

Aleksander Borovoi, the leader of the expedition, raised the obvious question: "We don't understand why so few foreign scientists have come to help." Borovoi appealed for a joint scientific and engineering effort. "We are fighting for an international effort," he said.

There were also shots of earlier phases of the work, in preparation for building the sarcophagus, the enormous protective structure built to shield the damaged reactor. At one point, when robots were not available (and, in fact, were not able to function in the intense radioactivity), a human chain of 3,400 "biorobots," Army volunteers, spent one minute each running on the roof of the reactor to pick up debris and throw it into the smoldering core. In that minute, they received the allowable limit of radiation. The general in charge, who himself suffered from acute radiation illness, handed each volunteer a certificate, shook his hand, and told him, "I wish you good health, and may you live to be a general."

At other points in the project, the scientists improvised, putting a camera onto a toy tank, remotely controlled, and sending it in to explore collapsed areas of the building that they could not reach.

"The Complex Expedition," as this effort was named, succeeded, despite the lack of equipment and protective gear. After two years, they located the mass of molten reactor fuel four meters under the reactor core. The hot fuel had mixed with the sand surrounding and insulating the reactor core and fused into a glassy mass, still intensely radioactive. The scientists named it the elephant's foot, because of its shape. The scientists could now be satisfied that there would not be a new chain reaction and a second explosion. Now their worry was that the sarcophagus was not secure, and in some places was falling down. They also worried that any major disturbance of the structure could set off clouds of radioactive dust that would pose a danger for the workers in the other Chernobyl units that were still operating.

When the documentary's interviewer asked the scientists what their biggest problem was, they did not hesitate. The shortage of money and equipment was severe, but the biggest problem, they said, was "the bureaucracy."

Lessons

Chernobyl is not the worst industrial disaster the world has seen, despite the continuing scare stories that dominate the news media. There can be a recovery of the land, of the people, of the industry. After all, Japan recovered after the atomic bombings.

But look at what has happened in the ten years since Chernobyl, and how matter-of-factly western society has tolerated the loss of human lives. Millions of people have died in needless wars in Africa and in the former Yugoslavia, or died from diseases or famine that could have easily been prevented, had the political will existed to stop them. Without this quality of political will, economic development in Africa—or in Chernobyl—will not take place.

The particular configuration of events that led to the Cher-

Nuclear energy in the former Soviet bloc

According to the U.S. Department of Energy's International Nuclear Safety Program, here is the breakdown of nuclear power in selected nations of eastern Europe:

Russia: Nuclear power supplies 12.5% of Russia's electricity. Of its 29 reactors, 11 are RBMKs, 13 are a more standard light-water design called VVER, 1 is a breeder reactor, and 4 are another type of graphite-moderated reactor.

Ukraine: There are 15 operating Soviet-designed nuclear power reactors, which provide 32.9% of Ukraine's electricity. (This does not include Chernobyl units 2 and 4, which are not operating.) Of these, 2 are RBMKs, and 13 are VVER design types. Five other plants are in construction.

Czech Republic: Four operating VVER power plants supply 29% of the Czech Republic's electricity. Two other plants are in construction.

Hungary: There are four operating VVER reactors at the Paks site in Hungary, which supply 43% of the nation's electricity.

Lithuania: Two RBMK reactors at Ignalia provide 87.9% of Lithuania's electricity. These 1,500 MW plants are the world's largest.

Slovakia: Four VVER type reactors, all at Bohunice, provide 53.6% of Slovakia's electricity. Another four VVER reactors are under construction.

nobyl accident could have been prevented, certainly, with a better reactor design. From the personal accounts of what happened, it is also the case that individual engineers in the plant at the time, who knew better, followed bureaucratic "orders" instead of doing what their knowledge told them had to be done. And once the accident occurred, the response of the Soviet government surely could have been different. Lives could have been saved.

It is also the case that the response from the West could have been different—and can still be different. The science and technologies exist to build advanced, safe nuclear plants relatively inexpensively. To ensure the political decision to use these technologies will require a different kind of thinking on the part of U.S. citizens, including the nuclear industry and the nuclear community. This will take the kind of personal courage displayed by the scientists who carried out "The Complex Expedition" at Chernobyl. As Popov said of their work: "But the job has to be done. . . . Somehow, the problem has to be solved."