

## Topic 66: The Chernobyl Accident

The horror aroused by the use of two nuclear bombs in 1945 was somewhat mitigated by the realization that nuclear power also had the potential for peaceful applications. High among the possible benefits of nuclear power was its use in the generation of electrical power. For two decades after the dedication of the world's first nuclear power plant in Shippingport, Pennsylvania, in 1957 the world's industrialized nations continued to count on nuclear energy as a power source in the years to come.

By the late 1970s, however, attitudes about and hopes for nuclear power generation began to change, in the United States at least. One reason for this concern was the fear of a nuclear accident of massive proportions. Although the nuclear power industry's safety record overall was very good, critics still pointed to near-disasters like the Three Mile Island accident in 1979 as possible "worst-case" scenarios in a nation's reliance on nuclear power.

In 1986, critics were presented with an even more powerful argument about nuclear power plant safety. On April 26 of that year, an accident occurred in a Soviet nuclear power plant in the town of Chernobyl near the large industrial city of Kiev. A massive explosion in Unit 4 at the Chernobyl power station blew the concrete top off the plant. Flames, smoke, and radioactive dust and gases were released to the atmosphere.

For nearly a week, the Soviets released only modest amounts of information about the accident. During this time, news reports from outside the Soviet

Union speculated — sometimes wildly — about "hundreds" or "thousands" of victims of the accident. Lacking firsthand information from the host country, non-Soviet observers mixed factual information and reasonable guesses with improbable speculation and sales-generating panic headlines.

As radioactive fallout began to drift over Europe, however, the Soviets began to provide additional and more accurate data about the accident. By early 1987 they had provided a relatively detailed analysis of the accident.

Apparently the event occurred during a controlled test of the Unit 4 reactor. The objective of the test was to find out whether electrical energy could be obtained during the turbogenerator's "coast time." Coast time is that period during which the generator's steam supply has been turned off and the turbine continues to revolve as it coasts to a stop.

Investigators found that plant operators had made six specific errors during the test, each error contributing to the ultimate failure of the plant's safety system. During the final stages of the test, the fuel elements in the reactor essentially reached critical mass and, in less than 4 seconds, surged from about 100 megawatts of power to 320,000 megawatts, a hundred times the level at which it was designed to operate. At these temperatures, the core and cooling system essentially vaporized, blowing the reactor roof off and venting into the air.

### Questions

1. Read any report of the Chernobyl accident written shortly after the event and any technical or official report about the event one year later. What differences, if any, do you find in the two reports? What significance, if any, do you attribute to these differences?
2. To what extent does the Chernobyl event have significance for the construction and use of nuclear power plants in the United States and Canada?