

Marshall Islands Whole Body Counting and Urine Bioassay Program **Conducted by Brookhaven National Laboratory**

The Department conducts two whole body counting and urine bioassay monitoring programs each year. Committed and annual effective dose equivalents to populations or individuals are assessed from internally deposited radionuclides. Permanent installation of DOE whole body counting equipment at Enewetak has facilitated by providing whole body counting for a large segment at approximately two year intervals for those living at Enewetak Atoll.

Baselines are being established for those individuals who plan to return to the atolls of Bikini, Enewetak, Rongelap and Utrik previously contaminated during the atmospheric weapons testing era. In addition, the program monitors those Marshallese individuals who have resettled at Enewetak Atoll and on the island of Eneu at Bikini Atoll.

This urine bioassay dose assessment program includes the ability to design, organize, and conduct a bioassay campaign to perform whole body counting for either quantification of known radionuclides or for radionuclide identification anywhere in the world.

The urine bioassay program is based on a capability to perform the extremely sensitive fission track analytical (FTA) method for plutonium-239 in urine. The program can analyze about 400 samples per year, with a sensitivity of about 2-4 μBq per sample. Extensive calibration, operation, and quality assurance documentation continues to be developed. Currently, a new technology known as inductively coupled plasma mass spectrometry (ICP Mass Spectrometry) is being evaluated as a cheaper, faster screening technology with similar sensitivity and is under going a National Institute of Science and Technology (NIST) intercomparison and certification.

Field personnel are selected and trained to operate and calibrate field equipment, and maintain operating procedures and quality assurance documentation for all activities. Particular emphasis is placed on sample collection and personnel identification.

The whole body counting program has developed and maintains a field-ready capability for whole-body counting. State-of-the-art equipment facilitates reliable radionuclide identification and quantification of internally deposited radionuclides.

Calibration, operating, and QA procedures are available for application of these techniques to all age groups. Annual and committed effective dose equivalents are calculated based on models given in International Commission on Radiological Protection Publication 56.

The whole body counting program's capability includes data interpretation and dose assessments for individual or population groups based on whole body counting or excreta analysis.

Program efforts recently have been focused on improving sensitivity, enhancing accuracy and precision, and ensuring quality assurance and reduced cost per measurement. This will permit application of these dose assessment techniques to larger populations without adding extra cost burdens.