

Acid Rain in Germany

- Germany is a country of old forests, beautiful rivers, & historic artwork
- Over the past 30 years, acid rain has been destroying all of these things
 - It damages soil, harms trees, eats holes in the surfaces of statues/buildings, pollutes rivers, & kills wildlife



What is Acid Rain?

- Acid rain is a result of air pollution. When any type of fuel is burnt, lots of different chemicals are produced and released into the air and mix with water in the clouds.
- The rain from these clouds then falls as very weak acid.
 - It's not acidic enough to burn your skin, but it's very harmful for the environment.



Germany is Its Own Worst Enemy...

- Main source of acid rain is smoke from factories (burning fuels like natural gas, coal, & oil)
 - Germany is a top manufacturing country—leads the world in cars, steel, & chemical products—so it depends on these factories
- Cars & buses also produce harmful gases
 - Germans own more cars than people of most other countries do
 - ~ However, most of the pollution that comes into Germany, in which turns into Acid rain, is from other countries such as the U.K.
 - ~ The pollution is carried by the wind to other countries and falls as acid rain.

Acid Rain's Effect on the Environment:

- Acid rain can effect trees in several different ways, it may:
 - • dissolve and wash away the nutrients and minerals in the soil which helps the trees to grow.
 - • cause the release of harmful substances such as aluminum into the soil.
 - • wear away the waxy protective coating of leaves



Acid Rain in Germany

- Acid rain has destroyed nearly half of the Black Forest!
- This has harmed Germany's economy because one of its major natural resources is timber.



Solving the Problem:

- Plants that use water power are replacing many coal-burning factories
 - Developing new types of energy: leading producer of wind turbines & solar power
- German government has passed laws to reduce emissions from cars & factories
 - Factories are switching to cleaner fuels & building taller smokestacks that scrub the smoke before it enters the air

Air Pollution in the United Kingdom

- London, capital of UK, is famous for air pollution
 - Word “smog” first used in 1905 to describe air in London (thick fog + smoke)
- Thick London smog happens when water in the air mixes with smoke particles from a coal fire



The Great Smog of 1952

- Smog was so dense that, for 4 days, people in London could not see what was in front of them
 - Transportation slowed, crime increased, & thousands of people died from the pollution
 - People around the world became frightened & worried about the quality of the air they were breathing

Sources of Air Pollution

- In the past, the major source was smoke from burning coal
- Today, exhaust from cars & buses is the problem



Effects of Air Pollution

- Asthma and pneumonia are linked to vehicle emissions
 - Burns the lungs, nose, and eyes and endangers human life
- High air pollution keeps children & senior citizens indoors
- Blackens buildings & harms wildlife



UK's Solution

- Government set up “smokeless zones” where only smokeless fuels could be used
 - Also sets limits for industry & regularly checks air quality
- Laws have forced automakers to build vehicles that produce less harmful exhaust
- Cleaner coals, increased use of electricity, and use of gas have reduced air pollution, but UK still ranks in the top 10 in the world for harmful industrial emissions

Ukraine

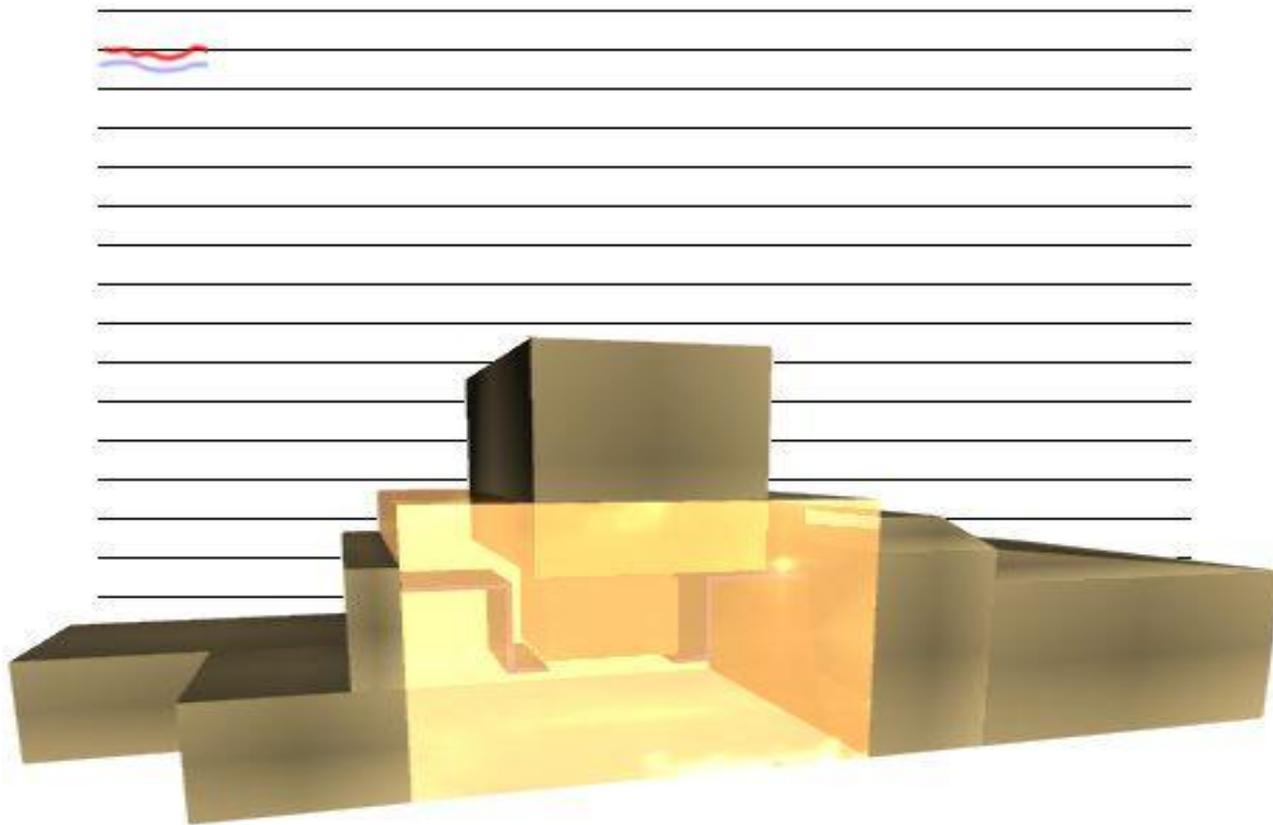
Chernobyl Nuclear Disaster

Ukraine

Chernobyl Nuclear Power Plant

- In 1986, the USSR generated 10% of the world's nuclear power.
- Chernobyl exploded on April 26, 1986
- 200,000 people evacuated to decrease exposure to radiation

What went wrong?

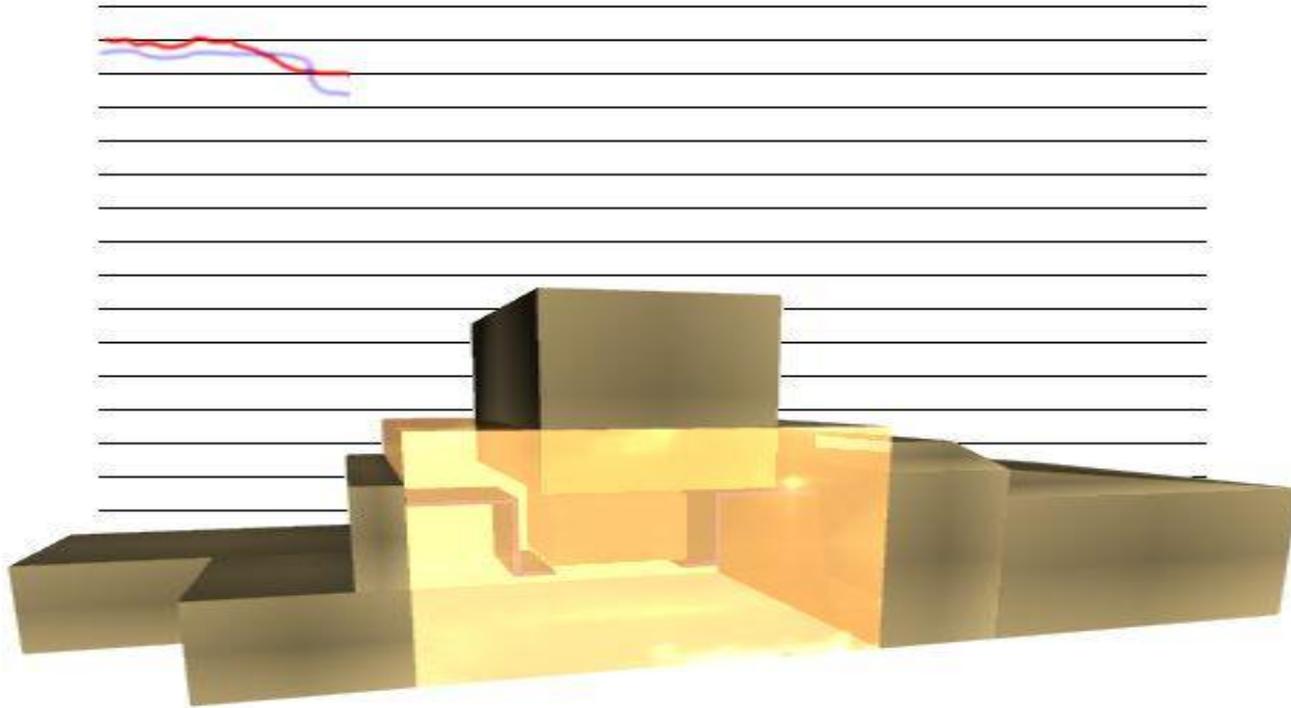


April 25th, 1:00 am

The reactor was scheduled to shut down for maintenance. While preparing for the shutdown, the operators wanted to perform a test to see how long the turbines could run the emergency cooling system if power is interrupted by an accident.

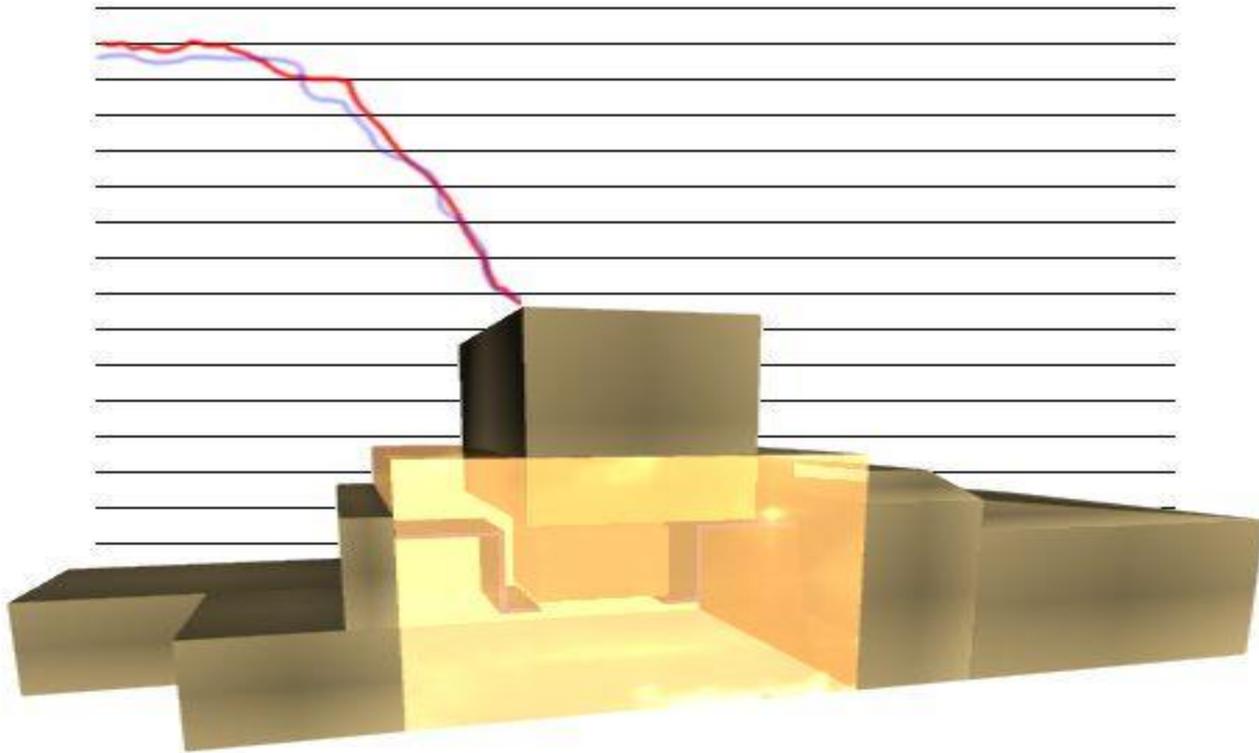
What went
wrong?

April 25th, 1:05 pm



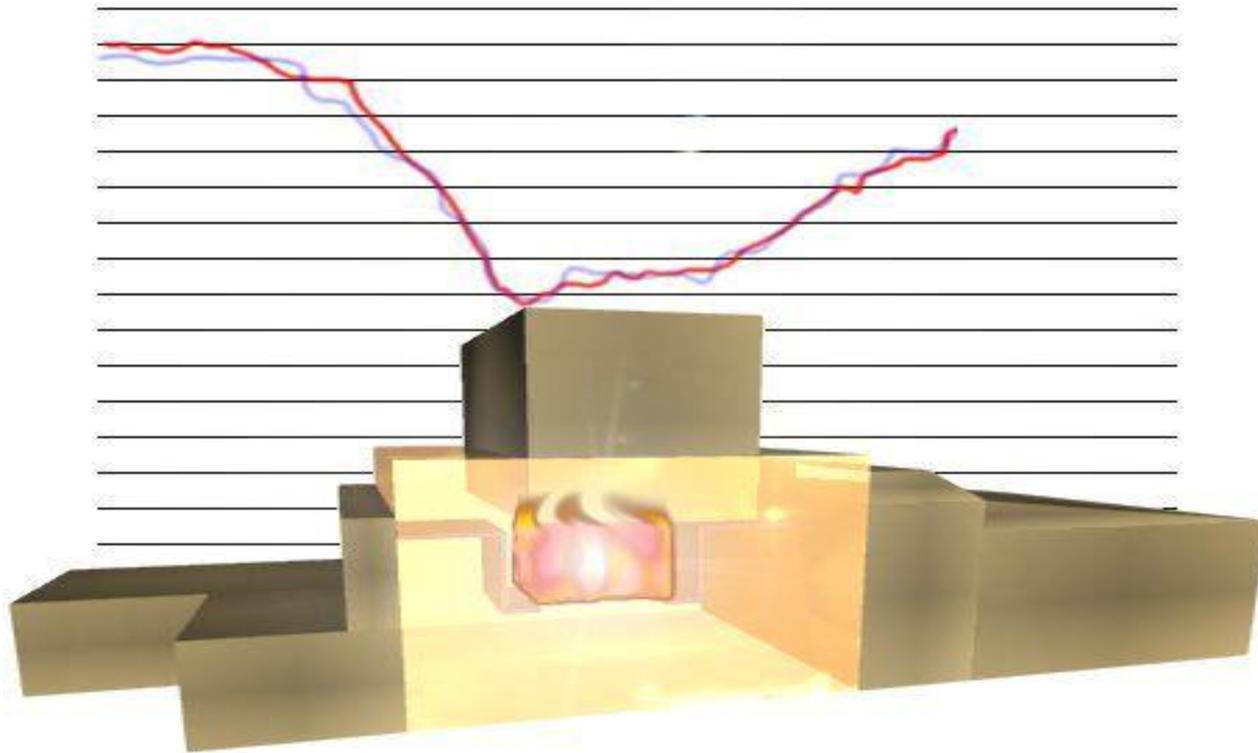
With the reactor "slowing" down in preparation for the shutdown, the power in Reactor No. 4 drops to about 1600 mega watts. The operators make a simple but fatal error by setting the regulator improperly.

April 26th, 12:28 am



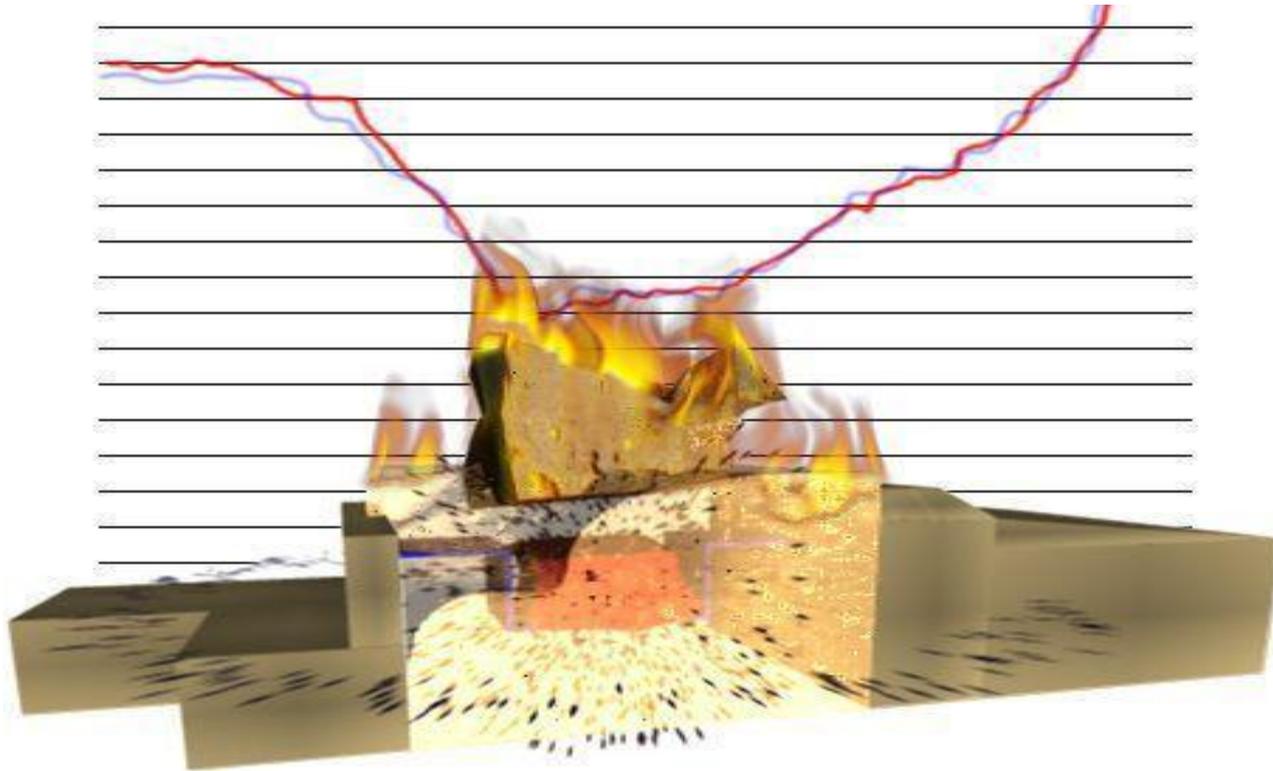
The power crashes down to only 30 mega watts.
The reactor is becoming hard to control.

April 26, 1:23am



- Thirty-six seconds after the test had begun, the shift supervisor attempts to drop all control rods back into the reactor realizing the power was rising beyond its limits. In four and a half seconds, the power level inside the reactor rises 120 times the reactor's capacity.
- The first explosion broke the pressure tubes, releasing steam which blew the containment lid off the reactor.

April 26, 1:24am

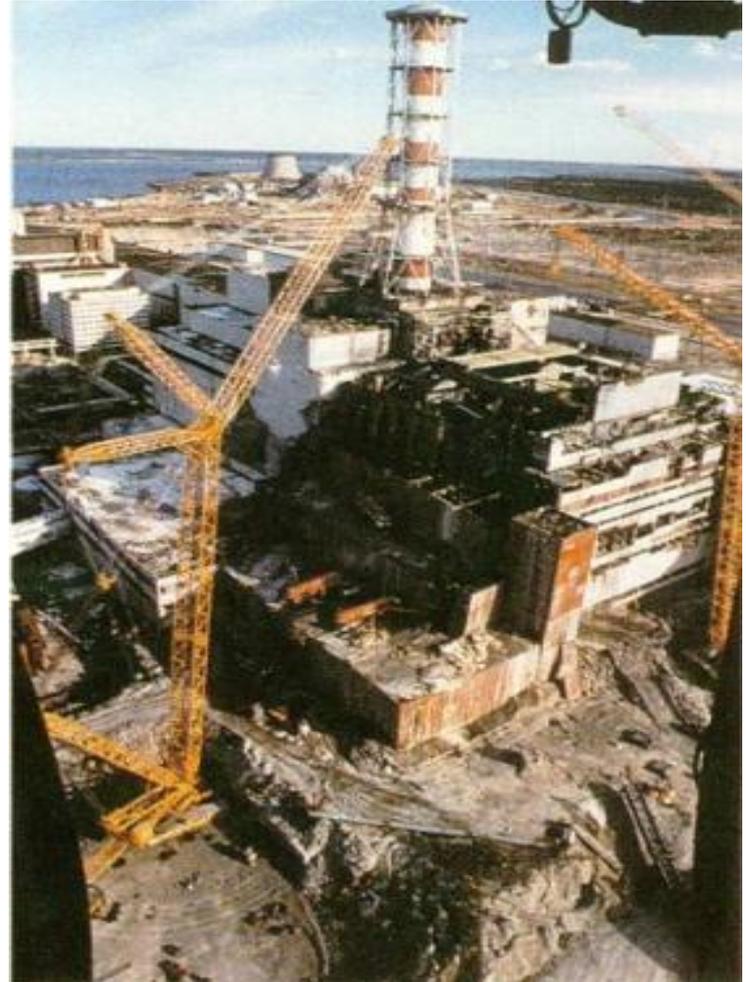


The second explosion was the reactor fuel and graphite inside the core exploding, sending chunks of graphite and other radioactive elements flying. It destroyed the building, and caused more than 30 roof fires.

What did it look like?



Before



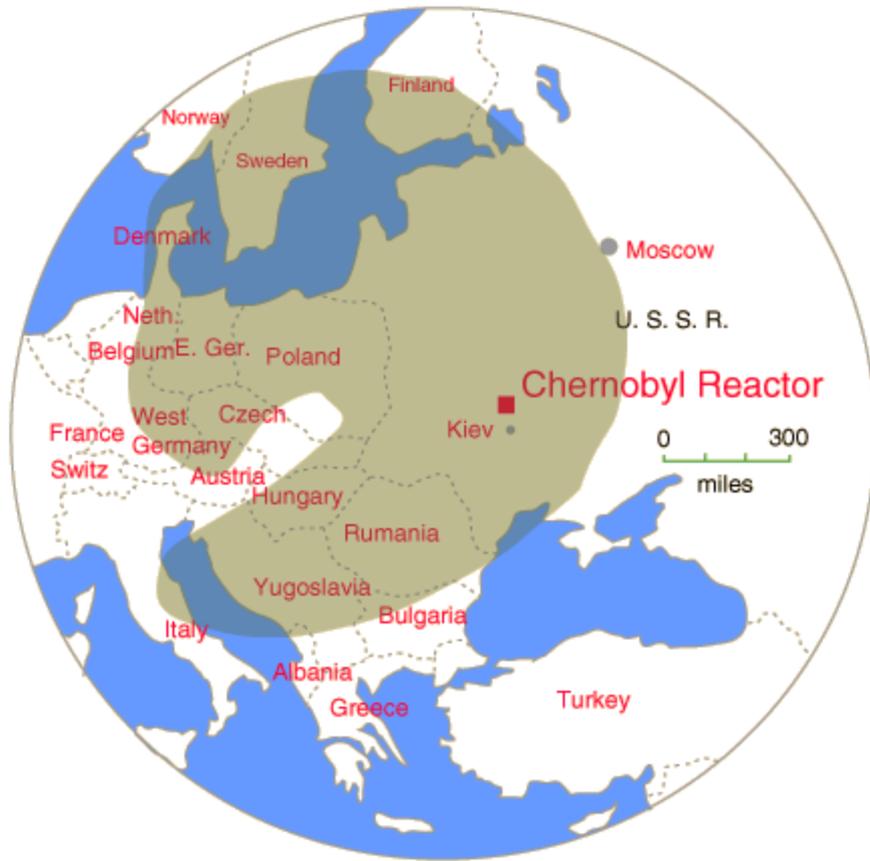
After

How did the country react?

- The morning after the explosion, there was no hint of a disaster.
- After 36 hours of being exposed to radiation, people were told to pack their clothing and evacuate their homes.
- There as was a 30 kilometer or 18 mile evacuation.



What was the effect on other countries?



- Nearly nine tons of radioactive material – 90 times as much as the Hiroshima bomb – were hurled into the sky.
- Winds over the following days, mostly blowing north and west, carried fallout into Belarus, as well as Russia, Poland & other countries around the world.

What about the environment?



- At the nuclear power station itself, several attempts were made to clear away and contain chunks of graphite and other radioactive solids.
- They sent in volunteers.
- The volunteers were only allowed to be in the power station for 90 seconds or less.
- The radiation levels were 15,000 times greater than a normal person's exposure in a year.

What about the environment?



- Any movable objects near the plant were buried; cars, trucks, and even topsoil.
- Some 60,000 buildings had to be washed with special chemicals, and even some roofs had to be replaced.
- A special solution was sprayed throughout the danger zone on streets and walkways to prevent radioactive dust from blowing and further contaminating the area.
- Nearby trees that had absorbed the radiation were all cut down and buried in concrete pits.



Is it still working?

- Chernobyl continued to produce electricity for another 14 years, until international pressure forced its closure in 2000.
- An official exclusion zone around the plant remains in place, extending for 30 kilometers (18 miles). It is one of the most radioactive spots on Earth.

- In the first months after the accident, 28 emergency workers died from acute radiation syndrome
 - Doctors have noticed an increase in cases of cancer who lived nearby
- Many animals died or suffered thyroid damage
 - Fish in nearby rivers were unsafe to eat for many years
- Millions of acres of farmland have been poisoned
 - Causes food shortages; hurts economy