



Lawrence Livermore National Laboratory

ENVIRONMENTAL SCIENCES DIVISION



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407599

Dr. Bruce Wachholz ✓
Department of Energy
EV-30
Germantown E-201
Washington, D. C. 20545

Dear Bruce:

The enclosed tables are self explanatory. The ratios in Tables 1 and 2 are based upon data from the Northern Marshall Islands Survey (NMIS) and our continuing program at Eneu Island. I think the predicted doses in Table 3 (based on the relative concentrations in Table 2) are certainly indicative of at least the magnitude of the doses we will see for the ingestion pathway when we run the final dose codes.

The marine pathway, ground-water and cistern water pathway and the EGG report on the external gamma exposure pathway are already published. These reports (and doses) combined with the enclosed predictions for the ingestion pathway, put the total dose picture for the NMIS pretty well in perspective.

In general, the final conclusion will be that for all atolls other than Rongelap, the total predicted doses (from all pathways) will be rather low and in most cases will be in the range of natural background exposures in the United States and less than background doses in many areas of the world. The doses for Rongelap will be less than Eneu Island doses.

I do emphasize that the ingestion pathway doses are estimated at this time and that you use the data presented in Tables 1, 2 and 3 in a quantitative or semi-quantitative manner at this stage. The data should not be released at this time. We will supply the final food chain doses at a later time.

Sincerely,

William L. Robison
Section Leader
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WLR:sh

Attachments

MZ Rec = 536

Table 1. ¹³⁷Cs concentration in coconut meat. Ratio of NMIS Islands to Eneu Island.

Atoll	Island	pCi/g Concentration in cocomeat	Ratio Island/Eneu	
Bikini	Eneu	19	1.0	
Rongelap	Arbar ⁺	0.7	0.037 ^{**}	
	Kabelle	9.9	0.52	} $\bar{x} = 0.48$ $\sigma = 0.32$ $n = 6$
	Rongelap [*]	5.5	0.3	
	Mellu	3.4	0.18	
	Enjaetak ⁺	7.3	0.38	
	Loniufal	21	1.1	
	Naen	8	0.42	
Wotho	Medyeron ⁺	0.059	0.0031	} $\bar{x} = 0.0074$ $\sigma = 0.0051$ $n = 3$
	Wotho [*]	0.25	0.013	
	Kabben ⁺	0.12	0.006	
Ailuk	Enjabro ⁺	0.54	0.028	} $\bar{x} = 0.034$ $\sigma = 0.015$ $n = 8$
	Berejan ⁺	0.3	0.016	
	Kapen ⁺	0.74	0.039	
	Enejebar ⁺	0.49	0.026	
	Bigen [*]	1.2	0.063	
	Aliet ⁺	0.38	0.020	
	Ailuk [*]	0.75	0.039	
	Agulue ⁺	0.74	0.039	
Utirik	Aon ⁺	3	0.16	} $\bar{x} = 0.092$ $\sigma = 0.061$ $n = 3$
	Utirik [*]	1.4	0.074	
	Pigrak	0.78	0.041	
Mejit	Mejit [*]	0.88	0.046	
Taka	Taka	0.3	0.016	
Bikar	Bikar	0.75	0.039	
Likiep	Jeltonet	0.078	0.004	} $\bar{x} = 0.020$ $\sigma = 0.015$ $n = 7$
	Riknraru [*]	0.35	0.018	
	Kapenor	0.23	0.012	
	Jiebaru	0.42	0.022	
	Likiep [*]	0.99	0.052	
	Etoile	0.23	0.012	
	Agony	0.39	0.021	

Table 1. ^{137}Cs concentration in coconut meat. Ratio of NMIS Islands to Eneu Island.

Atoll	Island	pCi/g Concentration in cocomeat	Ratio Island/Eneu	
Ujelang	Enniment	0.25	0.013	$\bar{x} = 0.012$ $\sigma = 0.007$ $n = 7$
	Eimnlapp	0.41	0.022	
	Pokon	0.13	0.007	
	Cindy (J-13)	0.099	0.005	
	Daisu	0.15	0.008	
	Ujelang*	0.39	0.021	
	Kalo	0.14	0.007	
Rongerik	Jedibberib	2.4	0.13	$\bar{x} = 0.14$ $\sigma = 0.021$ $n = 6$
	Bock	2.0	0.11	
	Rongerik	2.3	0.12	
	Bigonattum	3.1	0.16	
	Latobak	2.9	0.15	
	Enewetak	3.1	0.16	
Ailinginae	Knox	1.2	0.063	$\bar{x} = 0.067$ $\sigma = 0.019$ $n = 8$
	Knobuen	1.5	0.079	
	Ribinouri	1.0	0.053	
	Ucchuwanen	1.3	0.068	
	Enibuk	1.6	0.084	
	Mogirij	1.8	0.095	
	Manch	1.1	0.058	
	Sifo	0.7	0.037	

* Residence Island.

+ Occasional Residence Island.

** Excluded from Rongelap average until it can be verified.

Table 2. ^{137}Cs Concentration in Coconut Meat.
 Ratio of the atoll average ^{137}Cs concentration observed in
 samples from the NMIS to the concentration observed in
 Eneu Island.

	^{137}Cs Concentration in Coconut Meat Ratio
Inhabited Atolls	Atoll/Eneu Island
Rongelap	0.48
Utirik	0.092
Wotho	0.0074
Ailuk	0.034
Mejit	0.046
Likiep	0.020
Ujelang	0.012
Uninhabited Atolls	
Taka	0.016
Bikar	0.039
Ailinginae	0.067
Ronjerik	0.14

Table 3. Predicted Maximum Annual Wholebody Doses for Ingestion Based Upon Ratios Listed in Table 2 (i.e., doses calculated using the ratio in Table 2 and the Eneu ingestion wholebody dose of 116 mrem/y).

	Predicted Maximum Annual Dose Imported Foods Available
	mrem/y
Inhabited Atolls	
Rongelap	57
Utirik	11
Wotho	0.86
Ailuk	3.9
Mejit	5.3
Likiep	2.3
Ujelang	1.4
Uninhabited Atolls	
Taka	1.9
Bikar	4.5
Ailinginae	7.8
Rongerik	16