



Review of MARSAME by
EPA-SAB-RAC
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ASSESSMENT

**CAPT. Colleen F. Petullo, USPHS
(Assigned to USEPA/OSWER/ERT)
MARSSIM Workgroup Chair**

Overview of Survey Results Assessment

- Conduct Data Quality Assessment
- Compare Survey Results
 - Use of UBGR, UCL, Sign Test, WRS Test, or Quantile Test, as appropriate
- Evaluate Survey Results
- Select M&E Disposition From Options
- Document Survey Results and Disposition

Conduct Data Quality Assessment

Five steps used to determine if data are right type, quality & quantity for intended use:

- Review DQOs and Survey Design
- Conduct Preliminary Data Review
- Select Statistical Test
- Verify Assumptions of Statistical Test
- Draw Conclusions from Data

Data Quality Assessment (DQA)

- Effort should be consistent w/graded approach used to develop survey design
- Data should be Verified and Validated as described in the QAPP

DQA: Scan Only and In Situ Measurements

- MDC must be calculated realistically
 - True 95% confidence at or near the MDC
 - Detecting activity concentrations or levels of radioactivity \leq UBGR
- If measuring an individual item then the MDC should be \leq UBGR

DQA: MARSSIM-Type Survey

- Prospective or Retrospective Power Curves (Appendix I: MARSSIM)
 - Prospective Accuracy depends on estimate of data variability & planned # of measurements
 - Retrospectively the sample σ provides estimate of data variability & # measurements is known

DQA: MARSSIM-Type Survey (Continued)

- Consequence of Inadequate Power results in an increase in the Type II error rates

Scenario A: “Clean” M&E not released

OR

Scenario B: “Dirty” M&E released

Preliminary Data Review

- Review QA and QC reports
 - Important for surveys where individual measurements are not recorded
- Perform Graphical Data Review
 - N/A for surveys where recording individual measurement results is not required
- Calculate Basic Statistical Quantities
 - Mean, Standard Deviation, Median, Minimum, Maximum, Range
 - N/A for surveys where recording individual measurement results is not required

Select Statistical Test

- Scan Only Surveys
 - Individual measurements ALL compared to AL
 - Logged Data Sets: Calculate mean & UCL
- In Situ Surveys
 - Limited number of data points
 - Assumptions are made RE: distribution of radioactivity within the volume of M&E

Select Statistical Test (Cont'd)

- MARSSIM-Type Surveys
 - Samples
 - Scenario A
 - Sign or WRS Test
 - Scenario B
 - NUREG-1505 with adjusted Sign & WRS Test to account for difference in H_0
 - Sign or WRS Test with Quantile Test
 - Scans
 - EMC as in MARSSIM

Verify Assumptions of Test

- Scan Only and In Situ Surveys
 - Focus on assumptions used to develop MDC & MQC values
- MARSSIM-Type Surveys
 - Power of Statistical Test ($1-\beta$) verifies if the number of samples were sufficient to achieve the DQOs for Type I (α) & Type II (β) decision error rates

Draw Conclusions from Data

- When It's Easy
 - All the data meet the criteria for disposition – This is expected for Class 2 & 3
- When It's Simple
 - Table 6.2: Summary of Evaluation Methods and Statistical Tests
- When It's Not Easy or Simple
 - Re-evaluate disposition options

When the Survey Unit Fails

- Review and confirm data is valid
- Class 1
 - Re-segregate
 - Decontaminate and Re-survey
 - Change the disposition option
- Class 2 and Class 3
 - Re-classify and re-evaluate other classification decisions as these will now be brought into question

Document Survey Results

- Routine (Operational)
 - Documented via facility SOPs
 - Minimal or non-existent
- Non-Routine
 - Sufficient to allow for future independent evaluation of survey results to include verification measurements
 - Regulatory requirements

Questions

