Proposed Amended Rule 218.2

Continuous Emission Monitoring System: General Provisions

Proposed Amended Rule 218.3

Continuous Emission Monitoring System: Performance Specifications

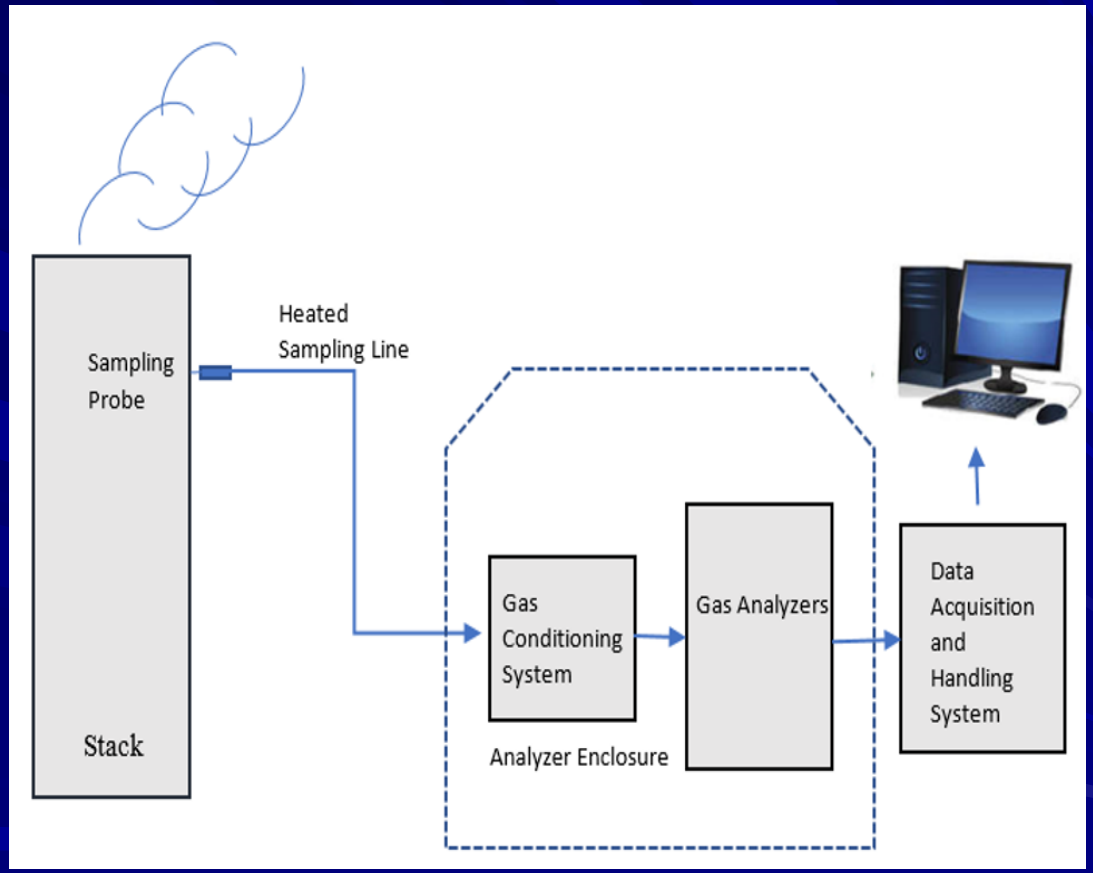
Public Workshop
March 30, 2022 10:00 am

Join Zoom Meeting - from PC or Laptop
https://scaqmd.zoom.us/j/92018155245
Zoom Webinar ID: 920 1815 5245 (applies to all)
Teleconference Dial In +1 669 900 6833

Background

- A typical Continuous Emission Monitoring System (CEMS) consists of:
  - Sampling system
  - Gas analyzers
  - Data acquisition and handling system
- CEMS can monitor multiple pollutants and parameters such as:

NOx | SOx | Carbon Monoxide | Carbon Dioxide | Oxygen | Air Flow | Flue Gas Opacity | Moisture



Background (*cont.*)

- CEMS monitoring rules:
  - Provide guidance and specifications for the CEMS installation and operation
  - Ensure accuracy and precision of the CEMS data

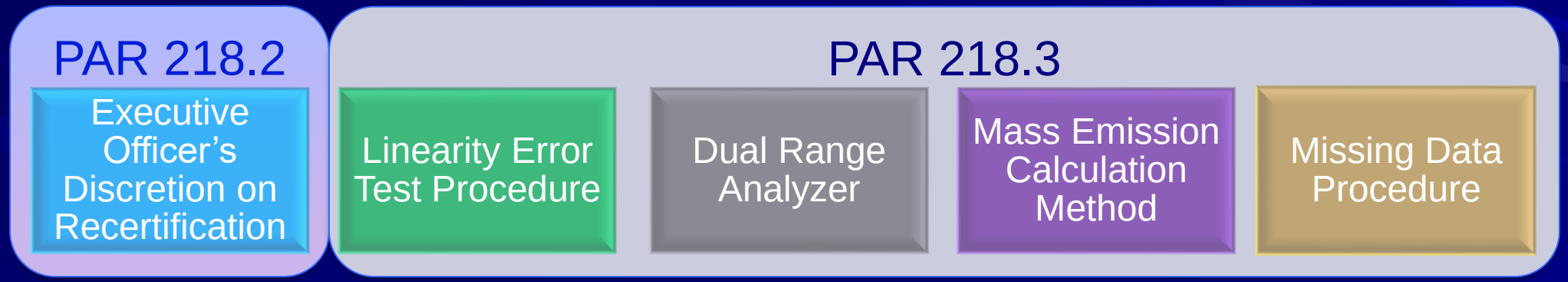
CEMS Monitoring Rules for RECLAIM Facilities	CEMS Monitoring Rules for Non-RECLAIM Facilities	CEMS Monitoring Rules for Non-RECLAIM and Former RECLAIM Facilities
• Rule 2011 – Requirements for Monitoring, Reporting, and Recordkeeping for SOx Emissions, and • Rule 2012 – Requirements for Monitoring, Reporting, and Recordkeeping for NOx Emissions	• Rule 218 – Continuous Emissions Monitoring, and • Rule 218.1 – Continuous Emissions Monitoring Performance Specifications, or	• Rule 218.2 – Continuous Emission Monitoring System: General Provision, and • Rule 218.3 – Continuous Emission Monitoring System: Performance Specification

Regulatory History

- Rules 218.2 and 218.3 were adopted on March 5, 2021 to:
  - Apply to former RECLAIM CEMS and Non-RECLAIM CEMS
  - Align CEMS requirements for RECLAIM facilities as they transition to a command-and-control regulatory structure
  - Include transition of Rules 218 and 218.1 to Rules 218.2 and 218.3
  - Streamline and provide more clarity to existing CEMS provisions
  - Codify existing practices to provide more transparency

Implementation Monitoring

- Staff has been monitoring Rules 218.2 and 218.3 implementation by:
  - Discussing the implementation with facilities with applications for CEMS certification under evaluation;
  - Meeting with CEMS vendors regarding their progress on software adjustments and customer feedback; and
  - Monitoring landing rule amendments and proposals as related to CEMS
- Some issues have been identified that can be resolved in a rule modification



Proposed Amended Rule 218.2

Executive Officer's Discretion on Recertification

- Rule 218 series requires certain case-by-case evaluations during CEMS certification/recertification
- Executive Officer's discretion may be required for some unique cases, addressed with rule language such as:
  - *"Determined by the Executive Officer that…"*
  - *"…unless the Executive Officer determines that…"*
- EPA advised staff to include more specificity to provisions that allow for Executive Officer's discretion

Executive Officer's Discretion on Recertification

- Staff is proposing the following revision to Rule 218.2 subparagraph (f)(1)(B) for additional specification

(f) Certification Requirements

(1) The owner or operator of a CEMS shall certify or recertify any CEMS that is:

(A) Installed after [*Date of Adoption*];

(B) Modified for any component that is either listed on the certification letter, Technical Guidance Document R-002, or Quality Assurance/Quality Control Plan, unless the Executive Officer determines that such modification would not impact data accuracy and certification or recertification is not necessary; or

(C) Determined by the Executive Officer that a CEMS recertification is required because the QA/QC or performance requirements for the CEMS cannot be achieved in accordance with Rule 218.3 subdivision (g).

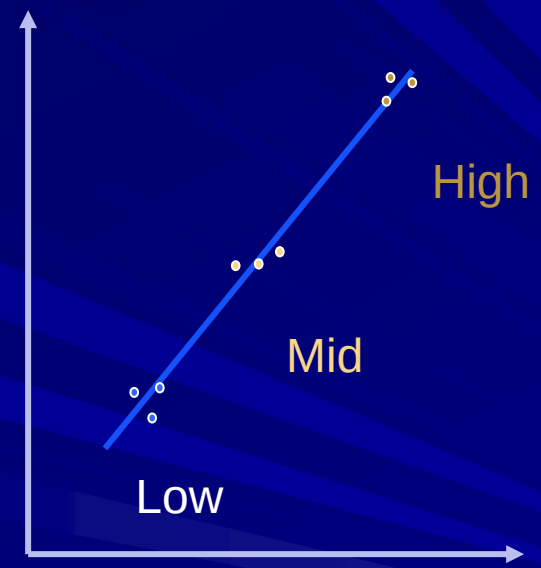
Proposed Amended Rule 218.3

Linearity Error Test Procedure

- Rule 218.3 subparagraph (f)(4)(F) specifies the linearity error test procedure
- Staff is proposing to include more detailed instruction for clarification

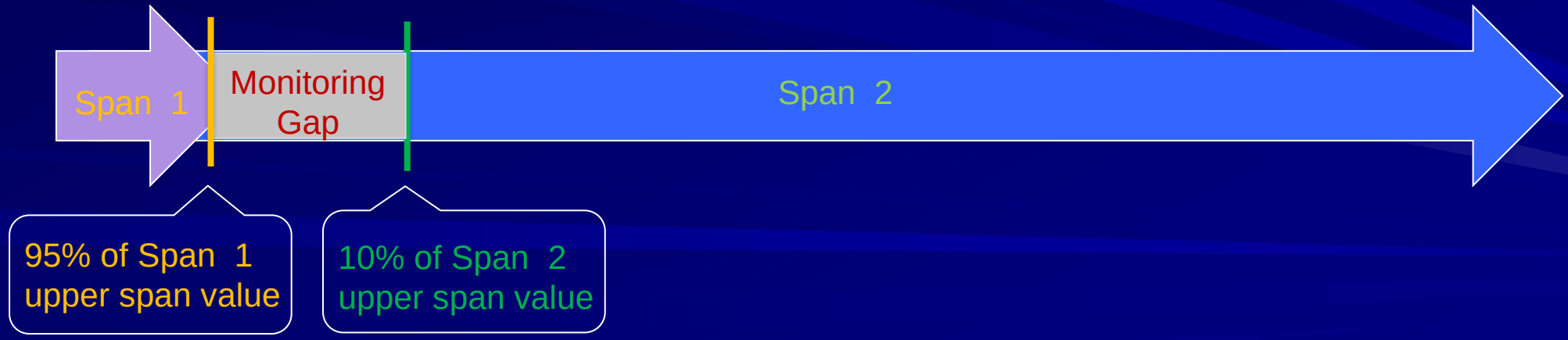
Linearity Error Test Procedure

- The proposed amendment clarifies the required data points and test sequence
  - Calibration gas at low (20-30%), mid (50-60%), and high (80-100%) ranges
  - Three data points for each calibration gas
  - Repeat test sequence in same order (e.g., low, mid, and high) until three data points for each level are acquired
    - The same calibration gas (e.g., low) shall not be tested twice in succession



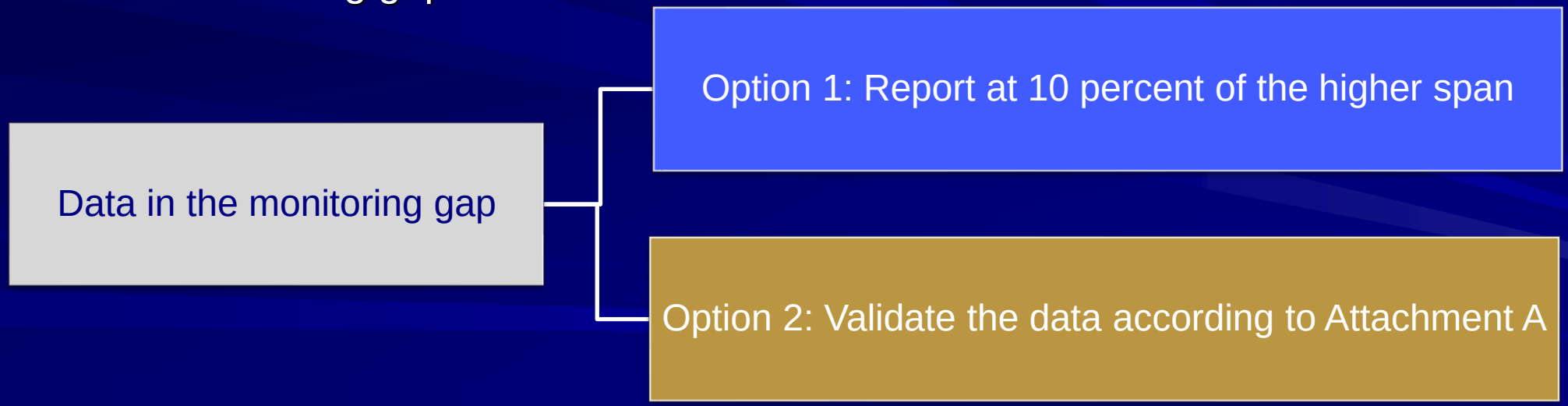
Dual Range Analyzer

- For a dual range span analyzer, when 95 percent of the lower span does not overlap with 10 percent of the higher span, an unintended monitoring gap results
- Rule 218.3 requires the data to be reported as 10 percent of the higher span, overestimating the emissions
- Stakeholders raised a concern that this overestimation could place the equipment out of compliance



Dual Range Analyzer

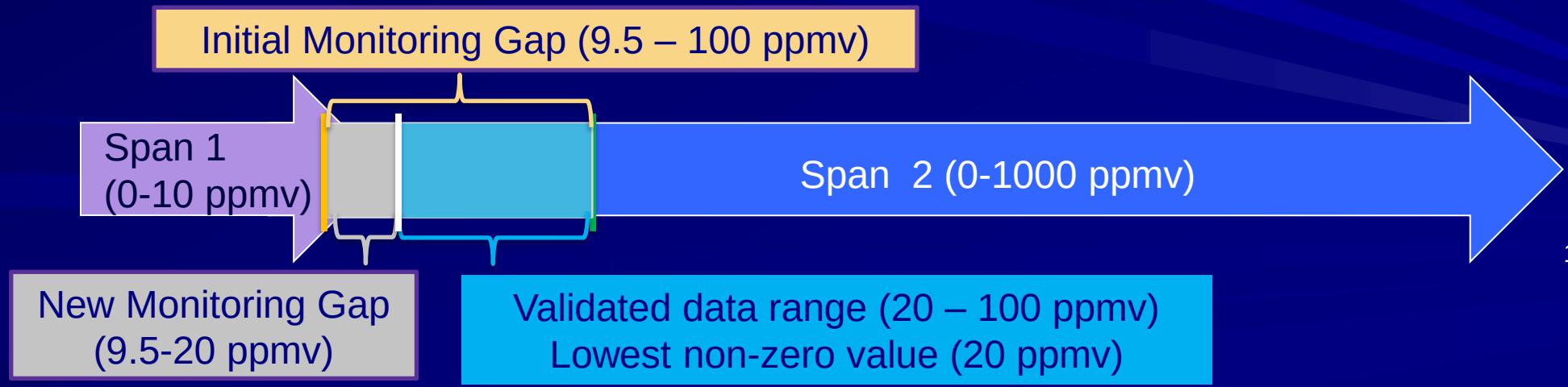
- Staff is proposing an additional option to validate the data in the monitoring gap
- To utilize this option, the CEMS should meet the Supplemental and Alternative Performance Requirements in Attachment A of Rule 218.3
  - Attachment A will be amended to include a three-point calibration (linearity error) option
  - A lowest non-zero value may be selected to validate the low end of the data range in the monitoring gap



Example of Proposed Validation Procedure

- Dual range analyzer with two span ranges:
  - Span 1: 0-10 ppmv
  - Span 2: 0-1000 ppmv

  } Monitoring gap: 9.5-100 ppmv
- Proposed validation procedure in the monitoring gap:
  - Choose lowest non-zero value: 20 ppmv
    - Can be any value in the monitoring gap but depends on the analyzer sensitivity
  - Demonstrate linearity for the data range of 20-100 ppmv with a three-point calibration
    - Data in the range of 20-100 ppmv can be reported as measured
    - Data in the range of 9.5-20 ppmv (new monitoring gap) reported at 20 ppmv



Mass Emission Calculation

- Rules 218.2 and 218.3 were developed for compliance with command-and-control pollutant concentration-based limits
  - Mass emission calculation not currently addressed
- Some landing rules include mass emission limit compliance options
  - Rules 1117, 1135, and 1109.1
- Rules 218.2 and 218.3 require an amendment to include data handling procedures to demonstrate compliance with mass emissions

Mass Emission Calculation

- Staff is proposing to include three calculation methods (equations) for hourly mass emission rates:
  - Stack gas concentration and volumetric flow rate;
  - Stack gas concentration, heat input rate and oxygen concentration; or
  - Stack gas concentration, heat input rate and carbon dioxide concentration

Table 5 - Mass Emission Calculation Equations

Mass Emission Calculation	Eq. #	Equation*	Where:
Based on stack gas concentration and volumetric flow rate	9	$e = a \times c \times 1.214 \times 10^{-7}$	e = The mass emissions of nitrogen oxides in pounds per hour. a = The stack gas concentration of nitrogen oxides averaged hourly (ppmv). c = The stack gas volumetric flow rate averaged hourly (scfh).
Based on stack gas concentration, heat input rate, and oxygen concentration *(Oxygen F factor approach)*	10	$e = a \times c_f \times 1.214 \times 10^{-7}$ $c_f = [20.9/(20.9 - b)] \times (F \times d \times V)$	e = The mass emissions of nitrogen oxides in pounds per hour. a = The stack gas concentration of pollutant averaged hourly (ppmv). c_f = The stack gas flow rate determined by oxygen-based F factor approach averaged hourly (scfh). b = The stack gas concentrations of oxygen measured (%). F = The oxygen-based dry F factor for the type of fuel (scf/10^6 Btu). d = The fuel flow rate for the type of fuel measured. V = The higher heating value of the fuel**.
Based on stack gas concentration, heat input rate, and carbon dioxide concentration *(Carbon dioxide F factor approach)*	11	$e = a \times c_{f/c} \times 1.214 \times 10^{-7}$ $c_{f/c} = (F_c \times d \times V) \times 100/t$	e = The mass emissions of nitrogen oxides in pounds per hour. a = The stack gas concentration of pollutant averaged hourly (ppmv). $c_{f/c}$ = The stack gas flow rate determined by carbon dioxide-based F factor approach averaged hourly (scfh). F_c = The carbon dioxide -based dry F factor for the type of fuel (scf/10^6 Btu). d = The fuel flow rate for the type of fuel measured. V = The higher heating value of the fuel**. t = The stack gas concentrations of carbon dioxide measured (%).

*NOx conversion factor 1.214×10^{-7} is based on standard temperature of 60°F.
** Default value in Table 6, if applicable, or as measured in a method approved by the Executive Officer.

Mass Emission Calculation

- Default higher heating values are listed in Table 6
  - Aligning with the values required in Regulation XX for RECLAIM CEMS

Table 6 - Default Higher Heating Value

Basic Equipment	Type of Fuel	Higher Heating Value of Fuel (Default)
Boilers, Ovens, Heaters, Furnaces, Kilns, Calciners, Dryers	Natural Gas	1050 mmBtu/mmscf
	LPG, Propane, Butane	94 mmBtu/mgal
	Diesel Light Dist. (0.05% S)	137 mmBtu/mgal
	Fuel Oil (0.1% S)	150 mmBtu/mgal
	Fuel Oil (0.25% S)	150 mmBtu/mgal
	Fuel Oil (0.5% S)	150 mmBtu/mgal
Internal Combustion Engines	Natural Gas	1050 mmBtu/mmscf
	LPG, Propane, Butane	94 mmBtu/mgal
	Gasoline	130 mmBtu/mgal
	Diesel Oil	137 mmBtu/mgal
Gas Turbines	Natural Gas	1050 mmBtu/mmscf
	Diesel Oil	137 mmBtu/mgal

Missing Data Procedure

- Mass emission limits must be demonstrated for specific averaging periods (e.g., 24 hours or 365-day rolling average)
- CEMS may have missing data for some periods of time due to maintenance or system malfunctioning
  - Missing data procedure required to fill data gaps for the mass emission calculation
- Staff has evaluated missing data procedures in 40 CFR Part 75, Regulation XX, and Rule 1109.1

Missing Data Procedure

- Staff proposes a simplified procedure as shown below, aligning with the missing data procedure specified in Rule 1109.1
- The substituted data are only enforceable for compliance demonstration on mass emission limits, not concentration limits (e.g., ppmv).

Missing data period ≤ 8 hours	Missing data period > 8 hours
Calculate missing data using the average of the recorded mass emissions for the unit operation hour immediately before the missing data period and the unit operation hour immediately after the missing data period	Calculate missing data using the maximum hourly mass emissions recorded for the previous 30 days with unit operation, commencing on the day immediately prior to the day the missing data occurred

Other Analysis/Assessment

- California Environmental Quality Act (CEQA) Analysis
  - The South Coast AQMD, as lead agency, is reviewing the proposed project and appropriate CEQA documentation will be prepared based on the analysis
- Socioeconomic Impact Assessment
  - A socioeconomic impact assessment will be conducted and released for public review and comment at least 30 days prior to the South Coast AQMD Governing Board Hearing

Next Steps – Rulemaking Process

- Written Comments – By April 13, 2022
- Stationary Source Committee – April 15, 2022
- Set Hearing – May 6, 2022
- Public Hearing – June 3, 2022

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