

Japan's Nuclear Power Plants under Scrutiny

The impact of the July 16 earthquake in Japan on a large nuclear power reactor near Niigata has raised issues about transparency and safety.

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I would like areas that host nuclear facilities around the world to treat this [the earthquake at the Kashiwazaki-Kariwa nuclear power plant] as if it were their own case.

— Akira Amari, Japan's minister, in-charge of overseeing the energy industry, August 9, 2007.¹

What happened at Tokyo Electric Power Company's (TEPCO) Kashiwazaki-Kariwa nuclear power plant (a facility consisting of seven boiling water reactors) was certainly unpredictable, as earthquakes are, and extraordinary. On July 16, a magnitude 6.8 quake hit about 60 km south-west of the city of Niigata and some 17 km below the bottom of the sea of Japan. "Its maximum intensity registered an upper 6 on the Japanese scale² of 7. It did not occur in a submarine trench where the Pacific tectonic plate slips under the continental tectonic plate; instead a strain in the continental plate caused a fault to slip."³

In March 2007, a magnitude 6.9 earthquake also did serious damage to the area around the Noto peninsula in Ishikawa prefecture and which also occurred in the Sea of Japan, not far way from Niigata. Three years earlier, in October 2004, a magnitude 6.8 earthquake hit the inland area of Niigata prefecture. In fact, records show that over the past century, Japan has experienced an average of one magnitude 7 or greater quake yearly. The "big one", a massive earthquake, according to calculations by the cabinet office's central disaster prevention council, has a 30 per cent chance of hitting Tokyo within the next decade and a 70 per cent chance within 30 years. Thus, to those who live in the Japanese archipelago, earthquakes of varying intensities are pretty common occurrences and hence every Japanese citizen and foreigner is asked by their local municipality to keep a survival kit of food and water for a few

days, radio, and a first aid kit ready.

The quake caused 11 deaths, left more than 2,000 people injured, and 3,000 people were living in shelters in the city as it destroyed hundreds of homes, although none of the deaths were linked to the nuclear plant. Losses stemming from the damage caused by the earthquake are estimated at ¥1.5 trillion, almost half of it amounting from the shutdown of the plant.

The context for Amari's statement calling for international concern is not however the magnitude of the earthquake which hit Niigata in July, but that TEPCO's Kashiwazaki-Kariwa nuclear power plant is the world's largest by output which is 8.21-million-kW, compounded by the fact that the plant was built close to, if not directly above, many fault lines in the area, including the one that triggered the killer temblor (shaking of the earth). This latter vital admission was forced out of TEPCO authorities by Japanese citizens. These two facts by themselves are more than enough to cause concern to any informed citizen, especially in India, which is increasingly opting – wrongly in the opinion of this journal⁴ – for nuclear energy to solve its energy problems. A well-informed Indian citizen has the right to information about the safety of nuclear power plants in their area of residence in the public interest, health, and safety.

Nuclear Energy: Energy of Choice?

What probably prompted Amari to make the statement is the fact that Japan now aspires to lead the world in being transparent in sharing information with and being accountable to, both of which it has not been so far, its own citizens in matters of nuclear power. This is increasingly becoming the energy source of choice, despite the fact that nuclear power plants cost enormous sums to build and nuclear waste is difficult to dispose of. For India, however, nuclear energy, as independent sources have confirmed, is the wrong

choice as it has a wide variety of viable, renewable, and cheaper energy sources, such as, wind, solar, and biomass.⁵ Amory Lovins, a physicist and head of the Rocky Mountain Institute in Colorado, argues that, "big nuclear power plants make no sense, and that the future belongs to energy efficiency and small-scale, distributed 'micropower' plants based on renewable energy sources."⁶

Japan's choice for nuclear energy – it is the third largest producer of electricity after the US and France through nuclear power and it has 52 commercial reactors in operation which provide approximately 34.6 per cent (FY 2001) of its electricity requirements – is predicated by the absence of domestic sources of fossil fuel. Further, a significant portion of the capital costs of investing in nuclear energy is absorbed by state subsidies, both at the early stages and later on when plants come online. The Tokyo-based Citizens' Nuclear Information Centre, an anti-nuclear group, claims "private investment in research and development into nuclear power averages well below 10 per cent of the government's roughly ¥ 500 billion annual nuclear budget. Without these subsidies the [nuclear] industry wouldn't have survived."⁷ Also, nuclear energy does not produce greenhouse gas emissions while generating electricity. This boost in favour of nuclear energy is due to climate change and global warming. Not to forget, the choice is also fuelled by abundance of uranium which is relatively plentiful and is located in politically stable countries, such as, Canada and Australia.

What the world is now witnessing is a "nuclear renaissance", despite the two serious nuclear power accidents of the 1980s – Three Mile Island, Pennsylvania (1979) and Chernobyl, Ukraine (1986). A recent British poll showed "30 per cent of the population against nuclear power, compared with 60 per cent three years ago. An American poll in March this year showed 50 per cent in favour of expanding nuclear power, up from 44 per cent in 2001."⁸ It is the instability in the supply and rise in oil prices that is moving many western countries to opt for nuclear power. "Britain's prime minister Gordon Brown recently affirmed his support for a new generation of nuclear power plants. America is expecting a rush of applications to build new reactors in the coming months, and others, including Argentina and South Africa,

plan to expand their existing ones. Construction of a new one in Finland, western Europe's first for 15 years, began in 2005; [and] work is just starting on another in France."⁹

Safety Concerns

Notwithstanding all of the above, ordinary citizens are still very wary of nuclear accidents and what it will do to their lives, incomes, health, environment, and future. Is nuclear power safe and to what extent? This is one of the main questions in India's choice of nuclear energy that none of the erudite past or present members/chairpersons of India's Atomic Energy Commission, or even the informed Indian journalists, or former/current Indian diplomats have cared to address in their veritable torrent of articles and interviews on this issue. Why the seeming callousness? Is the life of an ordinary Indian person less precious than that of a prestigious nuclear scientist, or its vociferous elites, or even the self-centred middle class? Should not nuclear power plant designs be subject to public scrutiny, especially when it is the tax payer who is paying the bill? Should not every Indian have the right to information whether a seismic fault lies under his house or under a not so far away nuclear plant?

It is in this key domain of public information and rights that Japan's ordinary citizens have shown the world the way. As a consequence, the Japanese government has been pulled kicking and screaming by its citizens to publicly admit that the value of adopting nuclear energy lies in its safety, it is the duty of those who run its nuclear plants to ensure its safety and face legal penalties if found wanting, and to call for a review of safety measures at all the nation's nuclear plants. Little wonder then that the minister made the rather bold and deceptively righteous statement quoted at the outset.

What exactly did public pressure from average Japanese make TEPCO reluctantly do to own up to its severe failures? TEPCO admitted that: the plant was built close to, if not directly above, many fault lines in the area, including the one that triggered the killer temblor; "the quake was stronger than the plant had been built to withstand and the level of radioactivity in the leaked water was more than first estimated,"¹⁰ "seismic acceleration detected at one of the reactors of the

Kashiwazaki-Kariwa power plant reached a maximum horizontal acceleration of 2,058 gals (a gal, a metric unit of acceleration, is defined as 1cm per second squared) when the powerful earthquake hit – about 2.5 times higher than the plant was designed to withstand";¹¹ the utility did not have any firefighting staff posted at its nuclear plants, hence the delay in fighting the fire; "402 million becquerels [a becquerel is defined as the activity of a quantity of radioactive material in which one nucleus decays per second] of radioactivity [were] released and radiation continued to be released into the environment";¹² "duct knocked out of place a major vent leading to a possible leak of radioactive cobalt-50 and chromium-51 from five of the plant's reactors";¹³ and fire at an electrical transformer facility. All these errors by any safety standards are serious acts of failure which warrant the closure of the nuclear power plant – as it since has at least for a year pending review by a variety of state regulatory authorities.

White Paper and Inspection

What prompted the citizens to act was probably the white paper for 2006 made public by the Nuclear Safety Commission (NSC). It reported that, "cover-ups and

falsified information have surfaced concerning 316 kinds of problems at all types of power stations. Of them, 98 have occurred at nuclear power plants".¹⁴ In conclusion, the commission chairman Atsuyuki Suzuki said, "power companies carry the primary responsibility for the safety of nuclear power plants [and] that for the sake of transparency, power companies must fully explain safety problems to the public".¹⁵

Tourism was also a big factor that prompted the citizens to be active. Hotel and inns in Kashiwazaki, the Niigata prefecture city, hardest hit by the earthquake "suffered roughly 30,000 cancellations for room reservations...while operators of about half of the 110 lodging facilities had to tell reserved guests that the facilities were rendered unusable from the temblor".¹⁶ Most of the tourists cancelled their reservations "citing concerns over a radiation leak".¹⁷

It was in order to "scientifically rebut and allay" the fears of citizens, tourists, and fishermen that the Japanese government invited "a third party assessment" from the International Atomic Energy Agency (IAEA), the Vienna-based UN nuclear watchdog agency to inspect the plant. This was a step which the government had never taken in previous

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nuclear accidents. The six-member team led by Philippe Jamet, director of the IAEA's nuclear installation safety division, consisted of two IAEA experts and four seismic safety specialists. They inspected the Kashiwazaki-Kariwa plant from August 6-10, 2007. It issued its report of "preliminary findings and lessons learned" from the earthquake on August 17.¹⁸

What the Jamet team was easily allowed to do by TEPCO authorities, the government's Nuclear and Industrial Safety Agency (NISA), and the NSC was to "look inside all seven buildings, survey reactor buildings Nos 1, 2 and 5, study the quake and discuss plant operational management with TEPCO and NISA officials".¹⁹ What it was not astonishingly permitted to do was to inspect "any crack or fracture in the reactor vessel(s) and the associated piping [which] can lead to a loss of coolant and the ability to remove heat from the reactor core, which is one of the most important safety concerns with the operation of a nuclear power plant".²⁰ This is where the plain truth may lay hidden about the actual extent of damage to the Kashiwazaki-Kariwa plant. So much for independent, third party assessments and Amari's statement!

Conclusion

If Japan aspires to transparency in its nuclear power plants which Amari proudly proclaims, then it may well take heed of the candid remarks by Hitoshi Arakawa, 42, a beachworker who complained about the radiation fears at Kashiwazaki. Arakawa said, "I want to see the TEPCO president, the head of the plant and the mayor of Kashiwazaki get into the ocean [Sea of Japan] and tell the people it is safe". As an afterthought he added, "Maybe (now former) prime minister (Shinzo) Abe should do that, too".²¹ Are there any lessons here for India's sanctimonious nuclear scientists, politicians, diplomats, scholars on sophisticated nuclear energy issues, and all others (of the political left or right proclivity) who weigh in one way or another on nuclear energy questions but apparently care two hoots for the health or interests of the average Indian who stays in close proximity to India's nuclear energy plants or uranium mines? 

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Notes

[It might appear to readers that *The Japan Times* is the only newspaper in Japan which has reported on the earthquake that hit the Kashiwazaki-Kariwa nuclear power plant, which is far from the case. However, it is true that no other English newspaper in Japan has followed this accident and rigorously investigated it as *The Japan Times*.]

- 1 'Report on Damaged Reactor due Friday', *The Japan Times*, August 9, 2007, p 2.
- 2 "The Japanese 'shindo' scale for measuring earthquakes is more commonly used in Japan than the Richter scale. Shindo refers to the intensity of an earthquake at a given location, i e, what people actually feel at a given location, while the Richter scale measures the magnitude of an earthquake, i e, the energy an earthquake releases at the epicentre. The shindo scale ranges from shindo one, a slight earthquake felt only by people who are not moving, to shindo seven, a severe earthquake. Shindo two to four are still minor earthquakes that do not cause damage, while objects start to fall at shindo five, and heavier damage occurs at shindo six and seven." At: <http://www.japan-guide.com/e/e2116.html>.
- 3 Editorial, 'Flagging Quake Resistance', *The Japan Times*, July 18, 2007, p 18.
- 4 Editorial, 'A Nation's Shame', *Economic and Political Weekly*, August 11, 2007, pp 3271-72.
- 5 Christopher Flavin and Gary Gardner, 'China, India, and the New World Order', *State of the World*, W W Norton, New York, 2006, p 11.
- 6 'Jolly Green Heretic', *The Economist Technology Quarterly*, September 8-14, 2007, p 28.
- 7 'All Cost Bets Off If Big One Hits Nuke Plant', *The Japan Times*, September 5, 2007, p 3.
- 8 'Nuclear Power's New Age', *The Economist*, September 8-14, 2007, p 11.
- 9 'Nuclear Dawn', *The Economist Technology Quarterly*, p 19.
- 10 'Radioactive Water Splashed When Quake Hit', *The Japan Times*, August 8, 2007, p 1.
- 11 'Seismic Acceleration 2.5 Times Reactor's Specs', *The Japan Times*, July 31, 2007, p 2. Also see 'Kashiwazaki Earthquake, Japan's Nuclear Safety Shaken to the Roots', Citizen's Nuclear Information Centre (CNIC - Report, July 23, 2007, by Hideyuki Ban (CNIC Co-Director) and Philip White (NIT Editor), at: <http://cnic.jp/english/newsletter/nit119/nit119articles/kkearthquake.html>
- 12 Michael Mariotte, 'Report on Earthquake Damage to Japan's Kashiwazaki-Kariwa Nuclear Power Facility', Nuclear Information and Resource Service, Tacoma Park, MD, July 19, 2007, at: <http://www.nirs.org/international/asia/>
- 13 Ibid.
- 14 Editorial, 'Nuclear Safety at Stake', *The Japan Times*, August 18, 2007, p 16.
- 15 Ibid.
- 16 'Tourists Spurn Kashiwazaki', *The Japan Times*, August 4, 2007, p 2.
- 17 Ibid.
- 18 'Preliminary Findings and Lessons Learned from the July 16, 2006 Earthquake at Kashiwazaki-Kariwa NPP', Report, Vol 1, IAEA, August 17, 2007, at: <http://www.iaea.org/NewsCenter/News/PDF/kashiwazaki060807.pdf>
- 19 'Quake-Hit N-Plant May Be Shut: IAEA', *The Japan Times*, August 11, 2007, p 2.
- 20 Evans, Robert L, *Fuelling Our Future*, Cambridge University Press, Cambridge, New York, 2007, pp 199-20.
- 21 'Radiation Leak Minor but Pulls Plug on Tourism', *The Japan Times*, August 8, 2007, p 2.

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