

WHEN WILL THEY EVER LEARN? A REPLY TO DR. SOLITA MONSOD

By Floro Quibuyen, PhD
Croydon, Greater Sydney, Australia
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It is stunning how Dr. Solita Monsod, UP economics professor, in her March 18, 2011 *Philippine Daily Inquirer* column, could wholeheartedly endorse Mark Cojuangco's recent claim that what happened to the Fukushima Dai'ichi Nuclear Processing Plant would not have happened to the Bataan Nuclear Processing Plant had the same magnitude of earthquake and tsunami occurred at Subic Bay. The notion that BNPP can be safe has been debunked two years ago by Dr. Kelvin Rodolfo (Professor Emeritus, Dept. of Earth & Environmental Sciences, Univ. of Illinois at Chicago) in a well documented and widely distributed paper—*Geological Hazards of the Bataan Nuclear Plant: Propaganda and Scientific Fact* (2009)—as well as in well-attended public fora.

Yet, Monsod persists in trumpeting Cojuangco's call for a revived BNPP, unmindful of the fact that this call has been based on wrong presuppositions. This is evident even in Cojuangco's new claims, as reported approvingly by Monsod:

Claim 1. *Well, says Cojuangco, for one thing, the BNPP is built on a hilltop, 18 meters above sea level, so no tsunami could have touched it. Is this a big deal? Yes, because the FNPP problems were caused by the tsunami that followed the earthquake*

One wonders why Monsod blindly believes all that Mark Cojuangco says. While it is true that the BNPP is 18 meters above sea level, it does not follow that “no tsunami could have touched it.” I've emailed Dr. Kelvin Rodolfo regarding Cojuangco's claim. He replied, *I'm a marine geologist who has studied Subic Bay and its tectonics. But even I cannot predict a tsunami height there. But bear in mind that the 2004 tsunami was 33 meters high, and that the record tsunami height (Lituya Bay, Alaska, 1958) was 524 m [or 1720 feet]!*

Aside from the real possibility that a tsunami could swamp the BNPP, so many other things can happen that could damage or disable the reactor's cooling system—precisely what triggered the overheating, fires and explosions at the Fukushima Dai'ichi nuclear power plant (FDNPP). As Dr. Kelvin Rodolfo notes,

A disruption would not be very difficult: Failure of a pump or valve, rupture of a pipe, an inattentive or sleepy technician, an electrical brownout or power surge... Not much of a task for an even moderate earthquake, let alone an eruption.

Claim 2. *Because the BNPP was designed to withstand a seismic load (definition: the force on a structure caused by acceleration induced on its mass by an earthquake) of 0.4g, while the FNPP was designed to a seismic load of only 0.18g. Cojuangco also points out that the FNPP did not crumble despite the fact that the earthquake was stronger than its design basis, because apparently nuclear plants are built conservatively with “overkill ‘safety factors’.*

The integrity of the structure of the reactor is not the only issue. Indeed, as what happened to the FDNPP shows, the Achilles heel of a nuclear reactor is its cooling system. Failure to keep the fuel rods, as well as the spent fuel rods from overheating would lead to a meltdown. Rodolfo explains,

The spent fuel rods must be kept immersed in a pool of water, typically 40 by 40 feet in area and 40 feet deep. Millions of gallons of water must flow through the plant every day not only to cool the reactor core, but also to absorb the radiation in the spent-fuel pool. There, the radiation energy is removed and transformed into heat. But the heated water must be continually replenished with cool ocean water. Interruption of that water supply could be catastrophic.

The spent fuel rods are armored with a zirconium alloy. If the pool water were lost, the armor of the newest spent-fuel assembly would ignite, and in turn could ignite adjacent fuel assemblies. Once started, the fire would be virtually impossible to put out. Spraying it with water would only make it worse, because even more heat is generated when zirconium reacts with steam. A fire and explosion in the spent fuel storage pool could release huge volumes of radioactive gases to the atmosphere, including much radioactive cesium-137, which is water-soluble and extremely toxic in minute amounts.

Claim 3. *Cojuangco mentions that while the FNPP is a BWR (Boiling Water Reactor) with only one cooling circuit, the BNPP is a PWR [Pressurized Water Reactor] with two separate and distinct cooling circuits. The additional isolation apparently makes for “more forgiving of extreme situations” although the tradeoff is a reduction in efficiency (4 percent).*

Having two separate and distinct cooling circuits is not a guarantee that the cooling system will never be disrupted—whether by an earthquake, a tsunami, or a volcanic eruption.

And why does Monsod keep repeating the already refuted idea that the BNPP is in an isolated site? In his paper, Rodolfo has already exposed and corrected Cojuangco’s misunderstandings, if not sheer ignorance of the geological context pertaining to the site of the BNPP.

To mention a few: BNPP is not just ten kilometers from Mt. Natib, *which constitutes more than the entire northern half of the Bataan Peninsula. Its base is below sea level. The BNPP site is on the flank of the volcano, at Napot Point; the last eruption of Mt. Natib is not between 11,000 and 18,000 years ago—In the years since Marcos decided to go nuclear, many more earthquakes have occurred in the vicinity of the BNPP. From 1973 to 2008, the U.S. Geological Survey has located many earthquakes of moderate magnitude in the vicinity of the BNPP, one of them directly under Napot Point, like the one mentioned by Hernandez and Santos in 1977; the fact that the BNPP does not sit directly over a fault does not mean that it will never be threatened by an earthquake—Manileños need to know that a major earthquake on the West Marikina Valley fault would probably be most damaging not along the fault zone itself, but in places built on natural and artificial bay fill kilometers away, like Tondo and the Asia Mall. The earthquake damage directly along the trace of a fault is usually minor compared to the total damage in the affected area. We must remember that the great 1990 earthquake in Nueva Ecija greatly damaged Baguio and Dagupan, cities 100 kilometers away from the epicenter; the idea that the farthest a volcanic mass can travel is six times the elevation of the volcano is true only with respect to landslides—During an eruption, pyroclastic flows --- dense mixtures of explosion debris and very hot gases -- can surge great distances down the volcano flanks at hurricane speeds, searing and obliterating everything in their paths. These are not landslides!; to bruit about the notion that the BNPP is safe because it withstood the 1990 Luzon quake and the 1991 Pinatubo eruption is absurd; the plant was not running! Think of the spent fuel pool and high-tension cables of an operating plant; etc.*

One has to actually read Rodolfo's paper, backed by peer reviewed scientific studies, to realize the full extent of Cojuangco's numerous egregious inaccuracies and misunderstandings of geology, if not outright distortions of the scientific data.

It takes one's breath away how Monsod can concoct, without any qualms, this spin:

*Cojuangco's views are a welcome relief from **the rush to judgment** that has apparently gripped any number of people, led and fed of course by the so-called "anti-nukes." But that does not excuse **the inaccuracies being bruited about to bolster the anti-nuke position.** Thankfully, Science and Technology Secretary Mario Montejo and Sen. Miriam Santiago refuse to be stampeded.*

On top of this, Monsod gushes over Cojuangco's credibility and intentions:

Cojuangco is credible, because he has no financial interest in any activity related to the issue, his main concern being how to make the country more competitive by lowering its energy costs, not to mention reduce its pollution. Moreover, he has done a lot of homework on the subject.

Of course only God in his infinite wisdom and mercy can tell whether Cojuangco indeed has no financial interest relating to the revival of the BNPP, but we mortals can at least ascertain if it is indeed true that the BNPP would lower the Philippines' energy cost and reduce its pollution.

Today, it costs US\$12B just to build a nuclear plant. But let us assume that the Philippines needs only one plant, and that all that is needed is to make the BNPP operational. It is said that refurbishing the BNPP will cost only \$2B (or 86 Billion Php), but this does not include the cost of its maintenance and operation, let alone the uranium that is needed to make it operational. As Rodolfo has pointed out, the Philippines does not have uranium, and so it will be importing, most likely, from Australia. Moreover, we should also consider how much it will cost to decommission a nuclear plant, once it has reached its expiry date—the costs are huge, according to environmentalist and consumer advocate Ralph Nader. How much will be the total cost of rebuilding, operating and maintaining the BNPP?

Not only does it cost too much, nuclear power is just too risky. That is why, in the USA, observes Nader, "nuclear power is uninsurable in the private insurance market" and "Wall Street will not finance new nuclear plants without a 100% taxpayer loan guarantee. (Nader, 2011)

Is the BNPP pollution free? The fact that the BNPP (like the Fukushima Dai'ichi Power Plant) was built on the coast, next to the sea, had a reason—massive amounts of water has to be pumped into the reactor to cool it. But ignored by Congressman Cojuangco and economist Monsod is something environmentally crucial—"the impact," notes Rodolfo, "of millions of gallons of seawater heated and released every day on Subic Bay and adjacent coastal environments and ecosystems should BNPP be operated." Rodolfo asks, "Does an Environmental Impact Statement for BNPP include an evaluation of such questions?"

Finally, is the BNPP the best option in making the Philippines competitive? Even the more prudent among advocates for a revived BNPP—notably Mark Cojuangco's wife and replacement in Congress, Kimi Cojuangco, who, unlike Monsod, realizes that the disaster at

Japan's FDNPP has dealt a death blow to her husband's pet project—have not given up on their conviction that a revived Bataan Nuclear Power Plant (BNPP) “is one way out of poverty,” and that there is “no other alternative that could offer cheap and stable source of power” [“Bill seeking BNPP revival shelved” By Lira Dalangin-Fernandez. INQUIRER.net First Posted 13:10:00 03/14/2011

<http://globalnation.inquirer.net/news/breakingnews/view/20110314-325371/Bill-seeking-BNPP-revival-shelved> Accessed 24 March 2011]

In fact there is a better alternative—solar power!

Author, inventor and futurist Ray Kurzweil—who became famous for predicting that the internet would emerge by the 1990s, that a computer would beat the best human chess player by 1998 (Deep Blue beat Kasparov in 1997), and that the IT would facilitate the spread of information that would accelerate the collapse of the Soviet Union—is now predicting that solar energy will soon be able to compete economically with fossil fuels.

Kurzweil is not looking at the crystal ball, he is deriving his predictions from his [law of accelerating returns](#):

One of my primary theses is that information technologies grow exponentially in capability and power and bandwidth and so on. If you buy an iPhone today, it's twice as good as two years ago for half that cost. That is happening with solar energy — it is doubling every two years. And it didn't start two years ago, it started 20 years ago. Every two years we have twice as much solar energy in the world.

Today, solar is still more expensive than fossil fuels, and in most situations it still needs subsidies or special circumstances, but the costs are coming down rapidly — we are only a few years away from parity. And then it's going to keep coming down, and people will be gravitating towards solar, even if they don't care at all about the environment, because of the economics. ... People say we're running out of energy. That's only true if we stick with these old 19th century technologies. We are awash in energy from the sunlight.

[Futurist Ray Kurzweil isn't worried about climate change

By Lauren Feeney. February 16, 2011

<http://www.pbs.org/wnet/need-to-know/environment/futurist-ray-kurzweil-isnt-worried-about-climate-change/7389/> Accessed 21March2011]

Ralph Nader observes that concerned scientists are saying much the same thing:

Nuclear power is both uneconomical and unnecessary. It can't compete against energy conservation, including cogeneration, wind power and ever more efficient, quicker, safer, renewable forms of providing electricity. Amory Lovins argues this point convincingly (see RMI.org). Physicist Lovins asserts that nuclear power “will reduce and retard climate protection.” His reasoning: shifting the tens of billions invested in nuclear power to efficiency and renewables reduce far more carbon per dollar (<http://www.nirs.org/factsheets/whynewnukesareriskyfacts.pdf>). Peter Bradford, a former Nuclear Regulatory Commission (NRC) commissioner has also made a compelling case against nuclear power on economic and safety grounds (<http://www.nirs.org/factsheets/whynewnukesareriskyfacts.pdf>).

[Nuclear Nightmare by Ralph Nader <http://www.commondreams.org/view/2011/03/19-0>. Accessed 19 March 2011]

Indeed, as Kurzweil has pointed out, the nuclear reactor is fundamentally a 19th century technology—the steam engine. It uses nuclear fission—which was originally developed to create, at the height of World War II, what was then the most powerful weapon of mass destruction—to produce the steam that would turn the turbines of an electric generator. Given the lessons of the tragedy of the Fukushima Dai’ichi Nuclear Power Plant, it is time to discard this 19th century model, and turn to solar power and other renewables.

Postscript:

When a reputed professor of economics argues, without shame or embarrassment, that it is the anti-nukes who bruit about “inaccuracies” and “rush to judgment”, when otherwise intelligent people like DOST secretary Mario Montejo and Sen. Miriam Santiago “refuse to be stampeded” into the anti-nuke position, one wonders what is driving their dogged push for the revival of the BNPP? We can be sure it’s not scientific reasoning and knowledge, much less the lessons of history. Perhaps something else is at stake—something so compelling that not even the scientific findings of distinguished scientists and the currently unfolding horror at Fukushima can make them think more sensibly and responsibly.

Could this unstated agenda, whatever it is, be the reason why the DOST abruptly, without explanation, ended the balik scientist program? Was it to discourage the likes of Dr. Kelvin Rodolfo from coming to the Philippines and providing scientific support to the anti-nuke activists loathed by Monsod (which, by the way, includes several progressive lawmakers, environmental groups and the Church led by the Catholic Bishops’ Conference of the Philippines)? There’s the rub!

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Contact info: Floro Quibuyen

quibuyen01@yahoo.com

Australia mobile number: 0410031093

Phil Globe roaming: 09273986728