SUMMARY OF THE WORKSHOP

"HOW CLEAN IS CLEAN? STATISTICAL APPROACHES TO FINAL RELEASE OF CLEANED UP RADIOACTIVE SITES"

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The principal theme of the four hour workshop was on statistical approaches to the final release of cleaned up radioactive sites, with focus on the U.S. Nuclear Regulatory Commission's (NRC) draft manual NUREG/CR-5849 on surveys for license termination and a similar U.S. Department of Energy (DOE) manual. At the onset, it should be recognized that the acceptance criteria (or cleanup standards) are set or being set by regulatory agencies (such as the NRC, the Environmental Protection Agency [EPA], and the DOE), thus providing the generic answers to "How Clean is Clean?" The subject of portions of the NRC and DOE Manuals and that of the workshop was on how to statistically treat radiological data from final status surveys such that valid interpretations can be made as to their meeting present and/or upcoming acceptance criteria for cleanliness.

Six individuals with expert knowledge of the manuals and statistics applied to radioactive cleanup problems constituted the panel and presented their perspectives with ample time for participants to discuss issues. More than 100 people had registered for 50 spaces available. Highlights of the presentations, discussions, and recommendations are summarized here. The presentation material, in its entirety, is included in the proceedings, separately.

James Berger, Oak Ridge Associated Universities, gave a detailed overview of the manual NUREG/CR-5849. The manual describes procedures for the design and conduct of surveys in a manner which will provide a high degree of assurance that NRC guidelines and conditions will be satisfied for termination of a license. The manual also describes methods for documenting the survey findings in a final report to the NRC. It incorporates statistical approaches to survey design and data interpretation used by the EPA for evaluation of hazardous waste sites under Superfund. Quality assurance is emphasized throughout. The presentation covered the statistical basis of survey design and soil sampling patterns as well as the data evaluation techniques.

David Fauver of the U.S. NRC provided an overview on the application of NUREG/CR-5849 and the general decommissioning regulations. He stressed the need for a statistically based confirmatory survey and intended application of the techniques for the Shoreham decommissioning project. Andrew Wallo III provided DOE's viewpoint observing that the scope of the DOE manual is broad, covering all types of surveys, equipment, and small items and mixed waste issues. In regard to statistical treatment, he further observed that tests for normality are considered as well as techniques for non-normally distributed data (e.g., residual soil activity concentrations).

John Warren of the EPA was not able to attend; however, Richard Gilbert of Pacific Northwest Laboratory, provided a short summary of Warren's topic on the Statistician vs. the Decision maker. Richard Gilbert's own presentation dealt with the key question - How should the statistical evaluation be done? It dealt with the data quality objectives process, the number of samples and measurements, testing philosophy, measurements less than the minimum detectable activity, and nonparametric statistical tests for background standards.

Robert Tuttle of Rockwell International provided a comparison of statistical methods in NUREG/CR-5849 with those previously implemented at Rockwell International's cleanup projects. Both methods use statistical sampling inspection techniques, but emphasize different aspects of the survey.

The panelists were encouraged to share their draft presentation material before the workshop. This lead to a cohesive and comprehensive treatment of the subject. Discussion was encouraged throughout the workshop; specifically, two rounds of discussion were included in the program.

Participants were asked to ask and/or submit questions. The panelists and workshop co-chairs all took part in addressing these questions. Two questions which certainly need further work are: 1) How can the statistically-based sampling programs meet the requirements for both radioactive and hazardous analysis? and 2) How should the background levels for natural backgrounds be determined (geographic factors such as local or a larger area and soil type)?

Evaluation comments received from participants generally rated the workshop as "met all expectations" or "met most expectations."