

Chernobyl



**ASSIGN
BUSTER**

But as these needs grow, we start to sacrifice the understanding of the technology to satisfy these needs. Without proper understanding, we begin to create a medium in which accidents can occur. It is when these accidents occur do we finally start to realize how important understanding really is. In a woodland area near the town of Primary, on April 26, 1986, the lack of understanding a technology shook the civilized world. " The most serious accident in the history of the nuclear industry occurred at Unit 4 of the Coherency nuclear power plant in the former Ukrainian Republic of the Soviet Union. International Chorally Research and Information Network, 2010, p. 1) The explosion from the accident sent radioactive materials over a 150, 000 square kilometer area. Storm and wind patterns also scattered this material across most of the northern hemisphere, although these amounts were considered insignificant. (International Atomic Energy Agency, 2011) Due to the large area of contamination, the accident garnered international attention on the safety of nuclear energy. Only with this attention did people finally start to realize the scope of how seriously dangerous growing technologies could be.

This purpose of this report is to provide the reader with insight as to the cause of the accident, the health and environmental effects, decontamination efforts, and finally what has come of Coherency today.

Cause of the Accident On the morning of April 25, 1986, the fourth reactor at the facility was to be shut down for routine maintenance. The shutdown provided an opportunity for technicians to perform a test on the turbines of the fourth reactor. Unknowingly, this was ten cause leaning to ten calculate .

A Russian state committee McNally released this statement in a report, acknowledging this fact: The immediate cause was an experiment which it had been planned to perform while the reactor was being shut down for a "medium repair" on 25 April. The purpose of the experiment was to determine whether, after steam had been shut off from the turbo-generator, the inertia of the still-rotating generator would be sufficient to generate enough electricity to operate auxiliary motors which were part of the emergency cooling system of the reactor. (Mega, 1987, p. 4) In preparation to the test, the operators of the reactor had to take upon some actions including disabling of the automatic shutdown mechanisms. This was to improve the accuracy of the test, but proved to be disastrous. As the test carried on, it became delayed due to power demands in a nearby town. Because of the delay, the plant continued to operate without the safety mechanisms in place. By the time the test was to be finally finished, the reactor had already become unstable. When the procedures of starting normal operations commenced, the reactor experienced a huge power surge due to a design flaw.

The power surge caused fuel to melt, which in turn caused a pressure explosion, and then a hydrogen explosion which blew the lid off the of the reactor. (Health Protection Agency, 2012) " There were over 100 radioactive elements released into the atmosphere when Chernobyl's fourth reactor exploded. " (International Atomic Energy Agency, 2011, p. 1) Two employees of the plant died from these explosions. Thousands more were contaminated as a result of the explosion which, mentioned in the introduction, covered 150,000 square kilometers throughout Russia, Belarus, and the Ukraine.

Human error and a design flaw are now considered the main contributors to the accident. (Mega, 1987) Health and Environmental Effects The contaminates released from the explosion is known as radioactive fallout, which are essentially atoms of elements. The most dangerous of which are iodine, tritium, and cesium which have a half-life of 8 days, 29 years, and 30 years respectively. Therefore, strontium and cesium are still present in the soil today. Exposure to these elements can lead to leukemia, thyroid cancer, and diseases to the liver and spleen. International Atomic Energy Agency, 2011) According to the Health Protection Agency some of the radioactive fallout traveled quite a large distance: It is generally agreed that about five per cent of the reactor's radioactive fission products were widely dispersed. Gaseous and volatile fission products traveled the farthest. Iodine-131 and cesium-134 and -137 were detected in many parts of western and northern Europe, and traces were detected further field, in Japan and the USA for example. (Health Protection Agency, 2012, p.) Among the 1 50, 000 square kilometers of contamination, there is " an area spanning 30 kilometers around the plant that is considered the " exclusion zone" and is essentially uninhabited. " (International Atomic Energy Agency, 2011, p. 1) This area is still considered unsafe to humans today. As well " The entire town of Primary (population 49, 360), which lay only three kilometers from the plant was completely evacuated 36 hours after the accident. " (International Atomic Energy Agency, 2011, p. Multiple health effects in people were reported after the initial dose of radiation and years after the accident.

The initial dose caused acute radiation sickness, which Darlings on anything Trot nausea to eaten, appending on ten exposure. " 600 workers present on

the site during the early morning of 26 April 1986, 134 received very high doses and suffered from acute radiation sickness. Of those, 28 workers died in the first three months. " (Mega, 1987, p. 39) The long term effects included cases of thyroid cancer. The World Health Organization has been investigating the link between thyroid cancer and radioactive iodine exposure. They discovered in 2005, more than 6000 thyroid cancer cases had been found in people exposed to the Coherency radiation. World Health Organization, 2011) According to the World Health Organization, "... It is expected that increases in thyroid cancer incidence due to the Coherency accident will continue for many more years. " (World Health Organization, 2011, p. 1) Decontamination Efforts Emergency workers, known as liquidators, were called into the area of Coherency to try to contain the debris from the accident. The workers were made up of firefighters, plant employees, miners, and even soldiers. Rough estimates bring the number of liquidators called in to around 400, 000. International Chorally Research and Information Network, 2010) Their main focus was to contain the remains of the fourth reactor. The liquidators wore heavy protective gear, but still could only stay exposed to the radiation for up to 40 seconds at a time. (Mega, 1987) Helicopters were also brought in to deploy bags of sand, lead, and boric acid on the reactor, as it acts as a shield against radiation. The next step was to cover the reactor in a tomb of moment and steel to prevent any more leakage of radiation. The cement tomb was meant a temporary fix, but it still stands today.

There is an uncertainty as to its stability, but the Ukrainian government has plans to build another containment vessel in the near future. Due to the

heroic efforts of the clean-up crew, some 400, 000 received the title of "Liquidator" and received special benefits for their aid. Evacuations, water containment and filtration could have not have happened without them. (World Nuclear Association, 2012) Coherency Today As mentioned in the previous section, the structure containing the fourth reactor ay not be stable. The Coherency Shelter Fund, which was set up in 1997, is awaiting donors to create a new confinement structure. A New Safe Confinement structure is due to be completed in 2016, being built adjacent and then moved into place on rails. " (World Nuclear Association, 2012, p. 1) The new structure is planned to cover both the reactor and the cement tomb around it.