Proposed Amended Rule 1466 (PAR 1466) Control of Particulate Emissions from Soils with Toxic Air Contaminants

Instrument Sub-Committee Meeting #1

March 23, 2021

Join Zoom Meeting:

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Agenda

- PAR 1466 Instrument Sub-Committee
- Presentation Format
- Proposed Rule Language for:
  - Monitoring Requirements (Subdivision (d))
  - Appendix 1 – Rule 1466 Approved PM_{10} Monitors
  - Appendix 2 – Procedures to Demonstrate Intra-Instrument Precision
- Next Steps

PAR 1466 Instrument Sub-Committee

- Comprised of instrument manufacturers, rental companies, consultants, industry, environmental groups, community members, and public agencies

- Today's meeting will focus on revisions made to the monitoring portions of the proposed rule language since the Public Workshop

- Objectives are to seek input on industry terms and practices and build consensus on updated monitoring requirements
- Ensuring monitoring requirements are met is important so that clean-up projects are completed in timely manner and rule compliance is maintained

Presentation Format

- Staff will present excerpts of proposed rule language related to monitoring requirements
- Staff will identify revisions made since the Public Workshop (blue box) and rule language needing stakeholder input (orange box)
- Example:

2. Performance Requirements

2.1~~3~~. PM_{10} monitors ~~must~~ shall have the following minimum performance standards:

2.1.a. Range: 0 - ~~10,000~~ 1,000 µg/m^3;

2.1.b. Accuracy, determined through factory testing against a U.S. EPA Federal Reference Method or Federal Equivalent Method, or Best Available Technology, to show: ±5% of reading ± precision or coefficient of determination (R^2) of ≥ 0.95 through simple linear regression;

2.1.c. Resolution: 1.0 µg/m^3;

2.1.d. Flow control accuracy of ±5% of factory setpoint; and

2.1.~~d~~e. Measurement Cycle: User selectable (~~30~~thirty minute and ~~2~~ two hour).

2.2 Monitors that have a valid *Monitoring Certification Scheme* certification meeting the latest version of the *Monitoring Certification Scheme (MCERTS): Performance Standard for Indicative Ambient Particulate Monitors* may be exempt from meeting the performance requirements listed above, but shall meet all stated physical requirements.

Revision made after the Public Workshop

Rule language needing stakeholder input

Monitoring Requirements

Subdivision (d)

Additional QA/QC Procedures

Subparagraphs (d)(3)(G)-(I)

(G) On and after January 1, 2022, operating PM_{10} monitors with the heated sampler inlet on;

(H) On and after January 1, 2022, prior to conducting any on-site earth-moving activities, and weekly thereafter, run intra-instrument precision tests with the PM_{10} monitors in accordance with *Appendix 2 – Procedures to Demonstrate Intra-Instrument Precision,* demonstrating an intra-instrument precision of:

(i) No more than 25 percent as calculated pursuant to *Appendix 2* – 7a when the ambient PM_{10} concentrations are greater than or equal to 15 micrograms per cubic meter; or

(ii) No more than 5 micrograms per cubic meter as calculated pursuant to *Appendix 2* – 7b if the ambient PM_{10} concentrations are less than 15 micrograms per cubic meter; and

(I) On and after January 1, 2022, each day prior to conducting on-site earth-moving activities, perform a zero calibration in accordance with manufacturer's instructions, followed by a manual zero test on each PM_{10} monitor in accordance with *Appendix 2* – 4 and 5, that demonstrates an average PM_{10} concentration of zero ± 2 micrograms per cubic meter.

- Is ≤25% relative standard deviation achievable?
- Is 15 µg/m^3 an appropriate cutoff for this precision limit?
- Is ≤5 µg/m^3 absolute value achievable if ambient PM_{10} <15 µg/m^3?

- What are the pass/fail criteria for zero calibrations?
- What are range of precision limits (+/-) for zero tests?
- Which instruments are capable of easily performing a manual zero test?

Moving Monitors When Wind Direction Shifts

New Paragraph (d)(5)

(5) In lieu of complying with clauses (d)(3)(B)(i), (d)(3)(B)(ii), and subparagraph (d)(4)(D), the owner or operator can elect to place a minimum of one upwind monitor in the upwind direction of the area(s) of on-site earth-moving activity, indicative of background PM_{10} levels, and not generally influenced by fugitive dust sources from the site, a minimum of one downwind monitor in the downwind direction of the area(s) of on-site earth-moving activity, and move the monitors accordingly when there is a change in wind direction. If the owner or operator elects to use this option, the owner or operator:

(A) May be excluded from the requirements specified in paragraph (d)(1) when moving the monitors, but no longer than 15 minutes after the start of monitor movement when there is a change in wind direction; and

(B) Shall calculate the PM_{10} concentration by subtracting the results of the downwind monitor(s) from the upwind monitor(s) for the same averaging period, where:

(i) The missing data due to monitor movement is calculated using the average of the recorded emissions for the 15 minutes immediately before the missing data period.

Added provision addressing moving of monitors when there is a change in wind direction

At what degree of wind change or duration of the wind shift do operators decide to move monitors?

Is 15 minutes sufficient time to move monitors?

- How do operators calculate the two-hour average concentration when there's a missing data period due to moving monitors?
- Is the proposed 15-minute average feasible for the data software to calculate and incorporate into two-hour rolling average?

Wind Monitoring

Paragraph (d)(7)

(~~5~~7) When on-site earth-moving activities occur, the owner or operator shall monitor wind direction and speed in accordance with "On-Site Wind Monitoring Equipment" chapter in the South Coast AQMD *Rule 403 Implementation Handbook*~~as specified in U.S. EPA *Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV: Meteorological Measurements*~~.

- Removed existing U.S. EPA reference for conducting wind monitoring and replaced with Rule 403 Wind Monitoring Guidance
  - Wind monitoring according to Rule 403 Wind Monitoring Guidance is more achievable and already in practice

Recordkeeping Requirements

Subdivision (h)

Calibration and QA/QC Records

Paragraphs (h)(2) & (3)

(2) Results of wind and PM_{10} monitoring, including: ambient PM_{10} data; rolling average PM_{10} concentrations and calculations; wind direction and speed corresponding to the rolling average PM_{10} concentrations; instrument make and model; settings; proof of valid calibration in accordance with manufacturer's recommended schedule; configuration; calibration, correction, and correlation factors; maintenance; operator training; ~~and~~ daily instrument performance check records and zero calibration and manual zero test results; intra-instrument precision test data and calculation results; and all instrument logs for all monitoring instruments;

(3) All instrument maintenance activities, including: zero calibration, cleaning, filter replacement, and performance checks, including dates and times of the specific procedures;

- Added additional recordkeeping of:
  - Proof of valid calibration for monitors
  - Data from zero calibrations, manual zero tests, and intra-instrument precision tests

- How do the instrument manufacturers log the scheduled instrument calibrations?
- Can the instruments log the zero calibration and manual zero test results?
- Is the terminology for the added recordkeeping correct?

Rule 1466 Approved PM_{10} Monitors
Appendix 1

Physical Requirements

Appendix 1 – 1

Appendix 1 – ~~Executive Officer~~ Rule 1466 Approved PM_{10} Monitors

The Executive Officer may approve PM_{10} monitors that meet the following physical and performance requirements.

1. Physical Requirements
   - 1.1. PM_{10} monitors ~~must~~ shall be continuous direct-reading near-real time monitors and shall monitor particulate matter less than 10 microns.
   - 1.2. PM_{10} monitors ~~must~~ shall be equipped with:
     - 1.2.a. Omni-directional heated sampler inlet;
     - 1.2.b. Sample pump with active flow control mechanism;
     - ~~c. Volumetric flow controller;~~
     - 1.2.~~d~~c. Enclosure; ~~and~~
     - 1.2.~~e~~d. Data logger capable of logging each data point with average concentration, time/date, and data point number; and
     - 1.2.e. Conductive tubing that minimizes particle loss for any external tubing used to carry sampled air prior to measurement.

Specified requirement for sample pump with active flow control mechanism

- Moved added flow control accuracy standard to Performance Requirements (Appendix 1 – 2)

Performance Requirements

Appendix 1 – 2

2. Performance Requirements

2.1~~3.~~ PM_{10} monitors ~~must~~ shall have the following minimum performance standards:

2.1.a. Range: 0 - ~~10,000~~ 1,000 µg/m^3;

2.1.b. Accuracy, determined through factory testing against a U.S. EPA Federal Reference Method or Federal Equivalent Method, or Best Available Technology, to show: ±5% of reading ± precision or coefficient of determination (R^2) of ≥ 0.95 through simple linear regression;

2.1.c. Resolution: 1.0 µg/m^3;

2.1.d. Flow control accuracy of ±5% of factory setpoint; and

2.1.~~d~~e. Measurement Cycle: User selectable (~~30~~thirty minute and ~~2~~ two hour).

2.2 Monitors that have a valid *Monitoring Certification Scheme* certification meeting the latest version of the *Monitoring Certification Scheme (MCERTS): Performance Standard for Indicative Ambient Particulate Monitors* may be exempt from meeting the performance requirements listed above, but shall meet all stated physical requirements.

Adjusted minimum PM_{10} measurement range to match BAM 1020 instrument measurement range (U.S. EPA Federal Equivalent Method)

- Clarified accuracy as against a Federal Reference/Equivalent Method
  - Is this consistent with instrument manufacturer's interpretation of accuracy?
- Added option for determining accuracy using linear regression
  - What is the minimum R^2 acceptable for determining accuracy?
  - Are there other accuracy standards that should be considered?

Moved flow control accuracy standard for sample pump physical requirement to Performance Requirements

Performance Requirements

Appendix 1 – 3

3. Quality Assurance/Quality Control Requirements

~~4.~~ In order to ensure the validity of the PM_{10} measurements performed, there ~~must~~ shall be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the owner or operator to adequately supplement QA/QC Plans to include the following critical features: instrument calibration, instrument maintenance, operator training, and daily instrument performance ~~(span)~~ checks.

- Recordkeeping Requirements (subdivision (h)) now includes data from QA/QC requirements
- Removed "span" to avoid confusion
  - Span checks typically for gas/vapor direct-reading instruments

Procedures to Demonstrate Intra-Instrument Precision

Appendix 2

Intra-Instrument Precision Test Procedures

Appendix 2 – 1-6

Appendix 2 – Procedures to Demonstrate Intra-Instrument Precision

An owner or operator shall perform the following procedures to demonstrate the intra-instrument precision of all PM_{10} monitors as required in subparagraph (d)(3)(H):

1. Ensure monitors are identical in make and model, settings, and configuration.
2. Ensure monitor inlets are at the same height and located within four meters of each other but no less than one meter apart for the duration of the test.
3. Power on the monitors and turn on the heated sampler inlet. Allow the monitors to warm-up per manufacturer's recommendations or when readings have stabilized.
4. For each monitor, perform a zero calibration in accordance with manufacturer's instructions, then a manual zero test by removing any sampling inlet and installing a filter, rated by the manufacturer to achieve a 99.97 percent control efficiency for 0.3 micron particles, on the inlet of the monitor for a minimum of ten minutes.
5. Log the PM_{10} concentration reading every minute and calculate and record the average of the readings of the zero test. The average of the zero test readings shall be zero ± 2 micrograms per cubic meter before proceeding to Procedure 6.
6. Remove the filter and install the monitor inlet as required. After waiting 10 minutes, operate the monitors simultaneously and log the PM_{10} concentration reading every minute for a minimum of 60 minutes.

- Specified zero calibration and manual zero test procedures to be conducted prior to intra-instrument precision test
- References for daily zero calibration and manual zero test requirements prior to monitoring

Conduct intra-instrument precision test for 1 hour minimum

- Is 1-hour colocation sufficient for determining intra-instrument precision?

Intra-Instrument Precision Calculations

Appendix 2 – 7-8

7. Calculate the intra-instrument precision using either of the following equations:

   a. Intra-instrument precision in relative standard deviation or correlation of variation (%) when the ambient PM_{10} concentrations are greater than or equal to 15 micrograms per cubic meter:

$$P = \frac{S_t}{C_t} \, x \, 100\%$$

   where,

   P = Intra-instrument precision in percent (%);

   S_t = Standard deviation of the averaged PM_{10} concentration readings from all tested monitors over the time t of testing duration, to be calculated as:

$$S_t = \sqrt{\frac{\sum(x - \bar{x})^2}{(n-1)}}$$

   where,

   x = Mean of the PM_{10} concentration readings for a tested monitor over time t of testing duration,

   $\bar{x}$ = Mean of the averaged PM_{10} concentration readings from all tested monitors over the time t of testing duration, and

   n = Number of tested monitors; and

   C_t = Mean of the averaged PM_{10} concentration readings from all tested monitors over the time t of testing duration; or

   b. Intra-instrument precision in absolute value (micrograms per cubic meter) if the ambient PM_{10} concentrations are less than 15 micrograms per cubic meter:

$$P = S_t$$

   where,

   P = Intra-instrument precision in micrograms per cubic meter, and

   S_t = Standard deviation of the averaged PM_{10} concentration readings from all tested monitors over the time t of testing duration.

8. Record the results of the calculations.

Specified calculation of intra-instrument precision in percent when ambient PM_{10} ≥15 µg/m^3

Added equation to calculate standard deviation

Specified calculation of intra-instrument precision in absolute value when ambient PM_{10} <15 µg/m^3

Next Steps

Updated Slide

Sub-Committee Comments Requested By:

- April 6, 2021

Set Hearing

- May 7, 2021

Public Hearing

- June 4, 2021

Proposed Amended Rule 1466 Staff Contacts

Rule Development

Charlene Nguyen
cnguyen@aqmd.gov
(909) 396-2648

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

Michael Morris
mmorris@aqmd.gov
(909) 396-3282

General Questions

Susan Nakamura
snakamura@aqmd.gov
(909) 396-3105

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