

Chernobyl: The effects are still being seen today

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smoke, and debris that traveled through Europe and across the Atlantic Ocean. Over one country, the radiation in the air was noted to be 20-150 counts per second, when the normal range is 5-10 counts per second.

The longest-lasting effect was on the reindeer and sheep in Sweden. 86,000 head of cattle were evacuated but much of the livestock was mutated. Enormous amounts of milk in Poland, Hungary, Austria, and Sweden were contaminated with radioactive iodine and radioactive cesium.

There were bans on many agricultural goods in Eastern Europe because of contamination. The sale of milk, meat, many fruits and vegetables was banned in 1986 and 1987 in the Russian markets of Kiev, Chernigov, Minsk, and other small cities and towns. The cost of this ban in Russia totaled 11 billion rubles (about 400 million dollars). Even though the food was banned, there were still many health effects involved with those who consumed the contaminated food.

In the early phase of the Chernobyl accident, the amount of radiation from bodies of water was estimated less than 1-2 percent of the total exposure. But the radioactive contamination still made its way to many rivers in the Chernobyl area, such as the River Pripyat, Uzh River, and the Dniepr River. As the rivers drained into the Kiev, the Kanev and the Kremenchug reservoirs, the contamination of water, sediments, algae, mollusks, and fish dropped significantly by dilution. The Chernobyl Cooling Pond was the most heavily contaminated water body.

Contamination of groundwater,

especially with strontium-90, could be a problem for the future in the catchment basins downstream of the Chernobyl area.

Radiation on the body

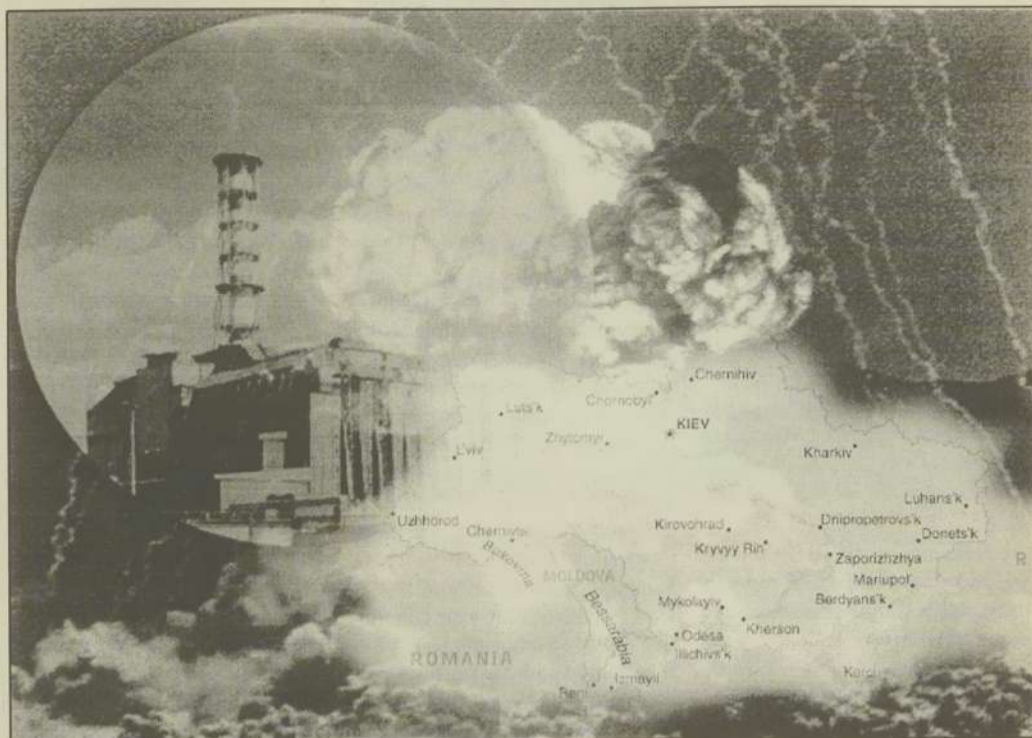
Ionizing radiation passes through the body and interacts with tissues that then leads to cell death and later on to organ dysfunction. Radiation effects were responsible for a majority of the early deaths in the Chernobyl accident. There were 31 deaths immediately after and into the first week after the explosion of Chernobyl. There were 237 people hospitalized for signs of acute radiation sickness. After the fire, 135,000 people evacuated the area around the reactor, and 800,000 "liquidators" were moved in to try to decontaminate the area.

A recent report shows that the Chernobyl accident is still killing people. According to the Ukraine Health Ministry ten times as many people are getting thyroid cancer each year. In 1996 there were an estimated 900 cases of thyroid cancer reported, all children under the age of 15.

An estimated 3,576 people have died from the accident. After ten years there were 2000 extra cancer deaths per year among the workers cleaning up the Chernobyl accident. There were also 4,600 deaths among the 6.8 million residents of the contaminated territories that include Kiev, Minsk, Belarus, and many other parts of Russia.

Changes in technology

To date, none of the accidents at nuclear facilities were directly caused by the facilities themselves; rather they were caused by human error, usually the operators. Certainly in the case of Chernobyl,



the accident would have been far less severe had the plans included a containment vessel.

There are currently 63 nuclear plants in operation in the former Soviet Union, with more under construction. According to the International Atomic Energy Agency, the safety of these plants is a continuing concern. The current energy demand in these countries is such that there is little flexibility for closing even those plants that are the least safe, such as the dozen or so based on the flawed Chernobyl design.

Assistance has been started by many groups to bring the Soviet reactors up to safety standards, or at least to effect improvements. This involves modifications, identification of safety deficiencies,

training of staff, and audits of the status of plant components.

The United States alone has contributed 1 billion dollars for more than 700 safety related projects in the Baltic and Russian states with considerably more money earmarked for more improvements. A repetition of the



1986 Chernobyl accident is now virtually impossible.

Regulations

One of the biggest fears that most of the population shares is the possibility of a nuclear explosion and melt down. To prevent these events from occurring the United States Nuclear Regulatory Commission (NRC) has set rules and regulations that all nuclear facilities must follow.

Among the thousands of

strenuous guidelines in effect for nuclear plants, the following is included. Plants need to be licensed by the NRC, produce onsite and offsite emergency response plans, which include the NRC and the Federal Emergency Management Agency (FEMA) working together, and adhere to strict building codes. Maintenance is also used as a preventative measure for safety.

Building codes are set by the NRC. The buildings are to withstand winds up to 300 miles per hour, tornadoes, and direct hits by large aircraft. The containment building is generally three-foot thick concrete lined with 3/4th inch thick steel and all material must pass inspection. The Chernobyl plant was built using from 70% to 90% defective materials.

As a result of these safety measures there has never been an accident in the United States involving a commercial nuclear power plant leaking a significant amount of radioactive materials into the environment. We all can rest easy knowing that there are many scientists and nuclear engineers that are working hard to make sure that there will never be another Chernobyl.

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