

Sept 10, 1982  
ML

Radiation Council

# Calculation of Potential Health Effects

410072

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for persons living in the Northern Marshall Islands.

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Potential health effects for persons living in the Northern Marshall Islands are calculated using the same assumptions and same methods used for ~~the~~ the Bikini population (copy attached). Risk is derived from both BEIR I & BEIR III were used providing not only a range of estimates but also a comparison of the most conservative (linear, relative risk model) with what would be described by many radiation biologists as the most probable (linear-quadratic, absolute model).

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~~to estimate of risk~~  
~~estimation of risk~~

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## Population estimate

The above population estimate are derived by simple ratio from the BEIR calculation (copy attached) for a population of 550. These calculations predicted 1277 births, 164 deaths over a period of 30 years, and a final population of 1684 after 30 years, for an <sup>initial</sup> population of 550.

$$\text{Deaths in 30 years} : \frac{164}{550} = \frac{\text{deaths in population of interest}}{\text{initial population of interest}}$$

$$\text{Births in 30 years} : \frac{1277}{550} = \frac{\text{births in population of interest}}{\text{initial population of interest}}$$

$$\text{Population after 30 years} : \frac{1684}{550} = \frac{\text{population after 30 years}}{\text{initial population of interest}}$$

Also from the Bikini populations, the estimate of the full

30 year dose received by children born during the 30 year period is 0.36.

## Risk Coefficients

Both BEIR I + BEIR III risk Coefficients are used.

These are as follows:

BEIR I

$$\begin{aligned} \text{Cancer} - \text{Minimum} &: \text{Absolute risk of leukemia } (26 \times 10^{-6} \text{ rem}^{-1}) \\ &+ \text{30 year elevated risk for other cancers } (61 \times 10^{-6} \text{ rem}^{-1}) = \\ &87 \times 10^{-6} \text{ rem}^{-1}. \end{aligned}$$

$$\begin{aligned} \text{Maximum} &: \text{Relative risk of leukemia } (37 \times 10^{-6} \text{ rem}^{-1}) \\ &+ \text{lifetime elevated risk } (921 \times 10^{-6} \text{ rem}^{-1}) = \\ &458 \times 10^{-6} \text{ rem}^{-1}. \end{aligned}$$

Cancer — Menomun: Absolute life time risk of Cancer for  
Continuous exposure,  $67 \times 10^{-6} \text{ rad}^{-1}$  (low LET)  
Based on Linear quadratic model

Margman: Lifetime life time risk of Cancer for  
Intermittent exposure,  $430 \times 10^{-6} \text{ rad}^{-1}$ , based  
on Linear model

smaller effect  
first generation

Margman:  $75 \times 10^{-6}$  increase per stem cell  
first generation

Naen  
Likip  
Mejit  
Ufirik

Am  
Ufirik

Ujelang  
Ailuk

Kepen

Bigen

Berejao

Ailuk

Wof

Medjeron

Kabben

Taka

Jemo

Bikar

omgerik

Ailinginae  
Kox

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FOLDER Calculations 9/82

DOCUMENT DOES NOT CONTAIN ECI

Reviewed by Dj Kridin Date 4/30/97  
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