 30-day averages?

***Include only “Normal” hours unless using a single set of traps***

# Emissions Averaging

- Emissions Averaging may be used if certain conditions are met
  - Existing units only
  - Same subcategory
  - Located at one or more contiguous properties
  - Under common control
  - Use CEMS and/or quarterly test data (not LEE)
- Pollutant-specific
- Either input-based or output-based for each pollutant (no mixing bases)

# Emissions Averaging

- Allow Units that “Over-Controlled” to Compensate for “Under-Controlled” Units
- Sounds pretty good to me, why not?
  - Emissions averaging plan submittal & approval
  - Errors in Equations
  - Anti Back-sliding wording
  - Future unit dispatch, outages, and startups

# Emissions Averaging

- Emissions Averaging Plan Submittal
  - 120 days prior to use
  - If Administrator requests submittal of plan, must receive approval before using Emissions Averaging
- No explicit procedure for changing your emissions averaging plan (e.g., removing or adding a unit)

# Emissions Averaging Caution

- The Maximum Weighted Average Emission Rate calculations used to demonstrate eligibility are not workable as written or as proposed
- Your emissions averaging plan may demonstrate eligibility based on the “intent” of the equations, but not based on the actual equations as written

# Emissions Averaging Caution

- Anti-backsliding provision
  - 63.10009(d)(1) Emission rate achieved during the initial performance test must not exceed the emission level that was being achieved at (the earlier of) the compliance demonstration date, the date on which emissions testing is done to support emissions averaging plan, or the date that you begin emissions averaging OR
  - 63.10009(d)(2) Control technology employed during initial performance test must not be less than design efficiency of the control technology at (the earlier of) the compliance demonstration date or the date that you begin emissions averaging



# Emissions Averaging Caution

*What we think it was intended to say:*

*You should maintain RELATIVELY consistent emission levels and control performance as you achieved during the initial performance test (don't turn controls off now that you're using emissions averaging)*

*What others may think:*

*Wording may be interpreted by agencies that you must maintain the EXACT emission levels and control efficiencies from the initial test or better (ignoring normal variations in process conditions and testing or monitoring uncertainties)*

# Emissions Averaging Caution

- Current and Future Dispatch of Units
  - What if your over-complying unit is offline for an extended period of time?
  - What if you have multiple startups or shutdowns in a 30-day period?

# Reporting

- The end result of the calculations will ultimately be reflected in your reports
  - Hourly records of PMA for Hg, HCl and SO<sub>2</sub>
  - Reporting to 3 “significant” figures problematic
  - 30-boiler operating day averages not reported for Hg, HCl, or SO<sub>2</sub> (track internally)
  - Hourly data not reported for PM
  - Obviously, HCl CEMS reporting will need a lot of work once PS-18 and Procedure 6 are finalized