Fukushima’s failure traced to U.S. design, miscommunication, Tepco lack of preparedness, problems with nuclear safety administration...

Tuesday 21 June 2011, by Asahi Shimbun, Japan Times, Kyodo News, Mainichi Shimbun, YAMAGISHI Kazuo, YOSHIDA Reiji (Date first published: 18 June 2011).

Contents

Head of Japan’s nuclear safety panel expresses regret

TOKYO (Kyodo) — Haruki Madarame, the chairman of the Nuclear Safety Commission of Japan, has expressed deep regret over inadequate efforts to enhance the safety of nuclear power generation in the wake of the nuclear crisis, acknowledging the commission’s role of monitoring the country’s nuclear policy is one of the issues that need to be reevaluated.

In a recent interview with Kyodo News, Madarame, 63, also indicated that he does not cling to the notion that the safety commission must be kept as it is, though saying that its role of presenting basic ideas about nuclear safety “will never fade away.”

After the crisis at Tokyo Electric Power Co.’s Fukushima Daiichi nuclear power plant triggered by the March 11 earthquake and tsunami, the government has drawn up a report calling for a review of the country’s regime for overseeing nuclear power policy.

Madarame’s candid admission of problems with nuclear safety administration will likely have some impact on discussions on the fate of atomic power plants as well as on regulatory policy.

On Japan’s nuclear safety administration, Madarame, who has been the commission’s chair since April 2010, said, "Our country’s way of enforcing regulations was perhaps rigid. I am sincerely repenting over this."

A former University of Tokyo professor, he said the commission’s oversight activities on nuclear policy "should be evaluated to see if

they have been effective."

Madarame said the International Atomic Energy Agency had pointed out some problems with the role of the Nuclear and Industry Safety Agency under the Economy, Trade and Industry Ministry, which promotes nuclear power. Yet Japan “had not finished addressing” them, he said.

Japan’s nuclear safety regulations are undertaken by the safety agency, which conducts safety screening and scheduled inspections of power plants, and by the safety commission that overseas the agency’s activities and also works out safety guidelines.

This setup was called into question after a series of incidents such as sodium coolant leaks at the advanced nuclear power reactor Monju in 1995, an explosion-caused radiation accident at the fuel reprocessing plant at Tokaimura and the reactor suspension at TEPCO’s Kashiwazaki-Kariwa plant after the 2007 quake.

The IAEA recommended Japan clarify the roles of the safety agency and the safety commission but no radical reform has been undertaken.

Lacking its own team of technical specialists, the commission has also been criticized for having been rubber stamping authorization of nuclear power plant plants screened by the industry ministry.

Madarame said swift safety enhancements have not been taken in revamping various guidelines set out by the safety commission on quake resistance and other issues. "They have hardly been reviewed because a review, once started, would pose a rather considerable challenge," he said.

On the responsibility of the safety commission for the nuclear accident, he said, "Given that not much progress was made in reviewing the guidelines, it was omission in a sense" but he fell short of saying how the commission would take responsibility, saying it will be left up to the third-party panel looking into the cause of the accident to decide.

He admitted that Japan’s safety regulations have been lagging behind international standards.

In Europe and North America, measures have been taken for a possible severe accident following the 1979 Three Mile Island and 1986 Chernobyl disasters.

In Japan, the safety commission also recommended measures against a severe accident but the government did not make such measures officially required, effectively leaving them to utility companies who are urged to take such steps voluntarily.

IAEA safety standards provide for methods of quantifying risks to the safety of nuclear power plants by computing the probability of possible accidents and problems, but Madarame said, "Just when we were about to embark on it, the big accident came."

Mainichi Shimbun , June 19, 2011
http://mdn.mainichi.jp/mdnnews/national/news/20110619p2g00m0dm022000c.html

---

Tepco report reveals lack of preparedness. New timeline details early days of crisis

Tokyo Electric Power Co. has released a 41-page timeline detailing its initial actions in the first days of the Fukushima nuclear plant crisis, and experts said it reveals a lack of preparedness and severe difficulty in coping with the world's worst atomic accident since the 1986 Chernobyl meltdown.

According to Tepco, plant director Masao Yoshida ordered staff to prepare to lower the pressure in reactor No. 1 by venting steam from its containment vessel at 12:06 a.m. on March 12, more than eight hours after the 9.0-magnitude earthquake and tsunamic knocked out power to the plant and triggered the crisis.

But Tepco's records, released Saturday, show it did not have crisis-management manuals that detailed the procedure for manually opening the valves in the event of full power loss.

Only after the situation had turned into a full-blown crisis did Tepco send workers into a quake-damaged building at the compound to grab the documents needed to check the design and other specifications of the release valve to see if it could be opened manually.

At that point, Tepco learned that the valve actually had a handle for doing exactly that, the utility said in the report.

"Tepco should have prepared a manual on (manual) venting in advance, but it seems that wasn't the case," Keiji Miyazaki, professor emeritus at Osaka University and an expert on reactor accident management, said Sunday.

"Tepco also should have started the venting procedure right after the station blackout occurred," he said.

The report also revealed that industry minister Banri Kaieda ordered Tecpo to "manually open" the valves to vent steam from reactor 1 at 6:50 a.m. on March 12.

But Tepco didn't send anyone to open the valves until 9:04 a.m., after confirming that all residents of Okuma, one of the towns that hosts the power plant, had been evacuated from areas at risk of being contaminated by the radioactive steam and other materials that would be released in the process.

To prevent a critical failure, the pressure should have been released from the reactor's containment vessel, which would have allowed workers to inject more coolant water into the core.

Tepco managed to open the valves and release steam from reactor 1 at 2:30 p.m. But hydrogen generated from the already melting fuel rods exploded and blew up the building at 3:36 p.m.

In the report, Tepco emphasized a number of difficulties that hindered its efforts.

All the lights in the central control rooms of reactors 1 through 3 eventually went dark after tsunami

knocked out auxiliary power supplies at 3:42 p.m. on March 11.

At 9:51 p.m. that day, the main building of reactor 1 was declared off-limits because of rapidly rising radiation inside.

At 3:45 a.m. March 12, workers opened a double-entry door to the reactor building to check radiation levels and prepare for venting. But after seeing a “white haze” inside, they immediately closed the door to avoid radiation exposure, the report said.

Meanwhile workers struggled to connect cables from power-generator trucks to the reactors’ facilities to restart their vital coolant systems to prevent the fuel rods from melting down and releasing radioactive materials.

But darkness, debris, puddles and repeated tsunami warnings hindered their work by forcing them to repeatedly evacuate.

The hydrogen explosion at reactor 1 also damaged some of the cables they laid, prompting the workers to evacuate to the radiation-proof main operation center at the plant, Tepco said in the report.

“Workers were quite tough, given the loss of power supply and aftershocks. (The crisis) was an accident that had gone far beyond the assumptions in our accident management (planning),” Junichi Matsumoto, a Tepco executive and spokesman, said during a news conference Saturday.

By REIJI YOSHIDA, *Japan Times* Staff writer, June 20, 2011
http://search.japantimes.co.jp/cgi-bin/nn20110620a2.html

Fukushima’s power emergency failure traced to U.S. design

The accident at the Fukushima No. 1 nuclear power plant following the Great East Japan Earthquake and tsunami of March 11 quickly worsened and spun out of control because the U.S.-styled design for its emergency power sources had been adopted without modification 40 years ago—a source at Tokyo Electric Power Co., the plant operator, told The Asahi Shimbun.

In the U.S. design, emergency power generators are installed underground to guard against tornadoes and hurricanes. The Fukushima plant was, however, swamped when the tsunami rose more than 10 meters above the normal sea level along the coast and knocked out its power supply in the blink of an eye.

In the U.S. nightmarish scenario, used in the 1960s to draw up protection measures against nuclear plant disasters, violent winds, as strong as 360 kph, strike the plant. A giant tree growing nearby, uprooted and airborne, crashes through the walls of a reactor building like a missile and destroys the emergency power sources. The emergency power generator is located in a turbine building, which has thinner walls than the reactor building next door. Thus, it was deemed safer to install the emergency power generator underground to protect it from a “tree missile,” explained the TEPCO source.

General Electric Co. and other U.S. enterprises took the helm in building the Fukushima No. 1

plant's No. 1 reactor, which was TEPCO's first nuclear reactor. The contract was called "full turn-key," which meant that TEPCO had only to turn the key to start operations. All technical questions were left to the U.S. contractors.

Design of the No. 2 and newer reactors, where Toshiba Corp., Hitachi Ltd. and other Japanese manufacturers had greater roles to play, also basically followed the playbook of the No. 1 reactor. There was not enough time to review the design to account for different natural disasters in Japan and the United States, including tsunami.

"We built them the way they told us to build them, because they said they wouldn't guarantee safety unless we built them according to the U.S. specifications," recalled a former senior official at the former Ministry of International Trade and Industry.

Forty years have passed since the Fukushima No. 1 reactor began operations, but the design was never reviewed.

"Emergency power generators are heavy and they cause vibrations. Their relocation would have meant radical redesign of entire buildings," said the TEPCO source.

As a result, 10 emergency power generators, a significant part of the total 13 at the No. 1 through No. 6 reactors of the Fukushima No. 1 power plant, were installed in the first basement. Only one generator, installed on the ground floor of the No. 6 reactor, escaped water damage when the tsunami hit. All power sources to cool down the nuclear reactors were lost, and the No. 1 through No. 3 reactors, which were operating at the time, suffered meltdowns.

Around Japan, the U.S.-styled design was adopted at other nuclear power plants, such as the Hamaoka nuclear power plant in Shizuoka Prefecture, where all operations have been halted at the request of Prime Minister Naoto Kan. As the emergency power generators were located on the ground floor of the reactor buildings, Chubu Electric Power Co., the plant's operator, installed new power generators on building rooftops as an emergency measure.

Direct transplant of technologies from overseas is a pitfall inherent to Japan's technological philosophy, said economic analyst Katsuto Uchihashi, who is familiar with the introductory phase of nuclear technologies.

"Development of technologies in postwar Japan went either of the two ways: try to develop them independently by learning from other countries, or rely entirely on other countries in introducing them. The Fukushima No. 1 power plant typically illustrates the latter option. People relied totally on a U.S. design without considering different natural conditions. The idea of bringing in technologies as a whole is a problem common to other fields, including space development and semiconductors," he said.

BY KAZUO YAMAGISHI, *Asahi Shimbun* Staff Writer

IAEA report says Japan's disaster response may have been slowed by

miscommunication

The International Atomic Energy Agency (IAEA) warns that complexity of organizations may have slowed Japan's response to the ongoing crisis at the Fukushima No. 1 Nuclear Power Plant in an unreleased report obtained by the Mainichi on June 17.

In the 160-page report, based on a visit to Japan by an IAEA research team from late May to early June, the United Nations nuclear watchdog appears to be sounding an alarm to Japan because of communication problems seen between the Tokyo Electric Power Co. (TEPCO), nuclear plant regulators and the national government that slowed the country's response to the disaster.

The report notes the lack of coordination between TEPCO and the government when they each set up their own task forces after the disaster. This caused a delay in venting gas from the reactors to reduce the inside pressure, setting the stage for the hydrogen explosions that damaged the reactor buildings. Delays in cooling the reactors allowed the fuel rods to be damaged.

The report also says the nuclear power plant was not fully prepared against tsunamis. In a section on lessons to be drawn, the report says that protective measures for nuclear plants need to consider even the rare cases where multiple outside dangers overlap. It particularly warns of the dangers of tsunamis and floods and calls for the introduction of early tsunami warning systems.

The report also says we can learn that in the event of damage from outside factors across a wide area, nuclear facilities need to be able to get enough support from outside in the form of equipment and trained staff.

The report, together with one from the Japanese government, is expected to be discussed at the IAEA ministerial meeting opening in Vienna on June 20. Discussion of the causes of the Fukushima nuclear crisis, Japan's response, and stepping-up of safety measures will be on the agenda for the meeting.

Mainichi Shimbun , June 18, 2011
http://mdn.mainichi.jp/mdnnews/news/20110618p2a00m0na022000c.html

---

P.S.

* Asahi Shimbun, June 17, 2011
http://www.asahi.com/english/TKY201106160177.html