QUALITY ASSURANCE BULLETIN-009 **Sample Volume Data Validation Criteria**
November 2021

Introduction

This bulletin is to provide information to ambient air monitoring organizations (MOs) within the California Air Resources Board (CARB) Primary Quality Assurance Organization (PQAO) regarding the data review and validation of data with a low sample volume (Qtot) collected from a Met One Instruments Inc. BAM 1020 running firmware version 3.6 or higher. MOs operating a BAM1020 running firmware version 3.6 or higher should update their SOPs and/or other appropriate quality assurance document(s) with the policy detailed in this bulletin.

MOs collecting PM10 and/or PM2.5 data using continuous instrumentation methods other than a BAM1020 running firmware versions 3.6 or higher should describe their policy regarding the data review and validation of data with a low Qtot in an SOP and/or other appropriate quality assurance document(s).

Issue

Qtot is the sample volume measured during sampling and is an indication of data validity. Qtot can be affected by the following: (1) run time (e.g., if sample time is less than the scheduled number of min/hr, Qtot will be lower), (2) flow (e.g., if low PM concentrations with no loading issues but low flow, Qtot will be lower), or (3) a combination of the two. Instances of low Qtot that result from sample time being less than the scheduled number of min/hr can occur during high-loading events such as wildfires and dust storms.

The consideration and acceptance criteria of Qtot data during the data validation process varies amongst MOs, resulting in inconsistent handling of data within the CARB PQAO.

Policy

To establish consistency within the CARB PQAO, data review and validation of BAM 1020 data should be done using the Qtot criteria below. These criteria are also summarized in Table 1. Note: these criteria assume that the BAM 1020 is operated in ACTUAL flow mode. A BAM 1020 set to STANDARD flow will report varying Qtot values from hour to hour.

1. The validation acceptance criteria for Qtot is 0.837 to 0.167 m^3 for a 50-minute sample cycle and 0.703 to 0.167 m^3 for a 42-minute sample cycle.
2. BAM concentrations with a Qtot between 0.837 to 0.500 m^3 for a 50-minute sample cycle and 0.703 to 0.500 m^3 for a 42-minute sample cycle are considered valid and do not need to have a qualifier applied to the data.

3. BAM concentrations with a Qtot between 0.499 to 0.167 m^3 (a 29 to 10-minute sample duration) are considered valid, but should be reported to AQS with the quality assurance qualifier "Y" – elapsed sample time out of spec.
4. BAM concentrations with a Qtot lower than 0.167 m^3 but greater than zero should not be reported and should be invalidated with the AQS null data qualifier "SV" – sample volume out of limits.

Table 1: Qtot data validation criteria for BAM1020 monitors

Qtot	BAM Data	AQS Qualifier
0.837 to 0.500 m^3 for 50-min sample; 0.703 to 0.500 m^3 for 42-min sample	Valid	N/A
0.499 to 0.167 m^3 (29 to 10-min sample)	Valid	"Y" QA code
< 0.167 m^3, but > 0	Invalid	"SV" null code

If you have any questions regarding the data review and validation of data collected from a BAM1020 running firmware version 3.6 or higher with respect to Qtot criteria, please contact Manisha Singh at manisha.singh@arb.ca.gov.