Requirements for Continuous Emission Monitoring

Proposed Amended Rules (PAR) 218 and 218.1

Working Group Meeting #5

September 12, 2019
1:30 pm

Telephone number: 1-866-705-2554
Passcode: 556560

South Coast AQMD Headquarters
Diamond Bar, California

Agenda

- Background and Approach
- Progress of Key Topic Discussion
- Revisit Key Topics and Address Comments
- New Key Topics for Today’s Discussion
- Key Topics for Future WG Meeting Discussion
- Next Step

Background and Approach

Background and Approach

- RECLAIM is transitioning to a command-and-control structure
- Current monitoring, reporting, and recordkeeping (MRR) requirements on CEMS are defined by:
  - Rule 218 and 218.1 for non-RECLAIM facilities
  - Rule 2012 Chapter 2 for RECLAIM facilities
- PAR 218 and 218.1 requirements would apply to
  - CEMS of any non-RECLAIM facility, former RECLAIM facility, or facility that is required by a landing rule to comply with Rule 218/218.1
  - Harmonize requirements for key topics

Progress of Key Topic Discussion

Overall Approach to Address Key Topics*

*Key topics related to proposed rule language

Progress of Key Topics Discussion

Key Topics	Discussion	Initial Recommendation
1. PAR 218/218.1 Applicability ➢ Any change?	Applicable to all pollutants, but the focus of this amendment will be on NOx MRR requirements	No changes to applicability
2. Semi - Continuous Emission Monitoring System (SCEMS) ➢ Any change to its requirements?	• R218/218.1 includes time-shared CEMS in SCEMS definition • Rule 2012 has specification on time-shared CEMS • No impact to NOx sources to retain R218/218.1 SCEMS requirements	• No changes to definition of SCEMS • Retain SCEMS requirements in PAR 218/218.1

Progress of Key Topics Discussion – cont.

Key Topics	Discussion	Initial Recommendation
3. NO2 to NO Conversion efficiency test ➢ Required?	Specified in Rules 218/218.1 but not in Rule 2012	Require NO2 to NO conversion efficiency test
4. Reporting excess emissions ➢ Also applicable to non-Title V source CEMS?	Would impact RECLAIM CEMS of non-Title V sources that report all mass emissions but not excess emissions	Require reporting excess emissions for both Title V and non-Title V sources with CEMS
5. The standards for “existing” CEMS ➢ Still applicable?	Obsolete requirements in Rules 218/218.1	Remove the requirement

Progress of Key Topic Discussion – cont.

Key Topics	Discussion	Initial Recommendation
6. Full Span Range (FSR) ➢ Any change to existing requirements? ➢ What if most of data falls below 10% of the range? ➢ Is low value calibration gas available?	With concentration limit being established for facilities exiting RECLAIM, their Full Span Range should be aligned with the Rules 218/218.1 requirements *Comment:* Concern on availability of low value calibration gas	• Use the Rules 218/218.1 requirements • Provide additional recommendation for data that falls below 10% of the range • Further discussion at today's meeting
7. Missing Data Procedure ➢ Applicable?	Required for RECLAIM sources, but no longer needed for concentration based monitoring	Remove the requirement

Progress of Key Topic Discussion – cont.

Key Topics	Discussion	Initial Recommendation
8. Strip chart recorder ➢ Continue to require?	The existing CEMS Data Acquisition and Handling System (DAHS or DAS) would be sufficient	Remove the requirement
9. Quality assurance (QA) test report submittal ➢ Extend the requirement to all CEMS?	• Not required by Rules 218/218.1 • Required by Rule 2012 • RECLAIM facilities submit QA test report summary by Electronic Data Reporting (EDR)	Require all PAR 218/218.1 facilities submit QA test report for all applicable pollutants via EDR

Progress of Key Topic Discussion – cont.

Key Topics	Discussion	Initial Recommendation
10. PAR 218/218.1 alignment with EPA's Part 75 ➢ How to align?	• An analyzer at or below 30 ppm span level is common in this area; • PAR 218/218.1 are also applicable for pollutants not regulated by Part 75; • Part 75 linearity check data could be used to calculate CGA; • PAR 218/218.1 CEMS monitored units may often have off-line time	• Continue to require CGA instead of linearity check; • May allow linearity check as an alternative in complying with CGA requirement; • Continue to allow certain tests to be conducted off-line

Progress of Key Topic Discussion – cont.

Key Topics	Discussion	Initial Recommendation
11. CEMS data availability threshold ➢ Can the rule be more specific and clear on this requirement? ➢ What will be required if it exceeds the threshold? ➢ What can be excluded from data availability calculation?	Current R218/218.1 • Defines data availability on an annual basis • Requires 95% as the threshold for data availability • Excludes 40 hours of CEMS calibration, maintenance, repair, or audit each month from data availability calculation	• Clarify the definition and calculation method for data availability; • Exclude the startup and shutdown hours allowed by permit condition from data availability calculation • Exclude CEMS maintenance, repair or audit for up to 120 hours/year (10 hours/month) • When data availability falls below 95%, certain requirements could be triggered • Further discussion at today's meeting

Comment: Rolling annual data availability could penalize facility beyond the data loss period

Comment: Daily calibration for a CEMS with multiple pollutants may not allow the generation of a valid hour

Progress of Key Topic Discuss

Comment 1: Difficult to meet this alternative standard;
Comment 2: Should have data to support the recommendation for alternative standard

Key Topics	Discussion	Initial Recommendation
12. CEMS measuring low emissions ➢ What are the challenges on passing QAQC test?	Stakeholders expressed difficulty meeting a 7-day calibration drift standard for CEMS measuring low emissions	• Considering an alternative standard • Analysis on in-house data for NOx ranging from 2 ppm to 50 ppm indicating no difficulty for CEMS measuring low emission • Further discussion at today's meeting
13. Certification testing ➢ Any change?	Certification testing requirements were summarized at the WG meeting	• Remove the requirements specific for RECLAIM (e.g., bias test for bias adjustment factor) • Update the Rule 218/218.1 guidance document for certification test accordingly

Progress of Key Topic Discussion – cont.

Key Topics	Discussion	Initial Recommendation
14. Recertification and diagnostic tests ➢ Any changes?	Any modification that may affect the description on the CEMS certification letter would require the CEMS application (Form ST-220) and the applicable tests according to Technical Guidance Document R-002	• The recertification requirements should not change • PAR 218/218.1 will provide clarification for recertification requirements • Staff will assess if the guidance document should be updated

Progress of Key Topic Discussion – cont.

Key Topics	Discussion	Initial Recommendation
15. Performance Standards for Relative Accuracy Test Audit (RATA) ➢ What will be the changes to the relative accuracy standards and *de minimis* standards for RATA?	Relative accuracy and *de minimis*/Alternative Standards required by different regulations were compared	• No change to the relative accuracy standards in PAR 218/218.1 (10% for O2/CO2, 20% for NOx concentration and mass emission, and 15% for flow); • Specify calculation method on meeting *de minimis* standards; • Retain R218/218.1 *de minimis* standards, but add *de minimis* 1.0% for CO2 and reduce the current NOx *de minimis* standard from 1.0 ppm to a lower level • When the measured O2/CO2 is at or below 15%, allow 20% RA for O2/CO2 with Executive Officer's approval

Progress of Key Topic Discussion – cont.

Key Topics	Discussion	Initial Recommendation
16. The option of complying with Part 60 Appendices B & F (*alternative to Rule 218.1 standards*) ➢ Shall the permit holders refer to R218.1 only or have the option to refer to Part 60 for CEMS certification and QAQC requirements?	Analyzed the differences between Part 60 and R218.1 on: • Certification tests • 7-day drift standard • Out-of-control period • Data point >95% of span • RATA standard • Operation load for RATA • Numbers of runs for RATA • Calibration gas requirement	• Phase out Part 60 option for those requirements • EO has discretion to approve otherwise (e.g., Operation load for RATA below normal load) • Requirements will be effective at next CEMS recertification • Additional recommendation regarding valid hour and hourly averaging will be discussed at today's meeting (Key topic #18)

Comment: Need Part 60 option to ensure biogas can pass calibration

Progress of Key Topic Discussion – cont.

Key Topics	Discussion	Initial Recommendation
6, 11, and 12	Discussion Today	Revisit for additional recommendations
17. Relief on CEMS operation and data availability	Discussion Today	Pending
18. Valid hour and hourly average	Discussion Today	Pending
19. Calibration gas	Discussion Today	Pending
20. Alternative CEMS	Discussion Today	Pending

Progress of Key Topic Discussion – cont.

Key Topics	Discussion	Initial Recommendation
21. Spiking data (data over 95% of span)	Future WG Meeting	Pending
22. Alternative data acquisition for CEMS out-of-control period	Future WG Meeting	Pending
23. Reporting – summary of emission data	Future WG Meeting	Pending
24. Rule structure	Future WG Meeting	Pending
Other Topics	Future WG Meeting	Pending

Revisit Key Topics and Address Comments

Key Topic #6

Full Span Range Requirements

- Initially proposed to retain existing span range requirements
- Proposed additional recommendation at WG #4
- Stakeholder made a comment at WG #4 concerning availability of low value calibration gas

Key Topic #6

Full Span Range Requirements – cont.

For the concern on availability of low value calibration gas

Solution 1:

Allow span range to be set at a higher value upon approval for CEMS monitoring a unit with emission limit at or below 5 ppm (e.g., Turbines with 2 or 2.5 ppm limit)

Solution 2:

Alternative certification protocol (upon approval) for calibration gas (Key Topic #19)

Full Span Range Requirements – Additional Recommendations

Key Topic #6

Existing Span Range Requirements

All data points

- Within 10 – 95% of the range

Full Span Range

- Set at 150 – 200% of the concentration limit

Additional Recommendations at WG #4

Allow data below 10% of the range reported at the 10% of the range as valid data, or use the low value spike method, when span is set at:

- 150 – 200% of the concentration limit

Additional Recommendations

Span range may be set otherwise upon approval

- For CEMS monitoring a unit with emission limit at or below 5 ppm (e.g., Turbines with 2 or 2.5 ppm limit)
- For CEMS monitoring emissions that are much lower than the applicable limit (e.g., CO analyzer)

Key Topic #11

CEMS Data Availability Requirements – Period for Computation

Question

Is R218/218.1 data availability calculated on a quarterly or annual basis?

Comment

Rolling annual data availability could penalize facility beyond the data loss period

Key Topic #11

CEMS Data Availability Requirements – Period for Computation

- Existing requirement on period for computation by various regulations

Monthly	Quarterly	Annually
• Alberta Environmental Protection –CEMS Code (1998) (Calendar month)	• New Jersey Department of Environmental Protection- CEMS Manual - 2001 • State of Ohio – a permit (2006) (Calendar quarter)	• Part 75 • RECLAIM R2012 • R218/218.1

CEMS Data Availability Requirements – Period for Computation – Recommendation

Key Topic #11

Propose to compute data availability on a calendar quarter basis

While data availability on an annual basis is essential in Part 75 and RECLAIM R2012 in applying a reasonable Missing Data Procedure (MDP), it is not as essential in PAR 218/218.1 which does not require MDP

This proposal aligns with the requirements proposed for situations when data availability falls below 95% (See WG meeting #4 presentation for difference requirements depending if it is one or two consecutive quarters below 95%)

Low data availability of previous calendar quarter would not affect data availability of any subsequent calendar quarter (Addresses previous comment)

CEMS Data Availability Requirements – Period for Computation – Recommendation – cont.

Key Topic #11

- Calculate data availability using the following equation:

W = Y/Z x 100%

Where:

W = the percent calendar quarter monitor availability

Y = the total emitting source operating hours for which the monitor provided quality-assured data during the calendar quarter

Z = the total emitting source operating hours during the calendar quarter

Key Topic #12

CEMS Measuring Low Emissions – Alternative Standard for 7-day Drift Test

Stakeholders Comment at WG #2 (5/2/2019)

- Difficulty meeting a 7-day calibration drift standard for CEMS measuring low NOx emissions at initial certification

Staff Analysis & Consideration

- Reviewed in-house data for NOx ranging from 2 ppm to 50 ppm but found no difficulty for CEMS measuring low emission
- Stakeholders did not provide supporting data but recommended that the NOx cut off level for determining the alternative standard should be 10 ppm
- Staff proposed NOx 0.3 ppm as an alternative standard at WG #4

Stakeholders Comment at WG #4 (8/1/2019)

- *Comment 1*: Difficult to meet the alternative standard (0.3 ppm) that was proposed
- *Comment 2:* Should have data to support the recommendation

Key Topic #12

CEMS Measuring Low Emissions – Alternative Standard for 7-day Drift Test - Update on Proposal

- Current 7-day calibration drift standard (2.5% of Reference Method) is universally referenced by EPA and local agencies
- Staff will withdraw the alternative standard proposed at WG #4 and maintain the existing standard.
- Would consider an alternative proposal based on additional valid data received from stakeholders

New Key Topics for WG #5 Discussion

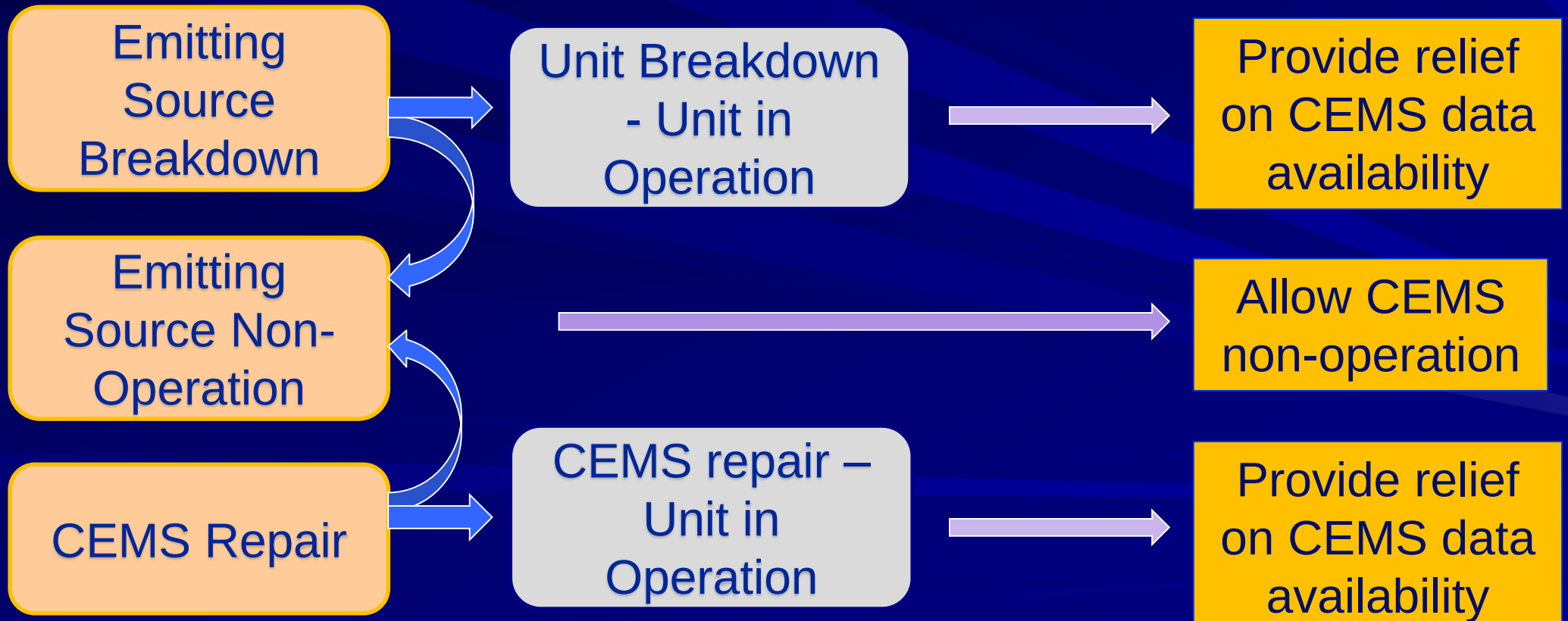
New Key Topics for Today's WG Meeting

17. Relief on CEMS operation and data availability
18. Valid hour and hourly average
19. Calibration gas
20. Alternative CEMS

Key Topic #17

Relief on CEMS operation and data availability

- Requests by stakeholders at WG #4 for relief on CEMS operation and data availability for the following situations:



Relief on CEMS Operation and Data Availability - CEMS Non-Operation

Key Topic #17

- Existing requirements by R218/218.1 and R2012:
  - CEMS shall operate at all times, except during a scheduled or unscheduled CEMS maintenance/repair:
    - ✓CEMS non-operation is allowed for up to 96 hours; and
    - ✓Can be extended for additional hours, specified differently by R2012 and R218/218.1
      - ❖ *R2012:* an additional 96 hours allowed if the emitting source is not operating and monitor for the stack flow or concentration indicates non-operation status
      - ❖ *R218/218.1:* additional hours with an interim variance

Relief on CEMS Operation and Data Availability - CEMS Non-Operation – Initial Recommendation

Key Topic #17

- During a scheduled or unscheduled CEMS maintenance/repair
  - Allow CEMS non-operation for up to 96 hours
  - May extend it for additional 96 hours if the emitting source is not operating, demonstrated by
    - Disconnected fuel line or zero fuel flow with a dedicated fuel meter (Stack flow monitoring is not referenced for this purposes as it is not required for non-RECLAIM sources)
  - Will require variance for further additional hours

Relief on CEMS Operation and Data Availability - CEMS Non-Operation – Initial Recommendation – cont.

Key Topic #17

- Additional proposal:
  - Allow CEMS non-operation when the emitting source is shut down for ≥ 7 consecutive days (168 consecutive hours), provided all the following requirements are met:
    - Applicable for combustion emitting sources only (not for any source with process emissions)
    - Require notification, written report, and recordkeeping
    - Disconnect the fuel line or demonstrate zero fuel flow with a dedicated fully operational quality assured fuel meter
    - Continue to operate the CEMS by showing zero emission for x hours after emitting source stops operation, and restarts the CEMS x hours before emitting source resumes operation
    - Calibrate the CEMS before any emission is detected upon emitting source restart

Relief on CEMS Operation and Data Availability - Hours to Exclude from Data Availability

Key Topic #17

- Existing requirements for the number of hours that can be excluded from data availability computation:
  - ✓R218/218.1: Can exclude up to 40 hours/month for CEMS calibration, maintenance, repair, or audit
  - ✓R2012: No exclusion

Relief on CEMS Operation and Data Availability - Hours to Exclude from Data Availability – Recommendations

Key Topic #17

- Recommended at WG #4 for hours to exclude from data availability calculation
  - Startup and shutdown exempted by permit condition from complying with any emission limit
  - CEMS maintenance, repair or audit for up to 120 hours/year (10 hours/month)
    - 30 hours/month already counted for daily calibration (valid QAQC hour per Topic #18)
- Additional recommendation for hours to exclude
  - A valid emitting source Breakdown that meets Rule 430 Breakdown Provisions
    - A valid Breakdown is exempted from complying with emission limit for non-RECLAIM sources by Rule 430 (for RECLAIM sources by Rule 2004 (i))

Key Topic #18

Valid Hour and Hourly Average

- Current R218/218.1 does not have specification on valid hour and hourly average method
  - Non-RECLAIM R218/218.1 sources are either referring to Part 60 or RECLAIM R2012 for data handling
- PAR 218/218.1 should specify and harmonize the requirements for valid hour and hourly average

Valid Data Points Required for a Valid Hour

Key Topic #18

	40 CFR Part 60 & 75	RECLAIM Rule 2012	Rule 218/218.1
Full operating clock hour*	• Minimum one valid data point in each operating quadrant hour	• Same	• No specification
Partial operating clock hour*	• Minimum one valid data point in each operating quadrant hour (no recording required for non-operation period)	• Same; and • Non-operation quadrant hours recorded as valid zero	• No specification
Maintenance/QAQC hour	• Minimum two valid data points separated by >=15 minutes if unit operates for more than one quadrant hour • Minimum one valid data point if the unit operates in only one quadrant hour	• Maximum four 1-hour maintenance/QAQC periods each day • Minimum two valid quadrant hours for a valid hour	• No specification

* Clock hour is a period of time from zero to sixty minutes for each hour in the 24-hour day

Key Topic #18

Hourly Average Method

Part 60 and Part 75

Hourly average is calculated using all the required valid data points

RECLAIM Rule 2012

A valid quadrant hour is calculated using required valid data points in the quadrant hour

Hourly average is then calculated using the required valid quadrant hour

Rule 218/218.1

No specification

Key Topic #18

Valid Hour and Hourly Average – Summary on Current Requirement

- Part 60 and Part 75 are aligned on valid hour and hourly averaging
- RECLAIM CEMS requirements differ on
  - Valid data points for maintenance/QAQC hour
  - Hourly average calculation
- R218/218.1 does not specify valid hour and hourly average
  - Most of R218/218.1 CEMS refer to Part 60 data handling method

Valid hour and Hourly Average – Initial Recommendation

Key Topic #18

For PAR 218/218.1	Specify valid hour and hourly average according to Part 60 & Part 75 method
For RECLAIM CEMS	CEMS with RECLAIM averaging method may continue until the next CEMS recertification as a result of any change needed to meet the landing rule NOx limits

Key Topic #18

Valid hour and Hourly Average – Initial Recommendation – cont.

Demonstrate compliance for a 15-minute interval*	Emission data may be averaged for each 15-minute quadrant of the hour in which the unit operates, utilizing all valid data points
Demonstrate compliance for an interval greater than 1-hour*	Emission data may be averaged for the required interval utilizing 1-hour averages computed in accordance with PAR 218/218.1
Concentration correction by diluent gas (e.g., NOx @ 3%O2)	Performed with the averaged value at the interval required for compliance demonstration

*The comparable requirement of a landing rule may supersede this

Key Topic #19

Calibration gas

- Existing requirement for calibration gas varies for RECLAIM R2012 and non-RECLAIM R218/218.1
- PAR 218/218.1 should harmonize the requirements and also take into consideration of stakeholder's comments (e.g., Availability of low value calibration gas)

Key Topic #19

Calibration gas

- Existing requirements

Category	R2012	R218/218.1
Calibration gas	• EPA Protocol Gases • National Institute of Standards and Technology (NIST)/EPA approved standard reference materials • Certified reference materials	• EPA Protocol Gases • Alternative certification protocol upon approval

** Certified according to "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards," September 1997 , EPA 600/R-97/121 or any subsequent version published by EPA*

Calibration gas – Initial Recommendation

Key Topic #19

- Proposed requirements
  - EPA Protocol gases
  - NIST standard reference materials;
  - A standard reference material-equivalent compressed gas primary reference material;
  - NIST traceable reference material;
  - NIST/EPA-approved certified reference materials;
  - If not covered by any of above programs, and upon approval by the Executive Officer, facility may use NIST research gas mixture, gas manufacturer's intermediate standard, or gas manufacturer's alternative certification protocol for the specific compound or compounds

Alternative CEMS

Key Topic #20

- R218/218.1 does not have a provision for Alternative CEMS
- Currently there are eight Alternative CEMS certified through RECLAIM R2012 according to 40 CFR Part 75 Subpart E specifications
  - They will be subject to PAR 218/218.1 after existing RECLAIM
- PAR 218/218.1 should incorporate requirements for Alternative CEMS

Alternative CEMS – Existing Requirements

Key Topic #20

- R2012 Chapter 2
  - May request to approve an alternative monitoring device (or system components) to quantify the emissions of NOx
  - Demonstrate that the proposed alternative monitoring device is at a minimum equivalent in relative accuracy, precision, reliability, and timeliness to a CEMS for that source, according to the criteria specified in 40 CFR Part 75 Subpart E

Alternative CEMS - Initial Recommendation

Key Topic #20

- For PAR 218/218.1, use R2012 Chapter 2 Alternative CEMS certification requirements
  - Certifying Alternative CEMS according to the criteria specified in 40 CFR Part 75 Subpart E

Recap – Key Topics Discussed today

Initial or additional recommendation was provided for each topic below:

6. Full Span Range requirements – Additional recommendations
11. CEMS data availability threshold – Calendar quarter basis
12. CEMS measuring low emissions – Need data to propose alternative standard for 7-day drift test
17. Relief on CEMS Operation and Data Availability – The exempted period
18. Valid hour and hourly average – Part 60 & Part 75 method
19. Calibration gas – Extended specification
20. Alternative CEMS – Apply R2012 requirements

Recap – Response to Comments Made at WG #4

Concern on availability of low value calibration gas

- Will propose additional recommendation for span range requirement
  - Span range may be set otherwise upon approval for CEMS monitoring a unit with emission limit at or below 5 ppm (e.g., Turbines with 2 or 2.5 ppm limit)
- May allow alternative procedure for certified calibration gas

Low data availability may not be able to improve even without further data loss if it is on the annual basis

- Propose to compute data availability on a calendar quarter basis

Recap – Response to Comments Made at WG #4 – cont.

Alternative Standard for 7-day calibration drift test

Comment 1: Difficult to meet this alternative standard

Comment 2: Should have data to support the recommendation

- Staff will withdraw the alternative standard proposed at WG #4 and maintain the existing standard.
- Would consider an alternative proposal base on additional valid data received from stakeholders

Recap – Response to Comments Made at WG #4 – cont.

Daily calibration for a CEMS with multiple pollutants may not allow the generation of a valid hour	• Dividing the calibration into different hours could ensure each calibration hour to be a valid hour
Should consider biogas which may be more difficult to pass calibration (need the Part 60 option for compliance)	• Calibration gas is used for calibration check which is independent of the unit fuel use • Any fuel sensitive requirement should be addressed in the landing rules

Recap – Response to Comments Made at WG #4 – cont.

Unit Breakdown - Unit in Operation

- CEMS shall remain on
- Propose to exclude the valid Breakdown hours from data availability calculation

Unit Non-Operation

- Propose to allow CEMS not operating during unit non-operation period
- At which time, CEMS non-operation hours are not counted in data availability

CEMS repair – Unit in Operation

- CEMS operation not exempt, and CEMS non-operation would be covered by the 96 hours allowance, or variance
- May be counted in data availability calculation, unless it is covered by
  - The allowance of up to 120 hours/year (10 hours/month), or
  - Permit condition allowed startup and shutdown, or a valid unit Breakdown

Key topics for the next Working Group Meeting

21. Spiking data (data over 95% of span)
22. Alternative data acquisition for CEMS out-of-control period
22. Reporting – summary of emission data
23. Rule structure

Next Steps

- Next Working Group Meeting – October, 2019
- Public Hearing – December, 2019

Staff Contacts
Rule 218/218.1 Development

- Yanrong Zhu
  Air Quality Specialist
  (909) 396-3289
  yzhu1@aqmd.gov

- Gary Quinn, P.E.
  Program Supervisor
  (909) 396-3121
  gquinn@aqmd.gov

General and Landing Rule Contacts

General RECLAIM Questions

- Gary Quinn, P.E.
  Program Supervisor
  (909) 396-3121
  gquinn@aqmd.gov

- Kevin Orellana
  Program Supervisor
  (909) 396-3492
  korellana@aqmd.gov

Rules 1146

- Lizabeth Gomez
  Air Quality Specialist
  (909) 396-3103
  lgomez@aqmd.gov

Rule 1110.2

- Kevin Orellana
  Program Supervisor
  (909) 396-3492
  korellana@aqmd.gov

General and Landing Rule Contacts – cont.

Rule 1135

- Uyen-Uyen Vo
  Program Supervisor
  (909) 396-2238
  uvo@aqmd.gov

Rule 1134

- Michael Morris
  Planning and Rules Manager
  (909) 396-3282
  mmorris@aqmd.gov

Proposed Rule 1109.1

- Sarady Ka
  Air Quality Specialist
  (909) 396-2331
  ska@aqmd.gov

Proposed Rule 1179.1

- Melissa Gamoning
  Assistant Air Quality Specialist
  (909) 396-3115
  mgamoning@aqmd.gov

General and Landing Rule Contacts – cont.

Proposed Rule 1147.1

- Shawn Wang
  Air Quality Specialist
  (909) 396-3319
  swang@aqmd.gov

Proposed Rule 1147.2

- James McCreary
  Assistant Air Quality Specialist
  (909) 396-2451
  jmccreary@aqmd.gov

Proposed Rule 1150.3

- Lisa Wong
  Assistant Air Quality Specialist
  (909) 396-2820
  lwong@aqmd.gov