MICHIGAN BROWNFIELD REDEVELOPMENT PROGRAM

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

Incremental Sampling Methodology

Data Quality Objective Process at Brownfield Sites

This checklist should be completed and supplied to the Brownfield Coordinator/Environmental Review Staff for discussion with supporting reports, figures, tables, etc. ***prior to execution of sample collection*.**

Process Checklist

Purpose (check only one per form)

☐ Risk Assessment ☐ Remediation Efficiency

Step 1 – Define the problem

Type of Facility:

Historic use:

Current use:

Proposed use:

Pathway(s) to be evaluated: ☐ Direct Contact ☐ Drinking Water ☐ Volatilization to Indoor Air ☐ Other:_____

Known or potential sources (Primary and Secondary)

1. Soil:
2. Groundwater:
3. Surface Water:
4. Vapor:

Identify relevant team members, stakeholders, decision makers.

Identify limitations or constraints due to available resources or deadlines.

Step 2 – Identify the Decision

What question are you trying to answer? What do you want to accomplish with the data? What is the goal?

What are the outcomes and alternative actions?

Step 3 – Identify the Inputs to the Decision

What are the appropriate analytes for each Recognized Environmental Condition (REC)?

What depth intervals will collect and why?

Note: This could be based on source, delineation, due care, future use, ongoing operations and maintenance, soil management during construction, etc.

How many increments are proposed based on the identified analytes?

Note: Recommended minimum number of increments based on heterogeneity in soil:

- Metals, 30-50 increments
- VOCs, SVOCs, PFAS, 50-70 increments
- PCBs, 70-100 increments

Do you have alternative analyses planned that may be considered based on initial analytical results?

Examples may include fine and coarse fraction lead speciation, etc.

What are the decision values or action levels?

(generic residential cleanup criteria, background soil survey, site-specific criteria, etc.)

Step 4 – Define the Study Boundaries

Explain the type of Decision Unit(s) [DU]

1) Characterization
   a) Source Area
   b) Remediation Boundary
2) Risk Assessment
   a) Exposure Area

Note: The explanation may include historical information, contaminant concentration, geology, proposed end use/layout, reduction in disposal cost, etc.

Does your DU(s) reflect your goals in Step 2? ☐ Yes ☐ No

Provide a figure of the DU(s). The figure(s) should clearly discern decision units, depth intervals, pathway, etc. Identify practical constraints on data collection.

Note: Do not include features in the DU that you will not collect increments from, such as currently paved or covered surfaces.

Step 5 – Develop a Decision Rule

What will you do with the results?

IF	THEN
IF	THEN
IF	THEN
IF	THEN

Step 6 – Specify Tolerable Limits on Decision Errors

Are QAQC samples being collected? ☐ Yes ☐ No

- **How many?**
- **What location?**
- **What method?**

Note: Triplicates on at least one DU to gauge heterogeneity or at a minimum of 1 triplicate for every 10 DUs (10%).

✓ **Provide a Figure that indicates which DU(s) you plan to do triplicate sampling on.**

Relative Standard Deviation (RSD): < 30%

Note: Decisions regarding RSDs shall take into account proximity of the results to the cleanup criteria and detection limits.

How will the results be compared to the criteria selected in Step 3 including the potential use of averaging or other statistics?

Step 7 – Optimize the Design for Obtaining Data

The final step of the Data Quality Objective (DQO) process uses the results of the first six steps to review your DQOs to ensure you are achieving the desired results at the lowest cost. For example:

- Is the decision unit the best, are the increments accurate, analytical methods correct, etc.?
- Can you improve the quality of the design and decision?

Resources:

EGLE Incremental Sampling Methodology and Applications

EGLE Exposure Barriers for Direct Contact Pathway

EGLE Volatilization to Indoor Air Pathway (VIAP) Evaluation of a Dispersed Vapor Source Under Part 201

Additional Considerations and Tips for Success

- Selecting a large list of analytical compounds to look for exceedances of criteria makes sample design significantly more difficult to achieve both representative and reproducible sample results. Make sure the number of increments and decision unit will be representative and reproducible for the analytical compounds of concern.
- May decide to collect triplicate samples on more than 10% of the DUs, if you need to understand the reproducibility on the individual DUs based on population differences (e.g., historical concerns, contaminants of concern, etc.)
- If conducting discrete sampling in addition to ISM sampling, it is recommended to have separate DQOs for each sampling method and separate sampling events.
- Existing site conditions that may present or create influence (e.g., asphalt pavement/base, flaking lead-based paint, etc.) on the results of the data for ISM should be considered prior to sampling to ensure increments are placed accordingly to assess the problem identified in the DQOs.
- High quality soil descriptions collected during field activities are helpful and should include any unusual staining, odors, asphalt pieces, coal chunks, etc.
- The DQOs are a living document and may need to be updated or amended, as appropriate.
- Triplicate collection for ISM is different than duplicate collection for discrete sampling. Triplicates for ISM are collected from separate and distinct increments within the same increment grid area as opposed to from the same increment, as would be the process for discrete sampling.