Fukushima: Reflections six months on

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When the Tohoku earthquake and subsequent tsunami hit the Fukushima Daiichi Nuclear Power Station on March 11, 2011, the world witnessed the largest nuclear incident since the 1986 Chernobyl disaster. In a special Fukushima issue of the *Bulletin of the Atomic Scientists*, published today by SAGE, experts examine the current and future impact of Fukushima, what might have been done to lessen the scale of the accident, and the steps we need to take both in Japan and worldwide to prevent another nuclear tragedy. This content will be free to access for a limited period.

In the article Deconstructing the zero-risk mindset: The lessons and future responsibilities for a post-Fukushima nuclear Japan, Tatsujiro Suzuki revisits the tragedy at the nuclear power station, and highlights a few of the most pressing – and most challenging – of the government's plans. "Fukushima should not just contain lessons for Japan, but for all 31 countries with nuclear power," says Suzuki, who is vice-chairman of the Japan Atomic Energy Commission.

Nuclear or not? The complex and uncertain politics of Japan's post-Fukushima energy policy by Masa Takubo, an independent analyst on nuclear issues and a member of the International Panel on Fissile Materials, highlights the complex power struggle underway over the future of nuclear energy in Japan. "Despite the seriousness of the Fukushima crisis, Japan's historical commitment to nuclear power – and a fuel cycle that includes reprocessing and breeder reactors – still has powerful supporters," Takubo says. Even with a scale-down of nuclear power, the political inertia in addressing spent nuclear fuel reprocessing

will most likely continue.

Frank N. von Hippel, co-founder of the Program on Science and Global Security at Princeton University and co-chair of the International Panel on Fissile Materials, looks at the projected health impacts following Fukushima in his article, The radiological and psychological consequences of the Fukushima Daiichi accident. Using the known after effects from Chernobyl and contrasting the extent of the incidents, von Hippel finds that the area in Japan contaminated with cesium-137 – at the same levels that caused evacuation around Chernobyl – is about one-tenth as large. The number of thyroid cancer cases is likely to be much smaller due partly to action taken by the Japanese Government in terms of evacuation and stopping people from consuming contaminated milk. However he cautions that the psychological effect on those living in the contaminated area could be substantial and must be addressed.

Physicist Edwin S. Lyman challenges nuclear industry claims that a Fukushima-type event is unlikely to happen in the United States, because few US nuclear power plants are vulnerable to tsunamis. In his article Surviving the one-two nuclear punch: Assessing risk and policy in a post-Fukushima world, he writes that every nuclear plant is vulnerable to natural disaster or deliberate attack, and a nuclear plant can only handle events it is engineered to withstand. "Many US nuclear plants appear to be subject to greater risks than they were designed to handle," he says, "particularly in regard to earthquakes." The author suggests that the US Nuclear Regulatory Commission should require reactors to be upgraded to withstand a greater range of eventualities.

Sharon M. Friedman looks at media coverage in her article, Three Mile Island, Chernobyl, and Fukushima: An analysis of traditional and new media coverage of nuclear accidents and radiation. A significant difference in Fukushima coverage compared with the earlier incidents was the enormous amount of information available on the Internet. In

addition to journalist contributions, citizens contributed significantly via social media. The Internet also provided many opportunities for better coverage, with more space for articles and the ability to present interactive graphics and videos. "Radiation coverage of the Fukushima accident was better than that for the Three Mile Island or Chernobyl accidents," says Friedman, although "television reporting still presented some problems."

In their article Fukushima: The myth of safety, the reality of geoscience, Johannis Nöggerath, Robert J. Geller, and Viacheslav K. Gusiakov look at the anzen shinwa (safety myth) image portrayed by the Japanese Government and electric power companies, and how it stifled honest and open discussion of the risks to nuclear installations from seismic events. Opportunities were missed: Between the 1970s and the 2011 disaster, new scientific knowledge emerged about the likelihood of a large earthquake and resulting tsunami. "Japan's seismological agencies are locked into outdated and unsuccessful paradigms that lead them to focus on the hazard of a supposedly imminent earthquake in the Tokai district, located between Tokyo and Nagoya, while downplaying earthquake hazards elsewhere in Japan," the authors say.

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