Fukushima 1 year on: Poor planning hampered Fukushima response

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One year after an earthquake and tsunami hit Japan on March 11, 2011, an independent investigation panel has highlighted the country's failures in disaster planning and crisis management for the accident at the Fukushima Daiichi Nuclear Power Station. The article, out now in the *Bulletin of the Atomic Scientists*, published by SAGE, shows that agencies were thoroughly unprepared for the cascading nuclear disaster, following a tsunami that should have been anticipated.

The Rebuild Japan Initiative Foundation established an independent investigation panel to review how the government, the Tokyo Electric Power Company (Tepco), and other key actors responded during the disaster. The foundation's chairman, Yoichi Funabashi, and staff director of the investigation panel, Kay Kitazawa, explain the reasons behind the lack of disaster preparation; their findings are based on interviews with nearly 300 people involved in the accident, including then-Prime Minister Naoto Kan.

Their article highlights how Kan secretly instructed Shunsuke Kondo, chairman of the Japan Atomic Energy Commission (AEC), to draw up a "worst case scenario" for the nuclear accident as the crisis deepened—that is, six increasingly drastic scenarios that would play out as various systems at the nuclear plant failed. The panel obtained a copy of this plan and the authors present an excerpt in their article in the Bulletin. The most extreme scenario would have involved evacuation of all residents living within 170 km or more of the Fukushima plant, and, depending on the wind direction, could have meant evacuating the 30

million residents in the Tokyo metropolitan area.

According to the investigation, the tsunami could and should have been anticipated. Earlier research on the Jogan tsunami of 869 AD showed that high water levels should not have been considered "unprecedented" along the Japanese coastline where Fukushima is located. Tepco's own nuclear energy division understood the risk, but the company dismissed these probabilities as "academic." Regulatory authorities also encouraged the company to incorporate new findings into its safety plans, but did not make these measures mandatory.

Many human errors were made at Fukushima, illustrating the dangers of building multiple nuclear reactor units close together. Masao Yoshida, the director of the Fukushima Daiichi Nuclear Power Station at the time of the accident, had to cope simultaneously with core meltdowns at three reactors and exposed fuel pools at four units. The errors were not the fault of one individual, but were systemic: When on-site workers referred to the severe accident manual, the answers were not there. And those who misjudged the condition of the emergency cooling system had never actually put the system into service; they were thrown into a crisis without the benefit of training.

The authors write that Tepco bears the primary responsibility for incompetent handling of the disaster's aftermath. The organisation failed to make rapid decisions, losing government trust in the process.

The article highlights government regulators, including the Nuclear and Industrial Safety Agency (NISA), and the Nuclear Safety Commission (NSC) for their poor response. The Japanese government's System for Prediction of Environmental Emergency Dose Information (SPEEDI) was designed to help governments decide when to evacuate in the event of a radioactive leak. The system was not used, negating the time and money invested in developing the system in the first place. The Japanese

government is now considering the creation of a new nuclear safety agency to replace NISA and NSC and be constructed as an external organ of the Environment Ministry.

A public myth of "absolute safety," nurtured by nuclear power proponents over decades, contributed to the lack of adequate preparation. The public was also ill-informed about the meaning of reported radiation levels.

"It's clear from our investigation of the Fukushima Daiichi accident that even in the technologically advanced country of Japan, the government and the plant operator, Tokyo Electric Power Company, were astonishingly unprepared, at almost all levels, for the complex nuclear disaster that started with an earthquake and a tsunami," say the authors. "And this grave oversight will affect the Japanese people for decades."

"Ultimately, the final outcome of studies of Fukushima Daiichi should be an intense effort to build up the resilience of the country, its organizations, and its people, so future disaster can be averted or responded to effectively," the authors conclude.

More information: Further information is also available online at: rebuildjpn.org/en/

Fukushima in review: A complex disaster, a disastrous response by Yoichi Funabashi and Kay Kitazawa is published today 2nd March in the *Bulletin of the Atomic Scientists.* bos.sagepub.com/

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