Professor Robert Jacobs, Hiroshima City University, 2020/08/06

https://www.youtube.com/watch?v=D0GXQYDwoSE

We're all well aware of the damage caused by the nuclear attack on Hiroshima on August 6th and the nuclear attack on Nagasaki on August 9th, of the destruction, of the loss of life, of the people whose bodies are wounded, the people whose families were torn apart, the devastation to humans, to community, and to the environment.

My name is Bo Jacobs. I'm an American historian. I study the history of nuclear technology and radiation politics. I work at the Hiroshima Peace Institute at the graduate school of peace studies of Hiroshima City University. I'm glad to be able to talk to you today.

We remember today what happened on August 6, 1945 and what happened on August 9, 1945—the devastation and the destruction. What I'd like to talk to you about today is that this is not some event that happened in the past that we have to remember and never repeat. It is those things, but it's also a world we continue to live in. What happened in August of 1945 here in Hiroshima and in Nagasaki was not the end of the use of nuclear weapons. It was the beginning of the use of nuclear weapons.

Since 1945 there have been over 2,000 nuclear weapons detonated here on earth. The United States was testing nuclear weapons in the Marshall Islands less than a year after the attack here in Hiroshima, in July of 1946. The United States tested over a thousand nuclear weapons. Other countries of the world—the nuclear states—have tested over 2,000 nuclear weapons, so the destruction and the suffering that came from detonations of nuclear weapons began in 1945, but continued throughout the cold war. We think of the cold war as a period of time in which nuclear weapons weren't used. However, if you take those 2,000 nuclear tests during the cold war and spread them out across that period of time, statistically, there's a nuclear weapon detonating every 8.6 days.

The cold war was a period of time in which nuclear weapons were exploding constantly, and while the blast and the heat effects of the weapons never did much damage to human beings—although they did some damage to human beings, especially soldiers that took part in nuclear tests—radioactive fallout has been a threat and a burden on the health of millions of people around the world.

For example, in 1954 the United States tested its first deliverable hydrogen bomb, the Bravo weapon in the Marshall Islands again. The radioactive fallout cloud from this test spread over 5,000 square miles out into the Pacific Ocean. It engulfed several atolls populated with human beings in the Marshall Islands, and those people all suffered impacts on their health from exposure to radiation. Many

developed thyroid cancers and other cancers. There was also a Japanese fishing boat inside this fallout cloud.

The Daigo Fukuryu Maru, which we call the Lucky Dragon. About three hours after the nuclear test, on the boat, which was about 100 kilometers away from the detonation point of the Bravo test, radioactive ash began to fall about three inches thick. This was radioactive fallout. The beta particles in the ash burned the skin of the fishermen, so they realized that it was dangerous and they swept it over overboard. However, by the time they got back to port two weeks later in Japan, the entire crew was hospitalized for radiation sickness. Six months later, one of the crew members died from radiation sickness. This was somebody who was a hundred kilometers away from where a hydrogen bomb was detonated and who was killed by that hydrogen bomb.

Hundreds of hydrogen bombs were tested by the various nuclear weapon states. While the United States tested its thermonuclear weapons in islands and atolls in the Pacific Ocean, the radiation dispersed because it landed in heaviest amounts into the ocean, but radioactive fish were found in Japan, in Southeast Asia, in Australia, in North America, in South America. Some countries, like the former Soviet Union, tested these large weapons over land so the fallout clouds deposited fallout into villages not far from the Polygon Test Site in Kazakhstan. And that fallout did not disperse. It simply entered into the ecosystem there and it remains. So in studying the global hibakusha—the people all around the world who are affected by radiation, we find people in villages like this, people who live where the fallout clouds deposited lots of radiation. We find ongoing illness as their children, grandchildren, and now great grandchildren are living in ecosystems that are dense with these radioactive particles, many of which have half-lives that keep them dangerous for 300 years or even thousands of years.

In addition to the people who suffered fallout exposure from nuclear weapon tests, nuclear weapon production has also affected huge amounts of people.

Uranium mining all over the world has devastated communities. A recent study in the United States found that even though uranium mining on Navajo reservations in the southwest stopped 25 years ago, over 25 percent of women and small children living now on those reservations have particles from that mining— uranium particles from that mining— inside of their bodies.

At Hanford, Washington—which is where the United States produced its plutonium that was used in the Nagasaki weapon and also in tens of thousands of other nuclear weapons—the amount of radiation that was released into the community was extremely high and had a very, very pronounced health effect on human beings living near the Hanford plant. So production, the testing of weapons and also accidents at nuclear power plants have had a huge effect on human beings and continue to have a huge effect.

In 1957, there were two massive nuclear power accidents 11 days apart. The first one at the Mayak site where the Soviet Union produced its plutonium in which a waste tank exploded and spread radiation downwind for hundreds of kilometers. Over 200,000 people lived in the path of where that cloud settled.

Eleven days later, the Windscale plant where the UK produced its plutonium for its nuclear weapons (now called Sellafield), had a fire inside one of the two reactors, and that fire burned for three days. This distributed radiation in wide berths all around Europe, to the north, to the west, to the south, and it has contaminated large areas.

We all know about the commercial nuclear power plant accidents, the worst of them Chernobyl, in which almost all of the fuel in the power plant was blown up in an explosion and settled downwind, and had a devastating effect on people in the Ukraine and also in Belarus, but even farther afoot than that. Every year we still find radioactive food at market from Chernobyl, from the cesium 137 that landed around Europe from the Chernobyl disaster. This is over 30 years later. We're still finding food coming to market. The radiation from the Chernobyl disaster devastated the reindeer herding of the Sami people in the north of Scandinavia. There was a large amount of Chernobyl radiation deposited there. The reindeer tend to eat lichen which grows on rocks, and lichen absorbs radiation to a great extent, so it devastated the food chain of the community, and also the economic underpinning and well-being of the community, as well as exposing many people to radiation.

Here in Japan nine years ago was the Fukushima disaster with three full meltdowns, and four explosions. Those explosions, just like a mushroom cloud, distributed a great deal of radiation, primarily to the northwest of where the plant is located, and it has been vexing and affecting people. The plants themselves still cannot be entered by human beings because the gamma radiation levels are so high, and the radioactive fallout has integrated into the ecosystem and been transported throughout the region. So even when decontamination is done in villages or in schools, as soon as there are rains, as soon as there are winds, more radiation blows down from the forests and from the mountainside, and re-enters the town and re-contaminates them. There are also all of those sites where the radiation is put into bags and piled up. Those are radioactive waste sites now. As Gordon Edwards once said, whenever you hear the word "decontamination" you should think of the word "distribution." You cannot make a radioactive particle not radioactive. You can simply move it. So decontaminating in Fukushima means moving the radiation somewhere else. It doesn't mean getting rid of the radiation.

The worst thing facing us in the future is the immense amount of radioactive waste, primarily spent fuel rods from operating nuclear power plants, from commercial nuclear power plants. There are over 80,000 metric tons of spent nuclear fuel, and there's as much again from military production of plutonium.

All of this waste has to be guarded carefully, and contained for over a hundred thousand years. We don't know how to do anything for a hundred thousand years. A hundred thousand years ago is when our ancestors first migrated out of the African continent. To imagine that we can exert technological competence over that period of time is a little unreasonable, no matter how good our science and technology and planning is. We're talking about a hundred thousand years of management.

So this isn't something that happened in the past. This isn't something we might do. This is something we already did. We manufactured this waste and only two generations of people, maybe three generations of people, had any benefit from this waste, through the use of electricity, but a thousand generations will have to deal with this waste or at least will be at risk and in relation to this waste. So when we think about the destruction of nuclear technologies, what happened here in Hiroshima, what happened in Nagasaki, these are things we should never forget. These are things that human beings did to other human beings. But we also need to see what we did after that, which is to continue to detonate nuclear weapons, to expose people to radioactive fallout, and to produce massive amounts of nuclear waste which will be a part of the ecosystem for millennia.

I'm standing on Aioibashi, Aioi bridge, the T-shaped bridge that was the aiming point for the Enola Gay on the day that it attacked Hiroshima with a nuclear weapon. From this bridge it's easy to see the A-bomb dome which was the commercial exhibition hall, but when we look at this building, this western building, we're not sure exactly. It was a commercial exhibition hall, so it's easy to imagine that maybe it wasn't so crowded on that day. Maybe there weren't a lot of people inside, even though there was so much damage that happened here in Hiroshima. But when we turn on the T-bridge, on Aioibashi and look the other way, what we see there is Honkawa Elementary School. We know exactly what happened there on August 6, 1945. 400 elementary school children were killed, and 10 teachers were killed. This weapon was aimed, essentially, at an elementary school. It ended up detonating at the ground zero point we saw. It ended up detonating over a hospital.

We live in the world that our ancestors made, and we make the world that our descendants will live in. It's incumbent on all of us to treat each other well, to make a peaceful world, and to make a world that future generations can thrive in, and be healthy, and be happy. And we honor them by taking care of this world. We honor them by taking care of peace, by making our world peaceful by ridding our world of these weapons, and of these toxins. And we also take care of our ancestors through carrying through their wishes and making this world a more beautiful place for all of us. Everybody be safe. Everybody be well. Sending you all love from Hiroshima.

VOCABULARY

destruction - 破壊
wounded - 傷ついた、負傷者
devastation - 荒らすこと、荒廃
detonation - 爆発
fallout - 原子灰の降下
radioactive - 放射性のある
engulf - 吸い込む
thyroid - 甲状腺の
overboard - 船外に、水中に
hospitalized - 入院させる
deposite - 溶着金属
massive - 大きい、大量の
contaminated - 汚す、汚染させる
integrated - 統合した、完全な

FRANCAIS

Prof. Robert Jacobs, Hiroshima City University, 2020/08/06
Message pour le monde, 75 ans après la destruction atomique de Hiroshima
version anglaise (video): Bo Jacobs from Hiroshima, August 6, 2020
https://vimeo.com/440185012

Nous sommes tous bien conscients des dégâts causés par l'attaque nucléaire d'Hiroshima le 6 août et l'attaque nucléaire de Nagasaki le 9 août, de la destruction, de la perte de vies humaines, des personnes dont les corps sont blessés, des personnes dont les familles ont été déchirées, de la dévastation pour les humains, pour la communauté et pour l'environnement.

Je m'appelle Bo Jacobs. Je suis un historien américain. J'étudie l'histoire de la technologie nucléaire et de la politique des radiations. Je travaille à l'Institut de la paix d'Hiroshima à l'école supérieure d'études de la paix de Hiroshima City University. Je suis heureux de pouvoir vous parler aujourd'hui.

Nous nous souvenons aujourd'hui de ce qui s'est passé le 6 août 1945 et de ce qui s'est passé le 9 août 1945 — la dévastation et la destruction. Ce dont j'aimerais vous parler aujourd'hui, c'est que ce n'est pas un événement qui s'est produit dans le passé que nous devons nous souvenir et ne jamais répéter. Ce sont ces choses-là, mais c'est aussi un monde dans lequel nous continuons à vivre. Ce qui s'est passé en août 1945 ici à Hiroshima et à Nagasaki n'était pas la fin de l'utilisation d'armes nucléaires. C'était le début de l'utilisation d'armes nucléaires.

Depuis 1945, plus de 2,000 armes nucléaires ont explosé ici sur la terre. Les États-Unis testaient des armes nucléaires dans les îles Marshall moins d'un an après l'attaque ici à Hiroshima, en juillet 1946. Les États-Unis ont testé plus d'un millier d'armes nucléaires. D'autres pays du monde, les états nucléaires, ont testé plus de 2,000 armes nucléaires, de sorte que les destructions et les souffrances causées par les détonations d'armes nucléaires ont commencé en 1945, mais se sont poursuivies tout au long de la guerre froide. Nous considérons la guerre froide comme une période où les armes nucléaires n'ont pas été utilisées. Toutefois, si vous prenez ces 2,000 essais nucléaires pendant la guerre froide et que vous les répartissez sur cette période, statistiquement, il y a eu une arme nucléaire qui explosa tous les 8,6 jours. La guerre froide a été une période où les armes nucléaires explosaient constamment, et bien que l'explosion et les effets de la chaleur thermonucléaire n'ont pas touché directement de nombreuses personnes ils ont quand même touché des personnes

— en particulier aux soldats qui ont participé à des essais nucléaires — les retombées radioactives ont été une menace et un fardeau pour la santé de millions de personnes dans le monde.

Par exemple, en 1954, les États-Unis ont testé leur première bombe à hydrogène utilisable, l'arme Bravo dans les îles Marshall encore. Le nuage de retombées radioactives de cet essai s'est répandu sur 5,000 milles carrés dans l'océan Pacifique. Il a englouti plusieurs atolls peuplés d'êtres humains dans les îles Marshall, et ces personnes ont toutes subi des impacts sur leur santé de l'exposition aux radiations. Beaucoup ont développé des cancers de la thyroïde et d'autres cancers. Il y avait aussi un bateau de pêche japonais à l'intérieur de ce nuage de retombées. Le Daigo Fukuryu Maru, que nous appelons le Lucky Dragon. Environ trois heures après l'essai nucléaire, sur le bateau, qui se trouvait à environ 100 kilomètres du point de détonation de l'essai Bravo, les cendres radioactives ont commencé à tomber d'environ trois pouces d'épaisseur. C'était des retombées radioactives. Les particules bêta dans la cendre ont brûlé la peau des pêcheurs, alors ils ont compris que c'était dangereux et ils l'ont balayé par-dessus bord. Cependant, au moment où ils sont rentrés au port deux semaines plus tard au Japon, tout l'équipage a été hospitalisé pour des maladies de rayonnement. Six mois plus tard, l'un des membres de l'équipage est mort des maladies causées par la radioactivité. C'était quelqu'un qui était à une centaine de kilomètres de l'endroit où une bombe à hydrogène a explosé et qui a été tué par cette bombe à hydrogène.

Des centaines de bombes à hydrogène ont été testées par les différents états dotés d'armes nucléaires. Alors que les États-Unis testaient leurs armes thermonucléaires dans des îles et des atolls de l'océan Pacifique, le rayonnement s'est dispersé parce qu'il a atterri en quantités les plus lourdes dans l'océan, mais des poissons radioactifs ont été trouvés au Japon, en Asie du Sud-Est, en Australie, en Amérique du Nord, en Amérique du Sud. Certains pays, comme l'Union Soviétique, ont testé ces grandes armes sur terre, de sorte que les nuages de retombées ont déposé des retombées dans les villages non loin du site d'essai du Polygone au Kazakhstan. Et ces retombées ne se sont pas dispersées. Elles sont simplement entrées dans l'écosystème là-bas. Ainsi, en étudiant l'hibakusha mondiale — les gens partout dans le monde qui sont affectés par les radiations, nous trouvons des gens dans des villages comme celui-ci, des gens qui vivent là où les nuages de retombées ont déposé beaucoup de radiations. Nous trouvons que la maladie continue parce que leurs enfants, petits-enfants, et maintenant arrière-petits-enfants vivent dans des écosystèmes qui sont denses avec ces particules radioactives, dont beaucoup ont des demi-vies qui les maintiennent dangereuses pendant 300 ans, voire des milliers d'années.

En plus des personnes qui ont subi l'exposition aux retombées des essais d'armes nucléaires, la production d'armes nucléaires a également affecté d'énormes quantités de personnes.

L'extraction de l'uranium dans le monde entier a dévasté les communautés. Une étude récente menée aux États-Unis a révélé que même si l'extraction d'uranium dans les réserves de Navajo dans le sud-ouest a cessé il y a 25 ans, plus de 25% des femmes et des jeunes enfants vivant maintenant dans ces réserves ont des particules provenant de cette exploitation minière — des particules d'uranium provenant de cette exploitation minière — à l'intérieur de leur corps.

À Hanford, dans l'état de Washington, où les États-Unis ont produit leur plutonium utilisé dans l'arme de Nagasaki et dans des dizaines de milliers d'autres armes nucléaires, la quantité de rayonnement qui a été libérée dans la communauté était extrêmement élevée et a eu un effet très prononcé sur la santé des personnes vivant près de la centrale de Hanford. Ainsi, la production, les essais d'armes et aussi les accidents dans les centrales nucléaires ont eu un effet énorme sur les êtres humains et continuent d'avoir un effet énorme.

En 1957, il y a eu deux accidents massifs d'énergie nucléaire à 11 jours d'intervalle. Le premier à Mayak où l'Union Soviétique a produit son plutonium dans lequel un réservoir de déchets a explosé et a répandu de la radioactivité portée par le vent sur des centaines de kilomètres. Plus de 200,000 personnes vivaient sur le chemin de l'endroit où ce nuage s'est installé.

Onze jours plus tard, la centrale de Windscale où le Royaume-Uni produisait son plutonium pour ses armes nucléaires (maintenant appelée Sellafield), avait un incendie à l'intérieur de l'un des deux réacteurs, et ce feu a brûlé pendant trois jours. Cette radioactivité s'est répandue sur de nombres régions dans toute l'Europe, au nord, à l'ouest, au sud, et a contaminé de vastes zones.

Nous connaissons tous les accidents de centrales nucléaires commerciales, le pire de tous celui de Tchernobyl, dans lequel la quasi-totalité du combustible de la centrale a été soufflé dans une explosion et a été répandu par le vent, et a eu un effet dévastateur sur les gens en Ukraine et aussi en Biélorussie, mais encore plus loin que cela. Chaque année, nous trouvons encore des aliments radioactifs de Tchernobyl sur le marché, à partir du césium 137 qui a atterri dans toute l'Europe à la fin de la catastrophe de Tchernobyl. C'est plus de 30 ans plus tard. Nous trouvons toujours de la nourriture qui arrive sur le marché. Les radiations de la catastrophe de Tchernobyl ont dévasté l'élevage de rennes du peuple Sami dans le nord de la Scandinavie. Il y avait une grande quantité de radioactivité provenant de Tchernobyl déposé là-bas. Les rennes ont tendance à manger du

lichen qui pousse sur les rochers, et le lichen absorbe les radiations dans une large mesure, de sorte qu'il a dévasté la chaîne alimentaire de la communauté, et aussi le fondement économique et le bien-être de la communauté, ainsi que d'exposer de nombreuses personnes aux radiations.

Ici, au Japon, il y a neuf ans, c'était la catastrophe de Fukushima avec trois meltdowns complets, et quatre explosions. Ces explosions, tout comme un champignon atomique, ont distribué beaucoup de radiation, principalement au nord-ouest de l'endroit où se trouve le centrale, et la contamination affecte les gens toujours. Les réacteurs de la centrale ne peuvent toujours pas être pénétrés par les êtres humains parce que les niveaux de rayonnement gamma sont si élevés, et les retombées radioactives se sont intégrées dans l'écosystème et ont été transportées dans toute la région. Ainsi, même lorsque la décontamination se fait dans les villages ou dans les écoles, dès qu'il y a des pluies, dès qu'il y a des vents, plus de radiation en provenance des forêts et des montagnes vient contaminer de nouveau les villages. Il y a aussi tous ces sites ou les débris et terres radioactifs sont mis dans des sacs et empilés. Ce sont des sites de déchets radioactifs maintenant. Comme Gordon Edwards l'a dit un jour, chaque fois que vous entendez le mot «décontamination», vous devriez penser au mot «distribution». Vous ne pouvez pas rendre une particule radioactive non radioactive. Vous pouvez simplement le déplacer. Donc la décontamination à Fukushima, c'est déplacer les radiations ailleurs. Ça ne veut pas dire se débarrasser des radiations.

La pire chose à laquelle nous sommes confrontés à l'avenir, c'est l'immense quantité de déchets radioactifs, principalement des barres de combustible usé provenant des centrales nucléaires en exploitation, provenant de centrales nucléaires commerciales. Il y a plus de 80,000 tonnes métriques de combustible nucléaire usé, et il y en a encore autant provenant de la production militaire du plutonium. Tous ces déchets doivent être gardés avec soin et contenus pendant plus de cent mille ans. Nous ne savons pas faire quoi que ce soit pendant cent mille ans. Il y a cent mille ans, nos ancêtres ont émigré pour la première fois hors du continent africain. Imaginer que nous pouvons exercer des compétences technologiques au cours de cette période est un peu déraisonnable, peu importe la qualité de notre science, de notre technologie et de notre planification. On parle de 100,000 ans de gestion.

Donc ce n'est pas quelque chose qui s'est passé dans le passé. Ce n'est pas quelque chose qu'on pourrait faire. C'est quelque chose que nous avons déjà fait. Nous avons fabriqué ces déchets et seulement deux générations de personnes, peut-être trois générations de personnes, ont eu quelque avantage de ces déchets, grâce à

l'utilisation de l'électricité, mais un millier de générations devront faire face avec ces déchets ou du moins seront à risque par rapport à ces déchets.

Donc, quand nous pensons à la destruction de ces technologies nucléaires, à ce qui s'est passé ici à Hiroshima, à ce qui s'est passé à Nagasaki, ce sont des choses que nous ne devrions jamais oublier. Ce sont des choses que les êtres humains ont faites à d'autres êtres humains. Mais nous devons aussi voir ce que nous avons fait par la suite, c'est-à-dire continuer à faire exploser des armes nucléaires, exposer les gens à des retombées radioactives et produire des quantités massives de déchets nucléaires qui feront partie de l'écosystème pendant des millénaires.

Je suis debout sur Aioibashi, Le Pont Aioi, le pont en forme de T qui a été le point de visée pour l'Enola Gay le jour où il a attaqué Hiroshima avec une arme nucléaire. De ce pont, il est facile de voir le dôme « A-bombe » qui était la salle d'exposition commerciale, mais quand nous regardons ce bâtiment, ce bâtiment de style européen, nous ne sommes pas sûrs exactement. C'était une salle d'exposition commerciale, alors il est donc facile d'imaginer que peut-être il n'était pas si bondé ce jour-là. Peut-être qu'il n'y avait pas beaucoup de gens à l'intérieur, même si il y a eu tellement de dégâts dans ce qui s'est passé ici à Hiroshima. Mais quand nous tournons sur Aioibashi et regardons dans l'autre sens, ce que nous voyons est l'Ecole Primaire Honkawa. Nous savons exactement ce qui s'est passé là-bas le 6 août 1945. 400 élèves du primaire ont été tués et 10 enseignants ont été tués. Cette arme visait essentiellement une école primaire. Elle a fini par exploser au-dessus point zéro que nous avons vu. Il a fini par exploser au-dessus d'un hôpital.

Nous vivons dans le monde que nos ancêtres ont fait, et nous faisons le monde dans lequel nos descendants vivront. Il nous incombe à tous de bien nous traiter les uns les autres, de faire un monde pacifique, et de faire un monde dans lequel les générations futures peuvent prospérer, être en bonne santé et être heureuses. Et nous les honorons en prenant soin de ce monde. Nous les honorons en prenant soin de la paix, en rendant notre monde pacifique en débarrassant notre monde de ces armes, et de ces toxines. Et nous prenons aussi soin de nos ancêtres en réalisant leurs souhaits et en faisant de ce monde un endroit plus beau pour nous tous. Un monde en sécurité. Un monde de peuples qui s'entendent bien. Voici mon message d'amour de Hiroshima à tout le monde.

- Prof. Robert Jacobs, Hiroshima City University, 2020/08/06

version anglaise (video): Bo Jacobs from Hiroshima, August 6, 2020

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ENGLISH

We're all well aware of the damage caused by the nuclear attack on Hiroshima on August 6th and the nuclear attack on Nagasaki on August 9th, of the destruction, of the loss of life, of the people whose bodies are wounded, the people whose families were torn apart, the devastation to humans, to community, and to the environment.

My name is Bo Jacobs. I'm an American historian. I study the history of nuclear technology and radiation politics. I work at the Hiroshima Peace Institute at the graduate school of peace studies of Hiroshima City University. I'm glad to be able to talk to you today.

We remember today what happened on August 6, 1945 and what happened on August 9, 1945— the devastation and the destruction. What I'd like to talk to you about today is that this is not some event that happened in the past that we have to remember and never repeat. It is those things, but it's also a world we continue to live in. What happened in August of 1945 here in Hiroshima and in Nagasaki was not the end of the use of nuclear weapons. It was the beginning of the use of nuclear weapons.

Since 1945 there have been over 2,000 nuclear weapons detonated here on earth. The United States was testing nuclear weapons in the Marshall Islands less than a year after the attack here in Hiroshima, in July of 1946. The United States tested over a thousand nuclear weapons. Other countries of the world— the nuclear states— have tested over 2,000 nuclear weapons, so the destruction and the suffering that came from detonations of nuclear weapons began in 1945, but continued throughout the cold war. We think of the cold war as a period of time in which nuclear weapons weren't used. However, if you take those 2,000 nuclear tests during the cold war and spread them out across that period of time, statistically, there's a nuclear weapon detonating every 8.6 days.

The cold war was a period of time in which nuclear weapons were exploding constantly, and while the blast and the heat effects of the weapons never did much damage to human beings— although they did some damage to human beings, especially soldiers that took part in nuclear tests— radioactive fallout has been a threat and a burden on the health of millions of people around the world.

For example, in 1954 the United States tested its first deliverable hydrogen bomb, the Bravo weapon in the Marshall Islands again. The radioactive fallout cloud from this test spread over 5,000 square miles out into the Pacific Ocean. It engulfed several atolls populated

with human beings in the Marshall Islands, and those people all suffered impacts on their health from exposure to radiation. Many developed thyroid cancers and other cancers. There was also a Japanese fishing boat inside this fallout cloud.

The Daigo Fukuryu Maru, which we call the Lucky Dragon. About three hours after the nuclear test, on the boat, which was about 100 kilometers away from the detonation point of the Bravo test, radioactive ash began to fall about three inches thick. This was radioactive fallout. The beta particles in the ash burned the skin of the fishermen, so they realized that it was dangerous and they swept it over overboard. However, by the time they got back to port two weeks later in Japan, the entire crew was hospitalized for radiation sickness. Six months later, one of the crew members died from radiation sickness. This was somebody who was a hundred kilometers away from where a hydrogen bomb was detonated and who was killed by that hydrogen bomb.

Hundreds of hydrogen bombs were tested by the various nuclear weapon states. While the United States tested its thermonuclear weapons in islands and atolls in the Pacific Ocean, the radiation dispersed because it landed in heaviest amounts into the ocean, but radioactive fish were found in Japan, in Southeast Asia, in Australia, in North America, in South America. Some countries, like the former Soviet Union, tested these large weapons over land so the fallout clouds deposited fallout into villages not far from the Polygon Test Site in Kazakhstan. And that fallout did not disperse. It simply entered into the ecosystem there and it remains. So in studying the global hibakusha— the people all around the world who are affected by radiation, we find people in villages like this, people who live where the fallout clouds deposited lots of radiation. We find ongoing illness as their children, grandchildren, and now great grandchildren are living in ecosystems that are dense with these radioactive particles, many of which have half-lives that keep them dangerous for 300 years or even thousands of years.

In addition to the people who suffered fallout exposure from nuclear weapon tests, nuclear weapon production has also affected huge amounts of people.

Uranium mining all over the world has devastated communities. A recent study in the United States found that even though uranium mining on Navajo reservations in the southwest stopped 25 years ago, over 25 percent of women and small children living now on those reservations have particles from that mining— uranium particles from that mining— inside of their bodies.

At Hanford, Washington—which is where the United States produced its plutonium that was used in the Nagasaki weapon and also in tens of thousands of other nuclear weapons—the amount of radiation that was released into the community was extremely high and had a very, very pronounced health effect on human beings living near the Hanford plant. So production, the testing of weapons and also accidents at nuclear power plants have had a huge effect on human beings and continue to have a huge effect.

In 1957, there were two massive nuclear power accidents 11 days apart. The first one at the Mayak site where the Soviet Union produced its plutonium in which a waste tank exploded and spread radiation downwind for hundreds of kilometers. Over 200,000 people lived in the path of where that cloud settled.

Eleven days later, the Windscale plant where the UK produced its plutonium for its nuclear weapons (now called Sellafield), had a fire inside one of the two reactors, and that fire burned for three days. This distributed radiation in wide berths all around Europe, to the north, to the west, to the south, and it has contaminated large areas.

We all know about the commercial nuclear power plant accidents, the worst of them Chernobyl, in which almost all of the fuel in the power plant was blown up in an explosion and settled downwind, and had a devastating effect on people in the Ukraine and also in Belarus, but even farther afoot than that. Every year we still find radioactive food at market from Chernobyl, from the cesium 137 that landed around Europe from the Chernobyl disaster. This is over 30 years later. We're still finding food coming to market. The radiation from the Chernobyl disaster devastated the reindeer herding of the Sami people in the north of Scandinavia. There was a large amount of Chernobyl radiation deposited there. The reindeer tend to eat lichen which grows on rocks, and lichen absorbs radiation to a great extent, so it devastated the food chain of the community, and also the economic underpinning and well-being of the community, as well as exposing many people to radiation.

Here in Japan nine years ago was the Fukushima disaster with three full meltdowns, and four explosions. Those explosions, just like a mushroom cloud, distributed a great deal of radiation, primarily to the northwest of where the plant is located, and it has been vexing and affecting people. The plants themselves still cannot be entered by human beings because the gamma radiation levels are so high, and the radioactive fallout has integrated into the ecosystem and been transported throughout the region. So even when decontamination is done in villages or in schools, as soon as there are rains, as soon as there are winds, more radiation blows down from the forests and from the mountainside, and re-enters the town and re-contaminates

them. There are also all of those sites where the radiation is put into bags and piled up. Those are radioactive waste sites now. As Gordon Edwards once said, whenever you hear the word "decontamination" you should think of the word "distribution." You cannot make a radioactive particle not radioactive. You can simply move it. So decontaminating in Fukushima means moving the radiation somewhere else. It doesn't mean getting rid of the radiation.

The worst thing facing us in the future is the immense amount of radioactive waste, primarily spent fuel rods from operating nuclear power plants, from commercial nuclear power plants. There are over 80,000 metric tons of spent nuclear fuel, and there's as much again from military production of plutonium. All of this waste has to be guarded carefully, and contained for over a hundred thousand years. We don't know how to do anything for a hundred thousand years. A hundred thousand years ago is when our ancestors first migrated out of the African continent. To imagine that we can exert technological competence over that period of time is a little unreasonable, no matter how good our science and technology and planning is. We're talking about a hundred thousand years of management.

So this isn't something that happened in the past. This isn't something we might do. This is something we already did. We manufactured this waste and only two generations of people, maybe three generations of people, had any benefit from this waste, through the use of electricity, but a thousand generations will have to deal with this waste or at least will be at risk and in relation to this waste. So when we think about the destruction of nuclear technologies, what happened here in Hiroshima, what happened in Nagasaki, these are things we should never forget. These are things that human beings did to other human beings. But we also need to see what we did after that, which is to continue to detonate nuclear weapons, to expose people to radioactive fallout, and to produce massive amounts of nuclear waste which will be a part of the ecosystem for millennia.

I'm standing on Aioibashi, Aioi bridge, the T-shaped bridge that was the aiming point for the Enola Gay on the day that it attacked Hiroshima with a nuclear weapon. From this bridge it's easy to see the A-bomb dome which was the commercial exhibition hall, but when we look at this building, this western building, we're not sure exactly. It was an commercial exhibition hall, so it's easy to imagine that maybe it wasn't so crowded on that day. Maybe there weren't a lot of people inside, even though there was so much damage that happened here in Hiroshima. But when we turn on the T-bridge, on Aioibashi and look the other way, what we see there is Honkawa Elementary School. We know exactly what happened there on August 6, 1945. 400 elementary school children were killed, and 10 teachers were killed. This weapon was aimed, essentially, at an

elementary school. It ended up detonating at the ground zero point we saw. It ended up detonating over a hospital.

We live in the world that our ancestors made, and we make the world that our descendants will live in. It's incumbent on all of us to treat each other well, to make a peaceful world, and to make a world that future generations can thrive in, and be healthy, and be happy. And we honor them by taking care of this world. We honor them by taking care of peace, by making our world peaceful by ridding our world of these weapons, and of these toxins. And we also take care of our ancestors through carrying through their wishes and making this world a more beautiful place for all of us. Everybody be safe. Everybody be well. Sending you all love from Hiroshima.