

THREE MILE ISLAND

JUST THE FACTS

Four incidents at nuclear power reactors dominate society's perception of the technology: SL-1 in Idaho (1961), Three Mile Island in Pennsylvania (1979), Chernobyl in Ukraine (1986) and Fukushima in Japan (2011). Few events in human history have generated such disproportionate reactions.

What happened?

On March 28, 1979, a reactor coolant relief valve opened and did not reclose when it was supposed to. The valve's instrumentation wrongly indicated that it had closed. That misinformation and other factors resulted in coolant water not being properly distributed, causing the reactor core to get hot enough to start melting uranium fuel. About half of the fuel melted before coolant water was restored. A small amount of radioactive material was released.

How many people died?

There have been no deaths or injuries detected as a direct or indirect result of the Three Mile Island accident.

How many were exposed to radiation?

Experts estimate up to 2 million people were exposed to extremely small amounts of radiation. The Nuclear Regulatory Commission, the U.S. nuclear industry's regulator, conducted detailed studies of the accident's radiological consequences, as did the Environmental Protection Agency; the Department of Health, Education and Welfare (now Health and Human Services); the Department of Energy; and the commonwealth of Pennsylvania. Several independent groups also conducted studies.

The approximately 2 million people nearby during the accident received an estimated average radiation dose of about 1 millirem



The Three Mile Island nuclear power plant consists of two reactors, both capable of generating more than 800 megawatts of electricity. They are located on an island in the Susquehanna River that is 3 miles from the Harrisburg airport.

above the area's natural background of about 100-125 millirem per year. (For context, exposure from a chest X-ray is about 6 millirem.) The maximum dose to a hypothetical person living at the Site boundary would have been less than

100 millirem above background. Experts disagree on whether there is any impact to health at these levels.

Other Impacts

None. The Pennsylvania Department of Health followed the health of the 30,000 people who lived within 5 miles of Three

Mile Island. The study was discontinued after 18 years when no evidence of unusual health effects was shown.

A federal court dismissed lawsuits on behalf of 2,000 people who claimed their health problems were caused by the

Comprehensive investigations and assessments by several well respected organizations, such as Columbia University and the University of Pittsburgh, have concluded that in spite of serious damage to the reactor, the actual release had negligible effects on the physical health of individuals or the environment.
— U.S. Nuclear Regulatory Commission

accident. The court ruled the plaintiffs did not present evidence they had received enough radiation to cause health problems.

Status Today

Unit 2, where the accident occurred, was declared cleaned up in August 1993. Some contaminated material remains entombed on-site. Unit 1 was shut down in September

2019 and will be decommissioned. At its peak, Unit 1 employed 675 people and is expected to employ 50 through 2022. The used nuclear fuel will be stored on-site in hardened, secure casks until a permanent national repository is opened.

Key Lesson

Careful analysis of the factors that caused the accident led to widespread changes in how U.S. nuclear plants were regulated, designed and operated. Federal requirements for safety controls and emergency response planning became more stringent. Additionally, the nuclear industry took several rigorous steps, including establishing the Institute of Nuclear Power Operations to further foster safety and training.

Pop Culture

On March 16, 1979, less than two weeks before the accident, a movie called “The China Syndrome” hit U.S. theaters. The film imagined the aftermath of a nuclear meltdown at a fictional reactor outside of Los Angeles.

Societal Reactions

Following the Three Mile Island accident and public fear amplified by “The China Syndrome,” public support for nuclear energy fell from an all-time high of 69% in 1977 to 46% in 1979. The accident inspired a 1979 protest of nuclear energy in New York City that attracted an estimated 200,000 people. It is considered the largest anti-nuclear protest to date.

Sources

<https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/3mile-isle.html>

<https://www.nytimes.com/1993/08/15/us/14-year-cleanup-at-three-mile-island-concludes.html>

<https://www.world-nuclear.org/information-library/safety-and-security/safety-of-plants/three-mile-island-accident.aspx>

<https://www.history.com/topics/1970s/three-mile-island>

<https://www.exeloncorp.com/newsroom/exelon-generation-files-tmi-unit-1-decommissioning-report>

Other Facts

There were two nuclear reactors at Three Mile Island – **TMI-1** and **TMI-2**.



Unit 1 (800-megawatt capacity) came online in 1974 and generated electricity until the fall of 2019, when it was closed and scheduled for decommissioning.

Unit 2 (906-megawatt capacity) began operations Dec. 30, 1978, and was shut down after its infamous meltdown on March 28, 1979.

Cleanup of Unit 2 took **14 years** and cost approximately **\$1 billion**.

In the 1980s, **150 tons** of radioactive debris from the melted core were shipped to the Idaho National Engineering Laboratory for study and then safe, interim dry storage.