

# Visual Sample Plan Version 4.0 User's Guide

N. L. Hassig      J. E. Wilson  
R. O. Gilbert    B. A. Pulsipher  
L. L. Nuffer

July 2005



Prepared for the U.S. Department of Energy  
under Contract DE-AC05-76RL01830

---

## DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor Battelle Memorial Institute, nor any of their employees, makes **any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights.** Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof, or Battelle Memorial Institute. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

PACIFIC NORTHWEST NATIONAL LABORATORY  
*operated by*  
BATTELLE  
*for the*  
UNITED STATES DEPARTMENT OF ENERGY  
*under Contract DE-AC05-76RL01830*

Printed in the United States of America

Available to DOE and DOE contractors from the  
Office of Scientific and Technical Information,  
P.O. Box 62, Oak Ridge, TN 37831-0062;  
ph: (865) 576-8401  
fax: (865) 576-5728  
email: reports@adonis.osti.gov

Available to the public from the National Technical Information Service,  
U.S. Department of Commerce, 5285 Port Royal Rd., Springfield, VA 22161  
ph: (800) 553-6847  
fax: (703) 605-6900  
email: orders@ntis.fedworld.gov  
online ordering: <http://www.ntis.gov/ordering.htm>



This document was printed on recycled paper.

# **Visual Sample Plan Version 4.0 User's Guide**

N. L. Hassig      J. E. Wilson  
R. O. Gilbert    B. A. Pulsipher  
L. L. Nuffer

July 2005

Prepared for  
the U.S. Department of Energy  
under Contract DE-AC05-76RL01830

Pacific Northwest National Laboratory  
Richland, Washington 99352

## **Abstract**

This user's guide describes Visual Sample Plan (VSP) Version 4.0 and provides instructions for using the software. VSP selects the appropriate number and location of environmental samples to ensure that the results of statistical tests performed to provide input to risk decisions have the required confidence and performance. VSP Version 4.0 provides sample-size equations or algorithms needed by specific statistical tests appropriate for specific environmental sampling objectives. It also provides data quality assessment and statistical analysis functions to support evaluation of the data and determine whether the data support decisions regarding sites suspected of contamination. The easy-to-use program is highly visual and graphic. VSP runs on personal computers with Microsoft Windows operating systems (95, 98, NT, 2000, Millennium Edition, CE, and XP). Designed primarily for project managers and users without expertise in statistics, VSP is applicable to two- and three-dimensional populations to be sampled (e.g., rooms and buildings, surface soil, a defined layer of subsurface soil, water bodies, and other similar applications) for studies of environmental quality. VSP is also applicable for designing sampling plans for assessing chem./rad/bio threat and hazard identification within rooms and buildings, and for designing geophysical surveys for UXO identification.

## Acknowledgments

We wish to thank the many sponsors from multiple US Government Agencies for their continued support of VSP developments. We thank George Detsis, Chip Landon, and David Bottrell, U.S. Department of Energy, for their initial and continuing support of many modules in VSP including the addition of the Data Quality Assessment and Statistical Assessment methods. We thank Rebecca Blackmon of Department of Defense's TSWG office and the support of the Department of Homeland Security and Environmental Protection Agency (Les Sparks) for development of methods focused on sampling within buildings. We wish to thank John Warren of the Office of Environmental Information, U.S. Environmental Protection Agency for his insight in how to make VSP more user-friendly and more aligned with EPA guidance on sample design approaches, as well as Mike Carter and JoAnn Griffith, U.S. Environmental Protection Agency Office of Solid Waste and Emergency Response, for their continued support and interest in a high-quality product. We also wish to thank Anne Andrews and Jeff Marqusee of DoD's SERDP and ESTCP Unexploded Ordnance program for their continued support and guidance. We wish to thank Bill Ingersoll, Fred McLean, and Ed Hartzog for their support and guidance on the development of the Range Sustainability module. Special thanks are extended also to individuals in the Statistical Sciences and Sensor Analytics Groups at Pacific Northwest National Laboratory: Bob O'Brien, Kevin Anderson, Deb Carlson, Mark Tardiff, Craig McKinstry, John Hathaway, and Brett Matzke for their statistical expertise; Lucille A. Walker for her project financial accounting support; Rose Urbina for editorial support; and Mary H. Cliff for her assistance in preparing the final report. We also thank Nancy Valentine and Don Hadley for their excellent guidance on biological sampling and building modeling. The authors are pleased to acknowledge the contribution from the developers of ProUCL on some of the statistical analysis algorithms.