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International Disarmament Institute
and Helene & Grant Wilson Center
for Social Entrepreneurship

Addressing Humanitarian and Environmental Harm from Nuclear Weapons

Kiritimati (Christmas) and Malden Islands

Republic of Kiribati

'[O]ur communities still suffer from the long-term impacts of the tests, experiencing higher rates of cancer, particularly thyroid cancer, due to exposure to radiation.'
– Statement by Kiribati to the UN for the 2015 International Day against Nuclear Tests.

Executive Summary

Between 1957 and 1962, the UK and USA tested 33 nuclear devices at Malden and Kiritimati (Christmas) Islands, now part of the Republic of Kiribati. British, Fijian, New Zealand and American veterans of the testing program and I-Kiribati civilians who lived on Kiritimati claim their health (as well as their descendants') was adversely affected by exposure to ionizing radiation. Their concerns are supported by independent medical research. However, analysis of the ongoing humanitarian, human rights and environmental impact of nuclear weapons testing at Kiritimati and Malden Islands has been inadequate. The 2017 Treaty on the Prohibition of Nuclear Weapons obligates assistance to victims and remediation of contaminated environments, including those affected by the Christmas and Malden Islands nuclear tests.

Recommendations

Kiribati and the international community should:

1. Sign and **RATIFY** the Treaty on the Prohibition of Nuclear Weapons.
2. Assess and **RESPOND** to the humanitarian needs of survivors, especially at Kiritimati.
3. Survey and **REMEDIATE** contaminated environments at Kiritimati and Malden Islands.
4. **RESPECT**, protect and fulfill the human rights of nuclear test survivors.
5. **RETELL** the stories of the humanitarian and environmental impact of the tests.

**Figure 1: US Questa 670 Kiloton Nuclear Weapons Test at Christmas Island,
4 May 1962. Photo Courtesy of Jane's Oceana.
(http://www.janeresture.com/christmas_bombs/questa%20over%20xmas%20island.jpg)**

Background on Nuclear Weapons Testing at Kiritimati and Malden Islands

From 1957 to 1958, almost 15,000 British, New Zealand and Fijian personnel[1] participated in Operation Grapple at Christmas and Malden Islands, then part of the Gilbert and Ellice Islands Colony (GEIC), in the Central Pacific.[2] British control of Christmas Island was disputed by a US territorial claim, but both countries proceeded with tests, agreeing that they would not prejudice the outcome of the dispute.[3] Military and scientific personnel were posted at military camps on Christmas Island, as well as on British and New Zealand naval ships.[4] A number of US military personnel also participated as observers or in Operation Miami Moon, in which they flew 'sniffer' aircraft through mushroom clouds from UK tests.[5]

About 100 Gilbertese civilians lived on Christmas Island, employed by a copra plantation or Operation Grapple. The number increased to almost 500 civilians by the end of the tests.[6] At least 30 spouses and 31 children of the soldiers visited Christmas Island, as well as dignitaries, such as the Duke of Edinburgh – who was instructed not to drink water served him by the troops (see Figure 2).[7] Ratu Sir Penaia Ganilau, a distinguished military officer who later served as Fiji's Deputy Prime Minister, Governor General, President and *Tui Cakau* (customary High Chief) visited Malden Island and witnessed the 1957 *Orange Herald* test.[8]

The first three tests, in 1957, were nuclear bombs air-dropped over Malden Island, 636 km from Christmas Island. However, to simplify logistics and under pressure to achieve a 1 megaton yield before the potential negotiation of a ban on testing, the remaining six Grapple tests occurred above Christmas Island itself, including two tests attached to balloons tethered at the southeastern point.

Key Indicators of Humanitarian, Human Rights and Environmental Harm	Number of Nuclear Weapons Tests
• **43,000 personnel participated in the UK and US nuclear weapons tests in and around Kiribati; family members and dignitaries also visited** • **The 500 I-Kiribati civilians living on Kiritimati during the tests received little protection** • **There are at least 48 first generation survivors in Kiribati, plus 800 children and grandchildren of survivors** • **Many military and civilian survivors have health problems consistent with exposure to radiation; descendants also report multi-generational health problems** • **The tests killed thousands of birds and fish. The environmental impact of the nuclear tests has not been adequately analyzed**	**Total 33 tests (9 UK and 24 USA) on Kiritimati and Malden Islands**
	Position on the Treaty on the Prohibition of Nuclear Weapons (TPNW)
	Kiribati is a signatory
	Official Development Assistance Recipient (OECD DAC Status)?
	Kiribati is eligible to receive development aid

[1] 3,908 Royal Navy; 4,032 British Army; 5,490 Royal Air Force (RAF), 2 Women's Voluntary Service; 520 scientists and staff from the UK Atomic Weapons Research Establishment (AWRE); 551 New Zealand Navy; 276 Fijian Navy and Army.
[2] Note on spellings: When covering the colonial period, this report will use the English spellings of 'Gilbert', 'Christmas', 'Gilbertese' and 'London'; for the post-independence period, it will use the I-Kiribati transliterations 'Kiribati', 'Kiritimati', 'I-Kiribati' and 'Ronton' unless in direct quotation. Similarly, while colonial documents sometimes transliterate the Fijian city 'Nandi', the Fijian spelling 'Nadi' is used here.
[3] Unless otherwise noted, details on UK Christmas and Malden Islands tests are from: Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press; Paul Ah Poy. (6 January 2018) Personal interview with Matthew Bolton, Suva, Fiji.
[4] For an account of veterans' experiences during the UK testing program, see: Becky Alexis-Martin. (2016) "'It was a Blast!"—Camp Life on Christmas Island, 1956–1958.' *Arcadia*. 19. <http://www.environmentandsociety.org/arcadia/it-was-blast-camp-life-christmas-island-1956-1958>.
[5] Julie Miller. (1994) 'Veterans Under an Atomic Cloud.' *The New York Times*. <http://www.nytimes.com/1994/05/01/nyregion/veterans-under-an-atomic-cloud.html?pagewanted=all>.
[6] Office of Te Beretitenti. (2012) '20. Kiritimati.' p. 2. <http://www.climate.gov.ki/wp-content/uploads/2013/01/20_KIRITIMATI-revised-2012.pdf>.
[7] Susie Boniface. (2 March 2008) 'They Warned Philip..But Not the Heroes.' *Sunday Mirror*. p. 14. <https://www.thefreelibrary.com/THEY+WARNED+PHILIP..+BUT+NOT+THE+HEROES%3b+EXCLUSIVE+%27Don%27t+drink+water...-a0175773274>.
[8] Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. p. 150-154.

In October 1958, the UK, USA and USSR, agreed to a nuclear weapons testing moratorium. The UK halted the Christmas Island tests, maintaining a presence of about 300-400 troops. The moratorium collapsed with a Soviet test in 1961 and the US detonated a further 24 atmospheric tests at or close to Christmas Island in 1962's Operation Dominic I (see Figure 1). This included the Operation Fishbowl Starfish Prime atmospheric test, a missile launched from Johnston Atoll (Kalama Atoll to Native Hawaiians), a US territory. Operation Dominic I was carried out by Joint Task Force 8 (JTF), with 28,000 personnel on Christmas Island, Johnston Atoll and ships and submarines in the surrounding ocean. JTF8 drew from all branches of the US armed forces, as well as civilians from the US Department of Defense, the Atomic Energy Commission (AEC), Public Health Service and private contractors. JTF8 received 65 VIP visitors to Christmas and Johnston Islands.[9] One report suggests that Soviet Navy and Intelligence personnel may have been on boats and submarines in the hazardous zone during Dominic I tests.[10]

Following the signature of the 1963 Partial Nuclear Test Ban Treaty, US and UK troops withdrew from Christmas Island. Nevertheless, they maintained a small military and civilian presence during Operation Hard Look, which monitored French atmospheric testing in French Polynesia.[11]

In 1979 the Republic of Kiribati (pronounced *Keer-ih-bas*) became independent. Negotiations with the US confirmed that Christmas, now Kiritimati (pronounced Christmas), and Malden Islands were part of the new country.[12]

Humanitarian and Human Rights Impact

The UK Ministry of Defence maintains that 'Almost all the British servicemen involved in the UK nuclear tests received little or no additional radiation as a result of participation."[13] However, veterans and civilians who lived on Christmas Island during the tests maintain they were

Figure 2: Prince Philip, Duke of Edinburgh (spouse of Queen Elizabeth II) is greeted by Gilbertese residents during a visit to Christmas Island on his Pacific Tour in 1959. He was warned not to drink the water. Paint splatter is on the original photograph, not on the Prince's clothing. Photo: Benfleet Community Archive: http://www.benfleethistory.org.uk/

exposed to the negative health effects of the heat and ionizing radiation of the nuclear tests. This is supported by documentary evidence released from British official archives, as well as independent medical research. According to an article published in the *International Review of the Red Cross,* 'radiation exposures for service personnel … were not systematically monitored, and personal protection was minimal.'[14] In 2015, Kiribati's Permanent Representative to the UN, Ambassador Makurita Baaro stated, 'Today, our communities still suffer from the long-term impacts of the tests, experiencing higher rates of

[9] Defense Nuclear Agency. (1983) *Operation Dominic I 1962: United States Atmospheric Nuclear Weapons Tests: Nuclear Test Personnel Review*. Washington DC, DoD. <https://web.archive.org/web/20120823152154/http://www.dtra.mil/documents/ntpr/historical/T24298.pdf>; Nuclear Weapon Archive. (2005) 'Operation Dominic.' <http://nuclearweaponarchive.org/Usa/Tests/Dominic.html>; Edward C. Whitman. (2004) 'The Other Frigate Bird.' *Undersea Warfare: The Official Magazine of the U.S. Submarine Force*. <https://web.archive.org/web/20150329041813/http://www.navy.mil:80/navydata/cno/n87/usw/issue_24/frigate_bird.htm>.

[10] C.A. Smith. (2015) 'Operation Dominic JTF 8 1962.' *NAAV News*. p. 8. <https://www.naav.com/assets/2015_10_NAAV_Newsletter.pdf>.

[11] Peregrine Langston. (1993) 'Northern Line Islands Development.' In: *Atoll Politics: The Republic of Kiribati*. Howard Van Treese (Ed.). Suva, University of the South Pacific. p. 202.

[12] Howard Van Treese. (1993) 'From Colony to Independence.' In: *Atoll Politics: The Republic of Kiribati*. Howard Van Treese (Ed.). Suva, University of the South Pacific. pp. 5-6.

[13] UK Ministry of Defence. (June 2008) 'UK atmospheric nuclear weapons tests: UK programme.' Factsheet 5. p. 2. <https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/82781/ntvfactsheet5.pdf>.

[14] Tilman A. Ruff. (2015) 'The humanitarian impact and implications of nuclear test explosions in the Pacific region.' *International Review of the Red Cross*. 97(899). pp. 775-813.

Figure 3: Teeua Tetua, President of the Association of Cancer Patients Affected by the British and American Bomb Tests, Kiritimati, January 2018. Photo: Matthew Bolton.

cancer, particularly thyroid cancer, due to exposure to radiation.'[15]

According to the Comprehensive Test Ban Treaty Organization (CTBTO), the 1.8 megaton Grapple X test on 8 November 1957 produced an unexpectedly severe shockwave that 'demolished buildings, equipment and infrastructure.'[16] Credible reports indicate that rain following the 2.8 megaton Grapple Y test, on 28 April 1958, dispersed fallout over the island and ships off-shore.[17]

Some Christmas Island veterans claim the lack of precautionary measures was intended to use them as 'guinea pigs', to see the impact of radiation on people. They point to UK military memos that, in the words of one RAF document, show the UK wanted to understand the 'effects of nuclear explosions on personnel and equipment.'[18]

During early UK tests military personnel were given protective suits and film badges to monitor their exposure to radiation. However, protective and monitoring measures declined over the course of the testing program. Contemporary film footage of the *Grapple X* test depicts

[15] Makurita Baaro. (10 September 2015) Statement in informal meeting to mark 2015 Observance of the International Day against Nuclear Tests. <http://www.un.org/en/events/againstnucleartestsday/pdf/kiribati.pdf>.
[16] CTBTO. (n.d.) '8 November 1957 – Grapple X.' <https://www.ctbto.org/specials/testing-times/8-november-1957-grapple-x>. Also: CRTukker. (2008) 'The First British Hydrogen Bomb.' <https://www.youtube.com/watch?time_continue=81&v=UhnjbkDotYI>.
[17] War Pensions and Armed Forces Compensation Chamber. (December 2016) *Decision: Ministry of Defence vs. Abdale et al.* paras. 194-201/pp. 57-59. <http://www.llrc.org/campaigns/testvets/testvettranscripts//Determination.pdf>; BBC. (2007) 'Christmas Island H-bomb controversy.' *BBC Inside Out.* <http://www.bbc.co.uk/insideout/content/articles/2007/11/01/east_christmas_island_bomb_s12_w8_feature.shtml>; Rob Edwards. (2006) '300 Islanders Accuse UK Government of Exposing Them to A-bomb Fallout.' *Sunday Herald.* <http://www.robedwards.com/2006/10/300_islanders_a.htm>.
[18] In: Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests.* Acton, ANU Press. p. 109.

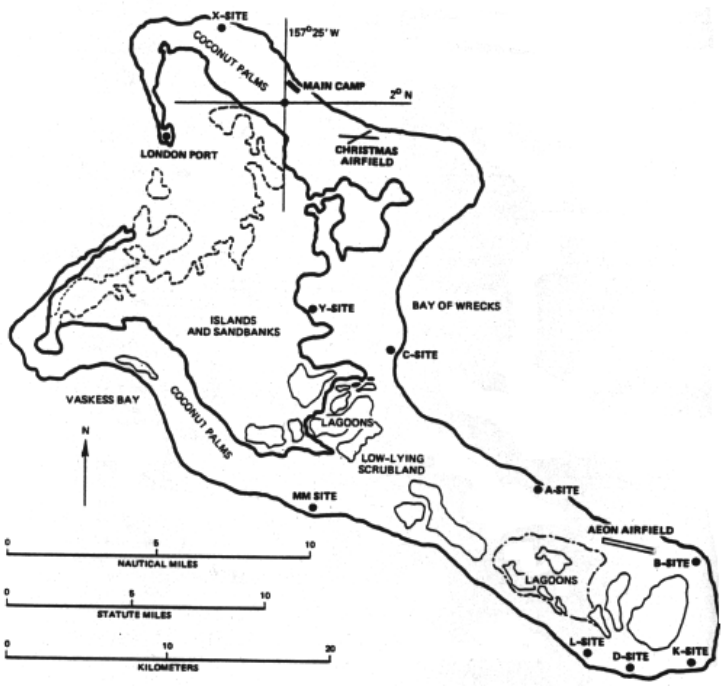

Figure 4: US Defense Department map of Christmas Island. Main Camp is now the site of the Captain Cook Hotel. The southeastern corner was the site of numerous UK and US tests – see the satellite photo in Figure 8. 'A -Site' housed a scientific instrumentation station. During the British tests, 'C-Site' was the Joint Control Camp and laboratories of the Atomic Weapons Research Establishment. Source: Defense Nuclear Agency. (1983) *Operation Dominic I 1962: United States Atmospheric Nuclear Weapons Tests: Nuclear Test Personnel Review.* Washington DC, DoD. Figure 2, p. 33.

military personnel in only their uniforms.[19] Even those who wore film badges later discovered in lawsuits with the British government that the film was never processed. The British military did not monitor the health of many service personnel following their service in the testing program. This may have been intentional; one RAF memo raised concerns about collecting airmen's blood samples because if they 'later developed leukaemia, it might be difficult to refute the allegations that this is due to radiation received at Christmas Island.'[20]

A 2008 cross-party inquiry into Operation Grapple by Members of UK Parliament John Baron (Conservative, Billercay) and Dr. Ian Gibson (Labour, Norwich North) 'heard clear personal testimony that makes us question whether adequate radiological safety standards were followed for the tests.' Baron said the inquiry 'saw little evidence that fallout and the dangers from ingested radioactive particles were taken seriously…. Servicemen were free to move around the island, drinking local water, eating local fruits, bathing in the lagoons and breathing in dust, all of which could have been contaminated. That is worrying, because ingested radioactive particles from fallout can remain in the body and continue to harm for many years.' The inquiry heard testimony from witnesses who 'described their experience of a heat wave of extraordinary intensity, leading in some cases to temporary blindness or a sensation of blood boiling within their bodies. Others developed skin rashes and flu-like symptoms immediately after the detonations.'[21]

Fijian soldiers and sailors were treated with even less regard than the British and New Zealand service personnel. They were 'often allocated dirty, difficult or dangerous tasks', subjected to a color bar, paid less than British soldiers and receiving limited R&R leave.[22] Paul Ah Poy, President of the Fiji Nuclear Veterans Association, says that while posted to Christmas Island, he 'never saw any protective gear at all' and was 'never issued with a badge' to measure radiation.'[23] He and many other Fijian veterans told the journalist Nic Maclellan that they supplemented their meals by catching fish, lobsters and crabs that they now fear were contaminated by the tests. The Fijian soldiers and sailors also participated in gathering and dumping dead, injured and blinded birds after the tests.[24] The RAF flew 'sniffer' planes through the mushroom clouds of the UK tests to obtain samples; many of these crews received dangerous exposures to radiation. As they transited through Fiji on their way from Fiji to Christmas Island, the crews were instructed not to inform the Nadi civil airport of the radiation risk: 'The fact that an engine may be 'hot' should be concealed from the Nandi authorities unless they ask.'[25] Following his official visit to Malden Island, Ratu Penaia's feet were found to be 'very hot' with radioactive contamination and his legs began to swell. He died of leukaemia in 1993; two of his children report having fertility problems.[26]

[19] CRTukker. (2008) 'The First British Hydrogen Bomb.' <https://www.youtube.com/watch?time_continue=81&v=UhnjbkDotYI>.
[20] In: Catherine Trundle. (2011) 'Searching for Culpability in the Archives: Commonwealth Nuclear Test Veterans' Claims for Compensation.' *History and Anthropology*. 22(4). pp. 497-512.
[21] John Baron. (2008) 'British Nuclear Test Veterans.' <https://publications.parliament.uk/pa/cm200708/cmhansrd/cm081022/debtext/81022-0021.htm>.
[22] Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. pp. 228, 260.
[23] Paul Ah Poy. (6 January 2018) Personal interview with Matthew Bolton, Suva, Fiji.
[24] Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. p. 139.
[25] RAF Air Commodore W.P. Sutcliffe, in: Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. p. 173.
[26] Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. p. 150-154.

The lower standard of protection applied to Fijian soldiers, airport workers and even a dignitary, was indicative of a racism that also pervaded the UK government's attitude toward the Gilbertese civilians living on the island. A 1956 UK military report preparing for the Christmas Island tests declared 'It is assumed that in the possible regions of fall-out at Grapple there may be scantily clad people in boats to whom the category of primitive peoples should apply.' This report established that the UK would apply a low standard of risk to this category: 'dosage…is about 15 times higher (for primitive peoples) than what would be permitted by the International Commission on Radiological Protection' (ICRP). A week later, a Grapple planning meeting determined that 'only very slight health hazard to people would arise, and that only to primitive peoples.'[27] In other cases, the UK government pretended there was no Gilbertese population at all, saying, for instance, 'Neither now nor at any time in the past has this desolate atoll had any indigenous population.'[28] While Kiritimati was uninhabited for much of the precolonial period, there had been a Gilbertese presence on the island since the early 20th Century.

In the early UK tests, Gilbertese civilians were evacuated to other islands or sheltered on boats off-shore. Suitupe Kiritome, who was 25-years-old at the time of the *Grapple Y* test, remembers being taken off-shore on a British ship. But when rain began to fall following the explosion, she was standing on the deck. 'Although the crew were wearing protective clothing over their heads, she was in her everyday clothes when the rain fell,' according to a report by the *Sunday Herald.* And she remembered her face getting wet. Later, her hair began to fall out and she developed burns on her 'scalp and face' which left a scar. In 1998, a doctor told her that it could have been caused by radiation.[29]

In later tests, Gilbertese civilians remained on the island. Teeua Tetua, President of the Kiritimati Association of Cancer Patients Affected by the British and American Bomb Tests, was a child at the time of the UK tests (see photo in Figure 3). She remembers gathering on the tennis courts in London village in the middle of the night. She said 'the people were really afraid.' The British authorities gave them blankets and some eye protection, 'but not enough glasses for everyone.' When the countdown began, everyone was instructed to hide under the blankets and cover their eyes: 'The babies were crying because they don't like the blanket and some kids ran away from their families and their eyes were blinded because the light was so strong.' She describes the blast as very hot and so loud that 'people tried to put their fingers in their ears.' When they returned to the house, glass bottles were broken. The tests caused considerable anxiety: 'we felt uncomfortable every day.'[30]

The Association has identified 48 survivors who experienced the tests first hand, as well as 800 descendants. Members of the Association report numerous health problems which they attribute to the testing, including blindness, hearing problems, cancers, heart disease and reproductive difficulties. They also report that their children and grandchildren have suffered similar illnesses. Survivors are 'worried about the disease in their bodies,' said Teeua Tetua.[31] In 2006, 300 I-Kiribati survivors, led by former president of the Association Suitupe Kiritome, submitted a petition to the European Parliament's Petitions Committee 'accusing the British government of breaking the law by failing to protect' the health of the indigenous civilians.[32]

A 1983 US Department of Defense review stated that 25,399 of the 28,000 personnel involved in Operation Dominic I were issued with film badges 'for extended periods.' It claimed that 'Because all but one of the shots were airbursts, there was little or no fallout problem and no residual radiation area around the surface zero.' Nevertheless, the film badges indicated that 56 people (2 Army, 4 Navy and Navy civilians, 49 Air Force, and 1 other civilian) were exposed to more than 3.0 roentgens (29 mSV), the 'established JTF 8 Maximum Permissible Exposure.'[33] However, the review barely mentions the

[27] Nic Maclellan. (2005) 'The Nuclear Age in the Pacific Islands.' *The Contemporary Pacific*. 17(2). pp. 113-114, 363.
[28] Rob Edwards. (2006) '300 Islanders Accuse UK Government of Exposing Them to A-bomb Fallout.' *Sunday Herald.* <http://www.robedwards.com/2006/10/300_islanders_a.htm>.
[29] Rob Edwards. (2006) '300 Islanders Accuse UK Government of Exposing Them to A-bomb Fallout.' *Sunday Herald.* <http://www.robedwards.com/2006/10/300_islanders_a.htm>.
[30] Teeua Tetua. (14 January 2018) Personal interview with Matthew Bolton, Kiritimati, Kiribati. Other survivors also remember children developing eye problems during the tests: Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests.* Acton, ANU Press. p. 254.
[31] Teeua Tetua. (14 January 2018) Personal interview with Matthew Bolton, Kiritimati, Kiribati.
[32] Rob Edwards. (2006) '300 Islanders Accuse UK Government of Exposing Them to A-bomb Fallout.' *Sunday Herald.* <http://www.robedwards.com/2006/10/300_islanders_a.html>.
[33] Defense Nuclear Agency. (1983) *Operation Dominic I 1962: United States Atmospheric Nuclear Weapons Tests: Nuclear Test Personnel Review*. Washington DC, DoD. pp. 3-4. <https://web.archive.org/web/20120823152154/http://www.dtra.mil/documents/ntpr/historical/T24298.pdf>.

Gilbertese civilian population on Christmas Island. Secondary reports and Association members state that during most of the US tests, the Gilbertese inhabitants were not evacuated.[34] One US naval officer recalled that while his ship was supposed to 'load up the Islanders [and] take them safely to sea', after the 'first experience the native people didn't show up again to be taken to safety and many of them suffered severe retina burns.'[35]

Independent medical generally backs the claims of survivors that exposure to the nuclear tests could have negative health implications. The UK's National Radiological Protection Board (NRPB) found elevated levels of leukemia among 22,000 veterans of the Christmas Island and Australian tests.[36] These results were supported by Neal Pearce of the Wellington School of Medicine in 1990 and 1996 who found that New Zealand test veterans had an increased risk of leukaemia.[37] However, the NRPB and Pearce studies have been heavily criticized by test veterans and medical researchers for their methodology and for underestimating the health impact of the tests.[38]

By contrast, a 1999 survey of 2,500 men who participated in UK nuclear tests (2,200 UK, 238 New Zealand and 62 Fijian) by Sue Rabbit Roff found that two-thirds of respondents who had died had cancers. Data on the 5,000 children and grandchildren of 1,000 such veterans found elevated rates of health problems consistent with multigenerational effects of radiation exposure, including a rate of spina bifida at five times the UK average.[39] The NRPB disputed Roff's and results, claiming there is 'no detectable effect on the participants' expectation of life, nor on their risk of developing cancer or other fatal diseases.'[40] Similarly, the judges in the Abdale case described Roff's 'methodology used (survey questionnaire) was less than ideal as there is a potential source of bias….'[41]

However, the most methodologically-rigorous study to date, led by Professor Al Rowland at Massey University's

Figure 5: A regimental marker at the Captain Cook, site of the former Main Camp, commemorates the role of the British and Fijian troops involved in the UK nuclear weapons tests in Kiritimati. There is no such memorial for I-Kiribati survivors. Photo: Matthew Bolton.

Institute of Molecular Biosciences, found elevated levels of genetic damage in cell samples taken from New Zealand Christmas Island test veterans compared with the control group. The researchers concluded that the damage was 'caused by exposure to harmful radiation, probably through ingestion of ionizing particles during…Operation

[34] e.g. IPPNW. (n.d.) 'Kiritimati and Malen, Kiribati.' Hibakusha Worldwide. <http://www.nuclear-risks.org/fileadmin/user_upload/pdfs/HBWW_EN/kiritimati-malden_EN_web.pdf>.
[35] C.A. Smith. (2015) 'Operation Dominic JTF 8 1962.' *NAAV News*. p. 8. <https://www.naav.com/assets/2015_10_NAAV_Newsletter.pdf>.
[36] S.C. Darby, et al. (1988) 'A summary of mortality and incidence of cancer in men from the United Kingdom who participated in the United Kingdom's atmospheric nuclear weapon tests and experimental programmes.' *British Medical Journal*. 296. pp. 332-338.
[37] Neal Pearce et al. (1990) *Mortality and Cancer Incidence in New Zealand Participants in United Kingdom Nuclear Weapons Tests in the Pacific*. Wellington, Wellington School of Medicine; Neal Pearce. (1996) *Mortality and Cancer Incidence in New Zealand Participants in United Kingdom Nuclear Weapons Tests in the Pacific: Supplemental Report*. Wellington, Wellington School of Medicine.
[38] Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. pp. 295-296.
[39] Sue Rabbitt Roff. (1999) 'Mortality and morbidity of members of the British Nuclear Tests Veterans Association and the New Zealand Nuclear Tests Veterans Association and their families.' *Medicine, conflict and survival*. 15(Suppl. 1). pp. i-ix, 1-51.
[40] In: Lorna Arnold. (2001) *Britain and the H-Bomb*. London, Palgrave Macmillan. p. 243.
[41] War Pensions and Armed Forces Compensation Chamber. (December 2016) *Decision: Ministry of Defence vs. Abdale et al*. p. 70. <http://www.llrc.org/campaigns/testvets/testvettranscripts//Determination.pdf>.

Grapple.'[42] An ongoing study of Grapple veterans has struggled to find sufficient participants, given the length of time that has passed since the tests.[43]

Nevertheless, since the publication of Rowland's landmark work, other studies have demonstrated further health impacts on British test veterans, including serious illness and reproductive difficulties.[44] Reviewing the evidence and literature on harm from testing in the Pacific, Dr. Tilman Ruff in the *International Review of the Red Cross*, concluded that 'Any and all levels of ionizing radiation exposure, including doses too low to cause any short-term effects or symptoms, are associated with increased risks of long-term genetic damage, chronic disease and increases in almost all types of cancer, proportional to the dose.'[45]

Moreover, research for a doctoral dissertation at Massey University found that New Zealand test veterans suffered 'psychological fallout', exhibiting 'more depressive symptoms' than a control group. The study suggested anxiety about the ongoing and potential health implications of their exposure to the tests caused a form of 'chronic anxiety.'[46] Fijian veterans speaking to Nic Maclellan reported that the fear and stress of experiencing the tests caused psychological distress.[47] In interviews, I-Kiribati civilians similarly recall the terror induced by the nuclear explosions, which has caused some to feel persistent anxiety.[48]

Veteran and civilian survivors of the British tests have faced systematic denial and secrecy from the UK and US governments. Seeking compensation but also more transparency, veteran and civilian survivors have sued the UK government in both British courts and the European Court of Human Rights.[49] So far, British and European judges have decided against survivors, expecting a high burden of proof that specific illnesses were caused by the testing and not by other factors like genetics, smoking or exposure to other carcinogens.[50] While they were ultimately unsuccessful, the court cases did result in limited release of official documentation. Journalist Nic Maclellan also succeeded in obtaining further documentation from official archives. However, the UK government has still refused to open its complete Operation Grapple archive to full public examination.

Field research in Kiritimati has revealed inadequate dissemination of information about the testing program and limited knowledge about the effects of ionizing radiation, even among government officials. Posters placed at Kiritimati's Captain Cook Hotel by companies contracted by the UK Ministry of Defence to clean up toxic waste at Kiritimati elide key information about the testing program. For example, one poster implies that the tests were 'carried out some 450 miles south' of Kiritimati.[51] Many tests were much closer, even tethered to southeastern point of the island itself.

Suppression of information by the UK and USA has contributed to survivors' distress, many of whom long for recognition. 'If you hurt someone you should help them, because we are human beings,' says Teeua Tetua. 'It should be known by the world, the cruel things that have been done.'[52] She says that there are few systems in Kiritimati for archiving and disseminating information about the impact of the nuclear tests and the potential health risks for those who may have been exposed to radiation. Association members have called for a

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[42] M.A. Wahab et al. (2008) 'Elevated chromosome translocation frequencies in New Zealand test veterans.' *Cytogenetic and Genome Research*. 12(2). pp. 79-87. For extended discussion of this study, see: Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. pp. 291-301.
[43] Susie Boniface. (8 April 2018) 'Scientists trying to prove Cold War nuclear weapons tests on servicemen caused genetic damage can't find enough survivors to test.' *Mirror*. <https://www.mirror.co.uk/news/uk-news/scientists-trying-prove-cold-war-12326858.amp>.
[44] Rebecca Miles, et al. (2011) *British Nuclear Test Veterans Health Needs Audit Commissioned by the UK Ministry of Defence. Miles and Green Associates*. <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/16592/20111027NTVsMODHealthNeedsAuditFinal.pdf>; Christopher Busby and Mireille Escande de Messieres. (2014) 'Miscarriages and Congenital Conditions in Offspring of Veterans of the British Nuclear Atmospheric Test Programme.' *Epidemiology*. 4(4). doi:10.4172/2161-1165.1000172.
[45] Tilman A. Ruff. (2015) 'The humanitarian impact and implications of nuclear test explosions in the Pacific region.' *International Review of the Red Cross*. 97(899). pp. 775-813.
[46] Rebekah Leigh Johnson. (2009) '"Psychological Fallout": The Effects of Nuclear Radiation Exposure.' Doctor of Clinical Psychology thesis, Massey University. <https://mro.massey.ac.nz/bitstream/handle/10179/1425/02_whole.pdf>.
[47] e.g. Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. pp. 133, 229.
[48] e.g. Teeua Tetua. (14 January 2018) Personal interview with Matthew Bolton, Kiritimati, Kiribati.
[49] See: UK High Court. (1988) *Pearce vs. Secretary of State for Defence*. AC755; European Court of Human Rights. (1998) *L.C.B. vs. the United Kingdom*. Reports of Judgements and Decisions 1998-III; European Court of Human Rights. (1998) *McGinley vs. the United Kingdom*. Reports of Judgements and Decisions 1998-III; UK Court of Appeal (Civil Division). (2010) *Ministry of Defence versus AB and Others*. EWCA Civ 1317, Case No. B3/2009/2205; War Pensions and Armed Forces Compensation Chamber. (December 2016) *Decision: Ministry of Defence vs. Abdale et al.* <http://www.llrc.org/campaigns/testvets/testvettranscripts//Determination.pdf>.
[50] For a review of the cases, see: Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. pp. 311-322.
[51] Enviros. (n.d.) 'Restoring Kiritimati: Operation Grapple.' Poster hung in the Captain Cook Hotel dining room, Kiritimati, Kiribati.
[52] Teeua Tetua. (14 January 2018) Personal interview with Matthew Bolton, Kiritimati, Kiribati.

Figure 6: Nuclear weapons test at Christmas Island. Photograph Courtesy of *Jane's Oceana* (http://www.janeresture.com/christmas_bombs/xmas%20island%20cloud%20may%2072.gif).

monument in Kiritimati memorializing the suffering caused by the nuclear testing. Current sites of memory on Kiritimati (with the exception of a Peace Pole) commemorate the military institutions that carried out the tests – such as a British regimental marker at the turnoff for the Captain Cook Hotel – not those who were most affected by them (see Figure 5). Similarly, New Zealand Christmas Island veterans have called for apologies from the governments that participated in the tests.[53]

Since independence, the population of Kiritimati has grown significantly, to 6,400 people.[54] In 1988 the government of Kiribati began encouraging settlers to move there to relieve overcrowding on other islands, particularly Tarawa.[55] According to Ambassador Baaro, 'In Kiribati, no studies have been done on the effects of these nuclear tests on our people – we do not have the medical facilities nor the capacity to do this.'[56]

While Malden Island was uninhabited during the nuclear tests, and remains so (except for authorized visitors), it is a site of important cultural heritage. It has prehistoric Polynesian ruins, including *marae* (shrines), considered 'the best preserved relics from the pre-European period.'[57] Also home to remarkable bird and fish biodiversity, Malden Island is part of the Kiribati's Southern Line Islands Marine Reserve; commercial fishing is banned in its waters.[58] A 2017 Chatham House report argues that compliance with international norms on cultural heritage (such as the 1954 Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict and 1972 Convention Concerning the Protection of the World Cultural and Natural Heritage) requires addressing the risks and impact of nuclear weapons use and testing.[59] Thus, even though Malden Island is uninhabited, the government of Kiribati should nevertheless assess the potential impact of the nuclear tests on the island's cultural and environmental heritage. There are also ancient Polynesian burial sites on Kiritimati.[60]

Environmental Impact

Kiritimati and Malden Islands are sites of great biodiversity. Kiritimati is the largest coral atoll on earth and has a large lagoon and reefs that are home to '83 species of coral, 235 species of fish, two marine reptiles

[53] Roy Sefton, in: Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. p. 217.
[54] Ministry of Line and Phoenix Islands Development. (2016) Line and Phoenix Islands Integrated Development Strategy 2016-2036. Tarawa, MLPD. p. 10. <http://www.mfed.gov.ki/sites/default/files/Line%20and%20Phoenix%20Islands%20Sustainable%2C%20Integrated%20Development%20Strategy%202016%20-%202036%20online%20version.pdf>.
[55] Office of Te Beretitenti. (2012) '20. Kiritimati.' p. 2. <http://www.climate.gov.ki/wp-content/uploads/2013/01/20_KIRITIMATI-revised-2012.pdf>; Peregrine Langston. (1993) 'Northern Line Islands Development.' In: *Atoll Politics: The Republic of Kiribati*. Howard Van Treese (Ed.). Suva, University of the South Pacific. pp. 207-209.
[56] Makurita Baaro. (10 September 2015) Statement in informal meeting to mark 2015 Observance of the International Day against Nuclear Tests. <http://www.un.org/en/events/againstnucleartestsday/pdf/kiribati.pdf>.
[57] Living Archipelagos. (2007) 'Malden.' <https://web.archive.org/web/20070105145111/http://www.livingarchipelagos.org/sitepage.asp?name=Malden>. Also: Jane Resture. (2012) 'Malden Island.' *Jane's Oceana*. <http://www.janeresture.com/kiribati_line/malden.htm>.
[58] Brian Clark Howard. (2014) 'Pacific Nation Bans Fishing in One of World's Largest Marine Parks.' *National Geographic*. <https://news.nationalgeographic.com/news/2014/06/140616-kiribati-marine-park-commercial-fishing-ocean-protection/>; National Geographic. (2018) 'Expeditions: Southern Line Islands.' *National Geographic*. <https://www.nationalgeographic.org/expeditions/southern-line-islands/>.
[59] Sasan Aghlani, Patricia Lewis & Beyza Unal. (2017) *Nuclear Disarmament and the Protection of Cultural Heritage*. London, Chatham House.
[60] Peregrine Langston. (1993) 'Northern Line Islands Development.' In: *Atoll Politics: The Republic of Kiribati*. Howard Van Treese (Ed.). Suva, University of the South Pacific. p. 202.

Figure 7: The islets in the Kiritimati lagoon provide vital nesting grounds for the island's 16 million birds. Photo: Matthew Bolton.

and marine mammals.' It is known worldwide by sports fishing enthusiasts for its abundance of bonefish, which spawn in the area. Kiritimati hosts an 'estimated bird population of 6 million made up of 18 species of sea birds, two land bird species and 18 species of migratory birds.'[61] Moreover, as illustrated by the work of poet and social theorist Teresia Teaiwa, indigenous conceptions of the environment in the Pacific, see the land, wildlife, plants and waters as more than simply a backdrop for human life or its instrumental uses for people. The environment has an intrinsic and even sacred worth.[62]

There has never been a sufficiently comprehensive, public, and independent analysis of the environmental impact of nuclear testing at Kiritimati, nor Malden Island. The scale of contamination and its potential long-term impact are in dispute.

Nevertheless, there is extensive evidence that the tests killed and maimed wildlife and damaged vegetation at the time.[63] Ernest Cox, a civilian who worked for the UK Atomic Weapons Research Establishment recalled flying to Malden Island following the 1957 *Orange Herald* test and having 'a strange feeling': 'We noticed no flies, no movement of lizards and no booby birds. We found several dead birds and, in the distance, we heard one of the three wild pigs…. It was badly burnt and was going around in circles, blind.' Returning to camp after spending two days on Malden Island, he found he had received a dangerously high dosage of radiation: 'Two thirds of my body was covered in blisters….' According to Maclellan, the tests on Malden Island left 'significant hotspots of fallout.'[64] Eyewitness reports suggest that one of the 1957 tests killed fish as far away as the Cook Islands.[65]

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[61] Office of Te Beretitenti. (2012) '20. Kiritimati.' p. 2. <http://www.climate.gov.ki/wp-content/uploads/2013/01/20_KIRITIMATI-revised-2012.pdf>; Further documentation of Kiritimati's biodiversity is available from: (2015) 'Kiritimati: the world's largest atoll.' <http://www.travel-tour-guide.com/kiribati/02_kiritimati.htm>.

[62] e.g. Teresia K. Teaiwa. (1994) 'bikinis and other s/pacific n/oceans.' *The Contemporary Pacific*. 6(1). pp. 87-109.

[63] e.g. Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. p. 132.

[64] Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. pp. 150-151.

[65] Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. p. 78; Britain's Pacific Nukes. (n.d.) 'Cook Islands.' <https://pacificnukes.wordpress.com/cook-is/>.

An official report by US military observers of the 1957 *Grapple X* test records visiting the southeastern point of Christmas Island after the explosion: 'timber and debris thrown up onto the beach were burning with a great deal of flame. … [B]irds were observed to have their feathers burnt off, to the extent that they could not fly. Dead fish were reported to have washed ashore.'[66] Contemporary film footage of the *Grapple X* test depicts scorching of vegetation.[67] UK test veteran Kenneth McGinley says that following the *Grapple X* test, 'Before we went off duty, we were ordered to kill the birds which had been injured by the explosion. Some were still flying around but they were blind as their eyes had been burnt out.'[68]

Fijian veteran Anare Bakale also remembers visiting the southeastern point two weeks after a test: 'The whole place look dry and black. Dead fish were floating in the sea. It was so horrifying. … The plants were … withered as if they had been watered with boiling water. Nothing was left. Everything from the stem to the leaves disappeared. Only the sand was left.'[69]

Despite years of UK government denial, former UK Ministry of Defence official John Large analyzed the many reports of fallout from the *Grapple Y* test, finding that it contaminated an area of 80 to 160 kilometers from ground zero – including Christmas Island and naval ships anchored offshore – with irradiated water and debris.[70]

Paul Ah Poy recalls his boat being loaded with 60 44-gallon barrels and being told to sail offshore and dump them. While on the journey he sat on one of the barrels, a Marine Sergeant pushed him off and told him they were full of radioactive waste. He says they got about 'four miles west of Port London', past the reef, where he estimated they were in international waters because 'the leaves of the coconut trees began to look like the leaves on a banana tree' (i.e. one could no longer see the individual fronds). He said they then dumped the barrels in the sea.[71]

Members of the Association fear that there may be contamination in the fish that they eat and desire verified information on the potential risks. Long-time residents of Kiritimati recall that 'in the 1980s', people avoided eating

Figure 8: Google Maps satellite image of the southeastern point of Kiritimati (near 'K-Site' in Figure 4 map). Note the damage from nuclear weapons tests, close to a publically-accessible road. Contrast adjusted for clarity.

reef fish and land crabs, fearing contamination risks. However, they say that many people now eat them.[72]

The UK Ministry of Defence claims that environmental monitoring was adequate during the time of the British tests, confirming 'that levels of radioactivity on land and sea were negligible and not a danger.' The monitoring effort included 'pumped air, sticky paper, rainwater collectors and fish sampling' of an area within 2,500 km from Christmas Island. The 2016 Decision of the *UK Ministry of Defence vs. Abdale et al* case in the UK War

[66] J.W. White & G.S. Patrick. (1957) Report of United States Observers of a Nuclear Test. AEC 66/13. Washington DC, Atomic Energy Commission. Quoted in: Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. p. 214.
[67] CRTukker. (2008) 'The First British Hydrogen Bomb.' <https://www.youtube.com/watch?time_continue=81&v=UhnjbkDotYI>.
[68] In: CTBTO. (n.d.) '8 November 1957 – Grapple X.' <https://www.ctbto.org/specials/testing-times/8-november-1957-grapple-x>.
[69] In: Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. p. 214.
[70] In: European Court of Human Rights. (1998) 'Appendix X.' *McGinley vs. the United Kingdom*. Reports of Judgements and Decisions 1998-III. pp. 3, 7.
[71] Paul Ah Poy. (6 January 2018) Personal interview with Matthew Bolton, Suva, Fiji; Also: Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. p. 140. In Maclellan, Ah Poy says they dumped the drums 'five miles west of the island.'
[72] (January 2018) Interviews of government officials with Matthew Bolton, Kiritimati, Kiribati.

Figure 9: Kiritimati's Wildlife Conservation Unit is responsible for protecting the great biodiversity of Kiritimati Island, its lagoons and reefs. Photo: Matthew Bolton.

Pensions and Armed Forces Compensation Chamber, backed the Ministry of Defense's claims. Nevertheless, it acknowledged that sticky tray samples taken during the *Grapple Y* and *Z* found high contamination readings tests at the Decca Master Site, Vaskess Bay, two sites 'on the uninhabited southern coast of the island' and at the Main Camp (now the site of the Captain Cook Hotel).[73]

Similarly, a review by the US Defense Nuclear Agency asserted that environmental monitoring during Operation Dominic I was sufficiently rigorous, taking samples of air, water, coconuts, fish, crab and lobsters, particularly in the inhabited areas of Christmas Island. In denying a US veteran's compensation claim in 2004, a judge with the Board of Veterans' Appeals stated, 'no fallout from any of the DOMINIC nuclear detonations was detected at Christmas Island or the surrounding waters.'[74] Nevertheless, Operation Dominic I monitoring did detect fallout from the tests dispersed as far as Penrhyn Island (now in the Cook Islands), as well as Palmyra, Washington and Fanning Islands (now in Kiribati).[75]

There have been several environmental studies of radiological conditions since the end of the UK and US tests, which have varied in scope, metholodogy and conclusions. An overview is available in the annex at the end of this report. The more comprehensive surveys have found 'traces of residual contamination… in a few localised areas' particularly where aircraft and clothes had been washed on Kiritimati[76] and at the tethered balloon

[73] War Pensions and Armed Forces Compensation Chamber. (December 2016) *Decision: Ministry of Defence vs. Abdale et al*. paras. 194-217/pp. 61-63. <http://www.llrc.org/campaigns/testvets/testvettranscripts//Determination.pdf>.
[74] Michael D. Lyon. (2011) 'Entitlement to service connection for myelodysplastic syndrome, to include as due to exposure to ionizing radiation.' Citation No. 1136565. <https://www.va.gov/vetapp11/files4/1136565.txt>.
[75] Defense Nuclear Agency. (1983) *Operation Dominic I 1962: United States Atmospheric Nuclear Weapons Tests: Nuclear Test Personnel Review*. Washington DC, DoD. pp. 86, 96.
[76] A.C. McEwan, K.M. Matthews & L.P. Gregory. (1981) 'An Environmental Radiation Survey of Christmas Island, Kiribati.' Report No. 1981/9/ Christchurch, New Zealand: National Radiation Laboratory; summarized and quoted in War Pensions and Armed Forces Compensation Chamber. (December 2016) *Decision: Ministry of Defence vs. Abdale et al*. paras. 221-222/p. 65. Also summarized in: Christopher Busby & Andrew Ades. (2015) 'Revised Amended Statement of Case.' *Ministry of Defence vs. Abdale*. Paras. 3.36-3.38.
<http://www.llrc.org/campaigns/testvets/testvettranscripts//BSStatementofCaserevised150516CJBeditDW2FINALdocx.pdf >; R. Naidu, et al. (1996)

test site, at the southeastern tip of the island.[77] In inhabited areas, studies 'are consistent in not disclosing significant radioactive contamination….'[78] However, there is no ongoing radioactive monitoring effort. None of the studies are available on the internet. Nor were they available at the office of the Kiritimati Wildlife Conservation Unit, which collects scientific and cultural research on the island. Therefore the methodology, scope and detailed findings of these studies are currently unavailable to the Kiritimati people, relevant government agencies, academia and civil society.

In addition, it appears that the surveys focused on the inhabited areas of Kiritimati, neglecting detailed consideration of the rest of the atoll, or of Malden Island. At the southeastern point of Kiritimati, the location of the two UK tethered balloon tests, satellite images today reveal craters (see Figure 8). The southeastern point is currently uninhabited and located 50 km from the nearest population center in the northern part of the island (see Figure 4). During, and for some time after the testing period, access to the military areas and testing zones of the island were restricted.[79] Today, though far from the inhabited areas and a wildlife reserve, there are no restrictions preventing Kiritimati residents and/or tourists from visiting the southern tip of the island. A road passes close to the craters and academics who have worked with the Association found that few local people know that this place was where devices tests were tested.

Moreover, the Appellants in the *Abdale* case have challenged the International Commission on Radiological Protection (ICRP) model used by the UK Ministry of Defence to determine acceptable risk levels of radiation exposure, summoning expert witnesses from academia and civil society who argued that the ICRP model inadequately accounted for long-term exposure to low-levels of radiation, particularly when ingested or inhaled.[80]

In their Decision, the Judges were unconvinced by this evidence, suggesting that the Appellants' expert witnesses were biased by association with civil society initiatives questioning the ICRP model.[81] The Low Level Radiation Campaign, which supported the Appellants' legal efforts, are supporting appeals against the Decision.[82]

However, the court cases have focused on the potential harm to people who were on Christmas Island during the UK nuclear tests. Policymakers today need to focus on the potential ongoing humanitarian and environmental impact to both Kiritimati and Malden Island. Moreover, the level of proof required in a civil court case should not serve as the standard for determining whether governments should take mitigating and remediating measures to protect the public from risk. Rather, the government of Kiribati should take a precautionary approach to the potential health and environmental risks at Kiritimati and Malden Island. In doing so, it will be important to examine emerging scientific research offering non-linear models of radiation effects as alternatives to the ICRP model.[83] The Line Islands, including Kiritimati, are becoming an increasingly popular destination for sports fishing and birdwatching. Any future assessment of environmental contamination should also consider the implications for visiting tourists.

Beyond the potential radioactive contamination, the military presence on Christmas Island left other toxic legacies. The British military regularly sprayed the island (including service personnel) with DDT from airplanes.[84] At the end of the British and US deployment, vehicles, equipment, waste and toxic chemicals were abandoned on the island and reefs. There is also unexploded ordnance (UXO) contamination on Christmas Island in areas of

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Contaminants and the Soil Environment in the Australasia-Pacific Region. Boston, Kluwer. p. 670. Peregrine Langston. (1993) 'Northern Line Islands Development.' In: *Atoll Politics: The Republic of Kiribati*. Howard Van Treese (Ed.). Suva, University of the South Pacific. pp. 206-207.

[77] 1998 Aspinwall and 2004 Enviros reports, summarized in: War Pensions and Armed Forces Compensation Chamber. (December 2016) *Decision: Ministry of Defence vs. Abdale et al*. paras. 223-224/p. 66.

[78] 1998 Aspinwall and 2004 Enviros reports, summarized in: War Pensions and Armed Forces Compensation Chamber. (December 2016) *Decision: Ministry of Defence vs. Abdale et al*. paras. 223-224/p. 66.

[79] John Pickford. (2013) 'Christmas Island: In Search of Britain's Nuclear Legacy.' *BBC News*. <http://www.bbc.co.uk/news/magazine-23184816>.

[80] A good review of the evidence on low-level radiation exposure is available in: Tilman Ruff. (2013) 'A Public Health Perspective on the Fukushima Nuclear Disaster.' *Asian Perspective*. 37. pp. 523-549.

[81] War Pensions and Armed Forces Compensation Chamber. (December 2016) *Decision: Ministry of Defence vs. Abdale et al*. paras. 226-235/pp. 66-75.

[82] Low Level Radiation Campaign. (n.d.) 'Test Veterans appeal against bad decision.' http://www.llrc.org/campaigns/testvets/testvettoplevel.htm

[83] e.g. Becky Alexis-Martin. (2016) *RADPOP: A New Modelling Framework for Radiation Protection*. University of Southampton PhD Thesis. <https://eprints.soton.ac.uk/412256/1/Becky_Alexis_Martin_PhD_Thesis_final.pdf>; UNSCEAR. (2017) 'Annex B: Epidemiological Studies of Cancer Risk due to Low-Dose-Rate Radiation from Environmental Sources.' 2017 Report to the UN General Assembly. <http://www.unscear.org/docs/publications/2017/UNSCEAR_2017_Annex-B.pdf>.

[84] The DDT spraying is documented in: Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. p. 138; Defense Nuclear Agency. (1983) *Operation Dominic I 1962: United States Atmospheric Nuclear Weapons Tests: Nuclear Test Personnel Review*. Washington DC, DoD. p. 35.

former firing ranges, including publically accessible beaches.[85]

In 1998, then Kiribati President Teburoro Tito, raised concerns about the environmental contamination on Christmas Island with then British Prime Minister Tony Blair.[86] The UK Ministry of Defence then commissioned environmental surveys by private environmental contractors Aspinwall, in 1998, and Enviros, in 2004. The UK Ministry of Defence then funded private contractors in 2004 to conduct hazardous waste remediation on Kiritimati. However, other than disposing of radium dials on equipment, this clean-up effort did not deal with radioactive or UXO contamination.[87] Residents of Kiritimati claim that further military detritus remains off-shore or buried underground.[88]

Victim Assistance and Environmental Remediation Obligations in the TPNW and Other International Norms

The Treaty on the Prohibition of Nuclear Weapons (TPNW), adopted at the UN in 2017, frames nuclear weapons as an affront to humanity and acknowledges the humanitarian and environmental harm of use and testing, including the disproportionate impact on women and girls and indigenous peoples. The International Campaign to Abolish Nuclear Weapons (ICAN) received the 2017 Nobel Peace Prize for its advocacy to achieve the treaty. Kiribati signed the TPNW on 20 September 2017, but is yet to ratify. Fiji and New Zealand are both signatories; the UK and USA boycotted the treaty negotiations.

In addition to banning nuclear weapons, the TPNW obliges states that join it to address the harm inflicted on people and the environment from nuclear weapons use and testing. Article 6(1) requires affected states parties to assist victims 'in accordance with applicable international humanitarian and human rights law', adequately providing 'age-and gender-sensitive assistance, without discrimination, including medical care, rehabilitation and psychological support' to survivors and to 'provide for their social and economic inclusion.' Article 6(2) requires affected states parties to take 'necessary and appropriate measures towards the environmental remediation of areas' contaminated by nuclear weapons use or testing.

The Treaty also encourages the international community to retell the stories of those who have suffered the humanitarian, human rights and environmental impact of nuclear weapons use and testing. The TPNW's preamble emphasizes 'the importance of peace and disarmament education … and of raising awareness of the risks and consequences of nuclear weapons for current and future generations.' The Treaty particularly recognizes the contributions of 'the *hibakusha'* (victims of nuclear weapons) as voices of 'public conscience.' It expresses a commitment 'the dissemination of the principles and norms' of the TPNW, which in Article 12 obligates states to universalizing the Treaty.

Joining the TPNW entitles affected states to international cooperation and assistance so that they can meet their obligations to help victims and remediate the environment. To ensure that an undue burden is not placed on affected states, Article 7 obliges states parties in a position to do so to provide 'technical, material and financial assistance to States Parties affected by nuclear-weapons use or testing' (Article 7(3)). Given the range of types of assistance, all states parties should be able to assist in some way. Such assistance, according to Article 7(5), can be provided through the UN system, 'international, regional or national' institutions, bilateral assistance, NGOs or the Red Cross and Red Crescent Movement.

Article 7(6) explicitly requires states parties that have 'used or tested nuclear weapons or any other nuclear explosive devices' to contribute to 'adequate assistance to affected States Parties, for the purpose of victim assistance and environmental remediation.'

The TPNW builds upon other crucial legal instruments on nuclear weapons. Kiribati is a party to the Treaty of Rarotonga, which established the South Pacific Nuclear Free Zone. The Treaty's preamble expresses a determination to 'ensure…that the bounty and beauty of the land and sea in their region shall remain the heritage of

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[85] Steven Francis, Ioane Alama & Lorraine Kershaw. (2011) *WWII Unexploded Ordnance: A Study of UXO in Four Pacific Island Countries*. Suva, Pacific Islands Forum Secretariat. pp. 36, 80. Also: (January 2018) Interviews of residents and government officials with Matthew Bolton, Kiritimati, Kiribati.
[86] Pacific Islands Report. (1998) 'British Helping Kiribati with Kiritimati Cleanup.' *Pacific Islands Report*. <http://www.pireport.org/articles/1998/09/10/british-helping-kiribati-kiritimati-nuclear-cleanup>.
[87] R.W. Kerr. (2009) 'Remediation of Kiritimati Island and the Challenges of Hazardous Waste Disposal to the United Kingdom from the Central Pacific.' <http://www.wmsym.org/archives/2009/pdfs/9526.pdf>; Defence Estates. (7 December 2004) 'Defence Contract Award Affirms Britain's Commitment to Pacific Island of Kiritimati.' <http://www.moruroa.org/medias/pdf/1704_Kiritimati_clean%20up_Contract.pdf>; Mayer Environmental. (n.d.) 'Grappling with waste on Christmas Island.' <http://www.mayer-enviro.com/casestudy/5/operation-grapple>.
[88] (January 2018) Interviews of residents and government officials with Matthew Bolton, Kiritimati, Kiribati.

Figure 10: Taneti Maamau, President and Minister for Foreign Affairs and Immigration of Kiribati, signs the Treaty on the Prohibition of Nuclear Weapons at the United Nations in New York, 20 September 2017. Photo: Darren Ornitz/ICAN.

their peoples and their descendants in perpetuity to be enjoyed by all in peace' and 'to keep the region free of environmental pollution by radioactive wastes and other radioactive matter.' Kiribati is also party to the 1996 Comprehensive Test Ban Treaty (CTBT), which established a global on nuclear weapons testing. Kiritimati hosts Kiribati's only CTBTO radionuclide monitoring station.[89] The UK, Fiji and New Zealand are also states parties. The CTBT will not enter into force until all states with nuclear technological capacity sign and ratify it. Nevertheless, it has established a global norm against nuclear weapons testing, strengthened by the TPNW. The USA signed in 1996 but has not yet ratified.

Also relevant to the situation in Kiritimati is the Convention on Certain Conventional Weapons Protocol V on Explosive Remnants of War (ERW Protocol), which obligates states parties to clear, remove or destroy unexploded ordnance, provide risk education and assist victims (Article 8). While Kiribati is not party to the ERW Protocol, the USA and New Zealand are. Moreover, states parties are obligated to provide international cooperation and assistance to affected states, like Kiribati (Article 8).

Finally, residents of Kiritimati are, of course, protected by international human rights norms, including the right to health, the right to a safe, clean, healthy and sustainable environment and the rights of indigenous peoples. The relevance of such rights to those living in former nuclear testing zones has been highlighted by the UN Special Rapporteur's 2012 report on the Marshall Islands[90] and the recurring UN General Assembly resolutions on addressing the human and environmental harms to the Semipalatinsk region of Kazakhstan (e.g. A/RES/72/213).

[89] CTBTO. (n.d.) 'Kiribati.' <https://www.ctbto.org/the-treaty/country-profiles/?country=91&cHash=81d9359a8a47f71fb56e3888dc267567>.
[90] Calin Georgescu. (2012) *Report of the Special Rapporteur on the implications for human rights of the environmentally sound management and disposal of hazardous substances and wastes, Calin Georgescu*. A/HRC/21/48/Add.1. Geneva, United Nations Human Rights Council. <https://documents-dds-ny.un.org/doc/UNDOC/GEN/G12/163/76/PDF/G1216376.pdf?OpenElement>.

Figure 11: Taabwi Teatata, Treasurer of the Association of Cancer Patients Affected by the British and American Bomb Tests, Kiritimati, January 2018. Photo: Matthew Bolton.

Existing Capacities for Addressing Harm from the Nuclear Weapons Tests

Most I-Kiribati survivors who have remained in Kiritimati live in the village of Tabwakea (one of the earlier local settlements on the island). About 20-30 of them formed the Association of Cancer Patients Affected by the British and American Bomb Tests. The Association has conveyed the story of the nuclear tests to younger generations and has communicated with academics at universities in Australia, Germany, Japan, New Zealand and the USA. These scholars have tried to communicate survivors' concerns to authorities and the public outside Kiribati. They have also disseminated information on the testing program and the potential health effects of ionizing radiation.[91] In 2017, the Association held a commemoration at the tennis courts where residents had gathered and sheltered under blankets during the tests.[92]

The Association has been advocating for compensation from the British and American governments. Given the lack of response from the US and UK, they have called on the government of Kiribati to step in with support. Teeua Tetua said the desire for compensation was 'not about money, but about doctors and medicine' – they need help addressing their health problems.[93]

There is a small hospital and three clinics in Kiritimati. However, survivors have found the facilities inadequate for treating the diseases they attribute to the testing, particularly cancer. Government officials say that people needing cancer tests and treatment have to go to other countries, like New Zealand.[94] Pacific Islands Medical Aid, Inc. (PIMA), a small American NGO, sends short-term medical missions to Kiritimati and the other Line Islands

[91] Taabwi Teatata. (12 January 2018) Personal interview with Matthew Bolton, Kiritimati.
[92] Teeua Tetua. (14 January 2018) Personal interview with Matthew Bolton, Kiritimati, Kiribati.
[93] Teeua Tetua. (14 January 2018) Personal interview with Matthew Bolton, Kiritimati, Kiribati.
[94] (January 2018) Interviews of government officials with Matthew Bolton, Kiritimati, Kiribati.

and has conducted some uterine pre-cancer cells screening for women.[95]

In calling for support from the government of Kiribati, Association members point to the successes of the Fiji Nuclear Veterans Association. After decades of advocacy, in 2015 the Fijian government has provided one-off payments of about US$5,000 for each veteran (or their surviving family). They also receive a US$50 a month pension and help with medical bills.[96] Speaking at the ceremony announcing the grant of compensation, Fiji's Prime Minister Josaia Voreqe Bainimarama said, 'Fiji is not prepared to wait for Britain to do the right thing. … We need to erase this blight on our history. We need to lift the burden on our collective conscience. … [T]hese men have been denied justice long enough.'[97] However, Paul Ah Poy says that many veterans living in Fiji's 'outer islands' have difficulty accessing government clinics.[98]

Nuclear veterans in the UK, US and New Zealand have also engaged in a long struggle pushing for information recognition, compensation and support, with varying results. The government of New Zealand has funded independent medical research on the effects of radiation, recognized the Christmas Island and other nuclear veterans with a special service medal, as well as health, war pension and other benefits.[99]

The US government recognizes US troops who participated in aboveground nuclear tests as 'Atomic Veterans.' They, and American civilians who participated in the tests, are eligible for compensation without providing evidence of their dose of radiation, if they develop any of a list of 21 'presumptive cancers.' They may also be eligible for compensation for a 'nonpresumptive cancer or condition', depending on the evidence of exposure they can provide.[100] Nevertheless, US test veterans and their families report difficulties with the paperwork to make claims.[101] The US National Association of Atomic Veterans (NAAV) has supported test veterans applications for compensation.[102] I-Kiribati citizens are not eligible for US compensation, even if they develop the presumptive cancers.

'Here in Britain we lag shamefully behind,' asserted John Baron, Conservative Member of UK Parliament for Billercay, following a review of the UK's policy toward its nuclear test veterans.[103] The British government still refuses to offer compensation to the overwhelming majority of personnel – military or civilian – who was negatively affected by its nuclear weapons tests in Christmas and Malden Islands. Illustrating the unduly high standard of proof required by the UK government, in 2006 the US granted Roy Prescott, a British soldier who was seconded to the US Dominic I testing program, $75,000 in compensation for his lung cancer. Meanwhile, the UK Ministry of Defence persisted in claiming that his cancer could not have been caused by radiation.[104] Following a campaign by the British Nuclear Test Veterans' Association (BNTVA), in April 2016 the UK government provided £25 million to the Aged Veterans Fund, some of which will finance a new Nuclear Community Charity Fund, supporting research, care, education and memorialization efforts for British nuclear test veterans and their descendants.[105] In April 2018, BNTVA plan to hold a 60th Anniversary Memorial Commemoration at Kiritimati, dedicated to 'the veterans who gave so much to ensure that the UK was a Nuclear power.'[106] The Low Level Radiation Campaign has supported British

[95] PIMA. (2017) 'Upcoming Missions.' <https://pacificislandsaid.org/upcoming-missions>.
[96] Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. pp. 323-338.
[97] Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. p. 324.
[98] Paul Ah Poy. (6 January 2018) Personal interview with Matthew Bolton, Suva, Fiji.
[99] New Zealand Veterans' Affairs. (2017) 'Support for veterans & families (nuclear deployments).' <http://www.veteransaffairs.mil.nz/support/specific-deployments/nuclear/>; New Zealand Veterans' Affairs. (2017) 'Research on New Zealand's nuclear veterans.' <http://www.veteransaffairs.mil.nz/support/specific-deployments/nuclear/nuclear-veteran-research/>; Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. pp. 218-219.
[100] US Department of Veteran Affairs. (2012) 'Are You an Atomic Veteran?' <https://www.publichealth.va.gov/docs/radiation/atomic-veteran-brochure.pdf#>.
[101] e.g. Nancy Young. (2011) 'Atomic-Veteran Family Feedback.' *NAAV News*. 2011-10. pp. 8-10. <https://www.naav.com/assets/2011_11_NAAV_Newsletter.pdf>.
[102] C.A. Smith. (2015) 'Operation Dominic JTF 8 1962.' *NAAV News*. p. 9. <https://www.naav.com/assets/2015_10_NAAV_Newsletter.pdf>.
[103] John Baron. (2008) 'British Nuclear Test Veterans.' <https://publications.parliament.uk/pa/cm200708/cmhansrd/cm081022/debtext/81022-0021.htm>.
[104] Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. p. 278.
[105] NCCF. (2017) 'The Nuclear Community Charity Fund.' <http://thenccf.org/>.
[106] BNTVA. (2017) 'BNTVA 2018 – Trip to Christmas Island – 60th Anniversary Memorial Commemoration Ceremony.' <https://www.cobseo.org.uk/bntva-2018-trip-christmas-island-60th-anniversary-memorial-commemoration-ceremony/>.

Christmas Island veterans' legal cases against the UK Ministry of Defence.[107]

In April 2018, the 60th anniversary of Grapple Y, the heads of the New Zealand and Fiji test veterans associations wrote an open letter to the Commonwealth Heads of Government Meeting (CHOGM) in London, calling on the British government to 'provide compensation, medical support and environmental remediation to all people affected by Operation Grapple….'[108]

There is a long history of civil society activism on nuclear issues in the Pacific region, notably the Nuclear Free and Independent Pacific (NFIP) movement. The Pacific Conference of Churches (PCC), a major backer of the NFIP, held a meeting of nuclear weapons testing survivors in Tarawa, Kiribati, in 2005. Reverend Baranite Kirata of the Kiribati Protestant Church lamented that the commandment to love one's neighbor was 'ignored by those who tested weapons of mass destruction in the Pacific. The people of the Pacific continue to seek the truth in relation to the health and environmental impacts of nuclear testing.' [109]

Local, national and regional civil society efforts are part of broader global campaigns addressing the harm caused by nuclear weapons. The Nobel Peace Prize-winning ICAN has an extensive network of partner organizations in the Pacific region, building on the NFIP movement. Civil society activists from Fiji, the Marshall Islands, French Polynesia, New Zealand and Australia addressed the negotiations or were featured in side event panels. Ensuring robust implementation of the victim assistance and environmental remediation provisions is a priority for ICAN, working alongside its partners in the 'Positive Obligations Group': Article 36, Elimondik, Mines Action Canada, the Harvard Law School International Human Rights Clinic and Pace University's International Disarmament Institute. The Group's work, including this report, has been supported by Friedrich Ebert Stiftung's New York Office.

The government of Kiribati is a supporter of the TPNW. While it did not speak on the floor of the negotiating conference, Kiribati voted in favor of the Treaty's adoption in July 2017. Kiribati's President Taneti Maamau signed the TPNW on the first day it opened for signature on 20 September 2017 (see Figure 10). The government now needs to ratify the treaty and pass legislation to enable implementation, particularly of its victim assistance and environmental remediation provisions. At the September 2017 Pacific Islands Forum meeting in Samoa, President Maamau acknowledged the growing calls for compensation by victims of both nuclear weapons testing and WWII across the Pacific, including in Kiribati, stating that he has 'taken up the issue of Christmas Island with the proper authorities.'[110] There are active policy discussions in the capital, Tarawa, on how to address compensation of I-Kiribati survivors of the nuclear tests. An option under review includes a broad victim compensation scheme that would also assist victims harmed by World War II and phosphate mining.[111]

The Kiritimati Urban Council is Kiritimati's municipal government. The Ministry of Line and Phoenix Islands Development is responsible for the administration and development of Kiritimati and Malden Islands. Kiritimati's Wildlife Conservation Unit protects the island's fragile and diverse environment. Development efforts at Kiritimati are guided by the *Line and Phoenix Islands Integrated Development Strategy 2016-2036*, which envisions 'a safe and healthy environment that is resilient to the impacts of climate change and supports productive, enterprise based livelihoods, human health and sustainable development within a sound governance framework.' It includes a specific focus on 'pollution management.'[112] Clearly, victim assistance and environmental remediation efforts will support this vision. The UXO clearance assistance by the USA and Australia provided to Kiribati might serve as an analogous model for assistance in environmental

[107] LLRC. (2016) 'Justice for British Nuclear Test Veterans Low Level Radiation Campaign leads in Royal Courts of Justice Cash needed to fight Ministry of Defence in pivotal legal case.' <http://www.llrc.org/campaigns/testvets/2016/testvetsjune2016.htm>.
[108] Roy Sefton & Paul Ah Poy. (12 April 2018) 'Support for Nuclear Veterans in the Pacific.' *Island Sun*. <http://theislandsun.com.sb/support-for-nuclear-veterans-in-the-pacific/>.
[109] In: Nic Maclellan. (2017) *Grappling with the Bomb: Britain's Pacific H-Bomb Tests*. Acton, ANU Press. p. 333.
[110] In: Nic Maclellan. (2017) 'Korea Nuclear Crisis Resonates with Pacific Test Survivors.' *Pacific Islands News Association*. <https://www.facebook.com/IslandsBusiness/posts/772348919611743>.
[111] (January 2018) Interviews of government officials with Matthew Bolton, Kiritimati, Kiribati.
[112] Ministry of Line and Phoenix Islands Development. (2016) Line and Phoenix Islands Integrated Development Strategy 2016-2036. Tarawa, MLPD. pp. 15, 21.
<http://www.mfed.gov.ki/sites/default/files/Line%20and%20Phoenix%20Islands%20Sustainable%2C%20Integrated%20Development%20Strategy%202016%20-%202036%20online%20version.pdf>.

remediation.[113] The Australia, EU, Japan, New Zealand and Taiwan provide official assistance to support Kiritimati's development.

Kiribati is a member of the Pacific Islands Forum, Pacific Islands Development Forum and Pacific Regional Environment Programme.

Recommended Action

Given the ongoing humanitarian, human rights and environmental concerns resulting from the UK and US nuclear tests at Kiritimati and Malden Islands, the international community should:

1) *Sign and **RATIFY** the Treaty on the Prohibition of Nuclear Weapons and other relevant international instruments*:
   a. Kiribati, Fiji and New Zealand should ratify the Treaty on the Prohibition of Nuclear Weapons (TPNW).
   b. Civil society, faith institutions and parliamentarians in the UK and USA should pressure their governments to bring their nuclear disarmament policy into closer alignment with the norms in the TPNW.
   c. The USA should ratify the Comprehensive Test Ban Treaty (CTBT) to reassure Pacific peoples that it will not resume nuclear testing.
   d. Regional institutions such as the Pacific Island Forum should promote regional accession to the TPNW, such as through the development of model ratification legislation.

2) *Assess and **RESPOND** to the multigenerational humanitarian needs of survivors, especially at Kiritimati*:
   a. Kiribati, Fiji, New Zealand, the UK and USA should comprehensively assess, monitor and respond to the multigenerational humanitarian needs of survivors, without discrimination.
   b. Conduct a multi-country independent study into the children and grandchildren of Christmas and Malden Island veterans and survivors, to investigate potential inter-generational health effects.
   c. Victim assistance should include, but not be limited to: healthcare provision, psycho-social support, socio-economic inclusion, support for victim's advocacy associations, risk education.
   d. Assistance should especially targeted to underserved communities like Kiritimati.
   e. Governments, multilateral organizations, the Red Cross and Red Crescent Movement, religious organizations, civil society and academic institutions should provide international cooperation and assistance to help affected states – particularly Kiribati and Fiji – provide victim assistance.
   f. Regional institutions such as the Pacific Island Forum and Pacific Islands Development Forum should promote regional approaches to assisting victims of nuclear testing.
   g. The governments of the UK, USA and New Zealand – which participated in the tests – should acknowledge their especial responsibility to support victim assistance in Kiribati and Fiji.

3) *Survey and **REMEDIATE** contaminated environments at Kiritimati and Malden Islands*:
   a. Kiribati should facilitate a comprehensive, independent and credible survey of the environmental impact of nuclear testing at Kiritimati and Malden Islands. Particular attention should be paid to the southern tip of Kiritimati, as well as Malden Island.
   b. Surveys on radiological conditions should be conducted perhaps under multilateral and/or academic auspices, but not by institutions that are committed to the promotion of nuclear technology. Kiribati could consider models of grassroots citizen radiation monitoring, which have had some success in areas of Iraq affected by depleted uranium and in Fukushima, Japan.[114]
   c. Kiribati should adopt a precautionary approach to low level radiation risks and should establish and implement a plan to remediate land or marine environments contaminated by the radioactive, explosive and toxic remnants of the nuclear testing program and other military activities at Kiritimati and Malden Islands.
   d. Kiribati should facilitate the communication of radiation risk education at Kiritimati.
   e. Governments, multilateral organizations, civil society and academic institutions should provide international cooperation and assistance to help

[113] Justin Smith. (2014) 'ERW Contamination in the Pacific Islands.' *Journal of ERW and Mine Action*. 18(3). <http://commons.lib.jmu.edu/cgi/viewcontent.cgi?article=1041&context=cisr-journal>; Steven Francis, Ioane Alama & Lorraine Kershaw. (2011) *WWII Unexploded Ordnance: A Study of UXO in Four Pacific Island Countries*. Suva, Pacific Islands Forum Secretariat. p. 80.
[114] e.g. Safecast. (n.d.) 'About Safecast.' <https://blog.safecast.org/about/>.

Kiribati survey and remediate contaminated environments.

f. Regional institutions such as the Pacific Island Forum, Pacific Islands Development Forum and Pacific Regional Environment Programme should promote regional approaches to assessing and remediating environments affected by nuclear testing.
g. The governments of the UK, USA and New Zealand – which participated in the tests – should acknowledge their especial responsibility to support environmental remediation in Kiribati.

4) ***RESPECT****, protect, and fulfill the human rights of nuclear test survivors*:
   a. Kiribati, Fiji, New Zealand, UK and the USA should implement 'effective remedies' of the harm to the human rights of victim of the nuclear tests, through measures including, but not limited to, investigation, opening of archives, provision of information, acknowledgement, apology, memorialization, commemoration, paying tribute to victims, assistance to victims, guarantee of non-repetition and reparation.[115] Especial attention should be paid to the relevance of the rights of indigenous people, including indigenous practices of remedy.[116] Care should be taken to ensure non-discrimination in access to victim assistance.
   b. States should question the USA, UK, New Zealand, Fiji and Kiribati on their measures to guarantee the human rights of nuclear test victims during Universal Periodic Reviews in the UN Human Rights Council.
   c. Governments, multilateral organizations, the Red Cross and Red Crescent Movement, academic institutions, religious organizations and civil society should provide international cooperation and assistance to help guarantee the human rights of nuclear test survivors. This should include support for the human rights advocacy of survivor and test veteran associations, as well as nuclear disarmament networks like ICAN
   d. Regional institutions such as the Pacific Island Forum and Pacific Islands Development Forum should promote regional approaches to guaranteeing the rights of victims of nuclear testing.
   e. The governments of the UK, USA and New Zealand – which participated in the tests – should acknowledge their especial responsibility to remedy the human rights harm caused by nuclear testing in Kiribati.

5) ***RETELL*** *the stories of the humanitarian and environmental impact of the tests*:
   a. Kiribati, Fiji, New Zealand, UK and USA should open independent official inquiries to investigate the humanitarian, human rights and environmental harm caused by nuclear weapons testing in Kiribati. They should declassify and make publically available archives and official documentation related to the testing programs.
   b. Kiribati, Fiji, New Zealand, UK and USA should support mechanisms of radiation risk education, particularly in affected communities.
   c. Academia, journalists, civil society and survivors' associations should record and disseminate the testimony of victims of nuclear weapons testing in Kiribati. They should facilitate the participation of survivors, particularly from Kiribati and Fiji, in global nuclear disarmament policymaking.
   d. Governments, multilateral organizations, the Red Cross and Red Crescent Movement, academic institutions, news media, religious organizations and civil society should provide international cooperation and assistance for disarmament education and radiation risk education, particularly to amplify survivors' voices.
   e. Regional institutions such as the Pacific Island Forum and Pacific Islands Development Forum should promote regional approaches to disarmament education and radiation risk education.
   f. The governments of the UK, USA and New Zealand – which participated in the tests – should acknowledge their especial responsibility to amplify the voices of survivors of nuclear testing in Kiribati.

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[115] For a summary of international norms on 'effective remedy', see: UN General Assembly. (2005) 'Basic Principles and Guidelines on the Right to a Remedy and Reparation for Victims of Gross Violations of International Human Rights Law and Serious Violations of International Humanitarian Law.' A/RES/60/147. <http://legal.un.org/avl/pdf/ha/ga_60-147/ga_60-147_ph_e.pdf>.

[116] See: United Nations. (2008) 'United Nations Declaration on the Rights of Indigenous Peoples.' <http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf>.

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Annex: Studies of Radioactivity at Kiritimati and Malden Islands

Author/Authority	Date	Survey Area	Media Sampled	Findings	Publically Available?	Limitations
University of Washington Radiation Biology Laboratory, under US Atomic Energy Commission contract	1964	Unknown areas of Christmas, Fanning and Washington Islands	'[S]amples of various soils, foodstuffs and water'	'Although some radioactive elements were detected, their concentrations were extremely low.'	No, though summarized in Defense Nuclear Agency 1982 report.[117]	Prior to US tests; did not survey Malden Island.
Operation Hard Look	≈1970s	Unknown areas of Christmas Island	Unknown	Reportedly no cause for concern.	No, though referenced in media reports.[118]	Little known about study; did not survey Malden Island.
US Government (agency unknown) for Japanese government's space agency (NASDA)	1975	Unknown areas of Christmas Island	Unknown	Reportedly, 'radioactivity levels were lower than those found in most American cities.'	No, though referenced in media reports.[119]	Little known about study; did not survey Malden Island.
University of Washington Radiation Biology Laboratory	1977	Unknown areas of Kiritimati	Fish, soil, seawater.	Found 'trace quantities' of 'eleven fallout radionuclides' at Kiritimati, of which 'only caesium-137 was found in a concentration greater than 37 Bq per kilogram.'	No. Summarized in *Abdale* Decision. Not in University of Washington library.[120]	Did not survey Malden Island
University of the South Pacific	1978	Unknown	Unknown	There 'appears to be cause for concern about risk and radiological hazard on Christmas Island.'	No, summarized in other sources.[121]	Unavailable.

[117] Commander Joint Task Force 9. (3 June 1964) 'Enclosure N: Report on Radiological Safety Operations.' Summarized in: Defense Nuclear Agency. (1983) *Operation Dominic I 1962: United States Atmospheric Nuclear Weapons Tests: Nuclear Test Personnel Review*. Washington DC, DoD. pp. 38-39. <https://web.archive.org/web/20120823152154/http://www.dtra.mil/documents/ntpr/historical/T24298.pdf>.
[118] Studies referenced in: Jane Resture. (2013) 'Christmas Island Bomb Tests.' http://www.janeresture.com/christmas_bombs/ Also: David Wolman. (31 August 2008) 'This Place Is the Bomb.' *Salon*. https://www.salon.com/2008/08/31/christmas_island/
[119] Studies referenced in: Jane Resture. (2013) 'Christmas Island Bomb Tests.' <http://www.janeresture.com/christmas_bombs/>. Also: David Wolman. (31 August 2008) 'This Place Is the Bomb.' *Salon*. https://www.salon.com/2008/08/31/christmas_island/
[120] 'Radiological Survey of Plants, Animals and Soils at Christmas Island and Scene Atolls in the Marshal Islands', summarized in War Pensions and Armed Forces Compensation Chamber. (December 2016) *Decision: Ministry of Defence vs. Abdale et al.* para. 220/p. 65. <http://www.llrc.org/campaigns/testvets/testvettranscripts//Determination.pdf>.
[121] D. Medford. (1978) *Illustrative Calculations on the Radiological Surveillance of Christmas Island*. Suva, University of the South Pacific, Center for Applied Studies in Development.

Author/Authority	Date	Survey Area	Media Sampled	Findings	Publically Available?	Limitations
New Zealand National Radiological Laboratory	1981	Inhabited areas of Kiritimati.	Soil, vegetation, possibly other media	Found 'traces of residual contamination… in a few localised areas, notably where aircraft had been washed down for decontamination' on Kiritimati. Detected traces of Ceasium-137 in 'groundwater and lagoons' and plutonium-239. However, concluded that concentrations of radioactive material were generally consistent with global fallout levels and low enough that 'No radioactive contamination was detected which would present a hazard to resident islanders.'[122]	No. Copy in New Zealand government archives misplaced following Nov. 2016 earthquake. Summarized in other sources, including the *Abdale* Decision.[123]	Did not survey Malden Island.
Pacific Regional Environment Program (SPREP)	1992	Appears to have been a review of the literature and qualitative data gathering.	N/A	Raised concerns that 'any ill effects' to the 'I-Kiribati continue to farm, fish and reside' on Kiritimati 'will probably not show up for years or generations.' Asserted that it was 'critical to have Kiritimati Island reassessed for radioactive contamination….'	Yes.[124]	Not a technical survey.
Aspinwall and Enviros	1998 and 2004	Former military areas of Kiritimati, and 'spot checks… over the island generally.'	Soil, possibly other media	Findings 'consistent in not disclosing significant radioactive contamination on the island generally and its inhabited areas in particular.' But Aspinwall found 'traces of plutonium-239 and -240' in former military areas and at southeastern tip of Kiritimati.	No. Companies have not responded to requests for copies. But summarized in *Abdale* Decision.[125]	Did not survey Malden Island

[122] A.C. McEwan, K.M. Matthews & L.P. Gregory. (1981) 'An Environmental Radiation Survey of Christmas Island, Kiribati.' Report No. 1981/9/ Christchurch, New Zealand: National Radiation Laboratory; summarized and quoted in War Pensions and Armed Forces Compensation Chamber. (December 2016) *Decision: Ministry of Defence vs. Abdale et al.* paras. 221-222/p. 65. Also summarized in: Christopher Busby & Andrew Ades. (2015) 'Revised Amended Statement of Case.' *Ministry of Defence vs. Abdale*. Paras. 3.36-3.38. <http://www.llrc.org/campaigns/testvets/testvettranscripts//BSStatementofCaserevised150516CJBeditDW2FINALdocx.pdf >; R. Naidu, et al. (1996) *Contaminants and the Soil Environment in the Australasia-Pacific Region*. Boston, Kluwer. p. 670. Peregrine Langston. (1993) 'Northern Line Islands Development.' In: *Atoll Politics: The Republic of Kiribati*. Howard Van Treese (Ed.). Suva, University of the South Pacific. pp. 206-207.

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