409877

Table One

July 1982 Survey Summary

Description	Number of Samples	Analyses	Status
Whole Body Counts	329	Gamma scans for fission and activation products, and naturally occuring nuclides.	Results enclosed
Urine Samples	237	Gamma scans same as above, radiochemical analyses for Pu-239,240.	Results in approximately one year
Fecal Samples	14	Gamma scans and radio-chemical analyses same as above.	Results in approximately one year
Milk Samples	3	Gamma scans, radiochemical and elemental analyses	Results enclosed

REPOSITORY PNNL
COLLECTION Marshall Islands
BOX No. 5684
FOLDER Bikini 1982

DOCUMENT DOES NOT CONTAIN ECI
Reviewed by R K Schultz Date 4/30/97

Table Two

July 1982 Field Trip Results - Average Cs-137 and K39-41 Whole-Body Counting Data

Population Grouping	Age Group	Sex	Number Group	Body Burden Mean ± 1 S.E. Cs-137 (Bq)	Cs-137 (μCi)	K39-41 (
Rongelap	≥ 16	M	29	$1.0x10^{4} \pm 1.0x10^{3}$	$2.8x10^{-1} \pm 2.7x10^{-2}$	$1.3x10^{2} \pm 5$
Rongelap	≥ 16	F	18	$7.8x10^{3} \pm 9.3x10^{2}$	$2.1x10^{-1} \pm 2.5x10^{-2}$	$8.5x10^{1} \pm 6$
Rongelap	11-15	M	12	$6.3x10^{3} \pm 9.6x10^{2}$	$1.7x10^{-1} \pm 2.6x10^{-2}$	$7.5x10^{1} \pm 3$
Rongelap	11-15	F	7	$8.1x10^{3} \pm 1.7x10^{3}$	$2.2x10^{-1} \pm 4.6x10^{-2}$	$8.4x10^{1} \pm 7$
Rongelap	<11	M	16	$4.4x10^{3} \pm 7.4x10^{2}$	$1.2x10^{-1} \pm 2.0x10^{-2}$	$5.1x10^{1} \pm 2$
Rongelap	<11	F	9	$6.3x10^{3} \pm 1.1x10^{3}$	$1.7x10^{-1} \pm 3.1x10^{-2}$	$5.2x10^{1} \pm 4$
Former Bikinian	≥16	M	77	$2.1x10^{2} \pm 1.3x10^{1}$	$5.8x10^{-3} \pm 3.5x10^{-4}$	$1.5x10^{2} \pm 3$
Former Bikinian	≥16	F	42	$1.3x10^{2} \pm 1.9x10^{1}$	$3.5x10^{-3} \pm 1.0x10^{-4}$	$1.2x10^{2} \pm 3$
Former Bikinian	11-15	M	9	$5.6x10^{1} \pm 6.7x10^{0}$	$1.5x10^{-3} \pm 1.8x10^{-4}$	$1.2x10^{2} \pm 9$
Former Bikinian	11-15	F	8	$6.7x10^{1} \pm 9.6x10^{0}$	$1.8x10^{-3} \pm 2.6x10^{-4}$	$1.0x10^{2} \pm$
Former Bikinian	<11	M	15	$4.1x10^{1} \pm 7.4x10^{0}$	$1.1x10^{-3} \pm 2.0x10^{-4}$	$6.2x10^{1} \pm$
Former Bikinian	<11	F	17	$4.1x10^{1} \pm 6.3x10^{0}$	$1.1x10^{-3} \pm 1.7x10^{-4}$	$5.5x10^{1} \pm$
Comparison Majuro	≥ 16	M	11	$1.6x10^{2} \pm 3.6x10^{1}$	$4.2x10^{-3} \pm 9.6x10^{-4}$	$1.6x10^{2} \pm$
Comparison Majuro	≥ 16	F	6	$1.1x10^{2} \pm 1.6x10^{1}$	$3.1x10^{-3} \pm 4.4x10^{-4}$	$1.0x10^{2} \pm$
Comparison Majuro	11-15	M	9	$5.9x10^{1} \pm 1.6x10^{1}$	$1.6x10^{-3} \pm 4.2x10^{-4}$	$7.0x10^{1} \pm$
Comparison Majuro	11-15	F	11	$4.8x10^{1} \pm 9.3x10^{1}$	$1.3x10^{-3} \pm 2.5x10^{-4}$	$6.7x10^{1} \pm$
Comparison Majuro	<11	M	13	$4.1x10^{1} \pm 7.4x10^{0}$	$1.1x10^{-3} \pm 2.0x10^{-4}$	$5.2x10^{1} \pm$
Comparison Majuro	<11	F	8	$4.1x10^{1} \pm 7.4x10^{0}$	$1.1x10^{-3} \pm 2.0x10^{-4}$	$5.5x10^{1} \pm$
Former Rongelap at Jabor	10-68	M&F	9	$5.6x10^{1} \pm 1.1x10^{1}$	$1.5x10^{-3} \pm 3.0x10^{-4}$	$9.4x10^{1} \pm$
Former Rongelap at Majuro	39-68	M&F	3	$1.1x10^{3} \pm 7.0x10^{2}$	$2.9x10^{-2} \pm 1.9x10^{-2}$	$1.5x10^{2} \pm$

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Table Three

Estimate of Mean Effective Dose Equivalent Rate From Photon Emitters at Rongelap Atoll

Man-Made Source of Irradiation	Male Effective Dose-Equivalent Rate On July 10, 1982 - Sv y^{-1} (mrem y^{-1})			Female Effective Dose-Equivalent Rate On July 10, 1982 - Sv y^{-1} (mrem y^{-1})		
	67 Kg	34 Kg	22 Kg	59 Kg	38 Kg	22 Kg
Internal Cs-137	3.8×10^{-4} (38)	4.2×10^{-4} (42)	4.0×10^{-4} (40)	3.2×10^{-4} (32)	4.9×10^{-4} (49)	5.7×10^{-4} (57)
Internal Co-60	$<5 \times 10^{-6}$ (<0.5)	$<5 \times 10^{-6}$ (<0.5)	$<5 \times 10^{-6}$ (<0.5)	$<5 \times 10^{-6}$ (<0.5)	$<5 \times 10^{-6}$ (<0.5)	$<5 \times 10^{-6}$ (<0.5)
Internal Bi-207	$<5 \times 10^{-6}$ (<0.5)	$<5 \times 10^{-6}$ (<0.5)	$<5 \times 10^{-6}$ (<0.5)	$<5 \times 10^{-6}$ (<0.5)	$<5 \times 10^{-6}$ (<0.5)	$<5 \times 10^{-6}$ (<0.5)
Net External Exposure	1.5×10^{-4} (15)	1.5×10^{-4} (15)	1.5×10^{-4} (15)	1.5×10^{-4} (15)	1.5×10^{-4} (15)	1.5×10^{-4} (15)

Table Four

Breast Milk ^{137}Cs Results From 1981 & 1982 Field Trips

Sample ID	Volume ml	Collection Date	1st ^{137}Cs Result µCi/ml	2nd ^{137}Cs Result µCi/ml	Result µCi/ml	^{137}Cs Body Burden µCi	Ratio Breast Milk to Body Burden ml^{-1}
5044	10	7/81	6.9×10^{-7} ±13%	5.4×10^{-7} ±19%	6.2×10^{-7}	0.251	2.4×10^{-6}
911	10	7/81	4.4×10^{-7} ±19%	4.1×10^{-7} ±21%	4.3×10^{-7}	0.17	2.5×10^{-6}
92	10	7/81	1.2×10^{-6} ±10%	1.1×10^{-6} ±11%	1.2×10^{-6}	0.23	5.2×10^{-6}
5057	10	7/81	4.55×10^{-7} ±18%	4.6×10^{-7} ±22%	4.6×10^{-6}	0.13	3.5×10^{-6}
2316	10	7/81	3.1×10^{-7} ±36%	2.7×10^{-7} ±28%	2.9×10^{-7}	0.077	3.8×10^{-6}
5035	5	7/81	< MDL	4.6×10^{-7} ±13%	4.6×10^{-7}	0.092	5.0×10^{-6}
5025	10	7/81	2.9×10^{-7} ±25%	2.4×10^{-7} ±23%	2.7×10^{-7}	0.084	3.2×10^{-6}
1044	10	7/81	4.2×10^{-7} ±18%	3.3×10^{-7} ±23%	3.8×10^{-7}	0.094	4.0×10^{-6}
3037	10	7/81	< MDL	2.5×10^{-7} ±41%	2.5×10^{-7}	0.072	3.5×10^{-6}
3532	10	7/81	1.3×10^{-7} ±56%	< MDL	1.3×10^{-7}	0.075	1.7×10^{-6}
5034	5	7/81	< MDL	< MDL	< MDL	0.010	-
6062	15	7/82	< MDL	< MDL	< MDL	0.0042	-
6151	7	7/82	< MDL	< MDL	< MDL	0.0015	
None	9.5	7/82	< MDL	< MDL	< MDL	No data	-

MDL = 2.6×10^{-6} µCi
1 µCi = 3.7×10^{4} Bq

Table Five

Estimate of Total Annual Committed Effective Dose

Equivalent At Rongelap Atoll During 1982

Man-Made Source of Radiation	Adult Average: Activity Intake During 1982 Bq (μCi)	Adult Average: Committed Effective Dose Equivalent Sv (mrem)	Adult Average Body Burden Estimate: January 1, 1982 Bq (μCi)	Adult Average Body Burden Estimate: December 31, 1982 Bq (μCi)
Internal Cs-137	3.3×10^{4} (8.9×10^{-1})	4.5×10^{-4} (4.5×10^{1})	7.4×10^{3} (2.0×10^{-1})	1.1×10^{4} (3.0×10^{-1})
Internal Sr-90	1.6×10^{2} (4.2×10^{-3})	5.6×10^{-6} (5.6×10^{-3})	9.4×10^{1} (2.6×10^{-3})	8.9×10^{1} (2.4×10^{-3})
Internal Fe-55	1.4×10^{3} (3.8×10^{-2})	2.2×10^{-7} (2.2×10^{-2})	8.6×10^{2} (2.3×10^{-2})	6.7×10^{2} (1.8×10^{-2})
Internal Co-60	3.8×10^{-5} (1.0×10^{-9})	2.7×10^{-13} (2.7×10^{-8})	4.2×10^{-2} (1.1×10^{-6})	2.7×10^{-2} (7.3×10^{-7})
Internal Bi-207	ID	$< 5.10^{-6}$ (<0.5)	$<7.4 \times 10^{1}$ ($<2.0 \times 10^{-3}$)	$<7.4 \times 10^{1}$ ($<2.0 \times 10^{-3}$)
Internal Pu 239,240	ID	ID	ID	ID
Net External Exposure	-	1.5×10^{-4} (15)	-	-
Total Man-Made	-	6.1×10^{-4} (61)	-	-

ID = Insufficient Data

Table Six

July 1982 Quality Control Point Source Counting

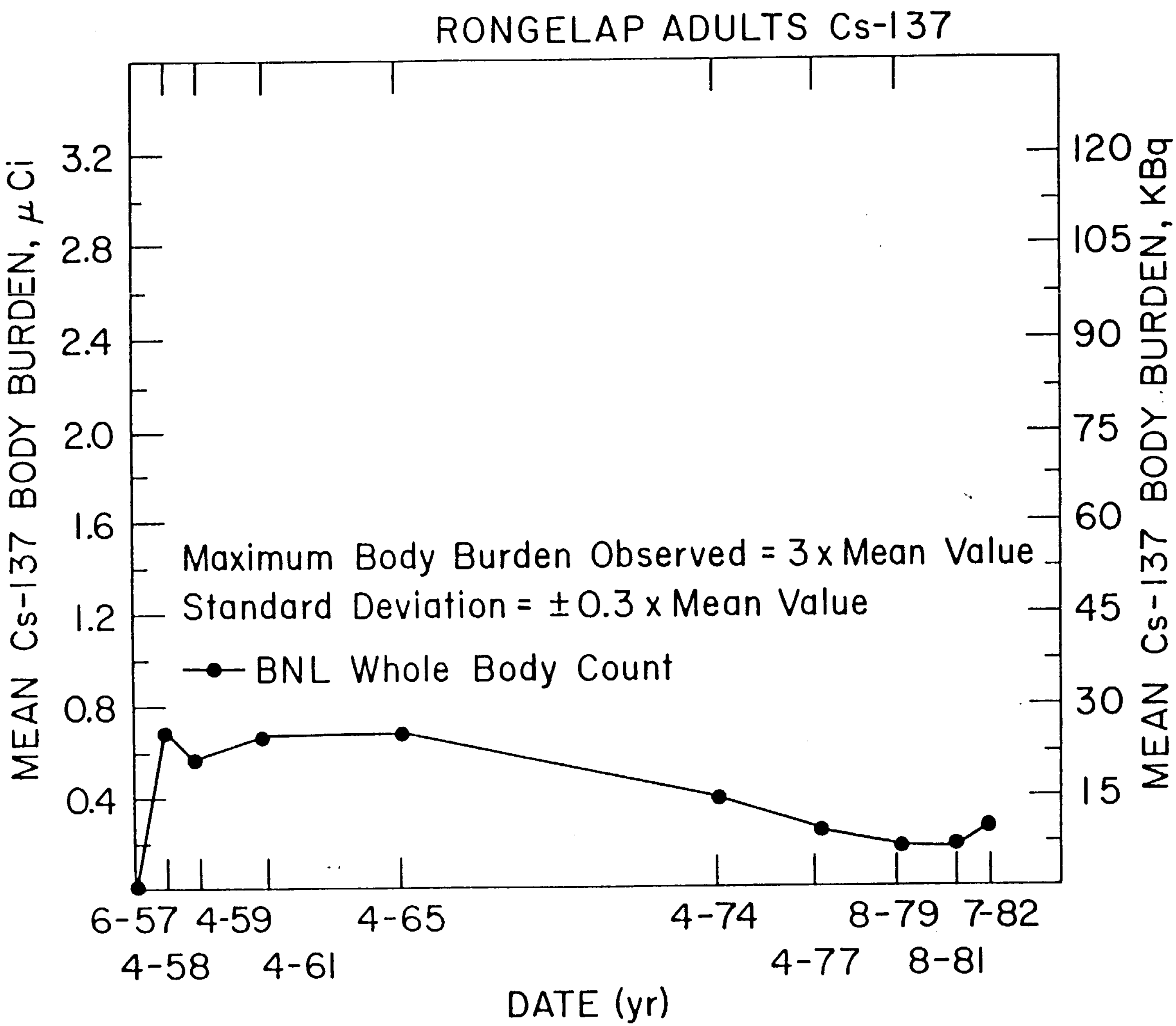
Date	Time	System No.	Activity μCi±1σ
7-04-82	1632	1	$9.9 \pm 1.7 \times 10^{-2}$
7-05-82	0838	1	$9.8 \pm 1.6 \times 10^{-2}$
7-07-82	1200	1	$10 \pm 1.6 \times 10^{-2}$
7-07-82	1715	1	$8.8 \pm 6.6 \times 10^{-3}$
7-08-82	0830	1	$9.5 \pm 1.6 \times 10^{-2}$
7-08-82	1302	1	$10 \pm 1.6 \times 10^{-2}$
7-11-82	0845	1	$9.1 \pm 1.5 \times 10^{-2}$
7-11-82	2030	1	$9.8 \pm 1.5 \times 10^{-2}$
7-12-82	2030	1	$9.7 \pm 1.5 \times 10^{-2}$
7-13-82	1104	1	$9.4 \pm 1.5 \times 10^{-2}$
7-14-82	0829	1	$8.7 \pm 1.5 \times 10^{-2}$
7-16-82	0810	1	$9.5 \pm 1.5 \times 10^{-2}$
7-04-82	1500	2	$10 \pm 6.3 \times 10^{-3}$
7-05-82	1000	2	$10 \pm 6.0 \times 10^{-3}$
7-07-82	0851	2	$8.2 \pm 1.4 \times 10^{-2}$
7-07-82	1725	2	$8.4 \pm 6.4 \times 10^{-3}$
7-08-82	0759	2	$9.3 \pm 1.5 \times 10^{-2}$
7-08-82	1020	2	$9.1 \pm 1.5 \times 10^{-2}$
7-08-82	1305	2	$9.1 \pm 1.5 \times 10^{-2}$
7-08-82	1440	2	$9.2 \pm 1.5 \times 10^{-2}$
7-11-82	0855	2	$9.1 \pm 1.5 \times 10^{-2}$
7-11-82	2000	2	$8.3 \pm 1.4 \times 10^{-2}$
7-12-82	2000	2	$8.6 \pm 1.5 \times 10^{-2}$
7-13-82	1010	2	$8.8 \pm 1.5 \times 10^{-2}$
7-14-82	0830	2	$8.8 \pm 2.1 \times 10^{-2}$
7-15-82	0845	2	$8.9 \pm 1.5 \times 10^{-2}$
7-16-82	0815	2	$8.7 \pm 1.5 \times 10^{-2}$
Mean ± Mean σ			$9.2 \pm 1.4 \times 10^{-2}$
Standard Error			11%

Table Seven

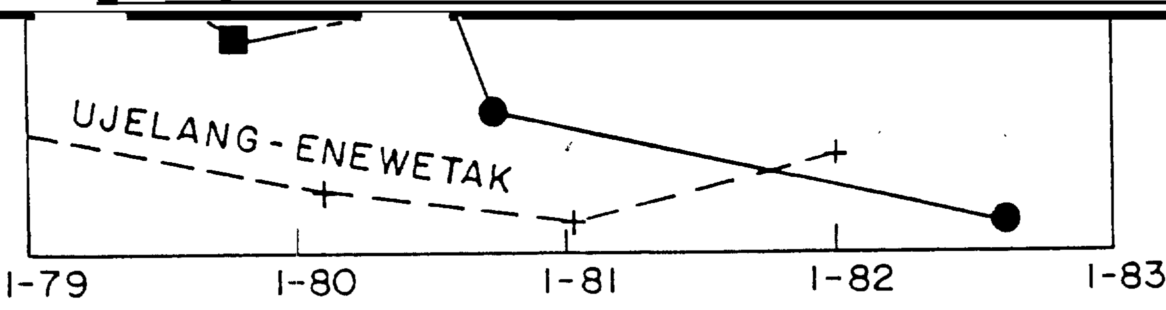
July 1982 Quality Control Replicate Counting

Name	Date	System No.	Ratio 1st ^{137}Cs/2nd ^{137}Cs	Ratio 1st K/2nd K
M.T. Ryan	7-5-82	1	MDL	1.1
M.T. Ryan	7-5-82	2	MDL	
S.V. Musolino	7-5-82	1	MDL	1.04
S.V. Musolino	7-5-82	1		
S.V. Musolino	7-5-82	1	MDL	1.01
S.V. Musolino	7-5-82	2		
E.T. Lessard	7-7-82	1	MDL	1.06
E.T. Lessard	7-15-82	2		
A. Leviticus	7-11-82	1	0.907	1.02
A. Leviticus	7-11-82	1		
J. Harper	7-12-82	1	MDL	0.99
J. Harper	7-13-82	1		
M.T. Ryan	7-5-82	1	MDL	1.03
M.T. Ryan	7-12-82	1		
E. Jibas	7-11-82	2	1.1	0.94
E. Jibas	7-11-82	2		
Winnie	7-7- 2	1	1.0	0.86
Winnie	7-7-82	2		
Randy	7-7-82	1	1.0	0.987
Randy	7-7-82	2		
Mean			1.0	1.0
Standard Deviation			7.9%	6.7%

MDL = Minimum Detection Limit


RONGELAP ADULTS Cs-137
MEAN Cs-137 BODY BURDEN, μCi
3.2
2.8
2.4
2.0
1.6
1.2
0.8
0.4
MEAN Cs-137 BODY BURDEN, KBq
120
105
90
75
60
45
30
15
Maximum Body Burden Observed = 3 x Mean Value
Standard Deviation = ±0.3 x Mean Value
BNL Whole Body Count
6-57
4-58
4-59
4-61
4-65
4-74
4-77
8-79
8-81
7-82
DATE (yr)

Graph One


UJELANG-ENEWETAK
1-79
1-80
1-81
1-82
1-83

JANUARY 1982 BIOASSAY FIELD TRIP TO ENEWETAK ATOLL

From January 9, 1982 to January 16, 1982, members from the Marshall Islands Ragiological Safety Program at Brookhaven National Laboratory conducted the third annual bioassay mission to Enewetak Atoll. The purpose of this mission was to define current body burdens of ^{137}Cs, ^{60}Co, ^{207}Bi, ^{90}Sr and ^{239}Pu in the population that currently resides on Enewetak Atoll. During this time, 399 Marshallese were whole body counted; 24-hour urine samples were collected from 310 individuals and consecutive daily urine and fecal samples were obtained from 10 adult males. Participation in the whole-body counting urine and fecal sampling programs was voluntary and restricted to individuals five years of age and older. Greater than 95% of the population participated in the whole body counting, program and approximately 75% of the population provided the requested urine and fecal samples. This report summarizes the results to date. Data obtained from the analysis of urine and fecal samples will be reported under separate cover.

Table 1 is a summary of the population average body burdens for ^{137}Cs, ^{60}Co, ^{207}Bi and potassium. The reported error represents the one sigma standard deviation associated with the mean for each population subgroup. The mean potassium body burden for the adult males has returned to the level determined in the baseline study of 1980. This is important since it may reflect a change in diet or living pattern. All other mean potassium body burdens have remained constant since 1980.

The mean adult male ^{137}Cs body burden has risen to the level observed at Ujelang Atoll in 1980 and represents a factor of two change in the mean body burden during the past year. Individual results have risen to a high of 0.14 μCi in January 1982 in contrast to 0.026 μCi in 1981. This change in the mean adult male ^{137}Cs body burden is associated with consumption of food grown at Enjebi Island. The ^{137}Cs body burden in all other population subgroups has remained the same or declined slightly.

The nuclides ^{207}Bi and ^{60}Co were detected in members of the sample population at levels that are at or near the minimum detection limit (MDL) for the radionuclide (0.6 nCi). Results were reported even if less than 0.6 nCi provided that the one sigma standard deviation due to counting statistics did not exceed the result. This reporting technique will tend to provide less precise information on an individual but will better describe population trends. The nuclide ^{60}Co has been detected in members of each population subgroup at a constant level in prior years. Because this level is at or near the system MDL it is a conservative estimate of the mean body burden of the population.

The nuclide ^{207}Bi has been detected in the Enewetak people in 1981 and again in 1982 at levels that substantially exceed the system MDL. In 1981, one individual was determined to have a ^{207}Bi body burden of 12 nCi. This year the highest value was 6.3 nCi. In the adult male population 15 individuals had body burdens in excess of 1 nCi while in adult females 6 individuals had body burdens exceeding 1 nCi. These data indicate that ^{207}Bi is being incorporated into the diet of the population in increasingly larger quantities each year.

Discussions with Bill Robison and Vic Noshkin on January 22, 1982 indicate that the ^{207}Bi and possibly ^{60}Co result are reasonable estimates of the population mean body burden. According to Dr. Noshkin, activity concentrations in Enewetak fish for ^{207}Bi, ^{60}Co and ^{137}Cs are 1 pCi/g, 1 pCi/g and 0.8 pCi/g respectively. Using an average residence interval of two years, these activity concentrations, the Robison diet (UCRL 53066 p 40) and the retention functions for ^{207}Bi (NUREG/CR-0150-V-2) and ^{60}Co (ORNL/NUREG/TM-190), the predicted body burden for ^{207}Bi falls into the range of 0.24-0.70 nCi and the predicted body burden for ^{60}Co falls into the range of 3.5 - 10.4 nCi. These estimates are highly dependent on the retention function and the assumed dietary patterns. Further discussions with Drs. Robison and Noshkin revealed that the presence of ^{207}Bi and ^{60}Co may also be enhanced for the Marshallese if they eat the entire fish since ^{207}Bi and ^{60}Co are present at higher concentrations in the fish intestinal content and liver. Drs. Noskin and Robison also stated that there were detectable quantities of transuranic elements in the non-edible parts of the fish and that LLNL dose projections do not assume that the entire fish is ingested. This dietary question will be investigated on the next field trip to Enewetak Atoll.

The rise in the adult male ^{137}Cs body burdens was investigated while the field team was at Enewetak Atoll. Comparison of the first 20 adult male results with past body-burden histories indicated that some individuals were exceeding prior levels. Individuals whose current ^{137}Cs body burden exceeded 75% of the maximum ^{137}Cs body burden observed in their population subgroup during 1981 were interviewed privately following the whole-body count in an effort to determine recent changes in living pattern or dietary habits.

The information obtained from these interviews is presented in Table 2. Table 3 lists all individuals whose ^{137}Cs body burden exceeded 75% of the maximum observed ^{137}Cs body burden in 1981.

From the interviews it was determined that individuals traveled to Enjebi Island usually once per month, ate coconut meat and drank coconut milk from the LLNL garden. The trips, usually two to three days in length, were made to collect birds and eggs and were made by members of the population with an age distribution as listed in Table 4. Food from the LLNL garden was consumed during the visit and occasionally coconuts were gathered and brought back to the southern islands. While the absolute quantities of food consumed on each trip, as listed in Table 3, are subject to substantial variation, these estimates may be helpful in determining reasonable upper and lower limits of consumption for coconut meat and milk.

The Marshallese were advised in the closeout meeting that a trip to Enjebi to collect birds and eggs was an acceptable practice but consumption of food products grown in the LLNL garden would increase their ^{137}Cs body burden. They were further informed that this exposure to radiation did not present a health problem but the loss of data would hamper the LLNL efforts to study the environment of the northern islands. Since this would affect future use of the northern islands, the Marshallese promised to refrain from eating LLNL garden food products.

Information provided during the private interviews led to the collection of three coconut samples from the LLNL garden. Gamma spectroscopy results conducted on the entire coconut (husk, shell, meat and fluid) are reported in Table 5. These coconuts have been shipped to Bill Robison for detailed analysis. If these ^{137}Cs activity concentrations are representative of future coconut activity concentrations, then one could expect to observe ^{137}Cs body burden of 4-7 μCi for individuals ingesting the Robison diet and residing on Enjebi Island.

Table 6 presents quality assurance replicate results. Identification numbers with an asterisk indicate that the replicate count was not performed on the same whole-body counting system as the first count. The means and standard deviations reported at the bottom of the page represent results for the total program and results grouped by the method of replicate counting. The average capability to reproduce a body burden with either whole-body counting system is ± 7%. The 2 sigma counting error associated with most results in Table 6 is ± 5-10%. Replicate counting results from the same system are somewhat closer than when two different systems are used. Most of the error associated with these results is due to re-positioning of the individual.

Table 7 presents results for all individuals who have ever participated in the Enewetak-Ujelang whole-body counting program. The data are ordered alphabetically by first name and grouped by age and sex. The age reported in this table is the age of the time of the last whole-body count. A person has been included in a specific subgroup based on the age as of January 1982.

In summary, the most important finding to date was the increase in ^{137}Cs body burdens for members of the adult male population subgroup. The coconut samples and the interviews will provide additional information to further define dietary habits and assist in predicting ^{137}Cs body burdens for future field trips.

[redacted]

POPULATION	ISLAND	YEAR	[redacted]
Adult Male	Enewetak	1982	
	Enewetak	1981	
	Japtan	1980	
	Enewetak	1980	
	Ujelang	1980	
Adult Female	Enewetak	1982	
	Enewetak	1981	
	Japtan	1980	
	Ujelang	1980	
Adolescent Male	Enewetak	1982	
	Enewetak	1981	
	Japtan	1980	
	Ujelang	1980	
Adolescent Females	Enewetak	1982	
	Enewetak	1981	
	Japtan	1980	
	Ujelang	1980	

TABLE #1, Continued

POPULATION	ISLAND	YEAR	SIZE	^{60}Co (nCi)	SIZE	^{207}Bi (nCi)	SIZE	^{137}Cs (nCi)	SIZE	POTASSIU (g)
Juvenile Male	Enewetak	1982	8	0.42 ± 0.091	11	0.44 ± 0.13	39	1.1 ± 0.49	39	48 ± 10
	Enewetak	1981	6	0.52 ± 0.16	--	-----------	44	1.5 ± 1.3	44	46 ± 9.8
	Japtan	1980	} 4 (Japtan and Ujelang)	} 0.40 ± 0.19 (Japtan and Ujelang)	--	-----------	7	2.6 ± 0.88	7	46 ± 6.7
	Ujelang	1980			--	-----------	41	5.6 ± 2.1	41	47 ± 9.6
Juvenile Female	Enewetak	1982	5	0.42 ± 0.01	16	0.42 ± 0.084	53	1.1 ± 0.41	53	48 ± 9.1
	Enewetak	1981	8	0.47 ± 0.25	--	------------	51	1.4 ± 0.93	51	43 ± 7.9
	Japtan	1980	} 3 (Japtan and Ujelang)	0.47 ± 0.20 (Japtan and Ujelang)	--	------------	7	2.6 ± 1.4	7	41 ± 8.1
	Ujelang	1980			--	------------	39	5.2 ± 1.9	39	45 ± 8.4

TABLE #2

DIETARY AND TRAVEL INFORMATION OBTAINED FROM PRIVATE INTERVIEWS

ID #	1982 ^{137}Cs BODY BURDEN (nCi)	TRIPS TO ENJEBI AUG	SEPT	OCT	NOV	DEC	NUMBER OF COCONUTS INGESTED PER TRIP MEAT	MILK	OTHER FOOD INGESTED
1035	20	X	–	–	–	–	None	2	None
1035	20	–	–	–	–	X	None	5	None
1173	23	–	–	–	–	X	None	7	None
2196	16	–	–	–	X	–	Unknown	Unknown	None
2064	27	–	–	–	–	X	5	5	None
2080	27	–	–	–	–	X	4	4	None
1026	19	–	–	–	X	–	1	1	None
	18	–	–	–	–	X	4	4	None
1348	76	–	–	–	X	–	10	10	None
1340	26	–	–	–	–	X	None	None	Eggs & Turn
1056	120	–	–	X	X	X	3	3	None
2152	136	–	–	–	X	X	1	1	None
1094	106	–	–	–	–	X	10	10	None
1192	73	–	X	X	X	X	Unknown	Unknown	None
2143	46	X	–	–	–	–	1	0	None
1226	43	(7 trips prior to Oct)			X	X	Unknown	Unknown	None
2147	30	Dates Unknown					1	3	None
1045	34	–	–	X	–	–	5	0	None
1045	34	–	–	–	X	–	0	5	None
1348	76	–	–	–	–	X	10	10	None

TABLE #3

LIST OF INDIVIDUALS WHOSE ^{137}Cs BODY BURDEN EXCEEDED 75% OF 1981 RESULTS

ID #	SEX	AGE	1982 ^{137}Cs BODY BURDEN nCi	ID #	SEX	AGE	1982 ^{137}Cs BODY BURDEN nCi
2041	M	29	40	1173	M	41	23
1156	M	37	26	2182	F	22	25
2227	M	27	23	2064	M	47	28
2079	M	28	90	1097	M	23	23
1007	M	41	25	1220	M	31	31
1059	M	29	39	2080	M	21	27
1308	M	23	83	1239	M	26	88
1112	M	33	73	1229	M	49	24
2074	M	38	44	1181	M	29	45
2097	M	25	42	2263	M	21	31
2071	M	20	32	2050	M	46	38
1054	M	33	35	1340	F	20	26
1004	M	46	37	1047	M	56	20
1078	M	26	33	1348	M	21	76
2117	M	35	22	1035	M	27	20
1056	M	22	120				
2152	M	29	136				
2141	M	28	24				
1094	M	34	106				
2143	M	26	46				
1266	M	26	43				
2147	M	31	30				
1045	M	28	34				

TABLE # 4

AGE DISTRIBUTION OF POPULATION TRAVELING TO ENJEBI

AGE GROUP	NUMBER OF INDIVIDUALS
20-29	23
30-39	8
40-49	6
Over 50	1

TABLE #5

^{137}Cs IN COCONUTS COLLECTED FROM LLNL GARDEN

SAMPLE #	MASS (g)	^{137}Cs ACTIVITY (μCi)	^{137}Cs CONE (μCi/g)
1	472	0.078	1.6×10^{-4}
2	841	0.054	6.4×10^{-5}
3	1193	0.12	1.0×10^{-4}
Ave	835	0.083	1.1×10^{-4}

TABLE #6

QUALITY ASSURRANCE REPLICATE RESULTS

ID #	^{137}Cs (nCi)	POTASSIUM (g)	RATIO 1st ^{137}Cs/2nd ^{137}Cs	RATIO 1st K/2nd K
1302	3.9	100	1.1	0.93
	3.5	108		
2206*	14	175	1.0	0.89
	14	197		
1234*	7.7	186	1.04	0.99
	7.4	187		
2173	2.0	58	1.05	1.1
	1.9	52		
2153	5.6	98	0.90	0.91
	6.2	108		
2185*	1.3	41	0.72	0.75
	1.8	55		
1093*	8.1	147	0.89	0.84
	9.1	175		
2136	3.9	80	0.85	1.05
	4.6	76		
1173*	26	152	1.13	0.96
	23	159		
1035*	22	167	1.1	0.86
	20	194		
2235*	4.5	104	1.25	0.94
	3.6	111		
2222*	10	117	1.0	0.91
	10	128		
2050*	38	187	1.27	1.03
	30	181		

ID #	^{137}Cs (nCi)	POTASSIUM (g)	RATIO 1st ^{137}Cs/2nd ^{137}Cs	RATIO 1st K/2nd K
2228*	25	195	1.09	0.99
	23	196		
2046*	18	170	1.06	0.99
	17	172		
1070*	11	190	1.0	1.02
	11	187		
1303	4.8	109	1.0	1.08
	4.8	101		
1079	3.6	102	1.03	1.02
	3.5	100		
1134	14	176	1.17	0.99
	12	177		
1142	2.0	119	0.83	1.02
	2.4	117		

	RATIO 1st ^{137}Cs/2nd ^{137}Cs	RATIO 1st K/2nd K
N	20	[illegible]
$\bar{X}$	1.0	0.96
σ	0.14	0.09
STANDARD ERROR	0.03	0.02
REPLICATE COUNTED ON SAME SYSTEM		
N	8	8
$\bar{X}$	0.99	1.01
σ	0.12	0.07
STANDARD ERROR	0.05	0.03
REPLICATE COUNTED ON DIFFERENT SYSTEM		
N	12	12
$\bar{X}$	1.05	0.93
σ	0.15	0.08
STANDARD ERROR	0.04	0.03