



**Environmental Quality
Management, Inc.**

US Ecology

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Introduction to Validation

✦ Based on *Data Validation Procedure for Chemical Analyses* (HNF-20433)

- ✦ Level A Performed on 90% of Data
- ✦ Level C Performed on 10% of Data

✦ Two-Tiered Approach

- ✦ Completeness
- ✦ Electronic Evaluation Using Data Validation Database
 - Hold Times
 - Quality Control (QC) Analysis

Validation Levels

- ✧ Level A
 - ✧ Completeness – Includes QC, as well as Samples
 - ✧ Hold Times
- ✧ Level B – Level A plus:
 - ✧ Method Blanks
- ✧ Level C – Level B plus:
 - ✧ Laboratory Control Samples and Matrix Spikes (MS)
 - ✧ Laboratory Duplicates or MS/Matrix Spike Duplicates
- ✧ Recalculation from Raw Data is Not Required for Level C Validations and below, per HNF-20433. However, Recalculation is performed when serious QC problems arise

Completeness

- ✧ Evaluation of Reported vs. Requested Analyses
- ✧ Electronic Check Using Data Validation Database (DVDB)
 - ✧ Completeness Query from Chains-of-Custody
- ✧ Manual Check of Analytical Reports for Sample and QC Results, Preparation, etc.
- ✧ Includes Comparison of Electronic Data Deliverables (EDDs) vs. Laboratory Reports

QC Components

- ✦ Fewer than 20 Samples in a Batch
- ✦ Holding Times – Preparation and Analysis
- ✦ Contamination – Method Blank (MB)
- ✦ Contract Required Detection Limits
- ✦ Accuracy
- ✦ Precision

QC Components

✦ Accuracy

- ✦ Laboratory Control Samples (LCS)
- ✦ Matrix Spike (MS) Samples
- ✦ Matrix Spike Duplicate (MSD) Samples
- ✦ Surrogates, Where Applicable

QC Components

Precision

-  Laboratory Duplicates
-  Matrix Spike/Matrix Spike Duplicates

Qualification Process

- ✦ When a QC Component Fails to Meet Acceptance Criteria, the Data Validation Chemist Manually Verifies the Failure
- ✦ Manual Verification Includes:
 - ✦ Evaluation of Laboratory Report vs. EDD
 - ✦ Checking the Narrative and, in Rare Cases, Contacting the Laboratory Directly
 - ✦ Evaluation of “Raw” Data – Preparation and Instrument Readout

Qualification Process

- ✦ Manual Verification Includes an Analysis of Tentatively Identified Compounds (TICs)
- ✦ Manual Verification Includes a very careful review of any data that will be rejected
- ✦ For Soil Gas Packages, Manual Verification Includes Calculating Field Duplicate Relative Percent Differences (RPDs)
- ✦ Manual Verification can include recalculation of data

Qualification Process

- ✦ After Manual Verification, the Data Validation Chemist Applies Validation Flags
 - ✦ J or UJ – Result is Estimated Detect or Non-Detect
 - ✦ R or UR – Result is Rejected Detect or Non-Detect
 - ✦ U – Result is a Non-Detect due to Contamination

Summary of Data

- ✦ A Total of 50,204 Reported Results as of March 2009
- ✦ Less Than 10% of Reported Results Have Been Qualified as Estimated
- ✦ Less than 1% of Reported Results Have Been Rejected
- ✦ Less than 1% of Results Reported as Detects Have Been Qualified as Non-Detects

Summary of Data

✦ Contract Required Detection Limits:

- ✦ SAP does not specify detection limits for Chromium (VI), Cyanide, Sulfide, Anions in Soil, or Phenol due to variability in methods and site conditions
 - In those cases where a CRQL was not specified, the laboratory used standard laboratory reporting limits
- ✦ Majority of Detection Limits Met Acceptance Criteria based on SAP requirements

✦ All Detection Limits Were Deemed Acceptable for Project Purposes

Summary of Data

✧ Reasons for Rejection of Data:

- ✧ Missed Hold Times by Twice the Limit for Nitrite and Phosphate in a Few Cases
- ✧ Very Low LCS Recoveries for Silicon in 9 Batches
- ✧ TICs that are Common Laboratory Contaminants or Documented by EPA as Common Instrument Artifacts are Rejected. These are Reactions of Alcohols and Ketones Used to Make the Surrogates and Standards.

Summary

- ✧ Level A and C Validations Performed per HNF-20433
- ✧ Two-Tiered Approach: Completeness and Electronic Evaluation
- ✧ QC Components: Accuracy and Precision
- ✧ Qualification of Data
- ✧ Data Meets Data Quality Objectives