

Japan Nuclear Crisis: How it happened?

Safety vows forgotten, 'safety myth' created

Wednesday 15 June 2011, by [Yomiuri Shimbun](#) (Date first published: 15 June 2011).

NUCLEAR CRISIS: HOW IT HAPPENED / Safety vows forgotten, 'safety myth' created

Three months have passed since the Great East Japan Earthquake triggered a nuclear crisis that shows little sign of ending anytime soon.

This is the fifth installment in a series that examines what caused the unprecedented crisis, which has dealt a fatal blow to the myth of the safety of nuclear power plants in this country.

A former employee of Tokyo Electric Power Co. still remembers the enthusiasm of the early days of atomic energy when he was sent across the Pacific Ocean to be trained to operate a nuclear power plant.

The 76-year-old former employee was involved in operating the Fukushima No. 1 nuclear power plant from when its No. 1 reactor went on-line in 1971 until he became a top executive at the plant in the 1990s.

In spring of 1969, TEPCO sent 16 workers in their 30s and 40s to the Dresden nuclear power plant southwest of Chicago, Ill. They underwent intensive training by General Electric Co. engineers, including on a nuclear plant simulator. "We really felt it was our mission to bring back nuclear power know-how and help it take root in Japan," he recalled.

After returning home, they translated GE's operation manuals and other resources into Japanese, eventually filling about 10 telephone book-sized volumes.

Whenever he entered the central control room for the No. 1 reactor, he said he made a vow to operate it safely. "We always felt a sense of urgency that any mistake could lead to an accident," he said.

He said TEPCO also stressed safety. The utility was proactive about adopting operators' suggestions for improvements, such as by installing a different type of emergency light in better locations. Improving safety was always top priority, according to the former employee.

While learning from their experiences, domestic engineers aggressively adopted technology from overseas. Over time, Japan's nuclear industry changed from student to teacher.

From 1992 to 2001 the Japanese government accepted about 1,000 trainees from nations of the former Soviet Union and eastern Europe. The program

was designed to spread a culture of safety at nuclear power plants around the world.

"We believed Japan's nuclear plants were top class. But there was probably a bit of overconfidence there," said a former top TEPCO official, 68, who was in charge of developing new plants.

According to government opinion polls from the 1980s and '90s, however, more than half of respondents continued to express "worry over nuclear plants," likely reinforced by the Chernobyl accident in 1986 and the criticality accident at JCO Co.'s facility in Tokaimura, Ibaraki Prefecture, in 1999.

Shunichi Tanaka, former acting chairman of the Atomic Energy Commission, said people in the nuclear industry were always on guard.

"If we even mentioned there was a slight possibility that nuclear plants were dangerous, antinuclear advocates pushed for shutting every plant down," he said. "So, we just kept on declaring the plants were safe."

This combination of overconfidence and trapping themselves with their own words gradually built up the "safety myth" of nuclear power plants.

"You can take all kinds of possible situations into consideration, but something 'beyond imagination' is bound to take place, like the March 11 tsunami," said the former plant operator. "The possibility of a worst-case scenario should have been assumed, and there should have been a reliable system in place with proper training to keep damage to a minimum."

The United States, which has provided Japan with nuclear technology and currency has 104 reactors, began a secret program called "B5b" in the wake of the Sept. 11, 2001, terrorist attacks to prepare for a possible loss of power to reactors.

The program was designed to prevent serious radiation leakage even if an aircraft crashed into a nuclear plant, and also to ensure plants could withstand natural disasters like floods or tornados.

A senior official of the U.S. Nuclear Regulatory Commission, which was in charge of planning the program, said confidently there was "no possibility" that any U.S. nuclear facility could lose all its cooling functions, as occurred at the Fukushima plant.

The San Onofre nuclear power plant on the Pacific Coast in California houses its four backup generators in a reinforced concrete building, separate from the power plant and designed to withstand being hit by a tsunami.

Sin of complacency

Japan, in fact, had ample opportunity to bolster disaster-prevention measures at domestic nuclear facilities.

The first opportunity came after the 1979 accident at the Three Mile Island nuclear facility in Pennsylvania, in which the world witnessed the first core meltdown of a nuclear reactor. But it was not until 13 years later that Japan's Nuclear Safety Commission revised its position that no serious accident could take place as long as its safety guidelines were followed.

Based on lessons learned from the Three Mile Island accident, in which mechanical troubles were compounded by operation errors by workers, the NSC asked electric utilities to come up with countermeasures for a "severe accident" beyond the specifications their reactors were designed to withstand.

In written instructions issued in May 1992, the NSC said the new guidelines for severe accidents would surely reduce the risk of such accidents from an already low level.

In 1994, TEPCO adopted a new policy to enhance safety at its nuclear plants. It decided to increase the number of emergency power sources by installing additional backup diesel generators and other means.

At the Fukushima No. 1 facility, the utility equipped the Nos. 2, 4 and 6 reactors with air-cooled backup generators from 1997 to 1999, in addition to 10 water-cooled generators already at the six-reactor complex.

The March 11 earthquake and tsunami, however, painfully exposed the insufficiency of these measures, which were meant to ensure emergency power would not be lost.

In the calamity, only one of the air-cooled generators for the No. 6 reactor, which sat 13 meters above sea level, was still operable after the tsunami. The generator barely got the Nos. 5 and 6 reactors into a state of stable cooling.

The other air-cooled generators at the Nos. 2 and 4 reactors—even though they were 10 meters above sea level—were rendered useless when the tsunami submerged their switchboards. All 10 of the plant's water-cooled emergency generators were also inundated.

"We took it for granted that the quake-resistant design of our Fukushima and other nuclear plants was fail-safe," one former TEPCO executive said. "But I now doubt how serious we were about preparing for a severe disaster." "If only we'd put the backup generators on even higher ground away from the reactors, the Nos. 1 to 4 reactors might not have been damaged," he said.

Guidelines sat unchanged

The "safety myth" of the nation's nuclear plants lay behind this failure to fully implement preparations for severe accidents.

Safety inspection guidelines the NSC revised in 1990 said, "We do not need to take into account the danger of a long-term power severance, as

we could anticipate recovery of power transmission lines and emergency generators in a short period of time."

The first sentence of a TEPCO report from March 1994 on action to be taken in the event of a serious accident said, "Our country's nuclear power plants have attained a high degree of safety from a global point of view."The report emphasized,"It is inconceivable that a severe accident could actually occur."The report seemed to imply that efforts to prevent an"inconceivable"accident would be a waste of time and energy."The NSC's guidelines for coping with a severe accident were left unchanged since they were set in 1992, and no additional steps were taken," said a preliminary government report on the Fukushima crisis submitted June 7 to the International Atomic Energy Agency.

The Yomiuri Shimbun

P.S.

* The Yomiuri Shimbun, June 15, 2011
<http://www.yomiuri.co.jp/dy/national/T110614004853.htm>