

Nuclear Scars - The lasting legacies of Chernobyl and Fukushima

Media briefing, March 2016

Introduction

To mark the 30th and 5th anniversaries of the Chernobyl and Fukushima disasters, Greenpeace commissioned reviews of scientific literature examining radioactive contamination and health effects linked with the accidents. Greenpeace radiation experts also carried out fieldwork to document the contamination of environment in which survivors in Russia, Ukraine and Japan live in. The results of these initiatives are compiled in the report *Nuclear Scars: The lasting legacies of Chernobyl and Fukushima*. In light of the social, health and environmental scars caused by Fukushima and Chernobyl, the most responsible way forward is to abandon nuclear power and shift to safer and cleaner energy options.

Chernobyl and Fukushima: Human Rights Disasters

A commonality between Chernobyl and Fukushima is the lack of respect for victim rights and involvement of survivors in decisions on what additional risks they are willing to accept. Around both Chernobyl and Fukushima the rights and health of survivors are not being fully acknowledged and protected by governments interested in saving money, while the nuclear industry that caused the disasters pays little to none of the full costs required to help victims recover from a nuclear disaster.

Hundreds of thousands of people have been permanently displaced by Fukushima and Chernobyl. Millions more live in radioactively contaminated areas. Their ability to determine their own personal safety and protect their families has forever been taken away.

- Financial support is being increasingly reduced for Chernobyl survivors, reducing control of contaminated food, decreasing money for protective measures and scientific monitoring. This increases radiation exposure risks for many living in contaminated areas.
- Most settlements in the Bryansk area of Russia that were categorized as an “evacuation zone” due to radiation levels were never evacuated.
- In Japan, 55,000 evacuees will be expected to return to their homes in contaminated areas before March 2017. Financial support will end one year later, effectively forcing many survivors to return to contaminated areas.
- The Japanese government has said that evacuees can return to all areas where radiation exposure is below 20 mSv per year. This is 20 times higher than recommended for non-

accidental situations. It is also 20 times higher than the maximum dose of 1 mSv per year established for living in areas contaminated by Chernobyl.

- Despite the Japanese government's promise to decontaminate areas before evacuees return home, many areas are either still very contaminated or at risk of recontamination due to neighbouring contaminated areas
- This means large areas that used to be part of communities' way of life – forests and other natural areas – won't be decontaminated.
- The United Nations Special Rapporteur to the Human Rights Council, Anand Grover, has said that Japan's evacuee return policy is not "in consonance" with the human right to health. He has also stated that the return of evacuees should only be "when the radiation dose has been reduced as far as possible and to levels below 1 mSv/year."

Health Effects

The health effects of Chernobyl and Fukushima are extensive. Both accidents have led to an overall decline in health and well-being of populations exposed to fallout. Due to the latency period of cancer, scientific evidence on specific cancers and diseases are not yet expected around Fukushima after only five years. Nevertheless, a discernible increase in thyroid cancer has been detected. After thirty years, the following radiation-induced health effects have been observed in Chernobyl affected areas:

- Significant increases in thyroid cancer in both affected children and clean-up workers;
- Leukaemia in clean-up workers;
- Breast cancer was 1.6 times higher among clean-up workers. A two-fold increase in breast cancer has been observed in the most heavily contaminated areas of Belarus and Ukraine;
- A decrease in cognitive function in clean-up workers;
- An increase in cataracts among clean-up workers;
- An increase in mortality of clean-up workers and people living in contaminated areas;
- Disability of the clean-up workers and of the population of the contaminated territories.

Until recently, mental health disorders were treated less sympathetically than physical health. However, mental health also impacts physical health. Stress of displacement, the inability return home, social stigmatisation, and concern about radiation exposure impacts mental health and the decline of physical health.

- Both disasters have caused widespread mental health disorders among survivors, including anxiety, depression, Post Traumatic Stress Disorder (PTSD), alcoholism and suicide.
- These responses occur due to trauma, concern for the future, such as risk of cancer, genetic impacts on descendants, living in contaminated areas, the inability to return home and unfair compensation and loss of livelihood.
- Five years after Fukushima, incidence of mental health disorders, such as depression, anxiety and PTSD are elevated.
- Thirty years after Chernobyl, mortality is higher among people who live in contaminated areas, birth rates are lower, cancer incidence have increased while mental health disorders are widespread among Chernobyl survivors.

Our uncertain understanding or radiation-induced health effects

While pro-nuclear organizations like the International Atomic Energy Agency (IAEA) minimize the impacts of radiation around Chernobyl and Fukushima, in reality they have limited evidence-based understanding of the effects of radiation. Comprehensive data gathering related to radiation exposure and the resulting health consequences from Chernobyl has not taken place.

- Confirming the impacts of Chernobyl has become difficult due to the lack of comprehensive and trustworthy data. While 1,800,000 people have been designated as Chernobyl survivors, only 131,450 survivors have had their dose exposure estimated in long-term study.
- Dose reconstruction has not taken place for 44,000 clean-up workers who received an acute radiation dose and then went on to live in contaminated areas.
- An analysis of peer-reviewed literature shows there has been no update of Chernobyl survivor dose estimates has been published since 2005.
- It is now “almost impossible” to comprehensively assess the effects of Chernobyl because of reduced funding and the resulting end of data collection and publication.
- Studies around Chernobyl have found increased incidence of genetic damage and mutation in plants, insects and animals.
- The fact that we’ve observed and confirmed genetic effects from low-doses of radiation in plants and animals, but not yet in humans, underlines our limited understanding of radiation and the need for continued studies.
- One study has found double the incidence of genetic mutation in children living in highly contaminated areas of Belarus.
- In a 2006 study, the Belarusian scientist Malko predicted 90,000 excess cancer deaths based on radiation exposure calculations, in countries contaminated by Chernobyl. In a more recent study he predicted 115,000 death. This contrasts with the WHO’s prediction of only 9,000 additional fatalities due to Chernobyl.

Contamination

Fukushima and Chernobyl caused chronic, low-level radiation exposure in large populations. This has increased the risk of both physical and mental effects among survivors. Contamination touches every aspect of their lives. It is in what survivors eat and drink. And it’s in the wood they use for construction and burn to keep warm.

- Today more than 5 million people live in areas that are officially considered contaminated from Chernobyl - 1.1 million in Belarus, 1.6 million in Russia and 2.3 million in Ukraine.
- 1 million people live in hundreds of settlements in Russia, Ukraine and Belarus that exceed the annual dose limit of 1 mSv.
- 150,000 km² of land in Belarus, Russia and Ukraine were contaminated at levels requiring evacuation or restrictions on land use or food production. When the Chernobyl accident occurred 8 million people lived in these areas.
- Today more than 10,000 km² of land is still unusable for economic activity

- Many “hot spots” have been discovered outside of evacuation zones, but there is nothing to prevent people from entering these areas.
- Due to high levels of plutonium contamination within 10 km of the Chernobyl reactors it will be impossible to repopulate these areas for tens of thousands of years.
- According to the IAEA, caesium contamination in the Fukushima prefecture (approximately 13,000 km²) meets or exceeds its definition for contaminated land.
- Around the Fukushima station, radioactive waste from decontamination efforts covers an area of 16 km².

Chernobyl and Fukushima’s Radioactive Forests

Radiation monitoring by Greenpeace radiation experts found forests around Chernobyl and Fukushima are large repositories of radioactive contamination. Caesium-137 is a key contaminant around both Chernobyl and Fukushima. Because of its long half-life (30 years), caesium contamination will be a risk for centuries to come. Whether from forest fires or the ongoing migration of radioactivity through the ecosystems near-by communities are at risk of radiation exposure.

Radioactive forests near Chernobyl continue to put human health at risk. Between 1993 and 2013 more than 1100 wildfires were officially registered in the Chernobyl exclusion zone. The burning of contaminated wood for warmth and cooking also puts survivors at ongoing risk of exposure. Greenpeace tested wood samples from the forests in Ukraine and the Bryansk region of Russia during September and October 2015.

In June-July and October 2015, Greenpeace conducted radiation-monitoring trips to the village of Litate to investigate the near and long-term risks for an area set for resettlement. The Litate region is between 28 and 47 km from the Fukushima nuclear station. The region is mountainous and heavily forested. Many homes and agricultural fields are bordered by forested hillsides. Although the Litate is approximately 20,000 hectares, the Japanese government’s decontamination policy only plans to decontaminate a quarter of the area. Decontamination is only being carried out within 20 meters of homes and roads leaving areas contaminated forests in their current state. Close proximity and the migration of radionuclides through the environment make ongoing recontamination of populated areas inevitable.

- In Litate, 96% of the measurement points of over 10,000 radiation measurements were above the government target of 1 mSv per year.
- Radiation levels in areas decontaminated around a Litate home surveyed by Greenpeace were found to be above the government’s decontamination target.
- Decontaminated areas bordering the forest to the rear of this Litate home were still twice the government target. The adjacent contaminated forest causes increased radiation levels within the house to approximately 10 – 15 mSv a year.
- Nine out of twelve wood samples collected in the Ivankiv region of Ukraine were above limits for strontium-90 in firewood.
- Ash sampled from a household oven using local brushwood as fuel had levels of strontium-90 20 times higher than the most contaminated wood sampled by Greenpeace.

- The caesium-137 levels in all four wood samples taken in Bryansk were above permissible levels for construction wood.
- A timber wood sample from a sawmill in Novozybkov contained 6000 Bq/kg of caesium-137. This is well above any radiation limits for wood products.
- Radiation mapping in the Bryansk region of Russia found that forests continue to be a repository for radioactive contamination.

Food Contamination

Greenpeace investigated the contamination of locally produced food and forest products in areas of Ukraine and Russia. Food samples were taken and analyzed from villages located to the west and southwest of Chernobyl, and from the Bryansk region of Russia in September-October 2015.

- Forty-six out of fifty milk samples taken in the Rivne region of Ukraine (approximately 200 km from Chernobyl) contained caesium-137 above limits for adults. All the samples were above consumption limits for children.
- Caesium-137 levels in mushroom samples from both Ukraine and Russia were well above consumption limits.
- Forty-two per cent of grain samples in the Ivankiv district, Kyiv region, Ukraine (approximately 50 km from Chernobyl) has levels of strontium-90 above consumption limit; two of the samples were double consumption limits.
- Five of six fish samples taken in the Bryansk area contained caesium-137 above permissible levels.

Fukushima and Chernobyl: Social Disasters

Beyond their impact on the environment and human health, Fukushima and Chernobyl are undeniably unacceptable social disasters.

- Increased rates of suicide have been observed following both Fukushima and Chernobyl.
- Significant depopulation of areas contaminated by Chernobyl has occurred and a similar trend is now being observed in Japan.
- Distrust in expert authorities has increased in response to both Fukushima and Chernobyl.
- Japan has seen an upsurge in citizen protest and what is known as 'citizen science', when citizens have started to monitor radiation and set up networks to share their knowledge.
- Before Fukushima, Japan was planning to build new reactors. Today public opposition to nuclear power continues to grow and Japan has ordered 85,550 megawatts of renewable energy since 2011.
- The responsibility of the state for survivors of Chernobyl is included in Article 16 of Ukraine's constitution, which states: "overcoming the consequences of the Chernobyl catastrophe - a catastrophe of global scale, and preservation of the gene pool of the Ukrainian people, is the duty of the State."
- In 2006, Mikhail Gorbachev stated that "even more than my launch of perestroika, [Chernobyl] was perhaps the real cause of the collapse of the Soviet Union five years later. Indeed, the Chernobyl catastrophe was an historic turning point: there was the era before the disaster, and there is the very different era that has followed."

Greenpeace Demands

In light of the scale of the social, health and environmental impacts caused by Fukushima and Chernobyl, a reasonable response is to phase out nuclear power in favour of clean energy options.

Countries that keep nuclear power in the short and long-term must design nuclear emergency plans to protect their citizens in the event of radioactive releases on par with Fukushima or Chernobyl.

Justice demands proper support be provided to the survivors of Chernobyl and Fukushima. Greenpeace recommends the following actions be taken:

- Survivor rights be fully acknowledged and respected. Impacted people should be involved in decisions related to their own personal safety.
- Survivors should have the right to determine their personal safety and not be forced to live in contaminated environments.
- Survivors should receive financial support from authorities.
- Studies on the long-term effects of Chernobyl and Fukushima should be supported, including the impact of chronic low-dose on humans and other biota.
- Protective measures to reduce exposure to fallout should be continued or increased.
- Environmental and food monitoring programs around Chernobyl should be re-instated;
- Restrictions on access to radioactive “hot spots” should be introduced.

Scientific Literature Reviews

Greenpeace commissioned three teams of scientists to review the peer-reviewed scientific literature on the health effects and contamination caused by Fukushima and Chernobyl.

- Professor Omelianets lead team to review scientific research on the health impacts of Fukushima and Chernobyl. Prof. Omelianets is the Principal Scientist for the Laboratory of Medical Demography at the National Research Centre for Radiation Medicine of the National Academy of Medical Sciences of Ukraine. Their report the *Health Effects of Chernobyl and Fukushima: 30 and 5 years down the line* documents the broad impact the accidents have had on survivors.
- Professor Valerii Kashparov lead a team to review academic literature on contamination caused by the Chernobyl disaster. Prof. Kashparov is the Director of the Ukrainian Institute of Agricultural Radiology of National University of Life and Environmental Sciences of Ukraine. He has published numerous peer-reviewed articles. Their report *Chernobyl: 30 Years of Radioactive Contamination Legacy* details the extensive contamination caused by the accident.
- David Boilley, a nuclear physicist and chairman of Association pour le Contrôle de la Radioactivité dans l’Ouest (ACRO), was commissioned to review current research into the contamination from the Fukushima disaster. Boilley’s report *Fukushima five years later: back to normal?* tells us five years since March 11, 2011, Fukushima operator “has yet to

fully stabilize the station and many fear radioactive emissions could resume in the event of another natural disaster.

Greenpeace Radiation Monitoring Surveys

In 2015, Greenpeace undertook radiation-monitoring work in the Ukraine, Russia and Japan to better understand the day-to-day reality of survivors of Fukushima and Japan. Greenpeace found that authorities have consistently underestimated both the risks and extent of radioactive contamination.

Since March 2011, Greenpeace's radiation experts have undertaken 25 radiation monitoring surveys in Japan. The teams were made up of Greenpeace radiation experts, trained in radiation monitoring and the use of sophisticated measuring devices.

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