

**DRAFT (pending review & release)**

**Authors:** David Hickman, Cindy Conrado, Ericson Arelong, Simon Langinbelik, and Terry Hamilton

**Title:** An assessment of cesium-137 exposure in Rongelap Island resettlement workers based on Whole Body Counting (1999-2000).

**Abstract**

During the 1950's the United States conducted 67 atmospheric nuclear weapons tests on Bikini and Enewetak in the Northern Marshall Islands. The most significant contaminating event in the entire Pacific test program was the Castle Bravo shot at Bikini in 1954. Prior to Bravo, little consideration was given to the potential health and ecological impacts of fallout contamination beyond the immediate vicinity of the test sites. The explosive yield of Bravo exceeded expectations, and led to widespread fallout contamination over the inhabited islands of Rongelap Atoll (about 100 miles away) and other atolls to the east of Bikini. A total of 64 people were evacuated from Rongelap about 50 hours after the Bravo blast-most were moved onto Majuro Atoll where they remained for 3 years. Scientific and medical investigations that followed over the next 2 decades only raised concerns within the community, and eventually prompted residents to move to a new temporary home on Kwajalein Atoll in 1985.

In September 1996, the Clinton Administration announced a \$45 million grant to the Rongelap community to enable resettlement of their atoll. The resettlement grant provides for environmental remediation, development of community infrastructure, and building of homes and schools. As part of a cooperative effort agreed too under a Memorandum of Understanding between the Department of Energy (DOE), the Rongelap Atoll Local Government (RALGOV), and the Republic of the Marshall Islands (RMI), scientists from the Lawrence Livermore National Laboratory are providing scientific and technical assistance in support of resettlement activities. Cesium-137 ( $^{137}\text{Cs}$ ) contributes 70-90% of the dose from residual fallout on the islands mainly from ingestion of locally grown foods – we provide equipment and training for local Marshallese technicians to monitor worker exposures to  $^{137}\text{Cs}$  by Whole Body Counting. The results from 1999-2000 show that the majority of resettlement workers on Rongelap received annual internal doses from  $^{137}\text{Cs}$  of less than 1 mrem (0.01 mSv). The average individual dose for the 32 workers monitored in 1999 was 0.5 mrem year (with a standard error of 0.6 mrem). The average dose for the 50 workers monitored in 2000 was 0.4 mrem per year (with a standard error of 0.5 mrem). These dose estimates can be compared with a natural background dose of 140 mrem per year in the Marshall Islands, and 300 mrem per year in the United States, and is also well below the recommended dose limit for members of the public in the United States of 100 mrem per year.

This work was performed under the auspices of the US Department of Energy by the University of California, Lawrence Livermore National Laboratory under contract No. W-7405-Eng-48.