

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Life Cycle of a Sample

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Key Client Executive

I'm planning a sample event, what do I do?

Call your TestAmerica Contact to discuss your Scope of Work.

Communication is the key to success!

- Name of Project
- Parameters / Analytes with required Detection Limits
- Turn Around Times (consider short hold time parameters)
- Volume of Samples by Matrix (identify QC samples individually)
- Required Deliverables (Hard Copy, EDD, Data Package Level)
- Budget for Project

Pre – Sampling Tasks

Ordering your Sample Kits



Call the lab a full week in advance of your project for the bottle kits

Verify the volume of samples

Be sure to include QC Samples (MS/MSD, Field Blanks, Rinsate, Duplicates, etc.)

Additional Supplies (i.e. 5035 Terracore/Encore kits)

Your Sample Kit

What have I ordered?

Check it out NOW! Don't wait until it's too late!



Bottles – Glass or Plastic – determined by the chemical nature of the parameter you will be analyzing for

Preservatives – HNO₃, HCL, H₂SO₄ etc. Preservatives, where applicable, are required to be there by the EPA. Please do not “dump” them out

Why – To stop the bio-degradation or chemical reaction in your sample

Your Sampling Event

You've sorted your kit

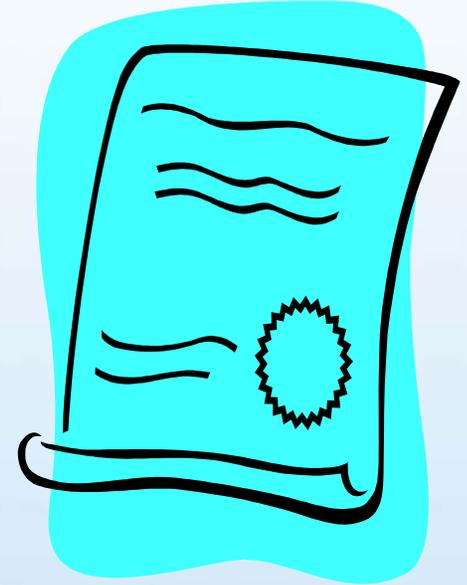
You're in the field

You've Sampled!

Better pack it in a lot of ice to keep it preserved and safe

The Chain of Custody

Client Name & Address
Project Name and PO Number
Client Project Manager & Sampler
Sample Descriptions & Info
Required Analysis
Turn Around Time (TAT)
Special Requests need to be documented
Comments (i.e. sample had a high field reading etc)
Signature



The First Days

- Your samples arrive at the lab and are unpacked
- Temperature taken and recorded
- Samples Unpacked
- Checked for Breakage
- Cross Checked with COC for Sample Identification
- Custody Seals examined
- Any exceptions are noted and sent to the Project Manager for resolution

Exceptions Handling

The Project Manager will contact you for guidance on how to proceed with your samples

Common Issues:

Out of Temperature

Out of Hold Time

Broken / Leaking Bottle

Missing bottles or labels

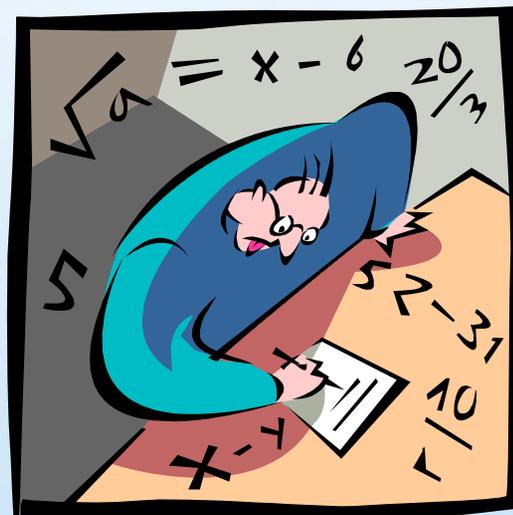
Missing Information on the COC



The Analysis Stage

Your samples are being Analyzed...but there are many potential roadblocks to overcome:

- Dilutions
- Equipment Calibration failure
- Equipment Failure
- Electrical Outages
- QC Failure



All of the above result in your sample having to be re-analyzed. Thus the reason for additional sample volumes for some parameters.

Quality Assurance is the total integrated program for assuring reliability of monitoring and measurement data.

Quality Control is the routine application of procedures for obtaining prescribed standards of performance in the monitoring and measurement process.

QA Objectives

The QA Objectives for data management are:

Precision – to EPA Methods

Accuracy – to EPA published data

Representativeness – a measurement of analytical and field sampling precision

Comparability – of reporting limit statistics are similar to these quality indicators generated historically and by other laboratories for similar samples

Completeness – providing data that passes the validation process as outlined in the QAPP



Precision: The closeness of agreement among two or more separate measurements of duplicate or replicate samples.

Precision: Relative Percent Difference %RPD

$$\text{RPD} = \frac{\text{Difference Between 2 Replicates}}{\text{Average of 2 Replicates}} \times 100\%$$

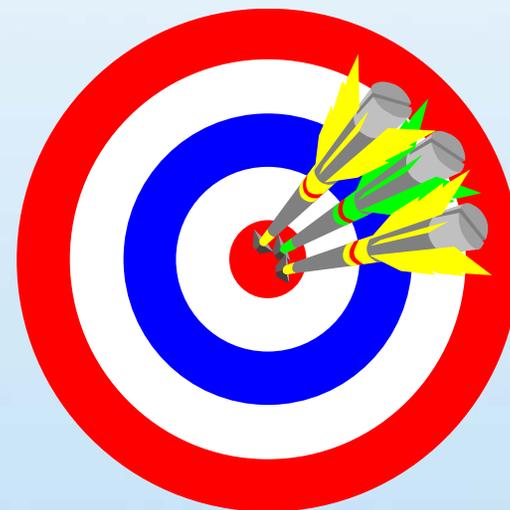
When the reported RPD falls below the maximum control limit, the data pass precision criteria.

Accuracy: The closeness of agreement between the measured value and the true or expected value.

Accuracy: % Recovery

$$\% \text{ Recovery} = \frac{\text{Analyzed Value}}{\text{True Value}} \times 100 \%$$

When the reported % recovery of a spiked sample falls within the control limit range, the data pass accuracy criteria.



Reporting Limits

Method Detection Limit (MDL)

The minimum concentration that can be **detected**, not quantified, by the method.

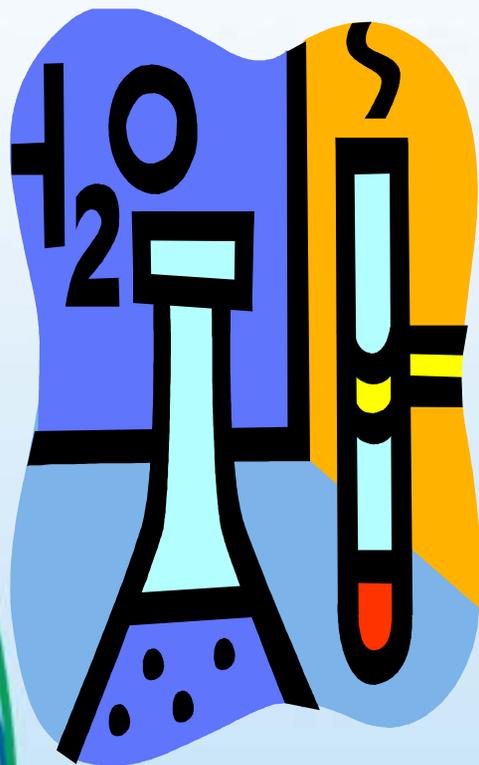
Practical Quantitation Limit (PQL)

The minimum concentration that can be consistently quantified. Typically, but not always, the PQL is 3-5 times the MDL.

Reporting Limit (RL)

A value the laboratory chooses to routinely report, usually based on the PQL.

QA Objectives Cont'd



Quality Control – Common Components

Blank – a sample that has been not been exposed to the analyzed sample stream in order to monitor contamination during sampling, transport, storage and analysis.

Laboratory Control Sample (LCS) – a sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes from a source independent of the calibration standards or a material containing known and verified amounts of analytes.

Quality Control – Common Components

Matrix Spike – Prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.

Matrix Spike Duplicate – a second replicate matrix spike is prepared in the laboratory and analyzed to obtain a measure of the precision of the recovery of each analyte.

Surrogate – a substance with properties that mimic the analyte of interest. It is unlikely to be found in environmental samples and is added to them for quality control purposes.

Quality Control – Common Components

Flagged Data:

J Flag – represents an estimated value determined between the MDL and the RL.

U Flag – represents a Non Detected (ND) value down to the MDL.



What specific items should I look for when evaluating my project's analytical data?

Did the field duplicates duplicate?

Did the matrix interfere with the analysis?

Are "total" metals results = or > the dissolved?

Are QA/QC data acceptable?

Batch Method Blank (batch acceptance)

Batch Accuracy and Precision Data

- ~ LCS/LCSD (batch acceptance)
- ~ MS/MSD (matrix effect evaluation)
- ~ Surrogate recoveries (individual sample acceptance/matrix evaluation)

Data Reporting

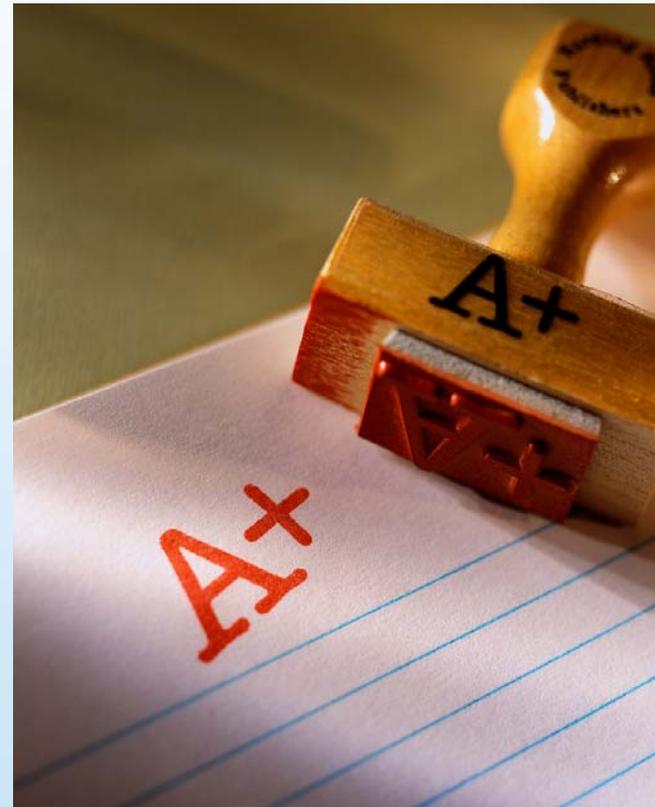
Quality Control
Reviews

Laboratory Technician
Review

Department Manager
Review

Project Management
Review

Data Released for
Reporting



Reporting Process

Upon completion of the QC review process, the data will be “reported”

PDF's of the report are available by email or fax

PDF/EDD of Report and Data is available online

Hard Copy of Report is mailed to client



Moving on to the next project...

