

CHAPTER 4 - Precision and Accuracy

DEP conducts regularly scheduled performance audits and precision checks on all air monitoring equipment. Performance audits are conducted quarterly for the purpose of assessing data accuracy on carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), ozone (O₃), total suspended particulate (TSP), suspended particulate matter 10 microns or less in size (PM₁₀), and lead (Pb) monitoring equipment. Precision checks are performed every two weeks on CO, SO₂, NO₂, and O₃ and every sampling day (once every sixth day) for selected TSP, PM_{2.5}, PM₁₀, and lead.

Data obtained from the performance audits and precision checks are converted to 95 percent upper and lower probability limits using standard statistical methods.

For precision, only one probability level is calculated for each parameter. Acceptable 95 percent probability limits for precision are met when the instrument response is within 15 percent for all parameters. For continuous analyzers, every two weeks the equipment is challenged by a low level gas of known concentration; and for discrete particulate parameters (TSP, PM₁₀, and lead), filters from pairs of collocated samplers that run on a one-in-six-day schedule are analyzed and compared. This Precision Level data is shown in Figure 4-1.

For accuracy, acceptable 95 percent probability limits are met when the instrument response is within 20 percent for continuous gaseous parameters and within 15 percent for discrete particulate parameters (TSP, PM₁₀ and lead). Challenging the equipment quarterly with 3 known concentration levels of audit gas, which are shown as Accuracy Levels 1, 2, and 3 (Figure 4-1), respectively, determines accuracy for continuous analyzers. For discrete particulate parameters (TSP, PM₁₀, and lead), an annual audit of the flow rate determines accuracy. These data are shown on the Accuracy Level 2 graph (Figure 4-1).

Figure 4-1 on the following page summarizes the 95 percent probability limits from all four quarterly reporting periods within the calendar year. The values presented were calculated from weighted arithmetic averages for each quarter's probability limits.

Note that there are two different types of accuracy checks for lead: the normal flow check, which is indicated by PB(F) and a quarterly analytical check, which is indicated by PB(A), on the legends of each graph. This analytical check is part of the EPA sponsored National Performance Audit Program (NPAP) in which spiked lead strips are sent to state laboratories to verify laboratory analysis accuracy.

Figure 4-1. Annual Accuracy and Precision Probability Limits 2004
95% Lower/Upper Limits

