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An assessment of potential health impacts on Utrōk Atoll from exposure to cesium-137 (^{137}Cs) and plutonium

T.F. Hamilton

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A short briefing statement

T.F. Hamilton

Lawrence Livermore National Laboratory
Livermore CA, 94551
U.S.A.

Background

Residual fallout contamination from the nuclear test program in the Marshall Islands is a concern to Marshall Islanders because of the potential health risks associated with exposure to residual fallout contamination in the environment. Scientists from Lawrence Livermore National Laboratory (LLNL) have been monitoring the amount of fallout radiation delivered to Utrōk Atoll residents over the past 4 years. This briefing document gives an outline of our findings from the whole body counting and plutonium bioassay monitoring programs. Additional information can be found on the Marshall Islands web site (http://eed.lnl.gov/mi/).

Findings from the radiological monitoring program

Cesium-137 is an important radioactive isotope produced in nuclear detonations and can be taken up from coral soils into locally grown food crop products that form an important part of the Marshallese diet. The Marshall Islands whole body counting program has clearly demonstrated that the majority of Utrōk Atoll residents acquire a very small but measurable quantity of cesium-137 in their bodies (Hamilton *et al.*, 2006; Hamilton *et. al.*, 2007a; 2007b;). During 2006, a typical resident of Utrōk Atoll received about 3 mrem of radiation from internally deposited cesium-137 (Hamilton *et al.*, 2007a). The population-average dose contribution from cesium-137 is around 2 % of the total radiation dose that people normally experience from naturally occurring radiation sources in the Marshall Islands and *is thousands of times lower than the level where radiation exposure is known to produce measurable health effects*. The existing dose estimates from the whole body counting and plutonium bioassay programs are also well below radiological protection standards for protection of the public as prescribed by U.S. regulators and international agencies including the Marshall Islands Nuclear Claim Tribunal (NCT). Similarly, the level of internally deposited plutonium found in Utrōk Atoll residents is well within the range normally expected for people living in the Northern Hemisphere. In addition, the preliminary results of the bioassay program on Utrōk Atoll (Hamilton *et al.*, 2007b) provide clear evidence that residents of Utrōk Atoll have never acquired a significant uptake of plutonium either through an acute exposure event or from long-term chronic exposure to plutonium in the environment.

This information and data should provide a level of assurance to the Utrōk Atoll population group and its leadership that the dose contribution from exposure to residual radioactive fallout contamination on Utrōk Atoll is very low, and is not likely to have any discernible impact on human health. We also estimate that the dose contribution based on current radiological

exposure conditions will not produce any additional cancer fatalities (or any other measurable health condition) above that normally expected to arise in a population group of similar size. The potential risks from any genetic illnesses caused by exposure to residual fallout contamination in the environment will be even lower still.

In conclusion, the data and information developed from the radiological protection monitoring program on Utrōk appear to support a consensus that it is safe to live on Utrōk Atoll. The health risks from exposure to residual fallout contamination on the atoll are minimal when compared with other lifetime risks that people normally experience, and are very small when compared to the threshold where radiation health effects could be either medically diagnosed in an individual or epidemiologically discerned in a group of people.

References

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University of California
Lawrence Livermore National Laboratory
Technical Information Department
Livermore, CA 94551