1. What was the Chernobyl Accident?
It is the worst reactor accident in the history of using nuclear energy. There was a power burst followed by steam and gas explosions at the Chernobyl #4 plant in the Ukraine.

2. When was the accident?
The accident happened on April 26th, 1986. The world did not find out about it until a few days later when the Soviet Union’s government told the outside world, after being asked. Sweden asked what had happened after picking up high amounts of unusual radioactive elements in routine air samples.

3. What happened?
The steam explosion lifted the reactor vessel head off. The steam created a chemical reaction and gas explosion that set the core graphite on fire. A hole was blown in the roof of the building, and burning core material landed on the roof, setting it on fire. The fire put a massive amount of radioactive material into the air, spreading it to several countries in amounts of concern. It was detectable around the world. The core was melting down and burning. It burned for 10 days.

4. Can it happen again?
No. The accident was unique to that model reactor, and could not have happened in any other type reactor.

5. Why did it happen?
The immediate cause was six errors by the Operators. The investigation by the international community revealed that there were design features that trapped the Operators, and made this unique design able to have such a terrible accident. The worst design trap was Bypass (“Battleshort”) Switches around the automatic safety shutdowns, which the Operators used, starting the accident. They were performing a generator engineering check that they had done twice before. It was after midnight, and they obviously lost track of what they were doing.

6. How was the reactor different?
The Chernobyl model reactor was designed to generate electricity and breed Plutonium-239 for weapons. Meeting these two objectives required a graphite (chemically like charcoal) core structure and on-line refueling. In addition, there was no western-style containment around the reactor, because the designers believed it would not be needed. Western-style reactors are designed only to generate electricity, have containments for the worst possible accident, and most shutdown to refuel. There were 29 reactors of the Chernobyl #4 model. The 15 still in operation were modified to make them safe.
7. I’ve heard 100,000 died. Is that true?
No. Several dozen plant staff and heroic responders died from radiation exposure. Many thousands were exposed to somewhat elevated radiation levels. Estimates using medical methods with large safety margins predict many thousands of lives shortened by a few years – dying at 78 instead of 80. The same methods also predict that if a person smoked for 10 years, then quit, they will die at 82 instead of 85.

8. What was the response then?
The fire was put out. Three hundred and thirty six thousand were evacuated and an area of many square miles quarantined. A temporary enclosure was quickly built around the damaged reactor building to minimize releases.
Several countries in Europe embargoed crops and destroyed farm animals, based on regulations that are ultra conservative applications of scientific knowledge of radiation effects. Chernobyl units 1-3 operated for years, the last shutting down in 2000.

9. What has been the follow up?
The site has been continuously monitored. The United Nations did a detailed health study 20 years after the accident. The study showed that the largest health effect was due to mental depression and efforts to cope with it. No health effects attributable to radioactive materials were found in most of the people. This is to be expected, since there are places in the world with very high natural exposure where people have been living successfully for generations, and people were evacuated from areas with lower levels.
The UN Chernobyl Forum documented 4,000 cases of thyroid cancer with 3,991 cured. Projections of long-term effects- such as dying at 78 instead of 80 – are controversial.
The Ukraine continued to build nuclear power plants. It has 15 in operation now.

10. What’s happening now?
A permanent enclosure is being built with international funding and support. Belarus is sending people back to evacuated villages.

11. What are the plans for the future?
Monitoring will continue.
The permanent enclosure will be completed. It is designed for 100 years.
At some time in the distant future, the Chernobyl plants will be decommissioned and removed. Waiting longer means, that radioactivity will have decayed more, making removal safer and less expensive.
Ukraine plans to build more nuclear power plants.
The Ukrainian government plans to open the evacuated area to tourism. Many people have visited the area over the years in controlled visits. There are still some restricted areas.

By
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