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British nuclear tests in the central Pacific

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The test explosions

With mounting public concern over radioactive fallout from British nuclear tests conducted in Australia, the Australian government in 1956 rejected proposed hydrogen bomb test explosions for “safety reasons”. As a consequence, Britain had to take its hydrogen bomb “Grapple” development to its then-colonized area of the Gilbert and Ellice Islands Colony in the central Pacific. Undertaken in considerable haste because of an impending agreement to suspend all forms of nuclear testing which the UK, USA and USSR signed and lasted between 1958 and 1961, the UK detonated its first three hydrogen bombs at Malden Island in 1957. Despite being airbursts, these massive explosions contaminated Malden, and subsequent tests were moved to Christmas Island (known locally as Kiritimati Island, now part of the Republic of Kiribati), the largest coral island in the world, comprising almost half the total land area of Kiribati. In both places, British soldiers and sailors, 551 crew on two New Zealand frigates, and nearly 300 Fijian soldiers and sailors worked in close proximity, as well as local Gilbertese plantation workers and their families. The latter were evacuated to Fanning Island or kept on ships during the initial but not the later 1958 tests (Losena Tubanavua-Salabula, Josua M Namoce, Nic Maclellan (eds). *Kirisimasi: Fijian Troops at Britain’s Christmas Island Nuclear Tests*. Suva: Pacific Concerns Resource Centre, 1999, p. 15). Nearly 14,000 British military and scientific staff travelled to the then colony as part of Britain’s H-bomb program ([Maclellan 2017](#)).

The total explosive yield of the 12 British nuclear test explosions in Australia was 0.180 Mt; that of the 9 explosions at Malden and Kiritimati was 7.87 Mt ([SCOPE 1999, Chapter 3](#), p. 26). All were air bursts except for tests on 22 May and 23 September 1958 which were suspended by balloon at 450m height. The Kiritimati tests were conducted over and just off the southeast tip of the island. It is noted for completeness that, in 1962, the United States conducted 24 nuclear test explosions in the Christmas Island area totaling 23.25 Mt; all were airdrops ([SCOPE 1999, Chapter 3](#), Table 3.1, pp. 19-22 and [SCOPE 1999, Appendix](#), Table A4, pp. 240-257).

British military documents reveal that one of the purposes of the tests was to study the effects of nuclear explosions on people – for example: “The Navy requires information on the effects of various types of atomic explosions on ships and their contents and equipment ... The Army must discover the detailed effects of various types of explosion on equipment, stores and men, with and without various types of protection” and “the RAF will gain invaluable experience in handling the weapons and demonstrating at first hand the effects of nuclear explosions on personnel and equipment” ([Maclellan 2017](#), p. 109).

Health aspects

As in Australia, radiation exposures for service personnel in the Christmas and Malden Island tests were not systematically monitored, and personal protection was minimal. Personnel were assembled in the open at varying distances with “backs to the blast” on land or on the decks of ships during each nuclear explosion (IPPNW and IEER 1991, p126-8). Test participants wore standard shorts, shirts and boots, lived in tents, and drank surface fresh water (Salabula *Kirisimasi: Fijian Troops at Britain's Christmas Island Nuclear Tests*. Suva: Pacific Concerns Resource Centre, 1999).

Protection standards were applied according to race. The Grapple Task Force Commander Air Vice Marshall Wilfred Oulton circulated to senior Task Force members a top-secret document explaining this: "For civilised populations, assumed to wear boots and clothing and to wash, the amount of activity necessary to produce this dosage is more than is necessary to give an equivalent dosage to primitive peoples who are assumed not to possess these habits. For such peoples the corresponding level of activity is called level B'. It is assumed that in the possible regions of fall-out at Grapple there may be scantily clad people in boats to whom the criteria of primitive peoples should apply. ... It is desirable that the Declared Danger Area should at least enclose the whole region in which there is a possibility that level B' may be produced. The dosage at this level is about 15 times higher (for primitive peoples) than that which would be permitted by the International Commission on Radiological Protection." ([Maclellan 2017](#), pp. 113-4)

“Clean-up” operations included disposing of thousands of seabirds maimed, blinded or killed by the nuclear explosions, as well as dumping drums of nuclear waste into the ocean. The massive 3 Mt Grapple Y explosion, on 28 April 1958, detonated lower than anticipated and sucked up large quantities of water and debris, accentuating the radioactive fallout, which was also exacerbated by a wind change that blew the main fallout cloud over Christmas Island. Personnel report being soaked by radioactive rainout after various blasts, with reports of hair loss and skin burns soon afterwards suggestive of acute radiation effects (and therefore high doses) (Salabula et al. *Kirisimasi: Fijian Troops at Britain's Christmas Island Nuclear Tests*. Suva: Pacific Concerns Resource Centre, 1999, p17-18, 60-1; [Maclellan 2017](#), p. 254). “Sniffer” aircraft that flew through mushroom clouds minutes after the explosions to collect samples were associated with high exposures to the crews, with a mean of over 50 mSv per person per test ([IPPNW and IEER 1991](#), p. 128).

Well-conducted later studies among the New Zealand test veterans (who on average participated in 3 times as many nuclear tests as their British counterparts) demonstrated an excess of haematological (blood) cancers, including leukaemia ([Pearce et al. 1990](#)).

Sophisticated genetic studies in a group of veterans, compared with ex-servicemen controls extremely well matched except for their absence of nuclear test service, showed highly statistically significant (three-fold) higher rates of chromosomal abnormalities, such as translocations, dicentric chromosomes and complex chromosomal rearrangements, among the test veterans (Wahab et al. “Elevated Chromosome Translocation Frequencies in New Zealand Nuclear Test Veterans”, *Cytogenetic and Genome Research*, June 2008, Vol. 121:79-87, 2008). It is significant that such evidence of long-term genetic damage was evident fifty years after the veterans' exposure to nuclear tests. The New Zealand government in 1998 provided full war pensions for disabilities relating to their service for Christmas Island nuclear test veterans.

Fiji response

Fiji's Prime Minister Bainimarama (whose father who led the first Fijian naval contingent sent to Christmas Island) announced on 30 January 2015 that the Fiji government would grant compensation to the surviving Fijian military personnel who witnessed the UK Grapple nuclear tests in 1957–58 ([Bainimarama 2015](#)):

"To this day, Britain has refused to pay compensation to anyone despite successive surveys that have shown veterans suffering from a range of terrible ailments – leukemia, other blood disorders, skin complaints and other conditions. And worse, these effects appear to have passed to some of their children, who were born with congenital deformities and a range of diseases. ...

You may ask: why is Fiji taking responsibility for something that is the fault of Britain? My answer is this: Too much time has passed. The ranks of these survivors are rapidly thinning. Too many men – our fellow Fijians – have gone to their graves without justice. Those who remain deserve justice and Fiji as a nation is determined for them to finally get it. ... There is a saying that justice delayed is justice denied. ...

You are living testament to our determination to never again allow our pristine Pacific environment to be violated by outside powers in such a destructive and terrible manner.

... [N]ot only the British but other colonial powers such as the United States and France, used the Pacific to test weapons of mass destruction that some of them would never have tested in their own backyards. ... As one, the Pacific nations stand and say: Never again. ...

It is a form of madness that we in the Pacific – the ocean that takes its name from the word “peace” – find incomprehensible. ... [W]e will always be on the side of those nations pressing for the dismantling of the world's nuclear arsenals. And to finally draw a line under the era that these men here today witnessed for themselves."

Successive British governments have systematically resisted long-standing legal claims for compensation from veterans of their nuclear tests in Australia and Kiribati, despite the fact that some British veterans who also worked on the 1962 US tests in Christmas Island received compensation from the US government for illnesses that would not be compensated by the UK ([MacLellan 2017](#), p. 277).

Clean-up

British forces left Kiritimati in 1963 after the Partial Test Ban Treaty became effective (which banned nuclear test explosions in every location except underground). Further material was dumped in the ocean; rusting trucks and vehicles and other equipment, batteries, drums of asphalt and oil, asbestos, and other materiel and debris were abandoned. Dispersal into the atoll environment and contact with people is inevitable over subsequent decades. Some equipment such as drums and corrugated iron sheeting were re-purposed by local people for housing and pig pens. In 2005, the UK Ministry of Defence provided 9.1 million pounds for a private contractor to remove and transport back to the UK 23,000 m³ of material remaining from the tests carried out decades earlier ([MacLellan 2017](#), p. 276-7).

The island was subject to repeated local fallout, particularly from the largest Grapple Y test of 3 Mt on 28 April 1958. Two of the test weapons were suspended from balloons at 450m altitude over the southeast part of the island, producing low-altitude airbursts. After Kiribati became independent

from the UK in 1978, the Kiribati government sought confirmation of environmental radiation levels. The UK government requested and funded the New Zealand National Radiation Laboratory (NRL) to undertake a survey of residual radiation at Kiritimati. This was undertaken in March 1981. The survey report notes that "A British report on the final radiological survey and decontamination operations at Christmas Island prior to the closing down of the base in 1964 was made available to NRL" ([McEwan et al 1981](#), p.1). The NRL concluded that radioactivity concentrations in soil were "found to be consistent with global fallout levels for a low rainfall equatorial area" and that "committed dose equivalents from drinking-water and locally produced foodstuffs for a postulated Gilbertese diet were estimated to be of the order of 0.01 mSv per year", and no restrictions on land use were recommended. ([MacEwan et al 1981](#), Summary, p. 10-11). While this report is reassuring, questions remain around the monitoring and sampling procedures. According to the report, gamma measurements and soil samples were taken only from areas of undisturbed soil, and no purposive sampling in relation to test sites or sites of supportive infrastructure and material or waste on land or sea appears to have been undertaken. Sampling of foodstuffs and fresh water appears to have been very limited, for example testing water only on the western side of the island, and testing only two landcrabs, and one fish from unspecified locations of each of several species. Until the 1981 NRL report was put on the Pace University website in 2021 by independent researcher Matthew Bolton, none of the official radiological survey reports were available publicly ([Alexis-Martin 2021](#)).

In 1992, the South Pacific Regional Environment Program called for radiological evaluation of the island: "It is thus seen as critical to have Kiritimati Island reassessed for radioactive contamination in light of the increasing evidence based on the cancer levels in the Marshall Islands." ([Maclellan 2017](#), p. 276).

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