

Table 3

ENIAETOK ISLAND - RONGELAP ATOLL
 RSS-111
 EXPOSURE SURVEY
 September 1976

Location	Exposure Rate in -R/hr
Eastwest cross island transect - Middle Island	
50 m due west of Ocean Beach	5.6±0.4
85 m due west of Ocean Beach - clearing south of path	11.4±0.3
85 m due west of Ocean Beach - clearing north of path	12.4±0.2
135 m due west of Ocean Beach	11.7±0.5
175 m due west of Ocean Beach	11.5±0.3
215 m due west of Ocean Beach near cluster of three houses. Area has patchy coral gravel.	8.6±0.2
265 m west of Ocean Beach: 40 m from Lagoon Beach	5.8±0.4
Second transect: 250 m due north of Middle Island transect	
70 m due east of lagoon	11.5±0.3
Adjacent clearing returning toward Lagoon Beach	12.0±0.4
Third transect near south end of the island	
80 m due east of the lagoon	12.0±0.3
30 m from Lagoon Beach near a house: some gravel present	6.7±0.4

Table 4

NAEN ISLAND - RONGELAP ATOLL
 RSS-111
 EXPOSURE SURVEY
 September 1976

Location	Exposure Rate in -R/hr
First transect due west to northwest from near southeast corner of the island	
clearing 40 m in from the beach	22.5±0.4
150 m inland due west to northwest	55.3±0.6
returning to beach due southeast, 25 m to next clearing	42.1±0.5
southeast ~40 m to next clearing	40.6±0.5
Midisland second transect due north from the lagoon center of island	62.2±0.7
25 m south of center island towards the lagoon	45.5±0.7
60 m south of center island towards the lagoon	46.7±0.5
90 m south of center island towards the lagoon	59.0±0.6
120 m south of center island towards the lagoon	33.1±0.5
150 m south of center island towards the lagoon	70.7±0.4
sandy head land on southeast corner of the island	6.0±0.6

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Table 5
RONGELAP ISLAND - RONGELAP ATOLL
RSS-111
EXPOSURE SURVEY
September 1976

Location	Exposure Rate in $\mu\text{R/hr}$
Cross Island transect on path near church	
70 m from Ocean Beach	6.8 \pm 0.6
140 m north from Ocean Beach	7.0 \pm 0.3
200 m north from Ocean Beach	8.5 \pm 0.3
270 m north from Ocean Beach	8.5 \pm 0.2
350 m north from Ocean Beach	9.1 \pm 0.5
420 m north from Ocean Beach	7.7 \pm 0.4
500 m north from Ocean Beach	7.5 \pm 0.3
570 m north from Ocean Beach	4.9 \pm 0.4
Village road transect starting at western end of the village	
100 m west of first house in the village	8.2 \pm 0.3
front of first house: lagoon side of the road	7.8 \pm 0.4
100 m due east of first house	7.3 \pm 0.4
200 m due east of first house: past houses 3, 4 and 5	8.9 \pm 0.3
300 m due east of first house: near houses 6, 7, 8 and 9 (area covered with crushed coral)	5.9 \pm 0.4
100 m past church	7.1 \pm 0.3
200 m past church near co-op	6.7 \pm 0.3
in front of Jerry Knight's house	6.0 \pm 0.3
in front of 2 houses near the dock	5.8 \pm 0.4
100 m east of the dock	6.6 \pm 0.4
170 m east of the dock	6.6 \pm 0.7
Observation tower at west end of the island in open field	5.1 \pm 0.3
0.5 km east near main road in clearing	9.6 \pm 0.3
1.0 km east near main road about 50 m from the lagoon	8.5 \pm 0.3
1.5 km east near main road in the middle of the road	5.8 \pm 0.3
in coconut grove about 1.2 km east of observation tower	8.1 \pm 0.2
1.9 km east near main road on lagoon side of the road	7.8 \pm 0.2
2.4 km east near main road, lagoon side on grass covered coral	6.3 \pm 0.3
2.9 km east near main road, lagoon side of grassy area	7.1 \pm 0.2
3.4 km east near main road, grassy area on the ocean side	8.8 \pm 0.4
3.8 km east near main road, grassy area on the ocean side	8.3 \pm 0.4
4.3 km east near main road, grassy near trees lagoon side	7.1 \pm 0.3
4.8 km east near main road, grassy area on ocean side	6.1 \pm 0.4
5.3 km east near main road, grassy area on lagoon side	7.4 \pm 0.2
5.8 km east near main road, a grassy area with Pandanus at edge of village	6.6 \pm 0.3
6.3 km east near main road in the village by the school and cemetery	5.0 \pm 0.2
along side church in mil village	8.9 \pm 0.4
6.7 km east near main road, east of village in grassy area beneath coconut trees, ocean side of the road	6.6 \pm 0.2
8.3 km east near main road near Japanese cistern	7.9 \pm 0.2
8.8 km northeast beneath Guettarda grove, ocean side	7.5 \pm 0.2
9.3 km northeast approaching north end of island	9.5 \pm 0.4
9.8 km northeast on main road, ocean side in a coconut grove	9.5 \pm 0.5
10.2 km northeast near end of island in grassy area and scaveola trees	6.0 \pm 0.4

Table 6
 RONGELAP ISLAND - RONGELAP ATOLL
 RSS-111
 EXPOSURE SURVEY
 October 1977

Location	Exposure Rate in -R/hr
Cross Island transect on path behind Tarbud's (Jerry Knight's) house	
shrub line, ocean side	3.9±0.3
39 m lagoonward (scaveola grove)	4.6±0.2
80 m lagoonward (edge of coconut grove)	4.9±0.3
118 m lagoonward	5.8±0.2
158 m lagoonward	5.8±0.4
197 m lagoonward	5.9±0.3
237 m lagoonward	6.1±0.2
276 m lagoonward	6.4±0.1
316 m lagoonward	7.0±0.1
355 m lagoonward	6.2±0.3
395 m lagoonward	7.3±0.4
434 m lagoonward	7.8±0.3
474 m lagoonward	7.5±0.4
513 m lagoonward (near rear of Tarbud's house)	5.9±0.3
Main island road, front of Tarbud's house	5.5±0.3
Lagoon Beach near Boas' house	4.2±0.2

Table 7
 AON ISLAND - UTIRIK ATOLL
 RSS-111
 ESPOSURE SURVEY
 September 1976

Location	Exposure Rate in -R/hr
100 m from the Ocean Beach	4.1±0.3
200 m from the Ocean Beach	4.2±0.3
30 m from Lagoon Beach near middle of the island	4.1±0.3

Table 8
 EORUKKU ISLAND - UTIRIK ATOLL
 RSS-111
 EXPOSURE SURVEY
 September 1976

Location	Exposure Rate in -R/hr
Middle Island	4.3±0.5
Southwest	4.1±0.4

Table 9
UTIRIK ISLAND - UTIRIK ATOLL
RSS-111
EXPOSURE SURVEY
September 1976

Location	Exposure Rate in -R/hr
Eastwest transect across island near south end of village	
60 m west of Ocean Beach	3.7±0.3
150 m west of Ocean Beach	4.3±0.3
10 m east of village road	4.1±0.8
100 m west of ocean near the middle of the village	4.1±0.2
200 m west of ocean near the middle of the village	4.2±0.2
300 m west of ocean near large hollow and taro patch	4.5±0.9
100 m from large hollow and taro patch	4.5±0.4
200 m from large hollow and taro patch near the middle of village	3.9±0.7
village road by the cemetery	4.0±0.2

Table 10
WORMEJ ISLAND - WOTJE ATOLL
RSS-111
EXPOSURE SURVEY
September 1976

Location	Exposure Rate in -R/hr
Middle of the village	3.9±0.3
transect due north ~150 m north of the church	3.7±0.3
transect due north ~250 m north of village	3.6±0.3
transect due north ~350 m north of village	3.8±0.3
transect due north ~450 m north of village	3.7±0.2
transect due north ~550 m north of village and ~30 m south of of Ocean Beach	3.9±0.2

Table 11
WOTJE ISLAND - WOTJE ATOLL
RSS-111
EXPOSURE SURVEY
September 1976

Location	Exposure Rate in -R/hr
northsouth air strip, 2/3 of the distance from the lagoon to the ocean	3.7±0.2
100 m west of air strip	3.7±0.2
200 m west of air strip	3.8±0.3
300 m west of air strip	3.8±0.3

Table 12

BIGEN ISLAND - AILUK ATOLL
RSS-111
EXPOSURE SURVEY
April 1976

Location	Exposure Rate in μR/hr
150 m from the Lagoon Beach, north end of the island	4.2±0.3
North end Lagoon Beach	

Table 13

AILUK ISLAND - AILUK ATOLL
RSS-111
EXPOSURE SURVEY
September 1976

Location	Exposure Rate in μR/hr
50 m from Ocean Beach	4.0±0.4
150 m due west of Ocean Beach	3.7±0.3
350 m due west of Ocean Beach	3.9±0.5
450 m due west of Ocean Beach, ~100 m from village	3.7±0.4
Ailuk village near intersection of village road and Cross Island road	3.7±0.4

Table 14

Average Exposure Rates (May 1977)

Island	Atoll	n	Average Exposure Rate ± 1σ error
Kabelle	Rongelap	11	21.7 μR/hr ± 7.3 μR/hr
Naen	Rongelap	11	43.1 μR/hr ± 18.6 μR/hr
Eniaetok	Rongelap	11	9.9 μR/hr ± 2.7 μR/hr
Rongelap	Rongelap	57	7.3 μR/hr ± 1.5 μR/hr
Aon	Utirik	3	4.0 μR/hr ± 0.3 μR/hr
Eorukku	Utirik	2	4.1 μR/hr ± 0.1 μR/hr
Utirik	Utirik	9	4.1 μR/hr ± 0.3 μR/hr
Bigen	Ailuk	2	3.9 μR/hr ± 0.3 μR/hr
Ailuk	Ailuk	5	3.7 μR/hr ± 0.1 μR/hr
Wormej	Wotje	6	3.7 μR/hr ± 0.1 μR/hr
Wotje	Wotje	4	3.7 μR/hr ± 0.1 μR/hr
Eniwetak	Rongerik	7	6.3 μR/hr ± 1.7 μR/hr

* Corrected for energy dependence of RSS-111. (Typical spectral correction factor was 1.05).

Table 15

External Exposure Rates and Dose Predictions
Persons Living on Surveyed Atolls ^{1,2}
(Exclusive of Rongelap Atoll)

Atoll	Ave. Gross Exposure Rate April 1977	Net Exposure Rate ³ April 1977	10 yr. Integral ³ Dose in Rem	30 yr. Integral ³ Dose in Rem	50 yr. Integral ³ Dose in Rem
Utiirik ⁴	4.07 μ R/hr	0.32 μ R/hr	0.024	0.056	0.077
Ailuk	3.80 μ R/hr	-	-	-	-
Wotje	3.70 μ R/hr	-	-	-	-
Rongerik ⁵	6.30 μ R/hr	2.55 μ R/hr	0.199	0.484	0.663
ICRP 9 Population Dose Limit		-	1.700	5.000	8.300

1. Doses were calculated from average exposure rates for each atoll.
2. Multiple year dose calculations were made on the background subtracted exposure rate. Background was assumed to be the average of exposure rates detected at Ailuk and Wotje Atolls.
3. Dose represents increase over background.
4. Conservatively assumes 100 percent of time spent on Utiirik Island.
5. Based on a superficial survey of Eniwetak Island only.

Table 16
Population Breakdown by Age and Geographical Living Patterns
(Ref. 6)

	Infants and small children	Children and adolescents	Men	Women
Age Bracket (years)	0-4	5-19	20+	20+
Fraction of population (%)	16	41	22	21
Fraction of time spent in respective areas (%):				
Inside Home	50	30	30	30
Within 10 m of home	15	10	5	10
Elsewhere in village	5	10	5	10
Beach	5	5	5	5
Interior of island	5	15	20	15
Lagoon	0	10	10	5
Other Islands	20	20	25	25

Table 17
Assumed Exposure Rate for
Each Living Pattern*

Pattern	Rongelap Atoll μR/hr
Inside home	7.3
Within 10 m of home	7.3
Elsewhere in village	7.3
Beach	7.3
Interior Island	7.3
Lagoon**	3.7
Other Islands***	24.9

* Values listed are mean exposure rates.

** Lagoon value is assumed to be the same as regional background at uncontaminated atolls.

*** Values used for other islands assumed equal distribution of time spent on other islands within the atoll.

Table 18

Rongelap Exposure Rates Based on Living Pattern Assumed for Bikini (3,4)

Description	Infants 0-4 yrs	Children 5-19 yrs	Men 20+ yrs	Women 20+ yrs
Fraction of population	16%	41%	22%	21%
Dose rate due to Time spent with- in these areas (μ R/hr)				
Inside Home	3.65	2.19	2.19	2.19
Within 10 m of home	1.10	0.73	0.37	0.73
Elsewhere in village	0.37	0.73	0.37	0.73
Beach	0.37	0.37	0.37	0.37
Interior Island	0.37	1.10	1.46	1.10
Lagoon	0.00	0.37	0.37	0.19
Other Islands	4.98	4.98	6.23	6.23
Total (μ R/hr) (incl bkgd)	10.84	10.47	11.36	11.54

Table 19

Exposure Rates and Dose Predictions for Persons Living on Rongelap Atoll Based on Assumed Bikini Living Pattern

Age Group	Net Weighted Rate in μ R/hr	External Integral Dose in Rem (8kgd Subst)		
	May 1977	10 yr.	30 yr.	50 yr.
Infants (0-4 yrs)	7.09	0.56	1.35	1.84
Children (5-19 yrs)	6.72	0.52	1.27	1.75
Men (20 yrs+)	7.61	0.60	1.44	1.97
Women (20 yrs+)	7.79	0.62	1.49	2.03

Table 20
Living Pattern Model for Rongelap
(October 1977)

	Infants & Small Children	Children & Adolescents	Men	Women	Old People
Age Bracket (yrs)	0-4	5-19	20-59	20-59	60+
Fraction of time spent in respective areas(%)					
In village (including inside home)	100	84	77	94	100
Interior of island	-	8	13	4	.
Beach	-	8		2	.
Lagoon	-	-	4	-	.
Other islands	-	-	6	-	.

Table 21
Rongelap Exposure Rates Based on Observed Living Pattern (5)

Description	Infants 0-4 yrs	Children 5-19 yrs	Men 20-59 yrs	Women 20-59 yrs	Old People >60 yrs
Dose rate due to time spent within these areas (-R/hr)					
In village (includ- ing home)	7.3	6.13	5.62	6.86	7.3
Beach	-	0.58	-	0.15	-
Interior Island	-	0.58	0.95	0.29	-
Lagoon	-	-	0.15	-	-
Other islands	-	-	1.49	-	-
Total -R/hr (incl bkgd)	7.3	7.3	8.21	7.3	7.3

Table 11
Average Exposure Rates and Dose Predictions for
Persons Living on Rongelap Atoll Based on
Rongelap Living Pattern 1977

Age Group	Weighted Net Exposure Rate in μ R/hr	Net Integral External Dose in Rem 10 yr	30 yr	50 yr
Infants (0-9)	1.6	0.81	0.65	0.90
Children (5-14)	1.6	"	"	"
Men (20-59)	1.5	0.76	0.82	1.12
Women (20-59)	1.6	0.81	0.65	0.90
Old People (60+)	1.6	"	"	"
<hr/>				
Additional Contribution From Background Radiation	1.7	1.0	0.97	1.62

Table 12
Total Doses Including Background Based on
Rongelap Living Pattern 1977

Group	Weighted Total Exposure Rate μ R/hr	Total Integral Dose in Rem 10 yr	30 yr	50 yr
Rongelap Men ages 20-54	3.3	0.66	1.79	2.74
All others (Rongelap)	"	0.69	1.62	2.54
Atiriki, all residents*	4	0.84	1.03	1.70

*Assumes conservative 100% occupancy of island

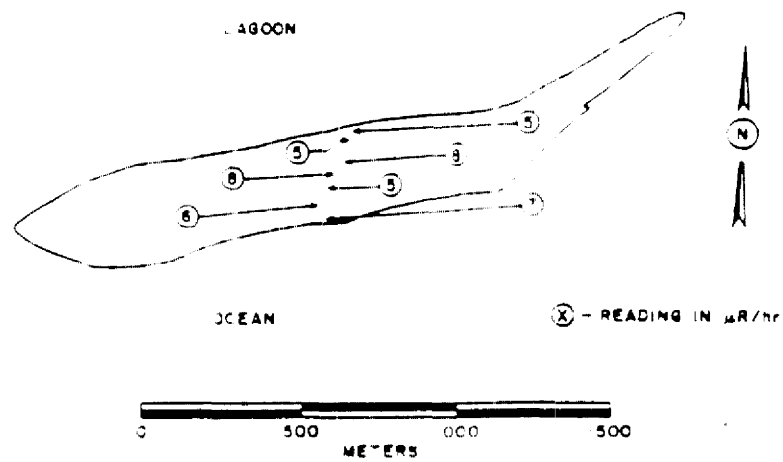


Figure 1. Eniwetok Island Rongerik Atoll.

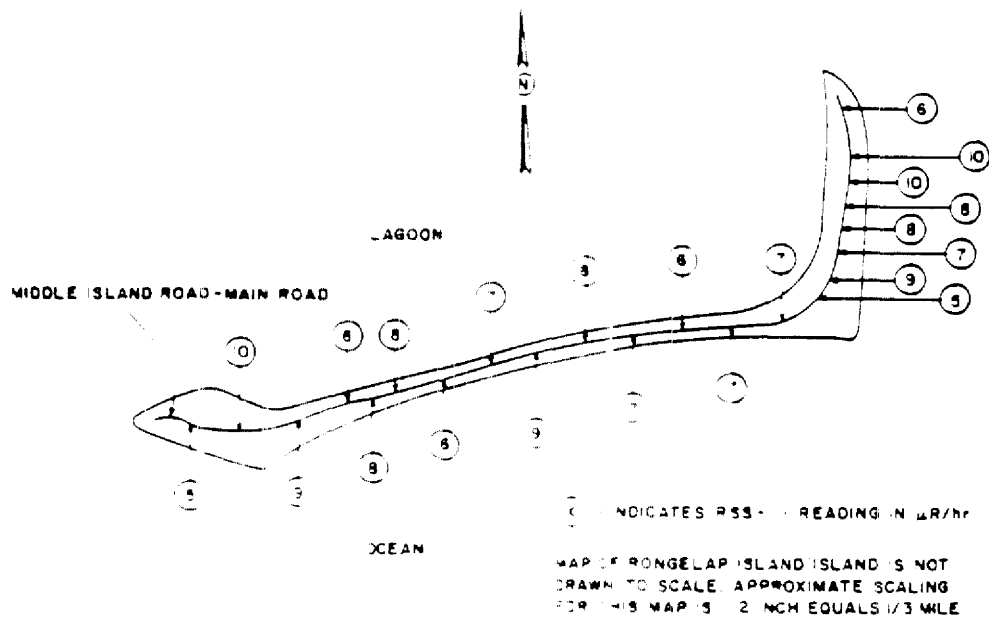


Figure 2. Rongelap Island

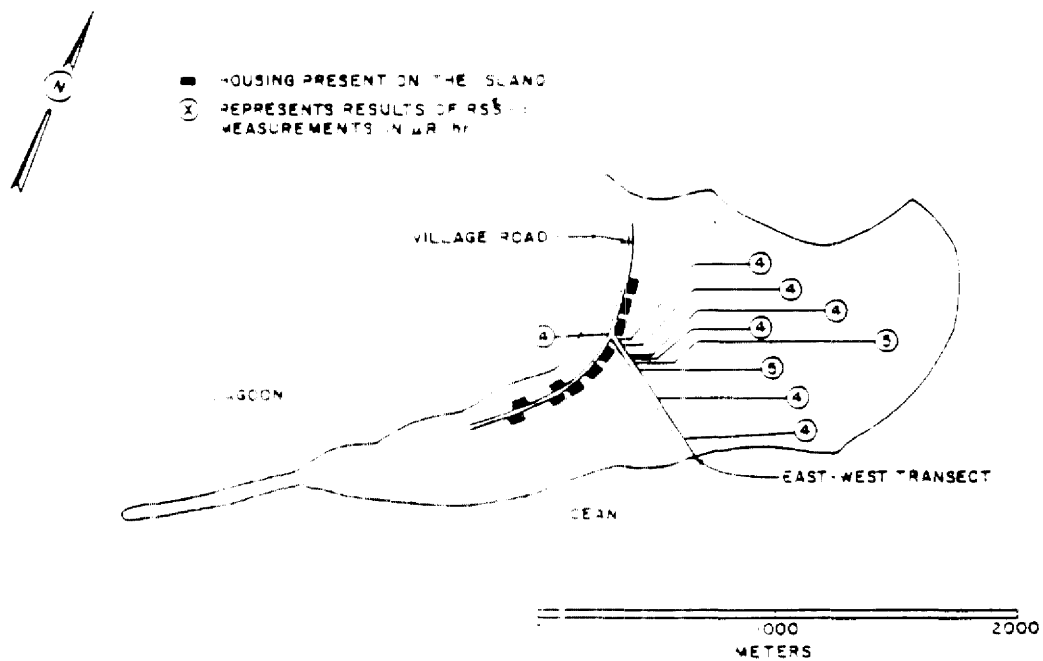


Figure 3. [unclear] Island.