Department of Statistics
303 Pond Laboratory
University Park, PA 16802 USA
814/865-1344 (Office)
APR 15 '97 11:27AM
Professor of
Mathematical Statistics
Member of
Graduate Energy Program

Gilbert

Gilbert and Simpson 0972

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Editors:

Herbert Lacayo
Statistical Policy Branch (PM-223)
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, DC 20460

Royal J. Nadeau
Environmental Response Branch/OSWER
U.S. Environmental Protection Agency
Woodbridge Avenue
Raritan Depot - Building 10
Edison, NJ 08837

Ganapati P. Patil
Center for Statistical Ecology and Environmental Statistics
Department of Statistics
Penn State University
University Park, PA 16802

Larry Zaragoza
Site Assessment Branch (OS-230)
U.S. Environmental Protection Agency
401 M Street
Washington, DC 20460

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STATISTICAL SAMPLING AND ANALYSIS ISSUES AND NEEDS FOR TESTING ATTAINMENT OF BACKGROUND-BASED CLEANUP STANDARDS AT SUPERFUND SITES

Richard O. Gilbert
Jeanne C. Simpson
Pacific Northwest Laboratory(a)
P. O. Box 999
Richland, WA 99352

ABSTRACT

The primary purpose of the Workshop on Superfund Hazardous Waste is to identify statistical issues and research needs that can form the basis for a long-term statistical research and training plan for Superfund hazardous waste site characterization and remediation. This paper discusses issues and needs that arise when statistical procedures are used to test whether remediated Superfund sites have attained site-specific background standards. Several nonparametric tests are discussed (Wilcoxon rank sum, slippage, quantile) as regards their power to detect non-attainment of background standards. Some of the important issues that appear to need attention are (1) how to select site-specific background areas, (2) determine the types of post-remedial-action concentration distributions that are likely to occur in practice for various types of remedial actions (to better select the most powerful tests to use), (3) develop and evaluate the power of multiple-comparison slippage, quantile, and other robust tests, (4) conduct additional (to those reported here) power studies of the Wilcoxon, slippage, and quantile tests, for various patterns of "hot spot" contamination, (5) develop and communicate a unified approach for deciding when to use geostatistical methods, classical testing methods as discussed here, or both simultaneously, and (6) determine and evaluate statistical procedures that are appropriate for testing compliance with non-constant risk-based standards.

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