

Grid Soil Sampling Outside of Source Areas



In its 2000 session, the Wyoming Legislature created new opportunities, procedures, and standards for voluntary remediation of contaminated sites. These provisions, enacted as Articles 16, 17, and 18 of the Wyoming Environmental Quality Act and implemented by the Wyoming Department of Environmental Quality (DEQ), will govern future environmental cleanups in Wyoming.

This Fact Sheet provides guidelines for grid soil sampling outside of known or suspected source areas.

1. What is grid soil sampling?

Grid soil sampling is a technique used to provide the information needed to determine whether soil contamination is present or absent in a defined area. It involves overlaying a sampling grid onto the areas identified for characterization and collection of soil samples within each grid.

Under the Voluntary Remediation Program (VRP), DEQ expects that grid soil sampling outside known and suspected areas or sources of contamination will be used infrequently. DEQ's typical approach to site characterization is a biased sampling approach, where information about a site is used to create a site conceptual model and sampling is carried out in the areas of most likely contamination based on the model. However, in some circumstances, grid sampling may be needed to assess whether contamination is present outside known or suspected areas of contamination.

2. When would grid soil sampling outside known or suspected source areas be needed?

DEQ expects that the most common circumstance under which grid sampling outside known or suspected areas of contamination will be needed is when a Volunteer requests a no further action letter liability assurance that will cover portions of a site that are outside known or suspected areas of contamination. This might be the case, for example, when a Volunteer requests a site-wide no further action letter and available information does not provide adequate certainty that all contamination outside known or suspected source areas has been identified.

DEQ recognizes that the grid soil sampling approach described in this guideline is conservative and could be costly. DEQ emphasizes that grid sampling will not be necessary at all VRP sites. For example, grid soil sampling outside of known or suspected source areas generally is not needed when a Volunteer is seeking a no further action letter only for portions of a site, or when a Volunteer

is seeking another type of liability assurance, such as a certificate of completion (including a site-wide certificate of completion)

3. What if grid soil sampling reveals soil contamination?

DEQ understands that cleanups are iterative and that grid soil sampling outside known or suspected source areas may sometimes reveal unexpected contamination. If soil contamination is detected during grid sampling, the Volunteer should consult with DEQ about the need for additional soil or groundwater characterization.

4. How does grid soil sampling relate to other site characterization activities?

When needed, grid soil sampling outside known or suspected source areas should be integrated into other site characterization activities and covered by a Volunteer's site characterization work plan. Site characterization is described more fully in Fact Sheet #8 *Site Characterization*.

5. How can I get more information about the VRP?

To learn about VRP sites that may exist in your community, obtain copies of other VRP Fact Sheets/guidance documents, get answers to your questions, or volunteer for the program, contact DEQ at (307) 777-7752 or through the VRP website at: <http://deq.wyoming.gov/shwd/voluntary-remediation-program/>

The VRP website includes all of the Fact Sheets and other guidance documents for the VRP. This website is updated frequently and includes the latest information about DEQ's progress in developing guidance, policy, and other supporting documents for the VRP.

**See Appendix A: Guidelines for Grid Soil Sampling
Outside of Suspected Source Areas**

Appendix A: Guidelines for Grid Soil Sampling Outside of Known or Suspected Source Areas

1. *Summary of expectations:* When using grid soil sampling for evaluation of site soil conditions outside of known or suspected source areas, the grid sampling approach should provide an adequate number of samples and accurate, representative analytical results to minimize the likelihood that soil contamination will be missed. The grid size and sample depths should be conservative unless site conditions or history warrant a less conservative approach and DEQ agrees to such changes. The approach to be used for grid sampling outside of known or suspected source areas will be included in the site characterization work plan for the site. Elements of a site characterization work plan are included in Fact Sheet #8 *Site Characterization*. The basis for collection of soil samples using a grid sampling approach is as follows:
 - a. Sample locations will be distributed over the entire site or study area, excluding known or suspected source areas that are characterized based on other sampling approaches.
 - b. Grid size will be based on site-specific characteristics, such as topography, potential for contamination to be present, availability of information regarding historical site activities, and size of site.
 - c. Total number of samples will depend on number of grids and number of sample depth intervals for each grid sample location.
 - d. Discrete samples will be analyzed; compositing of samples is not acceptable without prior approval from DEQ.
 - e. Standard EPA analytical methods and quality assurance/quality control (QA/QC) procedures should be used. Laboratory reporting limits may need to be lowered to meet soil cleanup levels.
 - f. A Volunteer may propose to DEQ an alternative approach for characterization of soil outside known or suspected source areas prior to preparation of a site characterization work plan and implementation of the sampling, but should assume residential site usage, unless otherwise approved by DEQ.

2. *Grid sampling approach:* Collection of soil samples using the following grid sampling approach should be used for site characterization in areas outside of known or suspected source areas unless an alternate approach is approved by DEQ:
 - a. A grid will be overlaid on the areas identified for sampling. Soil samples will be collected from the center of each grid.
 - b. Soil samples will be collected from three depths unless otherwise approved by DEQ. Sample depths will be selected based on site-specific characteristics such as soil type, depth to groundwater, historical information, and field screening results. Additional sampling for site characterization may be needed if contamination is found.
 - c. Minimum number of sample locations for statistical evaluation of sample results is ten, regardless of site size. (EPA, *Supplemental Guidance to RAGS: Calculating the*

Concentration Term, Publication 9285.7-081, May 1992). For very small sites (less than ½ acre), sample results may be directly compared to cleanup levels or grid sizes may be adjusted to provide ten sampling locations.

- d. Grid size:
- i. The maximum grid size should not exceed a residential lot, specified to be 1/5 acre (about 8700 ft.²).
 - (1) For sites less than or equal to two acres in area, grid size could range from 545 ft² for an 1/8 acre site to 1/5 acre (maximum grid size allowed) for a two acre site.
 - (2) For sites greater than two acres in area, the maximum grid size will be 1/5 acre and the minimum number of sample locations will vary depending on site size. See Table 1.

Table 1

Number of Sample Locations	
Site Size	Minimum No. of Sample Locations
5 acres	25
10 acres	50
30 acres	150
100 acres	500

- ii. Variable grid sizes may be used, based on site-specific characteristics:
 - (1) Topography.
 - (a) In topographically low areas (such as ravines, depressions, etc.), a smaller grid size should be used where there is a greater potential for contamination to be present (i.e., greater possibility of dumping or other release of contaminants).
 - (b) In topographically high areas (such as ridges, etc.), where access may be difficult or rock outcrops occur, or in topographically low areas, such as deep ravines where surface water bodies may occur, a larger grid size may be used with DEQ approval. Alternatively, the Volunteer may consider not including these areas of the property as part of the site under the VRP.
 - (2) Potential for contamination to be present.
 - (a) In areas where there is a higher potential for contamination to be present, based on previous knowledge or documentation of site operations and waste handling practices (e.g., facility files), historical aerial photographs, visual observations, etc., a smaller grid size should be used.

4. *Documentation.* Grid soil sampling activities should be documented and documentation should be submitted to DEQ for review and approval as part of the site characterization work plan and final site characterization report for the site. For more information on site characterization work plans and reports, see the Fact Sheet #8 *Site Characterization*.