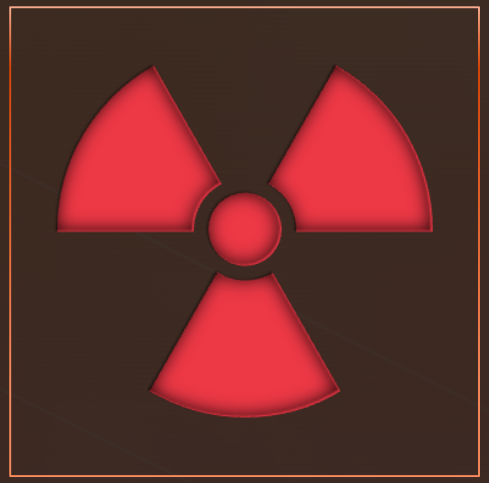
The Health and Socioeconomic Consequences of Nuclear Weapons Testing in the Pacific: Past, Present and Future



Association of Pacific Island Legislatures(APIL)

64th Meeting of Board of Directors

February 25, 2025

Wilfred C. Alik, MD, Neal Palafox, MD

PURPOSE

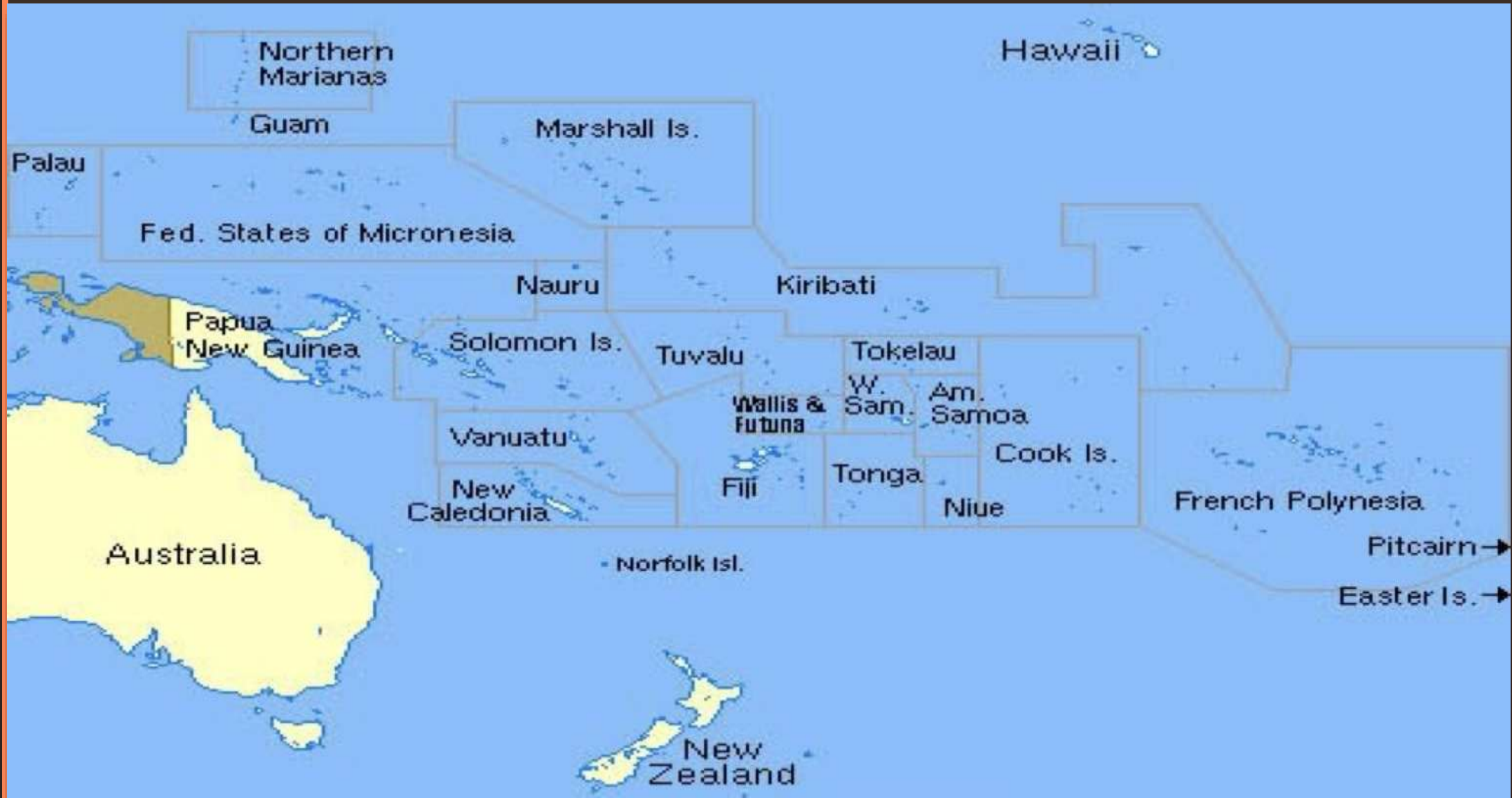
- UNDERSTAND THE HEALTH, SOCIOECONOMIC, AND CULTURAL IMPACTS OF THE US THERMO-NUCLEAR WEAPONS TESTING IN THE MARSHALL ISLANDS
- UNDERSTAND THE CHALLENGES IN ADDRESSING THE HEALTH, SOCIOECONOMIC AND CULTURAL IMPACTS OF THE US NUCLEAR LEGACY
- POSSIBLE RECOMMENDATIONS AND POLICIES FOR CONSIDERATION

BRIEF HISTORY

- Under colonial rule for 400 yrs (Spain, Germany)
- Japanese rule since 1914
- US rule in 1944-5 after some of the fiercest battles of WWII

- Became TTPI (Trust Territory of the Pacific Islands) as “Strategic Trust of US” under UN Security Council 1947
- US set up a military base in Marshall Islands and began US Nuclear Weapons Testing Program (1946-58)

Pacific Island Countries

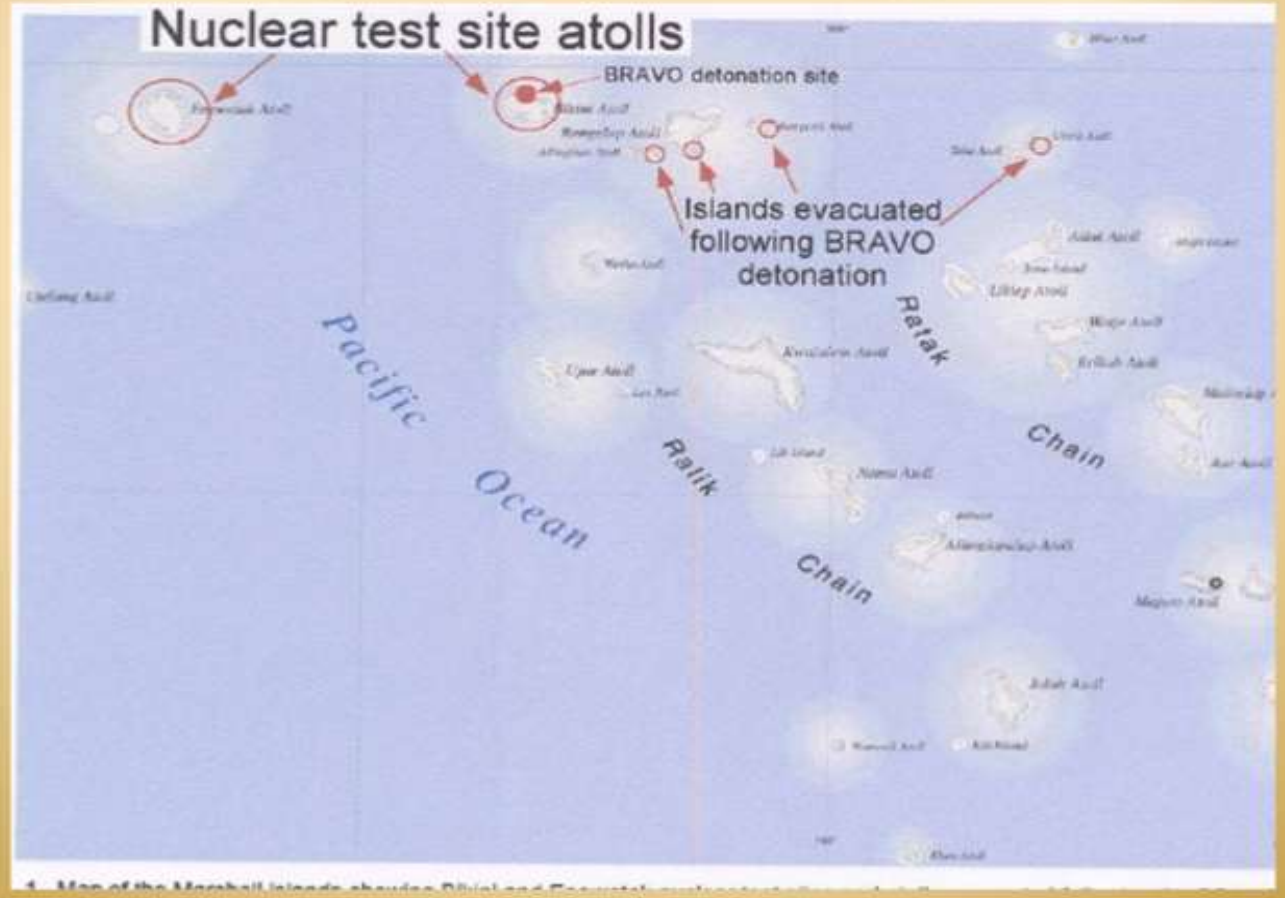


Marshall Islands

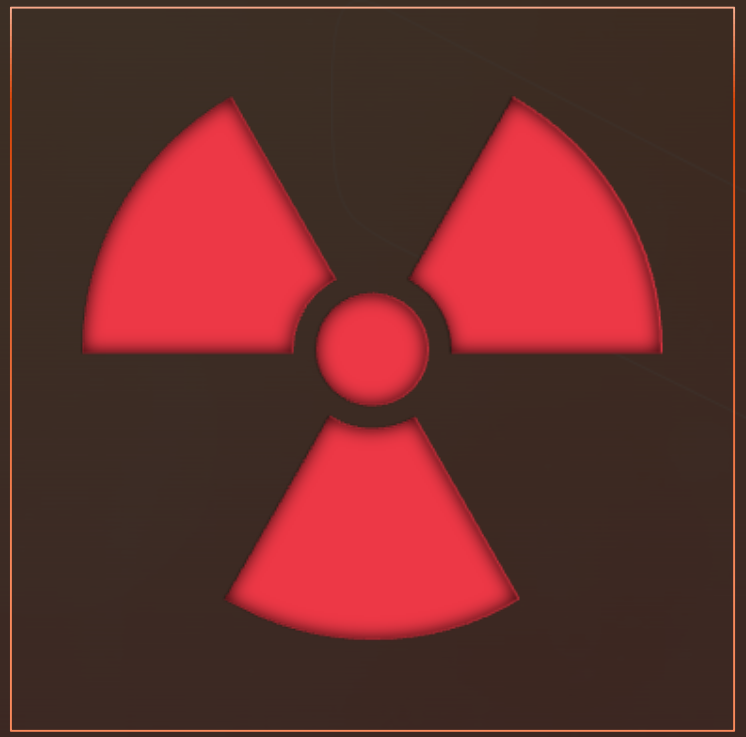
Typical Atoll

US NUCLEAR LEGACY - US NUCLEAR WEAPON TESTING PROGRAM

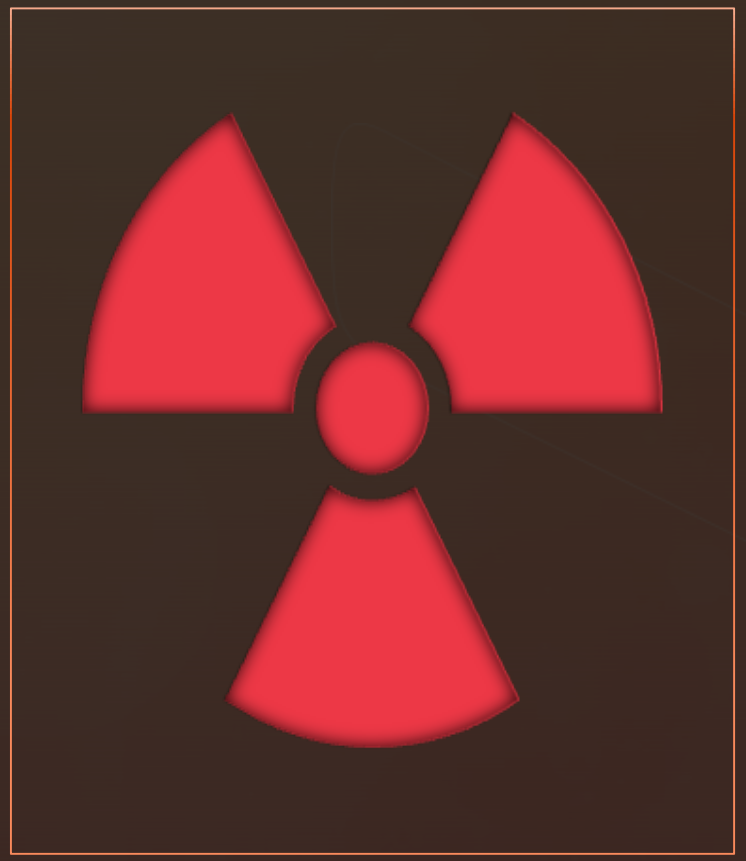
Test Sites


Nuclear test site atolls
BRAVO detonation site
Islands evacuated following BRAVO detonation
Pacific Ocean
Ralik Chain
Ratak Chain

THERMONUCLEAR FORCE



- Operation Crossroads (code name)
- (US Nuclear Weapon Testing Program - USNWTP)
- 1946 – 1958
- 67 total thermo nuclear test 12 yr span
- Testing done in atmosphere above ground and underwater
- Total yield = 7200 Hiroshima bombs.
- An average of more than 1.6 Hiroshima bombs per day for the 12 yr nuclear test program



BRAVO SHOT

- 1954, hydrogen bomb largest nuclear test US tested
- Force = 1,000 Hiroshima bombs
- Vaporized entire test island and parts of two others
- Fallout covered 7,000 squares miles

BRAVO SHOT

ATOMIC BOMB MUSHROOM CLOUD

- Leaves large gaping crater in the middle of the lagoon
- Destroys fishing and traditional food gathering grounds
- Contaminates land/ocean/air and alters the whole environment/natural ecosystem
- Atomic mushroom cloud 20 mi high/4 mi wide carried by winds to islands beyond testing sites

EXPOSURE
DOWNWIND FALLOUT

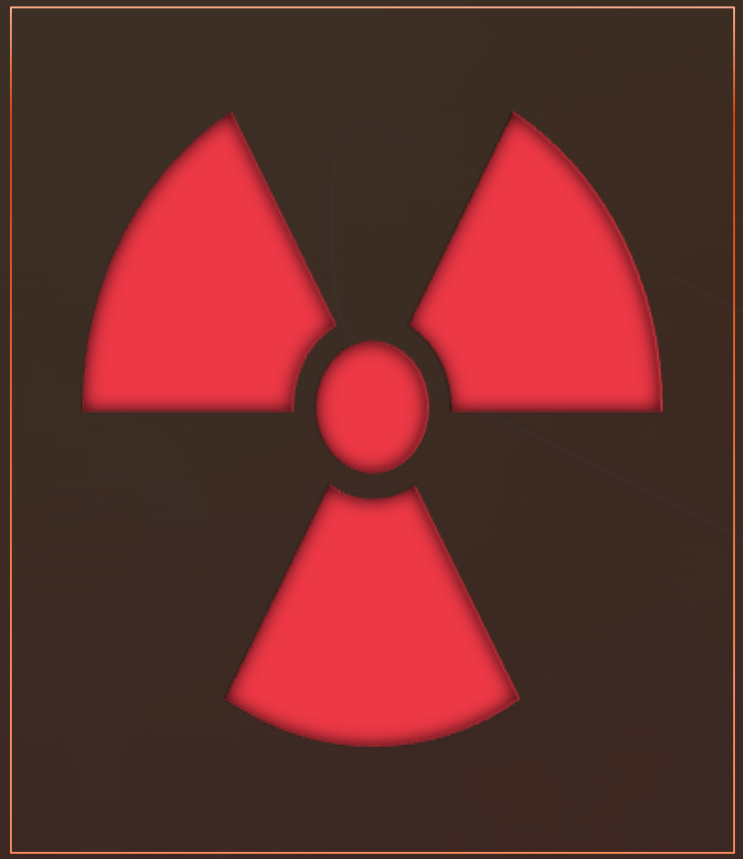
- Due to unexpected change in wind direction fallout affected 236 inhabitants 2 other atolls
- 400 inhabitants from Ailuk and Likiep atolls
- Led to U.S. moratorium on atmospheric nuclear testing/ U.S. – U.S.S.R Limited Nuclear Test Ban Treaty

EXPLOSIVE COMPARISON

Table G-1. Atmospheric Nuclear Weapon Tests Conducted by United States
(Source: DNA 1986)

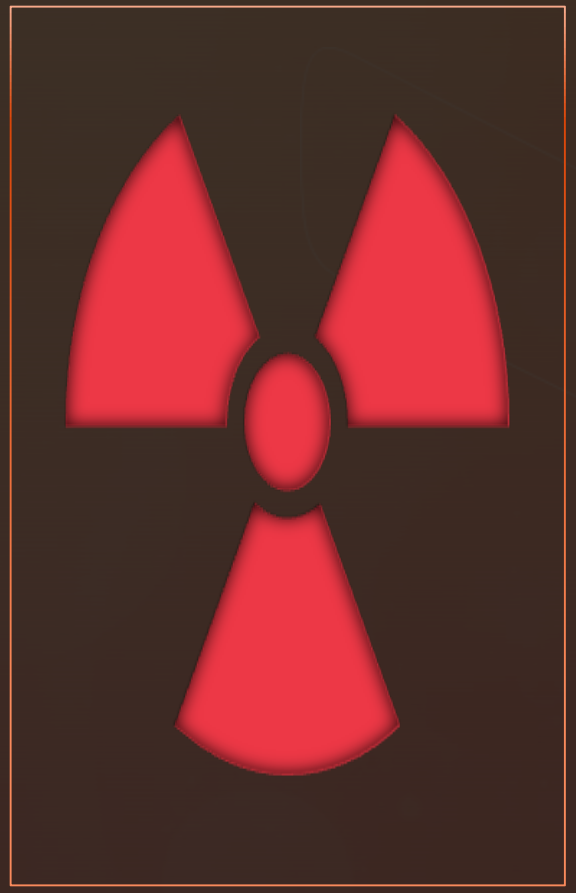
Location of Test	Number of Weapons Detonated	Total Yield (Mega-tons TNT)	Percentage Total Yield
Continental United States	107	1.38	1%
Marshall Islands	66	107	77%
- Bikini Atoll	22	78.8	56%
(BRAVO shot)	(1)	(15)	(6.5%)
- Enewetak Atoll	44	30.2	21%
All Other	55	30.6	22%

PROCESS



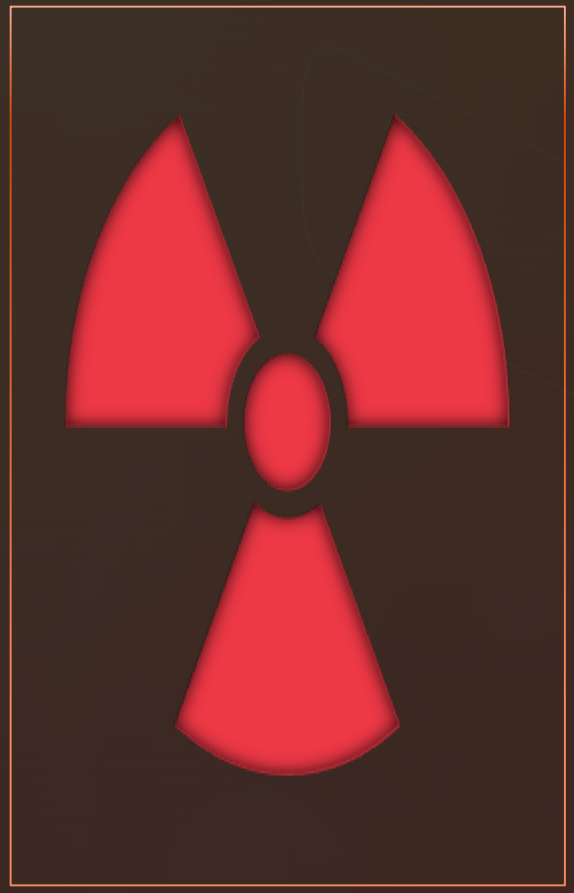
- Lacked rigorous thoughtful planning
- Lacked due diligence
- No medical or environmental assessments undertaken as to the possible consequences
- Resulted in unnecessary direct irradiation of many Marshallese– and others
- Resulted forced exile, starvation, near death

PROCESS



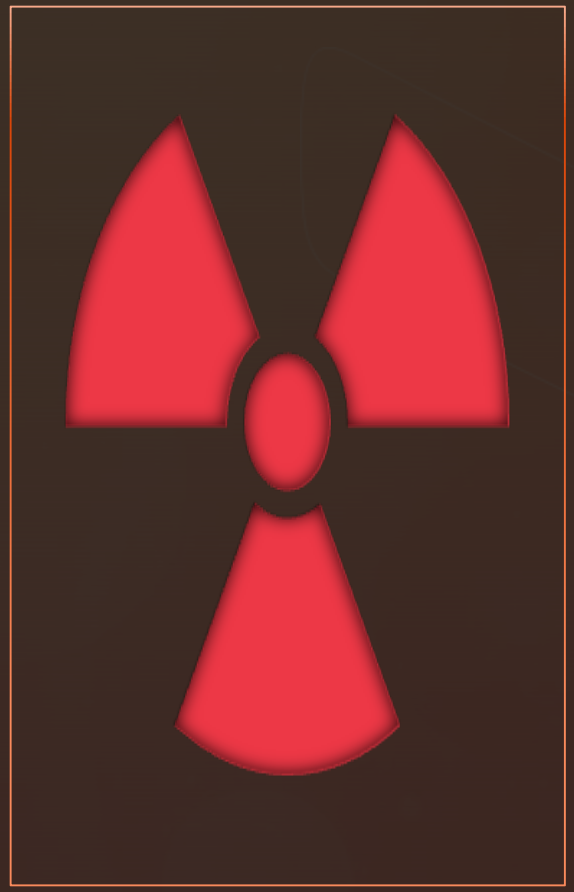
- Done on inhabited area, people's homeland, ancestral home
- Uprooted Marshallese families from their lands and homes
- Moved to landing craft and other islands
- Moved back home when land still contaminated.
- Moved again
- Not yet home, over 50 years later (nomads in their home land)

OUTCOMES



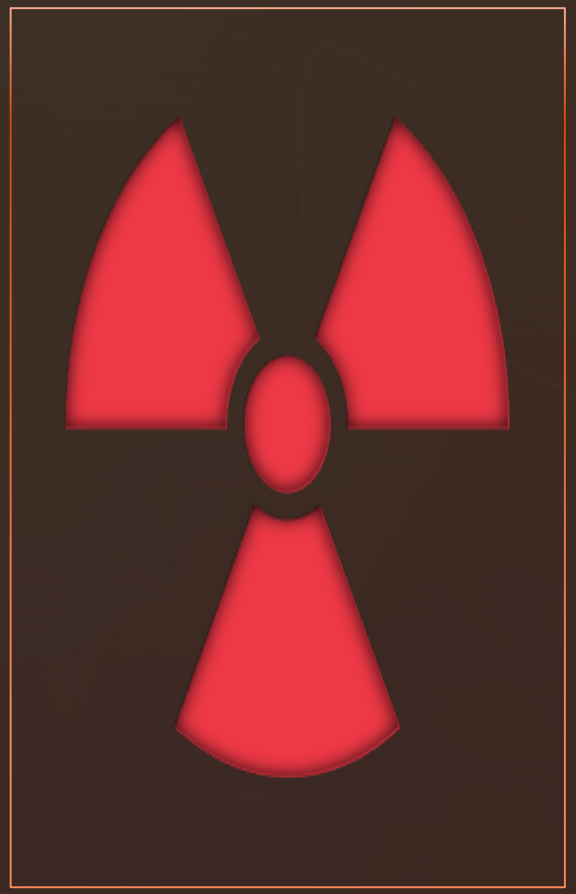
- Direct fallout on people of two atolls (downwind)
- Long term radiation contamination
- Food chain contamination
- Vaporization of some islands
- Destruction of culture and displacement of people

NUCLEAR RADIATION IMPACT



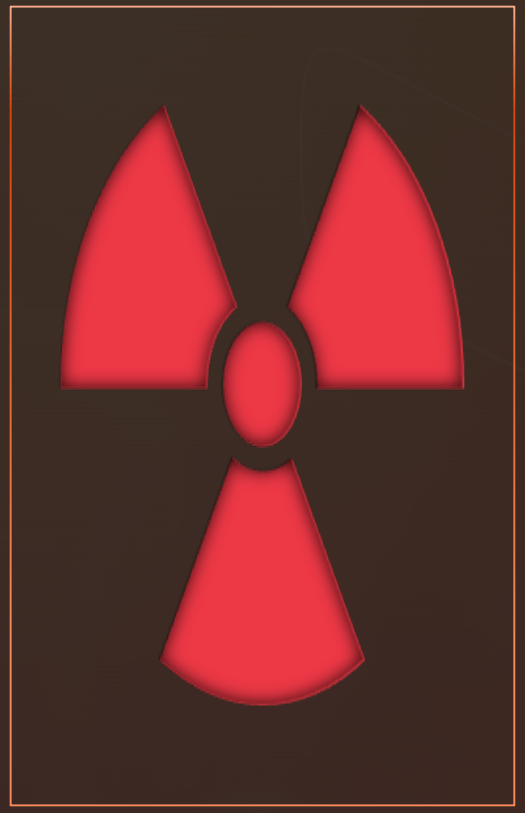
- Direct (Bio-Medical)
- Acute :
- Radiation burns, bone marrow suppression, hypothyroidism, deaths
- Fetal death and malformation
- Chronic:
- Cancers
- Possible intergenerational genetic transmission
- Indirect (Socio-Cultural)
- Post Traumatic Stress
- Cultural disruption
- Displacement from homes and lifestyle

RUNIT DOME



- The Runit Dome, also called Cactus Dome or locally The Tomb
- A 115 m (377 ft) diameter,[2] 46 cm (18 in) thick dome of concrete
- At sea level, encapsulating an estimated 73,000 m3 (95,000 cu yd) of radioactive debris,.
- The debris stems from nuclear tests conducted in the Enewetak Atoll by the United States between 1946 and 1958.
- Rising sea level related to climate changes washing up the concrete wall edges has caused corrosion
- Leaks into the ocean may become serious health hazards for RMI and nearby PIC

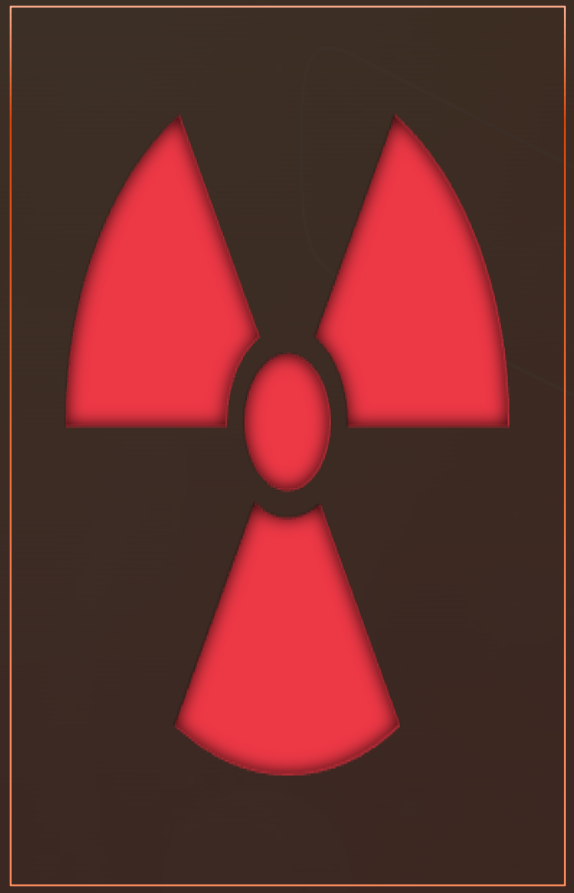
Biologic Effects of Ionizing Radiation (BEIR) VII



- 24 types of cancer: leukemia, multiple myeloma, lung, intestine, stomach, kidney, liver, bone, thyroid, skin and brain cancers.

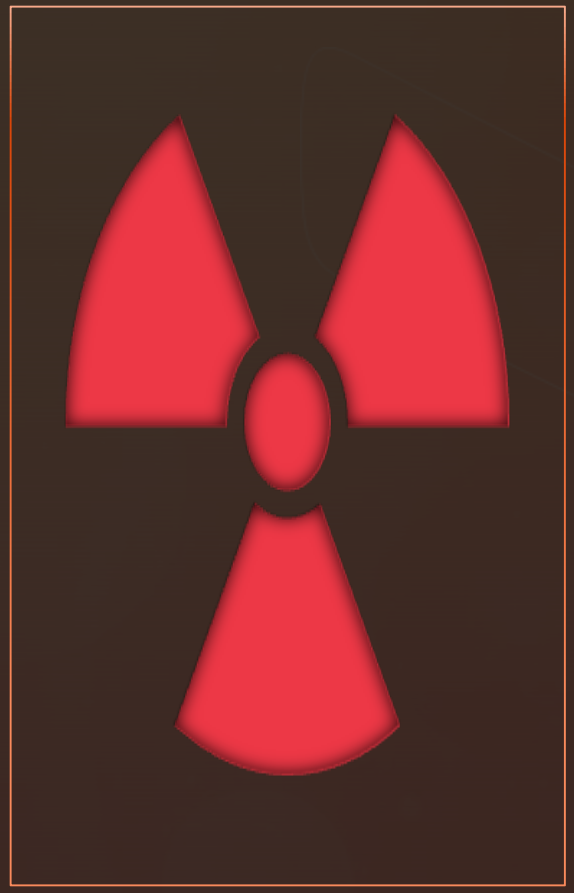
- Cancers may be latent –
  40 – 50 yrs after the initial exposure.

BEIR VII



- Intergenerational (hereditary) genetic effects
- May be possible in humans.
- Dose response relationship with mortality from non-neoplastic (non-cancer) disease with significant associations with heart disease, stroke, respiratory and digestive

Bio-psychosocial/Cultural Impacts



- Impacted land tenure
- Loss of land caused disruption of social hierarchy and traditional structure
- Altered traditional nutritional and food sources
- Interrupted cultural norms and customs and passing of knowledge
- Breaking apart of communities

CULTURAL PERSPECTIVE

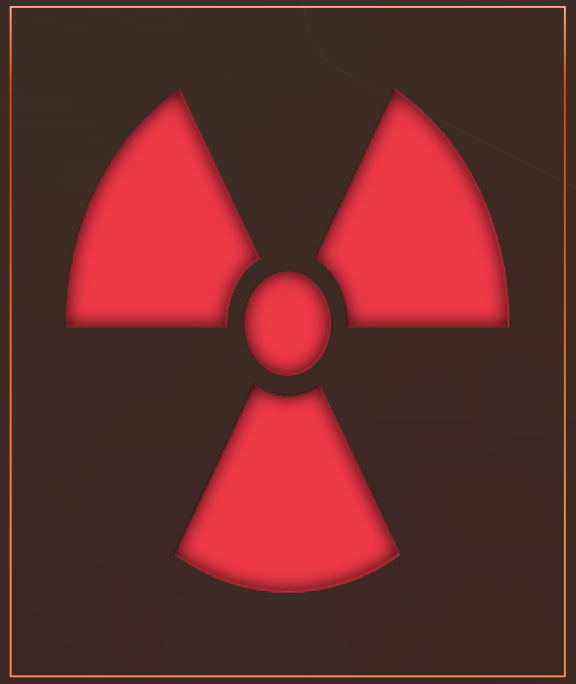
- Land -

  focal point of social structure
- Basis of social hierarchy
- Defines cultural and traditional value system
- All Marshallese have land rights (people belong to the land)
- No land no culture no identity

2004 NCI REPORT

- Excess 530 CA in people living between 1946-58
- 250 CA not yet manifested
- Nuclear fallout extended over entire RMI
- Greater in Northern atolls
- Southern atoll inhabitants at risk for CA

Nuclear Medical Programs



- 1)US DOE (Dept of Energy) Special Medical Mission
- 2)177 HP
- US DOE Medical Program
- -Direct Fallout from Bravo – Utrik / Ronglap atolls downwind from Bravo
- Ends when last one dies
- 177 Medical Program (COFA funding administered by RMI MOH)

POLICY ISSUES

- Establishing who was affected
- Establishing definitions of indirect vs direct nuclear impacts
- Establishing standards of care
- Providing appropriate medical and just compensation programs
- Providing the best science to inform policy making and resolutions to address all nuclear rad related issues not only in RMI but all throughout PIC

Recommendations

- That to support further research and inquiry to understand the health consequences of ionizing radiation, including the effects and extend of cultural disruption, health consequences of contamination of land / food sources, intergenerational genetic transmission of illness, and the extent of non-cancer illness associated with ionizing radiation
- That health care standards and protocols to care for people expose IR from Nevada and Hanover test sites be equitably applied to people affected by the USNWTP
- That comprehensive health care (prevention, screening, diagnosis, treatment) to that of the US Standards (i.e, access to major cancer health center) be provided in the Marshall IS to address the health consequences of the Pacific US NWTP

Island Setting: A Typical Sunset

Thank You & Kommol Tata!!

- Wilfred C. Alik, MD
- Republic of the Marshall Islands
  - Presidential Envoy, Primary Care and Disease Prevention
  - Interim Deputy Secretary Primary Health Care, Ministry of Health and Human Resources