

Fukushima and low-probability events

Thursday 31 March 2011, by [PODUR Justin](#) (Date first published: 30 March 2011).

A friend from the movement asked me my thoughts on George Monbiot's article in the UK *Guardian* about how Fukushima actually converted him to nuclear power [1]. George summarizes the Fukushima incident as follows:

"A crappy old plant with inadequate safety features was hit by a monster earthquake and a vast tsunami. The electricity supply failed, knocking out the cooling system. The reactors began to explode and melt down. The disaster exposed a familiar legacy of poor design and corner-cutting. Yet, as far as we know, no one has yet received a lethal dose of radiation."

There are several answers to this (and, indeed, Monbiot has been answered in the *Guardian* and elsewhere) [2]. The first is that a big problem with nuclear power is the long-term effects, which create cancers for decades. I recently read Devra Davis's "The Secret History of the War on Cancer", which deals with the environmental causes of cancer and the way that prevention and causation of cancer are downplayed compared to treatment, all in the interests of the pharmaceutical (and other polluting) industry. I also read an essay in an interesting little book called "Against Health" that argued that the nuclear bomb normalized the idea that you might just die of radiation, but it would be in the national interest (the essay, by Joseph Masco, author of "The Nuclear Borderlands", actually made more subtle arguments and interesting than this). So, on the question of no one having received a lethal dose, that's not really how radiation-induced cancer works.

Second, there is a fallacy here that runs throughout all the pro-nuclear arguments. The probability of something really awful happening is usually pretty low. It requires a bunch of things to go wrong at the same time - like an earthquake and a tsunami, say. But if you repeat a low-probability experiment enough times, the chances of the event occurring go up pretty fast. Most mathematical models of stock markets and derivatives markets fail to predict crises because they don't take this into account (mathematician Benoit Mandelbrot and popular philosopher Nassim Nicholas Taleb discuss these issues). The fact that Fukushima didn't go as badly as it could have (and we still don't know how badly it did go) is not evidence that the technology is reliable. To me, it is actually evidence of the extent that we depend on plain luck to save us from our bad decisions, especially where nuclear matters are concerned. This is even more true with nuclear weapons than with nuclear power, but the point is valid in both spheres. And in the case of Fukushima, plain luck did seem to have a role - some of the reactors happened to be off for planned maintenance, for example. Indian scientist and activist Prabir Purkayastha's analysis, for example, does not make me want to stop worrying and embrace nuclear:

"At any point the temperature can rise, the containment could fail and further explosions could take place. An emergency state would continue till the reactors are effectively de-commissioned. People are not talking about this, but decommissioning of these reactors will not be easy, particularly as they have stored fuel in cooling ponds in the same buildings that house the reactors. It is this inventory of stored fuel rods which is likely to be the major problem. A Chernobyl solution of burying the reactors under tons of concrete for reactors could work, but not for the stored fuel rods, particularly as they are not ground level. One cannot pour tons of concrete on the 4th floor of a building - this will bring everything crashing down." [3]

Purkayastha's article argues that Fukushima should give India pause about going nuclear - for safety reasons and economic reasons, which, because of the way the global nuclear industry works, cannot be separated.

The dangers to developing countries are explained further by Pakistani nuclear scientist and activist Pervez Hoodbhoy, in his own very sobering take on Fukushima, in which he imagines a Fukushima at a nuclear plant in Karachi:

"But with the breeze mostly directed towards Karachi, the population would surely have to be evacuated. The rich and the fortunate would succeed; the rest would not. Unlike the orderly and disciplined evacuation of post-tsunami Fukushima, all hell would break loose as millions would try to flee. Looters would strip everything bare, roads would be clogged, and vital services would collapse."

The arguments against nuclear - the health arguments, the incredible expense and opportunity cost of nuclear compared to renewables, and the slight probability of utter catastrophe presented by each plant - are unaffected by what happened in Fukushima - certainly it can't be used as a counter to these arguments. Fukushima shows a scenario of what might go wrong, but there is much more that can go wrong even in that case, let alone others.

And yes, every other form of energy has problems, and coal does worse than nuclear, especially for climate change. A colleague of mine at work, Mark Winfield, who studies energy policy, wrote a short note about how coal and nuclear are inferior to renewables in different ways. [4]

I think I understand what George was trying to do in his article, and there is a formulation of his argument that I could agree with, about the timeline for replacing nonrenewables with renewables. If he were to say that we should replace coal with renewables before we replace nuclear with renewables, I could agree with that. Where Hoodbhoy writes: *"Until nuclear fusion power becomes available after some decades, Pakistan, like other countries, must rely on a mix of oil, gas, hydro, coal, solar, wind, and other renewables,"* George is arguing that coal is actually more harmful than nuclear.

As Mark Winfield argues, coal and nuclear are pretty much equally bad, just for very different reasons. In addition to what I've been discussing, and in addition especially to the economics of nuclear, the real problem with nuclear is the political culture inevitably associated with it is so pernicious that it crowds out other options.

For the past few years, I have relied very heavily on George's book "Heat" to argue that a transition to renewables is possible and feasible, against environmentalists like James Lovelock and James Howard Kunstler who argue that nuclear is inevitable. I will continue to do so, even if now it's in disagreement with him on this issue.

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P.S.

* From Justin Podur's blog, Wed, 03/30/2011 - 00:12:
<http://www.killingtrain.com/node/787>

Footnotes

[1] See on ESSF: [Debate on the lessons of Fukushima and the costs of nuclear power](#)

[2] See [Nuclear power is not the way to fight climate change](#)

[3] See on ESSF: [Fukushima and India - Radioactive Cloud over Nuclear Renaissance](#)

[4] <http://marksw.blog.yorku.ca/2011/03/25/response-to-keep-building-nuclear-plants-globe-and-mail-march-19-2011/>