

Executive Briefing

Uniform Federal Policy Quality Assurance Project Plan (UFP QAPP) for Soils Reassessment at Dioxin Sites

SUMMARY

This Executive Briefing summarizes the purpose and elements of the UFP QAPP currently being developed for EPA Regions to use to perform reassessments of soils at properties in the vicinity of former NPL and/or Removal Action Sites.

Surface soils (0 to 2 feet below ground surface) will be reassessed for the potential presence of dioxins, furans and/or dioxin-like compounds associated with the sites as a function of the reduction in the Preliminary Remediation Goal (PRG) for dioxin. The final PRG value is currently being determined.

The strategic purpose of the reassessments is to determine whether sites confirmed to be impacted by these compounds are contaminated at concentrations and distributions which may pose an immediate direct contact risk to human health. It is anticipated that these determinations will need to be made quickly to provide Regions with an effective basis for responding to the technical, legal and community concerns that arise should the status of a site(s) change as a function of the new PRG.

The UFP QAPP is currently focused on evaluating direct contact exposure concerns in surface soil only. Subsequent versions, may or may not, deal with contaminants at depth and remediation/removal actions. There are accommodations for using certain data to support remedial planning – but the QAPP is not currently comprehensive in terms of guiding an entire remedial effort.

The UFP QAPP is being designed to be as uniform as possible, while providing sufficient flexibility for Regions to apply to site-specific situations, and to provide a consistent and defensible approach that EPA can utilize on a nationwide basis. Accordingly, the Regions are now formally engaged to provide developmental feedback and support to ensure the UFP QAPP is as responsive to their needs as possible.

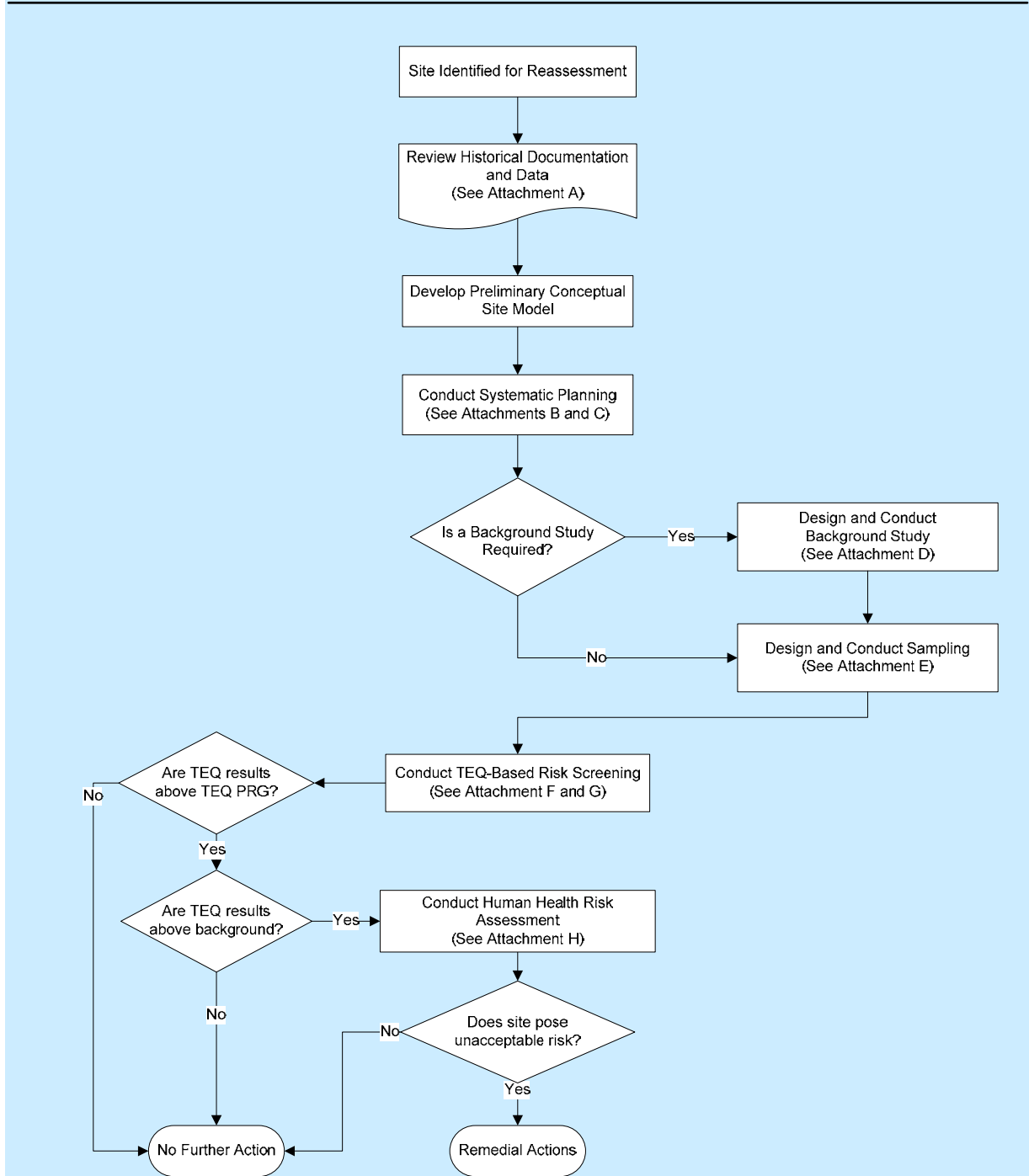
The UFP QAPP was developed by a multidisciplinary team of geologists, hydrogeologists, chemists, geochemists, environmental engineers, risk assessors, statisticians, and others with practical experience in specialized sampling methods and assessing dioxins – from EPA [TIFSD and ERT], Tetra Tech EMI, and Argonne National Laboratories.

To the extent possible, the UFP QAPP relies on existing sampling and analytical guidance and nomenclature, however, it leverages some innovative sampling design and sample collection methods which provide significant benefits in terms of expediting schedules, reducing and avoiding costs, and managing uncertainty for effective risk and remediation-related decision-making. The innovative methods are based on generally-accepted practices, however, regional input and support will be critical to their successful adoption and implementation.

Figure 1 is a decision logic diagram that shows the basic site reassessment process.

DRAFT V2 Figure 1: Decision Logic Diagram for Dioxin Site Reassessment Process

Friday, April 30, 2010



Note: The references to various attachments above are in regard to exhibits within the UFP QAPP and are not included with the Executive Briefing. Each attachment includes a sub-routine for key project activities and phases that each has their own designs to support the whole.

KEY STRATEGIC and TECHNICAL ELEMENTS

The UFP QAPP is based on the following key strategic and technical elements:

- Reliance on conceptual site models (CSMs) and systematic project planning as the basis for modifying the core UFP QAPP to address site-specific conditions.
- The use of incremental composite sampling (ICS) as the method of field sample collection. Increments will be collected using a systematic grid with a random starting point, determined manually or with Visual Sampling Plan (VSP), based on Regional preference and site-specific conditions. This approach will maximize the decision value of resources applied, in addition to increasing site decision confidence.
- The use of EPA Method 8290A/1613B, or CLP SOW Method DLM02.2 for analysis of samples for dioxins, furans and dioxin-like PCBs. The UFP QAPP does not contemplate other potential site contaminants, e.g. VOCs, metals, etc.
- The use of the TEF/TEQ approach to calculating analytical results for dioxins, furans and dioxin-like PCBs for comparison to decision criteria
- Decision criteria will be based on the final PRG and/or background, as determined on a site-specific basis. The current QAPP design assumption was to prepare for a potential 3.7 ppt PRG, thus it has been functionally designed for a 1.0 ppt analytical basis. At 1.0 ppt, there is a convergence of analytical capability and background that presents some technical, data evaluation and site decision challenges that are currently being worked through. At 72 ppt, the issue of convergence does not pose these same challenges.
- Risk-based decisions will be made for 0.25 acre decision units (DUs), based on a residential exposure unit (EU) scenario
- At the large site scale, there is a strategy for clearing larger decision areas (DAs), while providing the ability to identify sub-units (DUs) that require further inquiry and/or remediation. This will allow optimization of remedial needs and lowering of related costs. There are specific accommodations for scaling the process to address 1 acre, 5 acre, 25 acre areas. Sites larger than that will require a modified version of the UFP QAPP to accommodate site-specific situations and objectives.
- The UFP QAPP provides the maximum amount of pre-populated information as possible to increase the efficiency of Regional use. There are obvious prompts for the regional and site-specific aspects of the QAPP that are not pre-populated.
- The program includes collection of primary samples, as well as field replicates and laboratory replicates. The purpose of field replicates is to demonstrate by analytical result replication that the incremental composting sufficiently addressed site heterogeneity and sample homogenization. The purpose of the laboratory replicates is to provide the ability to assess analytical-related variability as needed. The lower the PRG, and the closer the result to established background values, the more important this factor becomes.

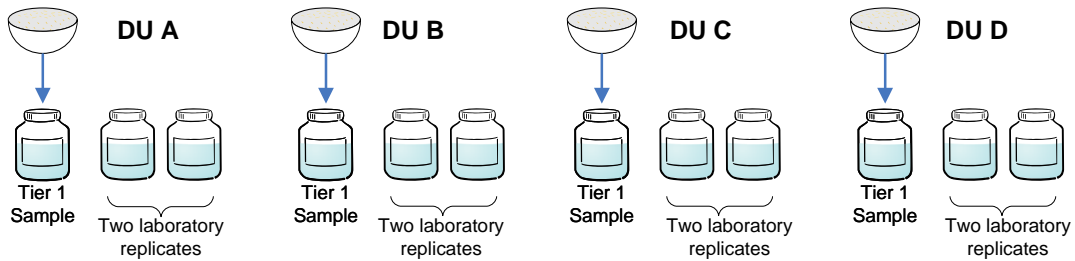
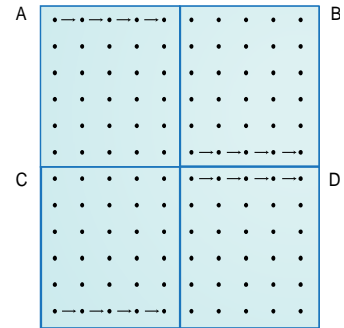
Figure 2 presents a graphical depiction of the ICS sampling and analytical concept.

FIGURE 2 – INCREMENTAL COMPOSITE SAMPLING CONCEPT

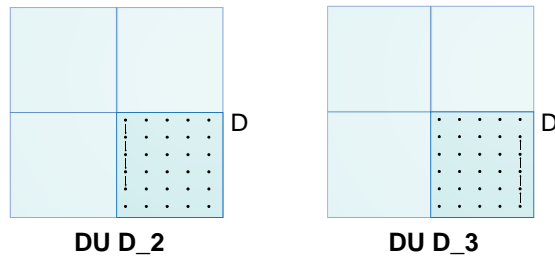
**Sampling Strategy 1:
0.25-Acre Residential Site Decision Units (DUs)**

Example: One 1-Acre site, four 0.25-Acre DUs

- 1 Collect 30 increments from each DU. Combine increments from each DU, homogenize, and subsample. Tier 2 samples are collected for each 0.25-acre DU.



- 2 Collect field replicates by re-walking one of the DUs and collecting new increments.



Combine increments from each DU, homogenize, and subsample.

- 3 Analyze four (4) Tier 1 Samples and the two (2) field replicates. Archive eight (8) laboratory replicates.

- 4 If results are within pre-established range of decision criteria, analyze laboratory replicates for the DU.

For Scenario 1:	
Samples for Analysis	
4 Tier 1 Samples	
2 Field Replicates	
Samples for Archive	
8 Laboratory Replicates	
Total Increments	180

1-1

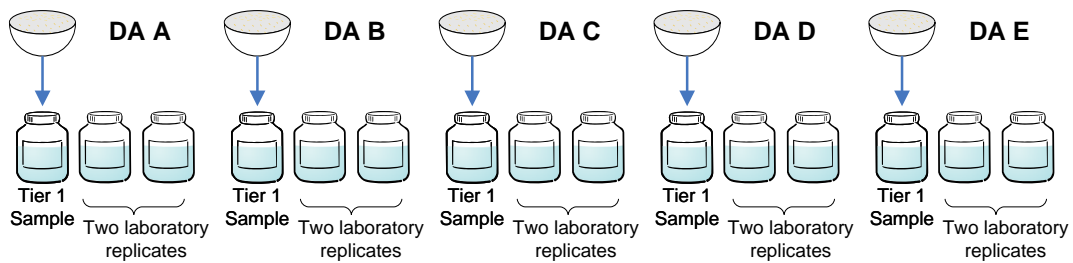
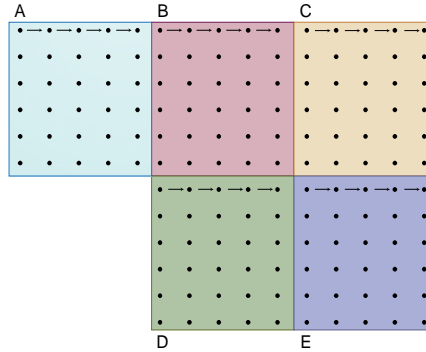
Sampling Strategy 2

Larger site with 1-Acre Decision Areas (DA) Evaluated for Site Clearance, and 0.25-Acre Decision Units (DUs) Evaluated for Remediation

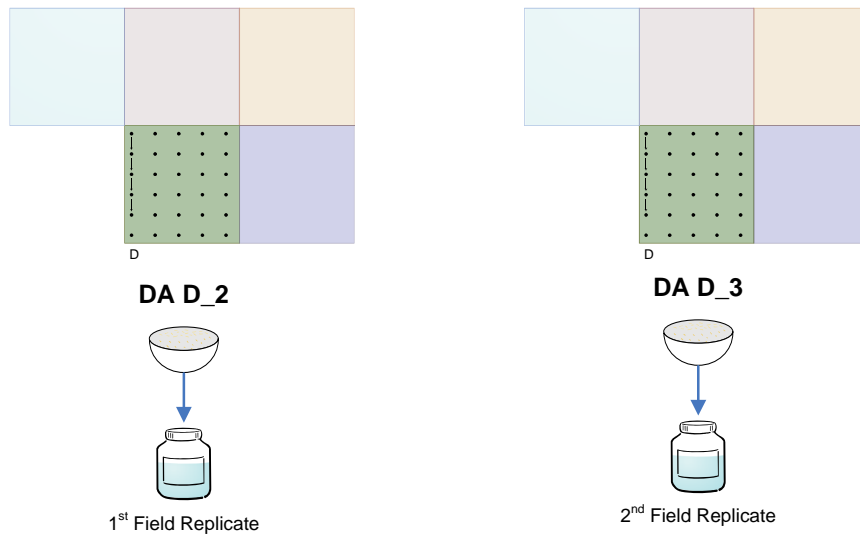
Example: One 5-Acre Site

DAs = 1-Acre
DUs = 0.25-Acre

- 1 Tier 1 (DA) approach appears much like Sampling Strategy 1 (except the Tier 1 sample area is now 1-acre).

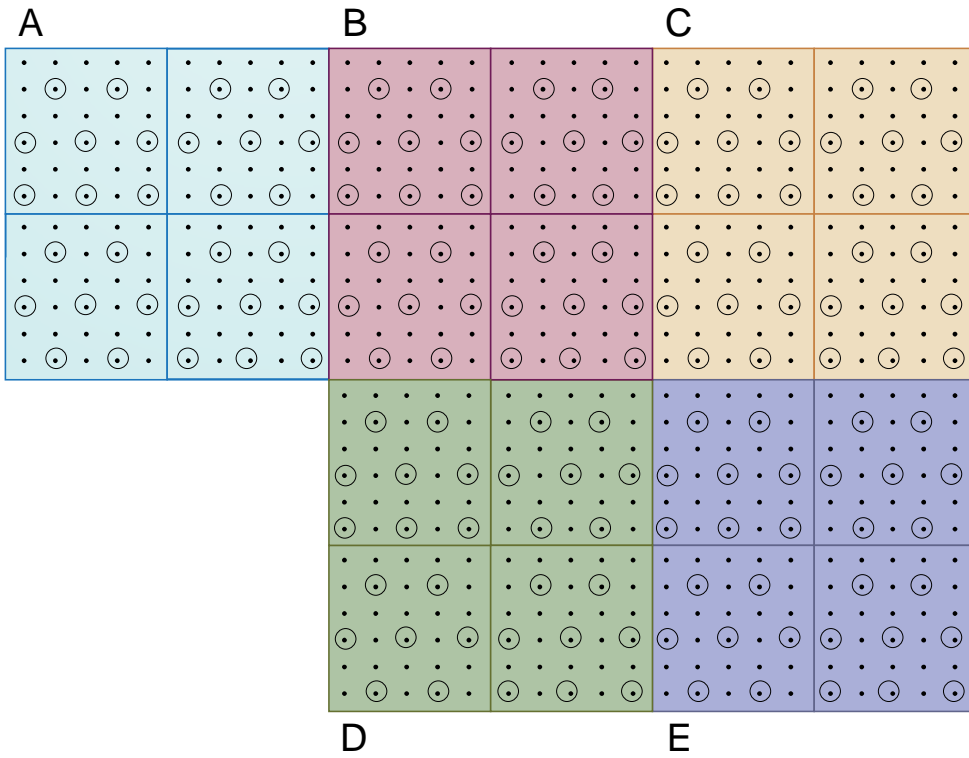


- 2 Field replicates are collected from one DA.



2-1

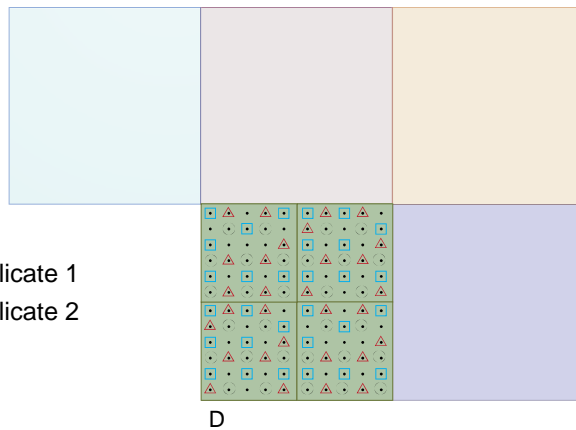
3 However, what this scenario actually looks like from a field-sampler's perspective is:



All of the locations were combined to form the Tier 1 sample for the DA.

All of the locations plus the locations within each DU are combined to form Tier 2 DU samples.

The field replicates from DA D look like this to a field sampler:



D

2-2

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- 4** Analyze five (5) Tier 1 samples and two (2) field replicates
Archive 10 laboratory replicates for possible analysis.
Archive 20 Tier 2 DU samples for possible analysis.

- 5** If results from Tier 1 samples are below pre-established range of decision criteria, no further action for that DA.

If results from Tier 1 samples are within pre-established range of decision criteria, analyze the 2 laboratory replicates for that DA.

If results from Tier 1 samples are above pre-established range of decision criteria, analyze two laboratory replicates and all Tier 2 DU samples.

For Scenario 2:	
Samples for Analysis	
5 Tier 1 Samples	
(1 from each 1-acre DA)	
2 Field Replicates	
(2 from one DA)	
Samples for Archive*	
10 Tier 1 Laboratory Replicates	
20 Tier 2 Samples	
(1 from each of the 0.25-acre DUs)	
Total Increments	600
*Note: Archive samples may be analyzed at a later time.	

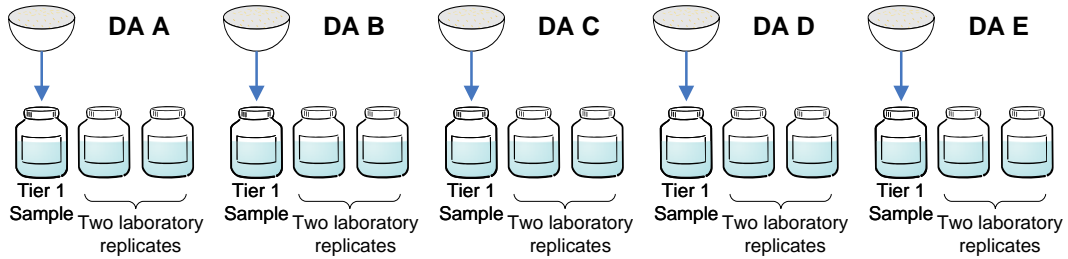
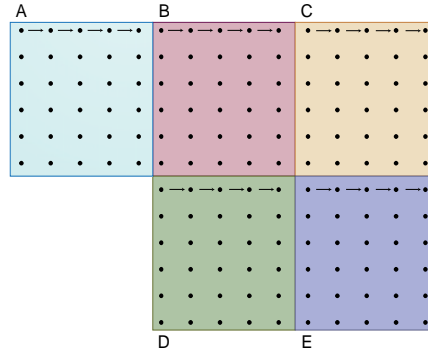
Sampling Strategy 3

25-Acre Site with 5-Acre Decision Areas (DA) Evaluated for Site Clearance, and 1.25-Acre Decision Units (DUs) Evaluated for Remediation

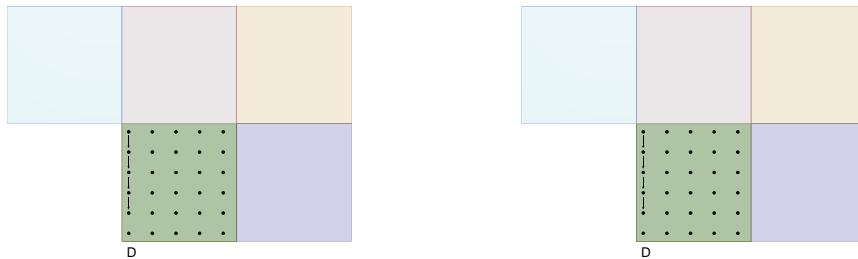
Example: One 25-Acre Site

DAs = 5-Acre
DUs = 1.25-Acre

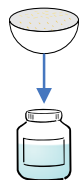
- 1 Tier 1 (DA) approach appears much like Sampling Strategy 1 (except the Tier 1 sample area is now 5 acres).



- 2 Field replicates are collected from one 5-acre DA.

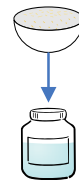


DA D_2



1st Field Replicate

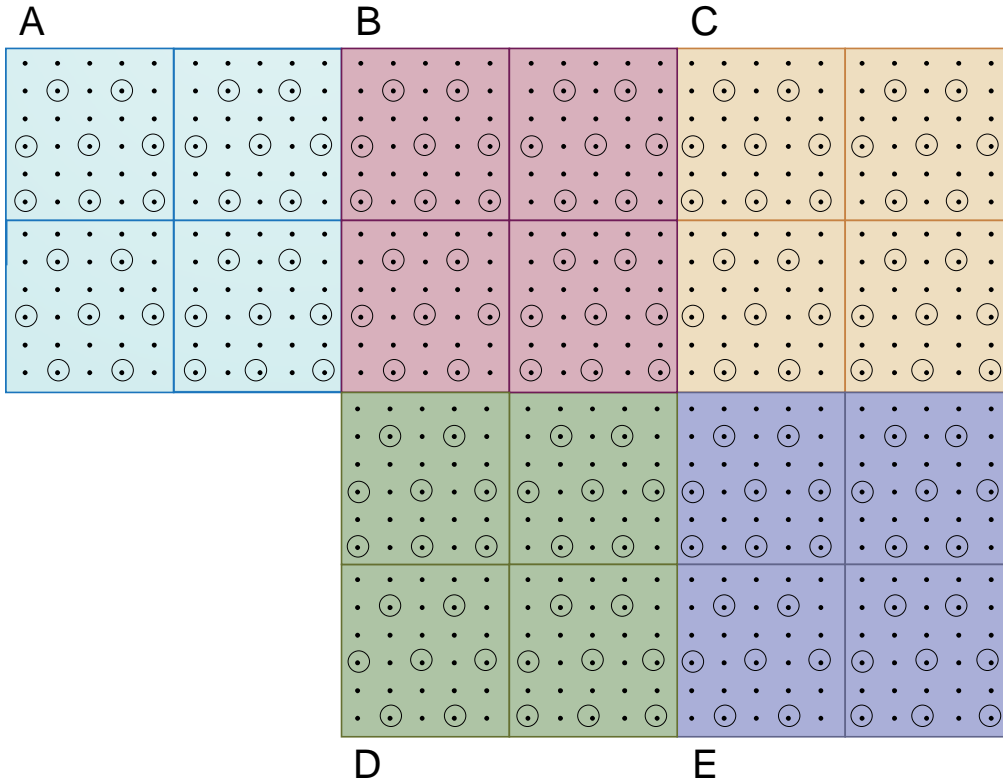
DA D_3



2nd Field Replicate

3-1

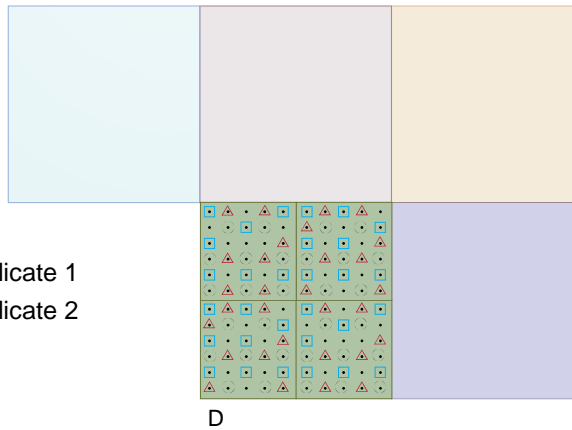
3 However, what this scenario actually looks like from a field-sampler's perspective is:



All of the locations were combined to form the Tier 1 sample for the DA.

All of the locations plus the locations within each DU are combined to form Tier 2 DU samples.

The field replicates from DA D look like this to a field sampler:



- Locations combined to form Tier 1
- Locations Combined to form Field Replicate 1
- Locations Combined to form Field Replicate 2

D

3-2

-
- 4** Analyze five (5) Tier 1 samples and two (2) field replicates
Archive 10 laboratory replicates for possible analysis.
Archive 20 Tier 2 DU samples for possible analysis.

- 5** If results from Tier 1 samples are below pre-established range of decision criteria, no further action for that DA.

If results from Tier 1 samples are within pre-established range of decision criteria, analyze the 2 laboratory replicates for that DA.

If results from Tier 1 samples are above pre-established range of decision criteria, analyze two laboratory replicates and all Tier 2 DU samples.

For Scenario 3:	
Samples for Analysis	
	5 Tier 1 Samples (1 from each 5-acre DA)
	2 Field Replicates (2 from one DA)
Samples for Archive*	
	10 Tier 1 Laboratory Replicates
	20 Tier 2 Samples (1 from each of the 1.25-acre DUs)
Total Increments	600
*Note: Archive samples may be analyzed at a later time.	

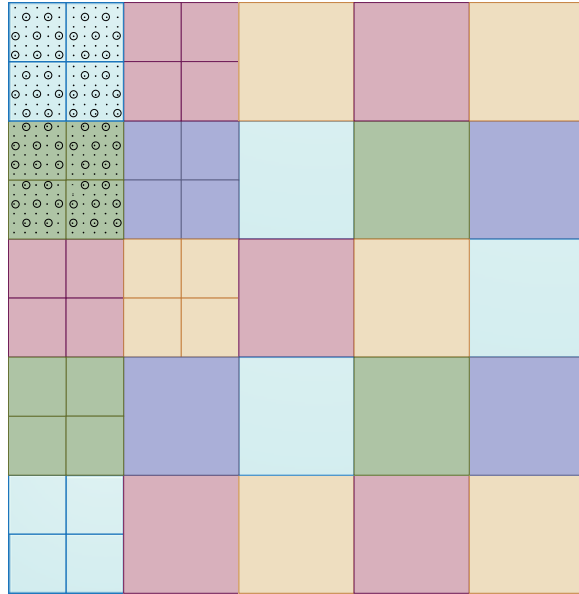
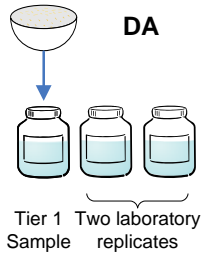
Sampling Strategy 4

25-Acre Site with 1-Acre Decision Areas (DA) Evaluated for Site Clearance, and
0.25-Acre Decision Units (DUs) Evaluated for Remediation

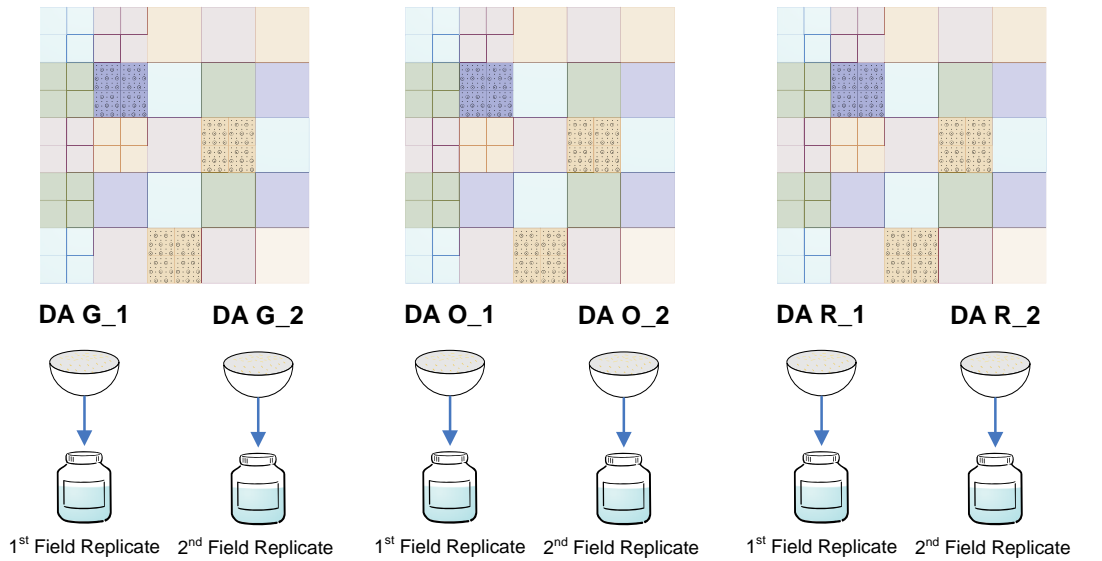
Example: One 25-Acre Site

DAs = 1-Acre
DUs = 0.25-Acre

- 1 Collect 30 increments from each 1-acre DA. Combine increments from each DA, homogenize, and subsample.






- 2 Collect 2 field replicates from three (3) randomly selected 1-acre DAs.



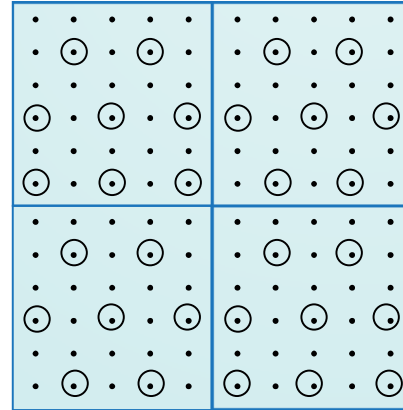
4-1




3 From a field sampling perspective, this process will involve taking 30 samples from each 0.25-acre DU, and combining a total of 30 samples from each 1-acre DA to form the Tier 1 samples.

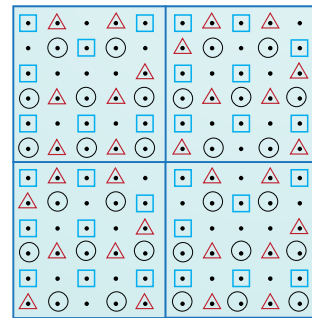
All of the  locations were combined to form the Tier 1 sample for the DA.

All of the  locations plus the  locations within each DU are combined to form Tier 2 DU samples.

The field replicates from the 3 selected DAs should look like this to a field sampler:



-  Locations combined to form Tier 1
-  Locations Combined to form Field Replicate 1
-  Locations Combined to form Field Replicate 2



4 Analyze 25 Tier 1 samples and six (6) field replicates. Archive 50 Tier 1 laboratory replicates for possible analysis. Archive 100 Tier 2 DU samples for possible analysis.

5 If results from Tier 1 samples are below pre-established range of decision criteria, no further action for that DA.

If results from Tier 1 samples are within pre-established range of decision criteria, analyze the 2 laboratory replicates for that DA.

If results from Tier 1 samples are above pre-established range of decision criteria, analyze two laboratory replicates and all Tier 2 DU samples.

For Scenario 4:

Samples for Analysis
25 Tier 1 Samples
 (1 from each 1-acre DA)
6 Field Replicates
 (2 each from 3 DAs)

Samples for Archive*
50 Tier 1 Laboratory Replicates
100 Tier 2 Samples
 (1 from each of the 1.25-acre DUs)

Total Increments **3,000**

*Note: Archive samples may be analyzed at a later time.