



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards (OAQPS)
Research Triangle Park, North Carolina 27711

December 14, 2012

MEMORANDUM

SUBJECT: Evaluation of the PM_{2.5}'Collocated PM₁₀' Data Substitution Routine, 2009-2011.

FROM: Mark Schmidt, Air Quality Analysis Group, OAQPS/OAR /s/

TO: PM NAAQS Review Docket (EPA-HQ-OAR-2007-0492)

This memorandum describes an evaluation of the PM_{2.5}“collocated PM₁₀” data and “maximum quarterly value” substitution tests. Specifically, the goal of this analysis is to quantify the utility of both tests and to determine if both are needed. The most recent design value period (2009-2011) is used for this evaluation.

The EPA proposed both tests for inclusion into 40 CFR Part 50, appendix N, which contains the codified data handling rules for making comparisons between reported ambient PM_{2.5}data and the PM_{2.5} NAAQS (77 FR 39001 - 39002, June 29, 2012). As proposed, both data substitution tests were to be used for validating “otherwise incomplete” annual standard and 24-hour standard design values that were equal or below their respective NAAQS levels. Both tests are described in the 1999 PM_{2.5}data handling guideline (U.S. EPA, 1999) and have been implemented as standard operating procedure for EPA design value computations.

In this assessment of 2009-2011 PM_{2.5} design values which did not meet the nominal data completeness requirements, the EPA found that collocated PM₁₀ test was almost entirely

redundant with the maximum quarterly value test and therefore very infrequently needed as a separate test. The results presented in Table 1 for each of the two $\text{PM}_{2.5}$ standards shows the number (and percentage) of sites that passed one, both, or neither of the two noted data substitution tests.

For the annual NAAQS, the maximum quarter value test in 100 cases resulted in a test design value (TDV_{max}) less than or equal to $12.0 \mu\text{g}/\text{m}^3$. There were only two other cases (2 percent) when TDV_{max} was greater than $12.0 \mu\text{g}/\text{m}^3$ but the TDV associated with the collocated PM_{10} test was less than $12.0 \mu\text{g}/\text{m}^3$. Similarly for the 24-hour NAAQS, the maximum quarter value test in 116 cases resulted in a test design value (TDV_{max}) less than or equal to $35 \mu\text{g}/\text{m}^3$ and again only 2 other sites (less than 2 percent) passed the collocated PM_{10} test but not the maximum quarterly value test. Furthermore, the maximum quarterly value tests allowed the annual and 24-hour design value to be validated approximately 5 times more often than through the use of the collocated PM_{10} test. Accordingly, the EPA has decided to not include the collocated PM_{10} data substitution tests in Appendix N, and thereby further simplifying the data handling procedures for making comparisons to the annual and daily NAAQS.

Table 1. Site counts for 2009-2011 with respect to design values and data substitution tests

Data substitution for the PM_{2.5} annual standard, 2009-2011

<u>Category</u>	<u>Number</u>	<u>Percent of total number of nominally incomplete sites for the annual standard for which the DV was validated with one or both data substitution tests</u>
Number of sites with nominally incomplete annual design values that passed the "maximum quarterly value" data substitution test	100	98.0%
Number of sites with nominally incomplete annual design values that passed the "collocated PM10" data substitution test	21	20.6%
Number of sites with nominally incomplete annual design values that passed both data substitution tests	19	18.6%
Number of sites with nominally incomplete annual design values that passed the "maximum quarterly value" data substitution test but not the "collocated PM10" data substitution test	81	79.4%
Number of sites with nominally incomplete annual design values that passed the "collocated PM10" data substitution test" but not the "maximum quarterly value" data substitution test	2	2.0%
Number of sites with nominally incomplete annual design values that passed either data substitution test	102	100.0%

Data substitution for the PM_{2.5} 24-hour standard, 2009-2011

<u>Category</u>	<u>Number</u>	<u>Percent of total number of nominally incomplete sites for the 24-hr standard for which the DV was validated with one or both data substitution tests</u>
Number of sites with nominally incomplete 24-hour design values that passed the "maximum quarterly value" data substitution test	116	98.3%
Number of sites with nominally incomplete 24-hour design values that passed the "collocated PM10" data substitution test	26	22.0%
Number of sites with nominally incomplete 24-hour design values that passed both data substitution tests	24	20.3%
Number of sites with nominally incomplete 24-hour design values that passed the "maximum quarterly value" data substitution test but not the "collocated PM10" data substitution test	92	78.0%
Number of sites with nominally incomplete 24-hour design values that passed the "collocated PM10" data substitution test" but not the "maximum quarterly value" data substitution test	2	1.7%
Number of sites with nominally incomplete 24-hour design values that passed either data substitution test	118	100.0%

Data substitution for the both the PM_{2.5} annual standard and the PM_{2.5} 24-hour standard, 2009-2011

<u>Category</u>	<u>Number</u>	
Number of sites with nominally incomplete annual design values that passed the "maximum quarterly value" data substitution test	100	
Number of sites with nominally incomplete 24-hour design values that passed the "maximum quarterly value" data substitution test	116	
Total number of sites that could use the "maximum quarterly value" data substitution test to validate an otherwise incomplete PM _{2.5} design value	216	a
Number of sites with nominally incomplete annual design values that passed the "collocated PM10" data substitution test	21	
Number of sites with nominally incomplete 24-hour design values that passed the "collocated PM10" data substitution test	26	
Total number of sites that could use the "collocated PM10" data substitution test to validate an otherwise incomplete PM _{2.5} design value	47	b
Ratio of: Total number of sites that could use the "maximum quarterly value" data substitution test to validate an otherwise incomplete PM _{2.5} design value / Total	5	a / b