INFORMATION TECHNOLOGY

VISUAL ENVIRONMENTAL STATISTICS PROJECT

LEAD ACTIVITY
Southwest Division Naval Facilities Engineering Command (SWDIV)

STATUS
Active

MISSION
Provide simple, defensible tools for addressing environmental contamination problems using environmental statistics

REQUIREMENT
In order to characterize environmental contamination problems in a cost-effective and technically sound manner, the Navy requires easy-to-use statistical tools to determine the appropriate number of samples to collect in order to characterize the extent of contamination at a site.

DESCRIPTION
Southwest Division Naval Facilities Engineering Command (SWDIV) teamed with the Oak Ridge National Laboratory (ORNL) - Environmental Technology Section (ETS) to test and implement the Visual Environmental Statistics Project (VESP) statistics software at NAS North Island Installation Restoration (IR) Site 10. The VESP is aimed at addressing real-world environmental contamination problems using state-of-the-art statistical methods that are cost-effective, simple, accurate, and defensible.

The first software tool to be produced for the VESP is Visual Sample Plan (VSP). VSP is a user-friendly program that helps to answer certain questions in sample planning. The software expands on these simple questions and lets the user refine the sample design. The program can be used for very simple tasks such as plotting five random points in a square and also offers more sophisticated options such as specifying Type I and Type II error limits. Collaboration among statisticians, software programmers, and project engineers allowed the development team to create the VSP software.

The remedial investigation (RI) for the IR Site 10 Shoreline Slag Area at NAS North Island was developed using VSP. As the RI proceeded, ETS studied the sampling challenges and modified the statistics software, thus improving the software with field-tested features. Regulators welcomed the statistical approach, allowing the project to progress quickly. The software works hand-in-hand with the U.S. Environmental Protection Agency (EPA) data quality objective process. Decisions are cast as a

testable hypothesis improving the credibility of cleanup decisions. Finally, the adaptive fill feature in the software allowed the final data to consider sample results from multiple events, resulting in an overall reduction in the number of additional samples required. NELP is currently seeking funding to bring VSP to a version 1.0 release with major field-tested features implemented and on-line documentation completed. It is anticipated that the VSP software will be revised by March 1999. SWDIV is currently using VSP at Naval Amphibious Base (NAB) Coronado.

BENEFITS

- Enables environmental professionals with a basic understanding of statistics to apply statistical and mathematical algorithms applicable to environmental statistics
- Uses familiar visual interfaces such as site maps and building plans
- Introduces the user to many different sampling methods, such as grid, random, and hot spot sampling
- Provides immediate feedback on the accuracy and the cost of a sampling event for multiple sampling scenarios
- Provides decision tools such as graphs of probability of hot spot detection versus total sampling costs
- Provides on-line and printer assistance to the user if a more detailed explanation is required.
- Provides flexibility to adapt to changing needs
- Field testing provides an opportunity to improve the software and methods to meet real-world challenges effectively

ACCOMPLISHMENTS/CURRENT STATUS

Date	Activity
FEB 1998	VESP implemented at NAS North Island IR Site 10
SEP 1998	VSP used for RI at NAB Coronado

FUTURE PLAN OF ACTION & MILESTONES

Date	Activity
Ongoing	Continue to seek opportunities to test VSP at various sites to expand program development

COLLABORATION/TECHNOLOGY TRANSFER

Because of the success at Site 10, SWDIV plans to continue the use VSP at restoration sites. The VSP is currently being used for a RI at NAB Coronado. The VSP improves with each project, and the Navy is seeking opportunities to expand its development. Parties with upcoming sampling events may have a use for the VESP.

BIBLIOGRAPHY

None available

RELATED GOVERNMENT INTERNET SITES

ORNL ETS Visual Environmental Statistics Project

RELATED NAVY GUIDEBOOK REQUIREMENTS

- 02039 Solid Waste Management Unit (SWMU) Cleanup
- 02012 Waste Stream Determinations/Analysis

UPDATED: 01/23/02