

RISK ESTIMATES FOR ENEWETAK AND BIKINI

Calculations made at Enewetak on
April 9, 1980
by B. W. Wachholz and W. J. Bair

REPOSITORY PNNL
COLLECTION Marshall Islands
BOX No. 5684
FOLDER Bikini - 1981

DOCUMENT DOES NOT CONTAIN ECI

Reviewed by J. E. Schmitt Date 4/30/97

Preferred Approach

Total risk = B.M. Dose x Leukemia risk coefficient + W.B. dose x (total risk - B.M. risk)

Pop. for risk assess.

500 for living on Southern Islands } assumed
250 for Enjebi

[If Enjebi is occupied - only dri Enjebi would live there (~250)
if Enjebi is not occupaied - all 500 would live on Southern Islands)

(during visit - 541 Enewetak people)

50-year dose should be used - 30 years is too short

Risk Coefficients - 5 sets of analysis should be done using:

- | | | | |
|----|---------|---|--|
| a. | BEIR I | - | % increase as before |
| b. | BEIR | - | risk/man rem |
| c. | BEIRIII | - | lowest coefficient - absolute - lin. quad. |
| d. | UNSCEAR | - | highest coefficient - relative - linear |

Because of the proportion of children I believe the cancer risk should be calculated on an age basis. The leukemia risk coefficient is equal to total cancer risk coefficient when irradiation is in utero and decreases to about one-fifth of total cancer risk coefficient after ~ age 30.

Based on BEIR I

Cancer - 2% per 5 rem over 30 years

$$2\%/5 = 0.4\%/rem$$

Based on ICRP

Risk coefficient for total body = $100/10^6$ /person rem

for 11 rem 500 people x 11 = 5500 person/rem

$$\frac{1}{10^4} = \frac{x}{5500} = 10^4 x = 5500$$

$$x = \frac{5500}{10000} = \frac{55}{100} = .55$$

risk coefficient - bone marrow $20/10^6$ person rem

Enjebi

	<u>30-year dose</u>	<u>50-year dose</u>	
BM	5,500 mrem	}	imports
WB	5,100 mrem		
BM	10,000 mrem	}	no imports
WB	9,200 mrem		

Max. Annual Dose
 multiply by 3 for maximum individual

Eneu (100% living on Eneu)

B.M.	118 mrem/year	}	imports
W.B.	107 " "		
B.M.	238 " "	}	no imports
W.B.	205 " "		

Bikini (100% living on Eneu)

B.M.	1007 mrem/year	}	imports
W.B.	952 " "		
B.M.	1941 " "	}	no imports
W.B.	1766 " "		

(risk - 0.4%/rem)

Eneu (100% living on Eneu)

30 years

B.M.	2800 mrem	} imports
W.B.	2400 mrem	

B.M.	5800	} no imports
W.B.	4600	

Bikini (100% living on Eneu)

B.M.	23,000 mrem	} imports
W.B.	21,000	

B.M.	46,000	} no imports
W.B.	40,000	

Assumed
Population Bases

Bikini	~ 400
Eneu	~ 200
No return	~ 300

Enjebi	~ 250
Southern Islands	~ 500

Use same age distribution for all groups

CANCER/RISK

	With Food Import			Without Food Import		
	% Increase	No/100	Total	% Increase	No/100	Total
Bikini (400)	9.2	.92	3.68	18.4	1.84	7.4
Enjebi (250)	2.2	.22	0.55	4.4	.44	1.1
Eneu (200)	1.1	.11	.22	2.3	.23	.46

10% deaths due to cancer (normal)

BIRTH DEFECTS

	With Food Import					Without Food Import				
	W.B. Dose	% Increase	Increase No/100	Normal No.	Total Additional	W.B. Dose	% Increase	Increase No.100	Normal No.	Total Additional
Bikini (400)	21.	4.2	.084	8	.326	40.	8.0	.160	8	.640
Enjebi (250)	5.1	1.0	.020	5	.05	10.	2.0	.040	5	.1
Eneu (200)	2.4	.48	.0096	4	.0192	4.6	.92	.0184	4	.0368

2%/rem