

**ADHS APPROVED ALTERNATE DEFAULT LIMITS
FOR THE QC PARAMETERS FOR WHICH ACCEPTANCE LIMITS ARE NOT
SPECIFIED IN THE REFERENCED METHODS**

(Director Approved on June 29, 2005)

Per ADHS Rules A.A.C. R9-14-615.C.8, *laboratories must statistically develop limits from historical data, if the laboratory tests for a parameter for which quality control acceptance criteria are not specified in the method or by EPA or ADEQ, by:*

- a. *Determining the mean and standard deviation for a minimum of 20 data points, excluding statistical outliers, and*
- b. *Setting the limits no more than 3 standard deviations from the mean and in the detectable range.**

ADHS understands the extent of time and labor involved in the development of QC acceptance criteria and to update them at a specified frequency. The statistically derived limits have other problems in that if a laboratory's precision is very tight, it leads to impractical limits; on the other hand, poor precision leads to an excessively wide range.

As an alternative to developing statistically derived limits, ADHS proposes the use of default limits that the laboratories could adopt for any applicable method without sacrificing the quality of the data generated. The laboratories have an option of selecting either of the two processes for individual method/compounds and the one they select must be specified in their SOPs. The default limits proposed are derived from the individual reference methods from another QC parameter's acceptance limits, which represent similar or narrower limits.

For laboratories not choosing to use historical limits, the following default limits (or narrower) could be used for any method, where applicable:

QC NOT SPECIFIED IN METHOD →	DEFAULT QC (METHOD SPECIFIED OR LABORATORY HISTORICAL IF NOT SPECIFIED)
MS/LFM (processed or non-processed)	LCS/LFB
LCS/LFB (processed or non-processed)/ Second Source reference standard	CCV/continuing IPC
PQL/MRL (non-processed)	CCV/continuing IPC
PQL/MRL (processed)	LCS/LFB
QCS (non-processed)	ICV/continuing IPC/manufacturer's limits
QCS (processed)	LCS/LFB/ manufacturer's limits
IDC limits	LFB/LCS
LFB/LCS/LFM/duplicate RPD	IDC limits/20%
Non-CCC compounds	CCC limits
ICV/CCV	10%

For 8000 methods that do not specify the QC limits for MS/LCS, the default limit of $\pm 30\%$ (8000B) could be used.

For 500, 600, 1600 and 8000 series methods that do not specify surrogates and or acceptance limits for surrogates, the default limits of 70-130% could be used.

Most methods do not list a precision measurement; the industry standard has always been 20% RPD (For example, See SM 20th ed. 1020B, Sections 1 and 3, Draft 7000B, Section 9.4).

- * The lower end of the detectable range should be at a minimum the PQL or the lowest standard value represented in the initial calibration. This should be explained in the lab's SOP.

6/16/2005

Definitions:

Calibration check compounds (CCCs):

The purpose of the CCCs is to evaluate the calibration from the standpoint of the integrity of the system. High variability for these compounds may be indicative of system leaks or reactive sites on the column. Meeting the CCC criteria is not a substitute for successful calibration of the target analytes using one of the approaches described in Sec. 7.0 of Method 8000.

Initial Demonstration of Capability (IDOC) -

Initial demonstration of laboratory accuracy and precision: This is method specific. Typically involves analyzing four to seven replicates of a laboratory fortified blank containing each analyte of concern at a concentration in the calibration range of the instrumentation. The accuracy and precision are then calculated.

Instrument Performance Check (IPC) Solution, (initial and continuing) /Continuing Calibration Verification Standard (CCV) –

The IPC/CCV solution is used to periodically verify instrument performance during analysis. It should be prepared in the same acid mixture as the calibration standards by combining method analytes at appropriate concentrations to approximate the midpoint of the calibration curve. The IPC/CCV solution should be prepared from the same standard stock solutions used to prepare the calibration standards and stored in a FEP bottle. As an option secondary source reference material can be spiked if all the method criteria can be met.

Laboratory Control Sample (LCS)-

The LCS consists of an aliquot of a clean (control) matrix similar to the sample matrix and of the same weight or volume. The LCS is spiked with the same analytes at the same concentrations as the matrix spike. When the results of the matrix spike analysis indicates a potential problem due to the sample matrix itself, the LCS results are used to verify that the laboratory can perform the analysis in a clean matrix. The spiking solution could be either from the primary (calibration) or the secondary (external) source standard.

Laboratory Fortified Blank (LFB) –

An aliquot of Lab Reagent Blank to which known quantities of the method analytes are added in the laboratory. The LFB is analyzed exactly like a sample, and its purpose is to determine whether the methodology is in control and whether the laboratory is capable of making accurate and precise measurements.

Laboratory Fortified Sample Matrix (LFM)/Matrix Spike (MS) –

An aliquot of an environmental sample to which known quantities of the method analytes are added in the laboratory. The LFM is analyzed exactly like a sample, and its purpose is to determine whether the sample matrix contributes bias to the analytical results. The background concentrations of the analytes in the sample matrix must be determined in a separate aliquot and the measured values in the LFM corrected for background concentrations.

Minimum Reporting Level (MRL)/Practical Quantitation Limit (PQL)

The Office of the Laboratory Licensure requires a laboratory to include a standard at the reporting level for multi-level calibrations. When the method specifically allows a calibration, such as in 200.7, with a blank and one standard, the laboratory should run the Reporting Level standard as a check. If the method does not specify that the reporting limit check is needed, then the laboratory must establish control limits for determining the acceptance criteria of this check. The "Manual for the Certification of Laboratories Analyzing Drinking Water", March 1997, IV-7, Section 7.2.12, and SW-846, 8000B, Rev. 2, 12/96, Section 7.4.1.2, states the reporting limit calibration standard requirement. A laboratory might choose to run a MRL/PQL.

Quality Control Sample (QCS) –

A solution of method analytes of known concentrations, which is used to fortify an aliquot of Laboratory Reagent Blank or sample matrix. The QCS is obtained from a source external to the laboratory and different from the source of calibration standards. It is used to check either laboratory or instrument performance.

Relative Percent Difference (RPD) -

Duplicates of samples, LCS or LFM are analyzed to determine the precision of the analysis.

Second Source Standard -

A solution of method analytes of known concentrations, that is prepared from a source different from the source of calibration standards. Its purpose is to verify that the primary calibration materials are accurate (quantitative check). It is also used as a qualitative check for the identity of target analytes in comparative methods such as gas chromatography with relative identification techniques. It is generally analyzed after the calibration curve has been established. It is not processed through the sample preparation procedure.

Surrogate -

A pure compound, (which is similar to the target analytes but is extremely unlikely to be found in any sample) that is added to sample aliquots and QC samples in known amount(s) before extraction, and then measured using the same procedures used to measure other analytes. The purpose of a surrogate analyte is to monitor method performance with each sample.