

distribution, the probability that any single measurement would exceed the CTV in this borderline situation is calculated to be 0.0062. However, the probability that at least one of five such measurements results in a citation is $1 - (0.9938)^5 = 3.1$ percent. Therefore, the confidence level at which a citation can be issued, based on the maximum of five measurements made in the same MMU on a given shift, is 97%.

The constant 1.64 used in calculating the CTV is a 1-tailed 95-percent confidence coefficient and is derived from the standard normal probability distribution. Since the purpose of the CTV table is to provide criteria for determining that the true dust concentration strictly exceeds the applicable dust standard and such a determination can occur only when a single-shift measurement is sufficiently high, there is exactly zero probability of erroneously citing noncompliance when a measurement falls below the lower confidence limit. Consequently, the total probability of erroneously citing noncompliance equals the probability that a standard normal random variable exceeds 1.64, which is 5 percent.

Appendix D—References

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