EML

Environmental Measurements Laboratory

"A Federal Resource"

Environmental Radiation Surveys

After a half century of intensive development in the nuclear field, emphasis has shifted to site closure as the DOE, other government agencies and the private sector dismantle aging reactors, processing plants, laboratories and other structures. Radiological surveys are a fundamental component of restoration work taking place. Building materials and soils must be characterized for contamination, monitored as cleanup work progresses, and then certified for release. With its long history in environmental radiation and radioactivity measurements, EML can apply its expertise in a number of areas related to site closure and long-term stewardship.

Multi-Agency Unified Approach for Radiological Surveys

The Multi-Agency Radiological Survey and Site Investigation Manual (MARSSIM) has been developed jointly by representatives from the DOE, EPA, NRC and DoD. MARSSIM provides guidance for planning, conducting, evaluating and documenting environmental radiological surveys for demonstrating compliance with dose-based regulations for decontamination and decommissioning of nuclear facilities. The MARSSIM describes standardized and consistent approaches to conducting radiation surveys and site investigations of potentially contaminated soils and buildings. EML assisted in MARSSIM development in the area of survey design, measurement methods, and statistical analysis for the interpretation of survey results.

Technical Assistance - Field Survey Team

The EML Field Survey Team currently provides technical assistance at sites undergoing remediation where radiological surveys are required. General consultation and specific guidance and training can be provided along with quality assurance, including the performance of confirmation surveys. As a federal DOE lab, EML serves as a technical interface between DOE site personnel and the contractors who are engaged in survey programs. Efforts in this area should help to insure that surveys are conducted with a high degree of quality in a cost effective manner. Subject areas for assistance include:

- *in situ* measurements
- "hot spot" assessment
- intercomparisons / cross-calibrations
- soil sampling
- sediment core / grab sampling
- air monitoring / aerosol measurements
- radon and radon progeny measurements
- survey plans / data quality objectives
- statistical tests
- MARSSIM methodology

Facilities and critical radionuclides at which EML has demonstrated new survey methodology include:

• Reactors	Cs-137, Co-60
• Manufacturing Plant	U-238
• Processing Facility	Th-232 series
• Fabrication Plant	natural U
• Research Lab	mixed fission/activation products

Contact: Kevin Miller
☎ Voice: 212-620-3572
💻 E-mail: kevin.miller@eml.doe.gov

U.S. Department of Energy, 201 Varick Street, 5th Floor, New York, NY 10014-4811, USA, http://www.eml.doe.gov (1/01)

Decommissioning Survey Guidance

EML was under contract to the Nuclear Regulatory Commission to provide the technical basis to support the implementation of new decommissioning criteria. This included the development of methodology to be employed in final status surveys. Guidance is provided in two NRC documents: "A Non-Parametric Statistical Methodology for the Design and Analysis of Final Status Decommissioning Surveys" (NUREG-1505) and "Measurement Methods for Radiological Surveys in Support of New Decommissioning Criteria" (NUREG-1506). Demonstration surveys using these methodologies have taken place at a variety of NRC licensed facilities.

DOE Facilities for which EML has provided consultation include:

- Fernald Environmental Management Project
- Brookhaven National Laboratory
- Rocky Flats Environmental Technology Site
- Ames Laboratory
- Weldon Spring Site Remedial Action Project
- West Valley Demonstration Project
- Idaho National Engineering and Environmental Laboratory
- YUCCA Mountain Site

In-situ Spectrometry for D&D

Increasingly, the DOE is relying on measurements that can be performed directly in the field to support cleanup. EML is active in advancing the state of the art for radioactivity measurements, particularly in the area of *in situ* gamma-ray spectrometry, a technique for assessing specific radionuclide concentrations. In place of potentially non-representative soil sampling techniques and time consuming laboratory analyses, *in situ* spectrometry can provide a measurement of several tons of soil in just a few minutes at the measurement site, thus providing savings in time, effort and expense.