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Message: Hope this helps. Please feel free to call Casper Sun if you have any questions.  
Casper's number is (516) 282-3469. If you want a hard copy, let us know.

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Reviewed by PK Schuelke Date 5/1/97

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## Current Status of the Plutonium Level in the Rongelap and Utirik Urine Samples.

### Executive Summary

At 6:45 a.m. the morning of March 1, 1954, a nuclear device, Code-named Bravo, was tested at Bikini Atoll. Unexpected weapon yield and tropospheric transport caused radioactive fallout to sweep over Rongelap and Utirik Atolls, 100 miles east from Bikini, a few hours later. As a result, thirty-five years following this incident, we are still studying the Northern Marshall Islands' radiological environments and evaluating the radiological impact on the Marshall Islands people.

As part of this effort, a comprehensive safety and dose reassessment project was conducted by Brookhaven National Laboratory (BNL) scientists beginning in 1981. Based both of the Lawrence Livermore Laboratory's (LLL) environmental measurements of air, water, food, and soil samples and the BNL's whole-body counting measurements, we presented a table of average annual effective dose equivalents (mrem/yr) from internal and external radiation (not including the dose from plutonium) to the people living at Rongelap Atoll. The total 30 years dose living on Rongelap Island was projected to be of less than 5,000 mrem. This is below the 170 mrem/yr of United States federal radiation protection guidelines for members of the public.

On May 1985, the people of Rongelap choose to leave their homeland and relocate on Majatto Island although the living conditions on Majatto were inferior to those on Rongelap. The basis for their relocation was never communicated to us, but it seem reasonable to assume that it may have been over their concern of plutonium in the environments taken from our polonium biased plutonium data in late 1984 from the Photon Electron Rejection Alpha Liquid Scintillation (PERALS) analytical methods.

In March 1, 1989, Dr. Kohn used the dose rate table mentioned above in his "Rongelap Reassessment Project Report." He showed that even using the 1987 maximum transuranic activity (5 fCi/sample) we found in urine, the estimated committed dose (i.e., the total dose to be received over the next 50 years), internal and external, from 1978 to 2008 still falls below an average of 170 mrem/yr.

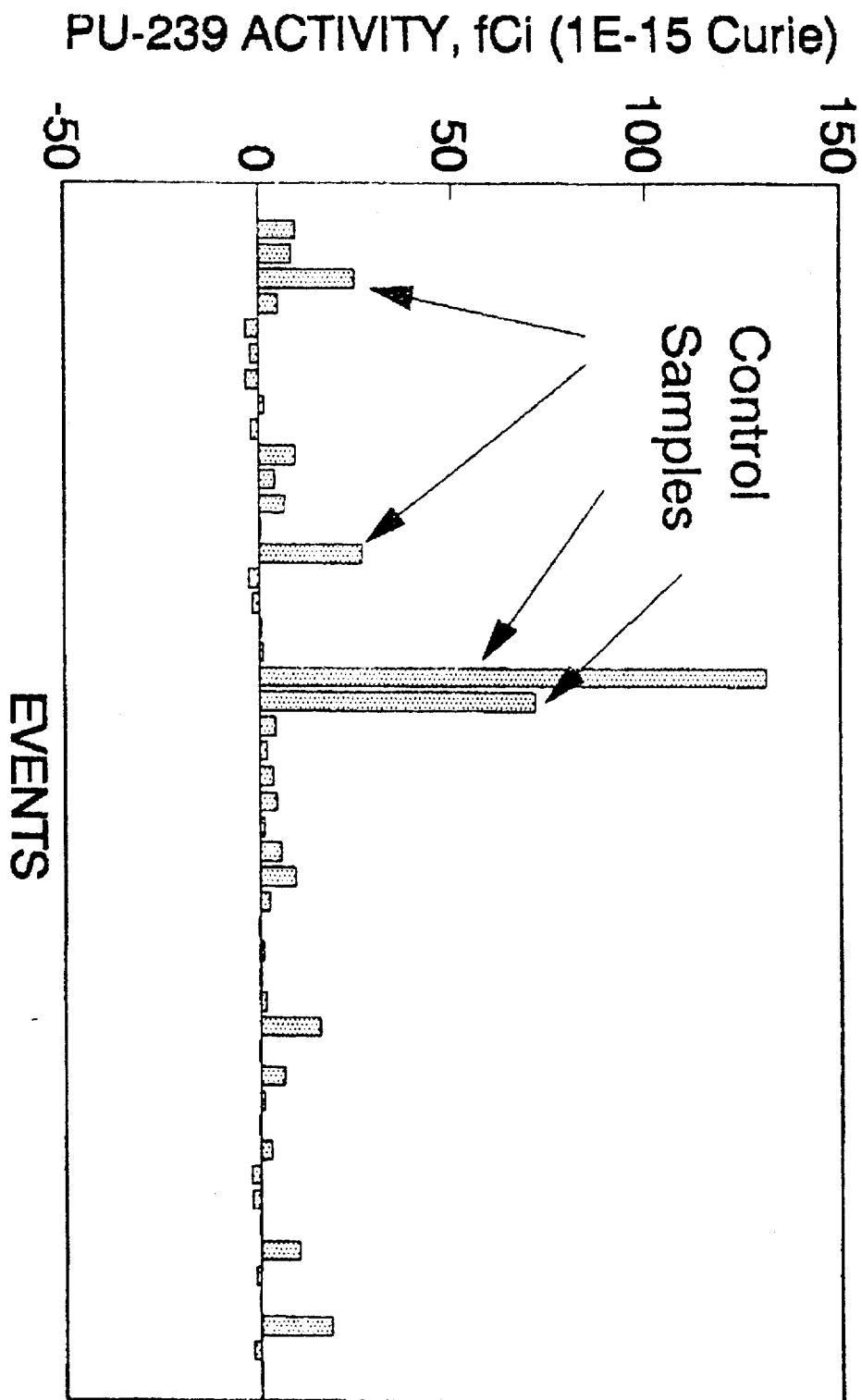
As a result of our extensive evaluation of existing plutonium measurement for ultra-low activities in urine, a detection sensitivity of about 100 aCi/liter using fission track analytical (FTA) method was established at BNL in 1986. As of December 1988, over 500 urine samples collected from 1981 to 1984 from the Rongelap and Utirik people was completed. These measurements have met rigorous quality assurance standards for chemical analysis. However, some inconsistencies still existed in the FTA data which we presented during the Livermore meeting in February 1988.

Furthermore, all the 1988 urine samples (67 samples from the Rongelap people and 101 samples from the Utirik people) taken by Dr. Sun last September were just analyzed. The results support the thesis that soil contamination in some of the earlier urine samples was giving false information. Because of Dr. Sun's careful attention to collecting

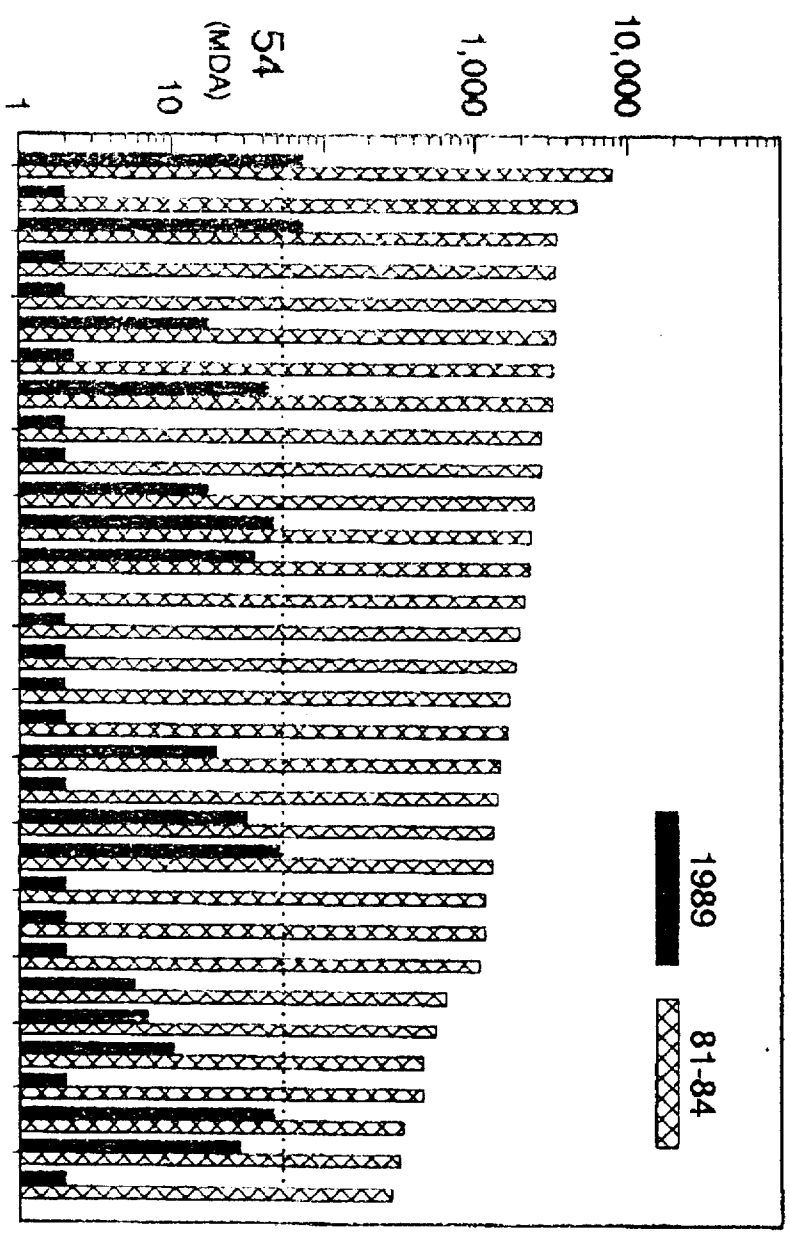
01 1000 0000 100 1000 (4 MBV).

With the greatly improved sensitivity of our FTA method and our newly developed urine sampling protocol we are confident that the Islanders' plutonium concerns can be satisfactorily answered.

# MARSHALLESE URINE RESULTS ANALYZED BY P.E.A.R.L.S.



Plutonium-239 activity, aCi,  
in 24-hour urine samples

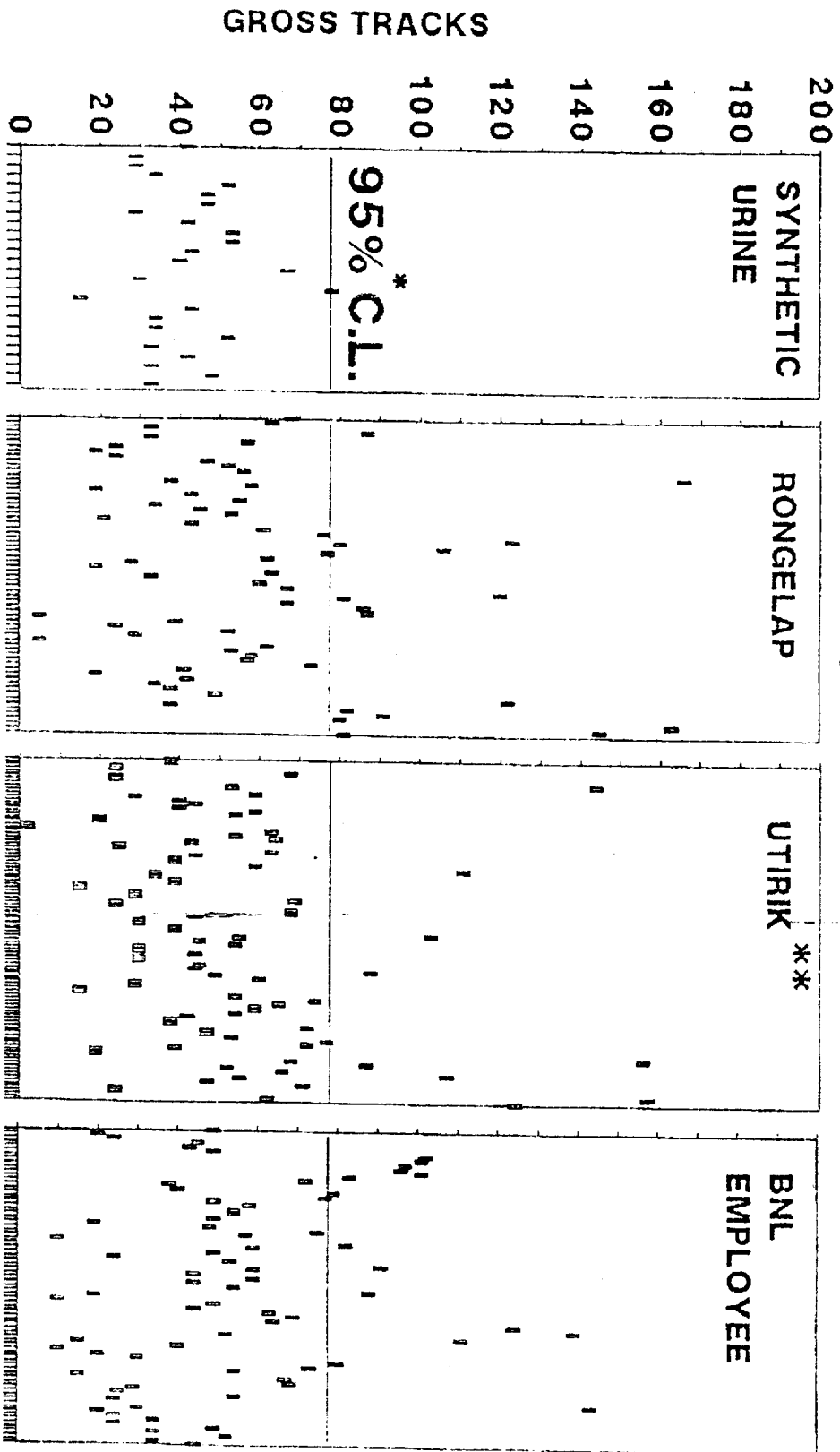


Individual sorted by earlier plutonium level

Note: for presentational purpose, 2 aCi is assigned as lowest value.

Comparison data of 32 resampled Islanders.

# DISTRIBUTION OF URINE DATA September 1988



\* Data points above the 80 track line reflect samples which contain Pu at concentration greater than the synthetic urine at a 95% confidence level.

\*\* One datum, 742 track, is not plotted. Because a 1981 sample was less than a MDL, new sample is being analyzed.