



Field Quality Control



Environmental sampling and analysis requires sound quality control practices to minimize systematic and ubiquitous sources of error. An accredited analytical laboratory will have a Quality System in place to fulfill the requirements in regards to the analytical portion however, it is equally important to use procedures in the field to ensure the quality of the analytical data produced.

Field QC Sampling Plan Basics

Field sampling plans should include site specific data quality objectives. Data quality objectives outline the acceptable overall level of uncertainty based on the nature of the sampling event. Prior to sampling, a plan should be devised where potential sources for error and variability are determined and the appropriate type and number of quality control samples set to determine precision, accuracy, reproducibility, representativeness, and completeness of field data.

The sampling plan should also include the types of field observations that are to be made during the sampling process, including information such as soil horizon depths, sediment and/or water, colour, texture, odours, meteorological conditions; any observations which may aid in the data interpretation and remediation phase.

Throughout all aspects of the sampling process, care must be taken to prevent cross contamination of samples. Sampling equipment should be cleaned carefully between sample points and the appropriate sampling containers and preservatives utilized. Prior to sampling, it is always recommended that you contact the laboratory performing the analysis to determine the hold times, correct sampling containers and volumes of sample required for the analyses being performed, most laboratories will provide the sampling containers and preservatives free of charge. Sampling should proceed from the least contaminated to the most contaminated areas to minimize the potential for cross contamination.



Field QC samples can indicate sampling variability and determine the presence and/or sources of contamination from the sampling process. There are several documents available in the province of Ontario which provides detailed information into the sampling requirements for field level quality control samples including:

- **Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater**, Ministry of the Environment, January 1999;
- **Guide for Completing Phase Two Environmental Site Assessments under Ontario Regulation 153/04, Ontario**, Ministry of the Environment, June 2011.
- **Protocol Manual for Water Quality Sampling in Canada**, CCME, 2011.
- **Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act**, Ministry of the Environment, June 2011.

Please consult these documents prior to establishing your site specific sampling plan. The following provides a basic description of the types and purpose of field samples required for quality control functions.

ENVIRONMENTAL AND INDOOR AIR QUALITY TESTING SERVICES



Field Quality Control

Types of Required Field QC Samples

There are 4 types of field QC samples outlined in the documents referred to above: replicates, field blanks, trip blanks and traveling spiked blanks.

Replicate Samples

These are also referred to as duplicate samples. Replicate samples are two separate samples which are to be taken at the same time in a manner to minimize differences. This can be accomplished in two ways, by sampling simultaneously or sequentially and repeating the sample acquisition technique for each. Replicate samples measure the variability and reproducibility of the matrix and site contaminant levels in the sampling and laboratory analysis processes.

Field Blank

A field blank is a sample of uncontaminated reagent water which is free of the analyte of interest. This sample is prepared by the laboratory and is taken to the sampling site, opened and exposed to the sampling environment while the sampling is performed, preserved as necessary then closed and returned to the laboratory for analysis. This type of QC sample will identify environmental contamination from the field and/or laboratory such as extraneous volatile fractions present in the atmosphere or contamination from the handling of the sampling containers.

Trip Blank

This blank differs from the field blank as it is not opened to the environment during the sampling process. The sample is prepared by the laboratory with reagent water free of the analyte of interest and the blank is shipped with the sampling containers to the field and returned unopened to the laboratory for analysis. This type of blank will identify any contamination from the sample containers, preservatives, and transportation and storage conditions. Where groundwater samples are to be analyzed for VOCs, trip blanks must be submitted. Trip blanks are also typically submitted where metals analyses are required.

Traveling Spiked Blank

A traveling spiked blank is a sample of uncontaminated matrix, free of the analyte of interest, which is prepared by the laboratory. The sample is spiked with a known concentration of the contaminant(s) of interest and preserved as necessary. The sample should be prepared just prior to the sampling event. The traveling spiked blank is taken to the field location and returned unopened to the laboratory for analysis. This type of QC sample will help to identify the stability and recovery of the contaminants of interest for the entire process of transportation, field sampling and laboratory analysis.

Again, to determine the frequency and required QC samples for your particular site, please refer to the appropriate guidance documents.

The Service Team at Paracel is dedicated to ensuring our Client Service Program meets your needs and expectations. If there is anything additional we can implement to our Program which will improve your interactions with Paracel, please don't hesitate to bring it to our attention. The Service Team at Paracel is also fully committed to continuous improvement and providing complete solutions to our clients in respect to their analytical requirements.

If you have any questions in regards to this document or your sampling program, please don't hesitate to contact Paracel's Service Team at 1-800-749-1947 or by email at paracel@paracellabs.com.