The Chernobyl Accident and its impact on Belarus

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Where is Chernobyl?
-In Northern Ukraine
-10 miles away from Belarus
-80 miles North of Kiev

The Chernobyl Nuclear Power Plant
• Located 11 miles north of the city of Chernobyl
• Plant consisted of 4 reactors
• Produced 10% of Ukraine’s electricity
• Construction began in the 1970’s
• Reactor #4 was completed in 1983
• At the time of the accident, reactors #5 and #6 were in progress.

What happened?
Saturday, April 26, 1986:
-Reactor #4 was undergoing a test to test the backup power supply in case of a power loss.
-The power fell too low, allowing the concentration of xenon-135 to rise.
-The workers continued the test, and in order to control the rising levels of xenon-135, the control rods were pulled out.

What happened? cont’d
-The experiment involved shutting down the coolant pumps, which caused the coolant to rapidly heat up and boil.
-Pockets of steam formed in the coolant lines. When the coolant expanded in this particular design, the power level went up.
-All control rods were ordered to be inserted. As the rods were inserted, they became deformed and stuck. The reaction could not be stopped.
-The rods melted and the steam pressure caused an explosion, which blew a hole in the roof. A graphite fire also resulted from the explosion.
-To save money, the reactor was constructed with only partial containment, which allowed the radiation to escape. 13%-30% of the material escaped.

Immediate Impact
-203 people were hospitalized immediately. 31 of them eventually died. Most of these people were workers in the plant or local firefighters.
-NW winds from the Black Sea carried the radiation for miles in the following days. Scandinavian detectors picked up on the abundance of radiation, but the Soviet government denied everything.
West and Northwest Winds carried radiation

The Clean Up

- "Liqui dat ors"
  - These were firemen who helped put out the fires and helped clean up the radiation
  - Most did not realize the dangers of radiation
  - Many later died from radiation, because they didn’t wear protection
  - An estimated 8,000-20,000 to date have died (20% from suicide)
- Robots
  - United States supplied
  - Specifically designed to enter reactor core and help build the sarcophagus

The Clean Up

Clean Up

-70% of total fallout fell on Belarus
  - 20% of Belarus land area was evacuated
  - 130,000 Belarusians evacuated
  - 2.5 million Belarusians affected

Evacuation

- Following the accident hundreds of thousands of people had to be evacuated and between 1990 and 1995 an additional 210,000 people were resettled.

People evacuated:
- May 2-3 (1 week later)
  - 10 km area (45,000 people)
- May 4
  - 30 km area (116,000 people)

-50,000 people from Pripyat, Ukraine were evacuated 2 days after the accident.

Impact on Belarus

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Containment

- Cement sarcophagus built in the months after disaster
- 5,000 tons of sand thrown on top of reactor core
Belarus after Chernobyl

Abandoned city in southern Belarus

Effects of Radiation

- Belarusian doctors identify the following effects from the Chernobyl disaster on the health of their people:
  - 100% increase in the incidence of cancer and leukemia
  - 250% increase in congenital birth deformities
  - 1,000% increase in suicide in the contaminated zones

  - "Chernobyl AIDS"--the term doctors are using to describe illnesses associated with the damage done to the immune system

The Children of Belarus

- Children were much more affected by Chernobyl and the radiation, due to their weaker immune systems.
- 1991-1992--sickness rate among children almost tripled
- Threat to gene pool—fewer children being born.
- The following problems have increased in Belarusian children:
  - heart and circulatory diseases, malignant tumors, and disorders of the nervous system, sensory organs, of the bone, muscle and connective tissue system

Children cont’d

- It is estimated that 1 out of every 4 infants in Belarus will develop thyroid abnormalities.

- The normal rate of thyroid cancer would be only one in 1 million.

- In the immediate aftermath of the disaster, had the authorities supplied the children with preventive potassium iodine, it would have prevented many of the thyroid cancer cases.

Thyroid cancer

- The thyroid gland is the most vulnerable organ to radiation in the human body.

- Normally, this is a rare disease, with only 1 case per year being reported in Belarus before the Chernobyl accident.

- Thyroid cancer can take 10-30 years to show its effects.

- There has been a 2,400% increase in the rates of thyroid cancer in Belarus since 1986.

- In the Homiel region of Belarus, the region closest to Chernobyl, there has been a 100-fold increase in thyroid cancer.

http://www.chernobyl-international.com/aboutchernobyl/thyroidcancer.asp
Belarusian Landscape

The Land of Belarus
- 25% of the country’s farmland and forest contaminated at a dangerous level
- 10% of the land is unusable
- 1% of the entire land in Belarus was uncontaminated
- Forests ruined
- Many animals are dying as well from the radiation


The Land cont’d
- Plutonium’s half life is 24,400 years.
- The 30-km radius has been expanded into a 70-km radius, covering a portion of southern Belarus.
- Forest/brush fires have spread the radiation through the air.


Other problems...
- Food & Water
  - Milk—Farmers have to watch the radiation level in milk.
  - Fish—Cannot be eaten, as water absorbs radiation and fats concentrate it
  - Radioactive Floods every spring
- Lives ruined
  - Suicide and depression
  - Even healthy people were traumatized

http://library.thinkquest.org/3426/data/local-effects/agriculture.effects.html

Chernobyl Today
- The plant has been shut down by Ukraine.
  (Dec. 2000)
- The cement sarcophagus is falling apart, due to the quick emergency construction of it.
- The UN estimates that up to 9 million people have been affected directly or indirectly by the fallout.
- The full consequences will not be seen for at least another 50 years.

http://www.iwpr.net/index.pl?development/workshops/training_chernobyl0103.html

Belarus today
- Hundreds of abandoned towns
- Land still very contaminated
- Most of budget goes towards medical facilities
- Over the next 30 years, Belarus will have spent a total of $235 billion on dealing with radiation.
- Many areas will forever be radioactive.
- The present value of resources spent from the republican budget since 1991 amounts to about 20% of the 2001 GDP
- Belarus depends on most of its electrical power from Russia.
- Radiation is still a problem, especially in children

http://www.iwrp.net/index.pl?development/workshops/training_chernobyl0103.html
Living in the contaminated zone in Belarus today...

- People must change their clothes twice a day, and may not walk in the woods for more than two hours a month.
- Radiation level charts are printed in the newspapers and dictate decisions such as whether children can be allowed out to play.
- People are told to wash food at least five times in clean water, but nobody is told where this clean water is to be found.
- Cattle are not supposed to graze in areas where the grass is less than 10cm high so their mouths will not touch the earth.
- Most people find it impossible to follow these nearly impossible instructions, so they simply give up trying.
- There are also housing shortages in Belarus and the rest of the ex-Soviet Union. This is a problem because people have a hard time moving out of the contaminated zone, since there are no other places to live.

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