Three Mile Island, USA Nuclear power plant meltdown

The most infamous nuclear reactor accident in U.S. history occurred at the Three Mile Island nuclear plant in March 1979. Equipment malfunction, design-related problems and human error led to a partial meltdown of the reactor core and the release of vast amounts of radioactive gas and liquid. To this day, effective lobbying and cover-up efforts by the nuclear industry have prevented a meaningful scientific analysis of the effects on health and the environment.



History

The Three Mile Island nuclear power plant is located roughly 16 km from Harrisburg, Pennsylvania and was commissioned in 1978. More than two million people lived within 80 km of the plant. On March 28, 1979, the failure of the plant's cooling system led to the worst nuclear catastrophe before Chernobyl. An emergency valve was opened to relieve pressure, accidentally releasing large quantities of coolant fluid. This resulted in a severe overheating of the reactor core and a meltdown of the radioactive fuel rods. The containment vessel held, but for several days, significant amounts of radioactivity were released into air, water and soil, mainly in the form of about 1.59 Peta-Becquerel (Peta = quadrillion) of krypton-85 gas with a half life 10 years, and 740 Giga-Becquerel (Giga = billion) of iodine- $131.^{1}$

who warned publicly of a significant rise in hypothyroidism and infant deaths after the disaster, was fired immediately.² Nuclear specialist Steven Wing of the University of North Carolina, Chapel Hill alleged that "a manipulation of research" had taken place: A court order prohibited upper limit or worst case estimates of releases of radioactivity or population doses if these had the potential to harm the interests of the nuclear industry.³

Outlook

Cleanup and decontamination efforts took around 14

The nuclear power plant at Three Mile Island sits on the Susquehanna River in Pennsylvania, about 16 km from Harrisburg. It was commissioned in 1978. Only one year later, on March 28, 1979, the most severe civil nuclear disaster up to that time took place at TMI. Photo credit: Todd MacDonald / creativecommons.org/licenses/by/2.0



Harrisburg residents join anti-nuclear protests on April 4, 1979. News about the meltdown was initially downplayed, but within days, elevated radiation levels had been registered in four adjacent counties. Photo: © NARA



Engineers needed five days after the meltdown to identify the causes, regain control of the cooling systems, and reseal the reactor core. About 70% of the reactor core had been damaged and 50% of the fuel rods had melted down. To get rid of the 150,000 liters of radioactive water, which had been contaminated in the course of cooling efforts, the Nuclear Regulatory Commission (NRC) took the controversial decision to dump it directly into the Susquehanna River.

Health and environmental effects

The news of the meltdown was initially downplayed, but within days elevated radiation levels were registered in four adjacent counties. Authorities claimed that external exposure to radioactivity was relatively low, but did not take into consideration the cumulative effects of low-level radiation through ingestion of radioactive particles and never measured actual exposure in the field. Instead, the public was informed that the levels of radioactivity released were too low to cause any harmful effects. Nevertheless, Pennsylvania Governor Thornburgh ordered the evacuation of more than 140,000 pregnant women and small children from the area.

In Dauphin and Lebanon, the two counties immediately adjacent to the site, studies found significantly elevated cancer and death rates in children, adolescents and young adults. From 1979 to 2001, 120 residents of these counties had died of cancer by age 19, a rate 46 % above the state average.²

Immediately after the meltdown, a large scale cover-up began. Pennsylvania Health Commissioner MacLeod,

References

years and cost American taxpayers about \$1 billion. Thorough research on the health effects of the radioactivity released during the five days of the meltdown remains limited to this day. The nuclear industry's lobbying worked well, with several industry-sponsored studies showing few or no effects of the disaster on population health. Many scientists, however, such as Joseph Mangano of the Bulletin of Atomic Scientists, criticized that no detailed studies were ever conducted on residents who lived outside of the 16 km-zone, on infant death rates or on the impact of radioactive noble gas.²

Independent investigations of the nuclear meltdown in Chernobyl have provided evidence, however, that radioactivity released by civil nuclear disasters causes significant harm to people's health. The people affected by fallout from Three Mile Island are also Hibakusha - casualties of an irresponsible nuclear industry.

The community of Goldsboro on the Susquehanna River. The Three Mile Island nuclear power plant can be seen in the background. To this day, thorough research on the health effects of the radioactivity released during the five days of the meltdown remains limited. Photo: © NARA

- 1 "Backgrounder on the Three Mile Island Accident." Website of the U.S. Nuclear Regulatory Commission (NRC), February 11, 2013. www.nrc.gov/reading-rm/doc-collections/fact-sheets/3mile-isle.html
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