

The Fukushima Nuclear Accident: Unmeasured amount of radioactive material discharged into the environment

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The tsunami-triggered accident in Fukushima (Japan) Daiichi plant's Unit 1 (operated by the Tokyo Electric Power Company, TEPCO) brings safety issues into question regarding the operation of nuclear power plants (NPPs). In the Daiichi NPP, the automatic shutting down of the reactor by stopping the controlled nuclear fission process, did occur as designed. However, the reactor did not cool down as fast as it was expected and required to do, and called for activating the emergency coolant pumps according to design. But there was no grid power due to a combination of earthquake and subsequent tsunami to operate the pumps. Also, because of flooding due to the tsunami, the dedicated standby generators could not provide power.

The standby battery power (standby to the standby generator) was insufficient to operate the pumps at sufficient rate and duration, and so the (radioactive) steam generated due to overheating had to be vented to relieve the increasing pressure. This has put an unmeasured quantum of radioactive elements (radionucleides) into the atmosphere. But that too did not cool down the reactor sufficiently. It was then reported that sea water was being let into the reactor to cool it to prevent a meltdown.

By this a further unmeasured amount of radioactive material would be discharged into the environment. [The TEPCO website](#) claims that "monitoring goes on around the clock year round" but at the bottom it says in red: "THIS SYSTEM IS CURRENTLY SHUTDOWN".



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All this detail is provided to show three things: One, that accidents in NPPs can and do occur for one or more of several reasons; Two, monitoring can fail, and even when it operates, the public is expected to unquestioningly accept the data provided by the NPP authorities as correct, due to official secrecy conditions. Thus, how much of nuclear radiation has already been discharged into the atmosphere and sea water from the Daiichi NPP and how much more will escape in the hours and days to come will never be known. Also, how much is being discharged from the other four affected NPPs is anybody's guess; Three, Unlike hydel or thermal power plants which can be shut down practically instantaneously, the nuclear fuel in NPPs requires cooling to prevent overheating even in normal conditions. Thus, NPPs always need independent power supply (from the grid or their own standby generators) in an emergency. That is, NPPs are not autonomous in respect of safety.

The Japanese nuclear engineers are making heroic efforts at immense personal risk to prevent a steam explosion (not a nuclear explosion) in the NPP. This is the point at which the design and construction standards of the concrete double containment structure of the nuclear reactor will have to withstand the explosion. This could trigger a partial or total meltdown of the reactor core, similar to what happened in USA in 1971 in the Three Mile Island NPP. (This put the US nuclear power industry into the doldrums until USA revived it by negotiating the nuclear deal with India in 2009). Japan has a reputation for good design and safety standards and good quality control and quality assurance in execution. It would be the fervent wish of every thinking person on the planet that the double containment will not fail and that the engineers will control the desperately delicate situation in the Daiichi NPP. Nobody is as yet even thinking of the costs of containing the accident and the subsequent nuclear clean-up.

But let us now cut to the nuclear situation in India. The issue of Indian design and construction quality standards stands naked when we note that the concrete containment dome of the Kaiga (Karnataka) NPP collapsed when under construction, and had to be rebuilt. It has not been revealed whether it was a failure of design or execution quality. It is not possible to obtain reliable information regarding the operation, safety standards and performance or other cost, constructional or operational aspects of any NPP because of the following reasons: One, Section 18 (Restriction on disclosure of information) and Section 24 (Offences and penalties) of the draconian Indian Atomic Energy Act 1962, do not permit anybody to even ask questions about NPPs, Two, nobody except the nuclear industry is permitted to conduct tests for radioactivity even outside the perimeter of any NPP, Three, the Environment Protection Act 1986, does not apply to NPPs, Four, the safety and monitoring agency (AERB) is not an independent agency and the public has to accept whatever health and safety information is released by the NPP or the AERB, Five, the budget of the DAE is not placed even before Parliament and the power generation and efficiency figures are not available even to the Central Electricity Authority (CEA). In short, the Indian nuclear industry is a closed door to the rest of India, and this can be at the cost of public safety and health.

Further, in the event of a nuclear accident, Government of India (GoI) has sought to cap or limit the liability of operators or suppliers of nuclear hardware and technology to assure profits to the US nuclear industry. In simpler language, this means that the real financial cost of post-accident nuclear clean-up and repair would be borne by India, as the liability of the suppliers would be limited to the cap amount, while the real costs of health and livelihood would be borne by the people.

In view of the secrecy and the poor standards of construction even in the nuclear industry, the conflicting parameters of safety, operational cost and radioactive emissions of any NPP leave the public to guess when one of India's NPPs may suffer a serious accident, and whether we will be able to handle the disaster effectively and efficiently. Indian nuclear engineers are second to none, thus the issue of safety in India's nuclear establishment is institutional. The secrecy, intransparency, unaccountability and self-certification of the nuclear industry makes one doubt whether we will be able to prevent serious emergency or handle it effectively should it happen.

This also raises questions about the advisability of going for mega NPPs such as planned in Jaitapur, Maharashtra. This is quite apart from the fact of enormous resistance to its construction from local people on the grounds of livelihood and environment. Let us hope that the Indian nuclear establishment would never need to handle a serious accident of the

type of Three Mile Island or Chernobyl or Fukushima.

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