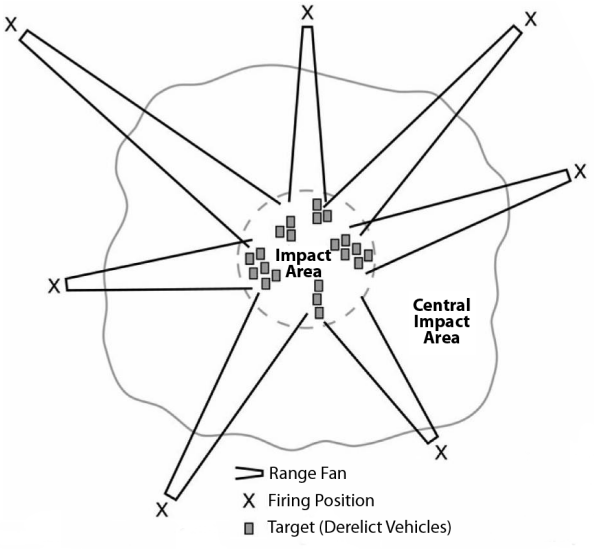
Federal Facilities Forum Fact Sheet:
Site Characterization for Munitions Constituents

EPA's Federal Facilities Forum has developed an issue paper, *Site Characterization for Munitions Constituents* (EPA 505-S-11-001), to provide personnel working on hazardous waste sites with the technical information they need to decide how to investigate sites contaminated with chemicals associated with conventional military explosives and propellants. The paper addresses the nature of energetic residues on Department of Defense training ranges and other munitions sites, sampling strategies that provide representative samples, and analytical methods developed to characterize these samples. The paper explores the nature of a variety of munitions constituents in the following areas:

- Physical and chemical properties of energetic chemicals and residues.
- Deposition and amounts of residues (including metals and other potential contaminants of concern) produced from different detonations and firing activities.
- Results of investigations describing the accumulation and distribution of residues at different types of military ranges and open burn/open detonation units.



Schematic diagram of an artillery range showing firing points, range safety fan, and impact areas.

- Comparison of methods for the collection of representative soil samples on ranges.
- Laboratory methods designed to provide adequate characterization of soil samples.

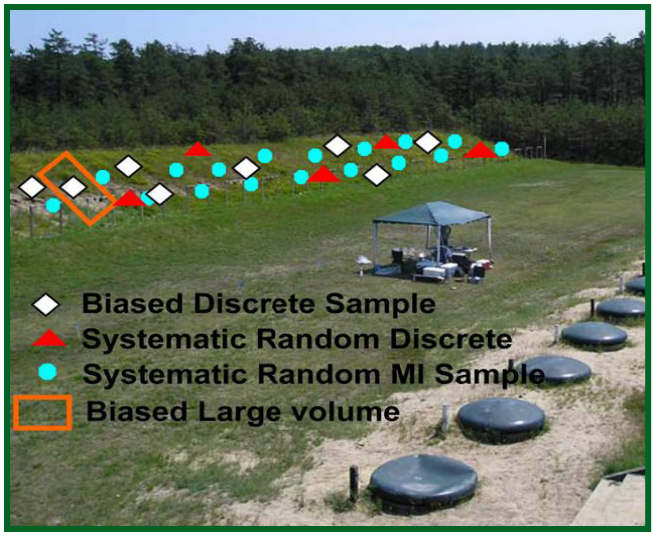
Appendix A of the issue paper contains five case studies that illuminate appropriate procedures for investigating different types of munitions sites:

The Federal Facilities Forum supports the federal facilities programs in each of the 10 EPA regional offices. The group was organized in 1996 to exchange up-to-date information related to federal facilities remediation issues at Superfund and RCRA sites. Additional participants come from EPA headquarters, labs, and some states. The forum promotes communication between the Regions and headquarters and works primarily to communicate current policy issues to each regional office as developed through the Federal Facilities Restoration and Reuse Office.

Two-person team collecting a multi-increment sample.

- Incremental sampling of sediments contaminated with white phosphorus.
- Implementation of Method 8330B for explosives residue characterization at the Utah Test and Training Range.
- Arnhem Antitank Rocket Range, Canadian Forces Base Valcartier, Quebec.
- Estimating perchlorate deposition from the firing of a MLRS rocket.
- Site inspection at the former Farragut Naval Training Center/Idaho Department of Fish and Game Farragut Firing Range, Athol, Kootenai County, Idaho.

Appendix B, "Fundamental Error," and Appendix C, "A Practical Guide to Sampling," address the difficulties of obtaining representative samples. Fundamental error is the most important statistical parameter to understand when sampling soil containing particulates. This error is fundamental to the composition of the particles (or other items or fractions) of the lot being chemically or physically different; that is, it is a result of the compositional heterogeneity of the lot. It is the only sampling error that can never be eliminated. The sampling guide discusses tools, determination of size and number of samples, multi-increment collection design, sample unit setup, sample collection, and other considerations.



Comparison of four different sampling designs.

Site Characterization for Munitions Constituents and other issue papers and fact sheets developed by the Technical Support Project forums can be found at www.epa.gov/tio/tsp/index.htm. For more information on this document, contact Monica McEaddy at (703) 603-0044 or McEaddy.Monica@epa.gov.

United States Environmental Protection Agency

Office of Solid Waste and Emergency Response (5203P)

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