QA/QC CHECKLIST

If your sampling program is to be defendable and representative, we encourage you to take the time to review the following guidelines and try to incorporate some of the field QA/QC items below into your project design:

FIELD QA/QC:

		WHAT?	WHY?	RECOMMENDED FREQUENCY?	OUTCOME?
BLANKS	Field Blanks	Lab-grade deionized water used in the field to fill sample containers as you would a regular field sample.	Tests quality of lab water and sample bottles, and contamination from the sampling process or from the background site conditions.	1 blank/day/matrix or 1 blank/20 samples/matrix, whichever is more frequent*.	Results should be in the range of 5x lower than all sample results. Note: Field and trip blanks must be treated as though they were actual samples. Regard must be given to hold times and temperature requirements.
	Trip Blanks	Sample containers filled with lab-grade deionized water that are transported from the lab to the site and return unopened.	Determine contamination that might arise from lab water, sample bottles and from transport and storage.	1 blank/cooler containing volatiles*.	Results should be in the range of 5x lower than all sample results. Trip blanks are intended more for studies involving volatile organic analyses as volatile compounds can sometimes diffuse through container walls and lids and are more mobile contaminants.
	Equipment Blanks	Lab-grade deionized water run over or through clean sampling equipment and collected as a rinsate.	Tests for contamination originating from sampling equipment or carry-over contamination from reuse of equipment.	Once per sampling event or when new equipment is introduced.	Results should be in the range of 5x lower than all sample results.
SPIKES	Trip Spikes	A Trip Blank that is spiked at the lab with a known concentration of an analyte of interest prior to transport to the field. Spiking solutions should not be greater than 5x average environmental levels or you may mask interference effects.	Intended to gauge the analytical accuracy of a laboratory method by assessing the percent recovery of a compound introduced at a known concentration.	Once per sampling event (particularly intended for volatile organic analyses)*.	Large biases (positive or negative) may indicate that the method or instrument is ineffective for that matrix. Poor recoveries may also imply problems with interferences of other compounds and stability issues. These should be further investigated.
DUPLICATES	Field Duplicates	A sample that is homogenized and divided into two sample containers. Samples for volatile organic analyses should not be homogenized but every effort should be made to minimize sampling bias between samples.	An indication of both the precision of field sampling procedures, and to a lesser extent laboratory procedures. Not well-suited for highly heterogeneous matrices. May be submitted to the lab as a "blind" duplicate (i.e. not identified as a duplicate).	A general rule of thumb is that a sampling program incorporate a field duplicate 1 in every 10 samples taken (i.e. 10% of the total samples collected should be field duplicates).	Homogenized field duplicates (i.e. splits from the same sample) can realistically attain results variances of 50-80% or more for water and 80-100% for soil. Sequentially-sampled duplicates can attain variances of 100% or greater due to variability associated with the two distinct sampling events.
	Inter-lab Duplicates	A field duplicate that is sent to 2 or more labs for analysis. Care must be taken that each lab utilizes similar methods and instrumentation and initiates analysis at the same time.	Generally lab duplicates (or splits) provide a measure of inter-laboratory precision. Such studies need to be extremely well managed to ensure apple-to-apple comparison.	Typically only utilized if concern exists regarding accuracy of results obtained by a lab.	See notes under "Field Duplicates" (above). Variability related to laboratory differences in methodology, instrumentation, sample preparation procedures, and sample transport and hold times need to be carefully considered when comparing data sets.

* Source: US EPA

Note: This is presented for general guidance purposes. Attention should also be given to cases where a regulation specifically identifies and mandates a required QA program.

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