



Fukushima shows why we must build the fight against all nukes!

While apologists for Tokyo Electric Power Company (TEPCO) and nuclear power in general repeat: “This was an unprecedented natural disaster, no one could have predicted it, and no one can be held to account”, the facts show otherwise.

Japan has a long history of huge quakes and tsunamis. This disaster was not only foreseeable, it was preventable, but the greedy TEPCO and General Electric, with the support of the Japanese government, placed the plant (and many others) in one of the most dangerous places on earth.

The wholly predictable twin natural disasters cut off outside power to the plant, shutting down the fuel cooling pumps. The damaged containment vessels lost water, and the fuel melted down in the very first hours or days of the disaster. Then as heat increased, reactions within the reactors led to a buildup of hydrogen which resulted in fire and explosions in the reactors.

In reactors 1 and 3 engineers vented hydrogen from the containment vessels into the buildings, which then exploded, destroying the buildings. More seriously, hydrogen buildup in reactor 2 wasn't vented in time, and the explosion occurred in the containment vessel itself, destroying it. With the three buildings trashed, the hundreds of tons of fuel stored in tanks on the roofs were scattered across the countryside¹.

Massive radiation release

Accurate estimates of radiation spewed into the environment are hard to come by, but based on measurements made on land, in the air and in the ocean, it's clear that it is significant. As a result, this man-made disaster and its aftermath will reverberate for generations in sickness, cancer, mutations and death, and has already made swaths of Japan more or less permanently uninhabitable by humans. More than 80,000 nuclear refugees are living camps or shelters, or with relatives, having lost everything. Worse yet, children in the Fukushima Prefecture are suffering from fatigue, diarrhea and nosebleeds, common symptoms of radiation sickness. And even so, schoolteachers are being muzzled when they try to educate their students about the dangers they face in the dirt in their backyards.

Compare this unfolding disaster to the 1986 meltdown at Chernobyl in the Ukraine: Chernobyl contaminated 100,000 km² of land so that it is no longer useable by humans 25 years later². The entire country of Japan is under 400,000 km², and is only about 100 km wide at the point where the Fukushima plants are. Chernobyl isn't entirely predictive because wind and weather patterns are different there from those in Fukushima, and so the semi-permanent no-go zone in Japan may look quite different. Fukushima involves many times more new and spent fuel, so that the process of cooling and cleanup and entombing the reactors will be much more complex. And the Chernobyl sarcophagus is already decaying, only 25 years later. To date, TEPCO's main effort to control

the situation has been to spray 5700 gallons of seawater an hour (135 thousand gallons a day, or roughly 17 million gallons total) onto the fuel. Much of this extremely radioactive water is either sloshing around in the plants, seeping into the ground water, vaporized as steam, or run off into the ocean.

TEPCO released estimates that the radiation released in just the first week alone was in the range of 770,000 terabecquerels, though of course they have a strong incentive to underestimate the numbers³. Radiation continues to spew forth, though, so the numbers today are likely between several times to many times higher. In August workers started reporting highly radioactive steam rising out of new cracks in the ground at the facility. Scientists guess that recent powerful aftershocks may have broken new pipes releasing water onto the fuel, but no one still knows. A full accounting of all of the radiation would include that released in the form of vaporized radioactive water, water seeped into the ground and the ocean, bits of spent fuel rods, and hot particles, which have been measured in significant quantities (in auto air filters, for example) on the west coast of the U.S. as well as in high concentrations in Tokyo.

The Japanese government ordered people to evacuate their homes in a 12 mile radius around the plant, and to stay inside or evacuate in an 19 mile zone (including the town of Minamisoma, population 71,000). Other communities have been evacuated beyond that zone, based on high radiation readings. The U.S. and British governments consider these zones to be too limited, and recommended their citizens stay at least 50 miles away (home to 2,000,000 residents). Fukushima City, a population of 290,000 (40 miles away from the plant), was for a time receiving .012 millisieverts per hour, representing more than 50 times the normal background radiation. Accumulated radiation in Koriama (population 340,000) – about 35 miles from the plants – over the months since the earthquake, is up to 1.8 millisieverts, or about 12 times the normal background radiation⁴. Even in mid-August, at a distance of 4 kilometers from the plant, scientists detected 166 million becquerels of radioactive Iodine and 21 million becquerels of radioactive Cesium per square meter. The Iodine measurement is particularly significant because its half-life is 8 days, showing that the release of new radioactive material continues. Onsite measurements also taken in August reveal particular hot spots where readings are as high as 5 and 10 sieverts per hour. This is enough to kill someone within weeks after an hour's exposure, and is another indication of how far from “under control” the situation still is⁵.

Scientists studying the dose rates and predicting the effects on sea and land organisms from this new radiation in the region have found significant effects there too. As organisms most closely dependent on the ocean floor, flatfish like flounder and halibut, shellfish, crustaceans and seaweed have already received doses high enough to significantly increase their mortality. On land, birds, rodents and trees have received enough to reduce their reproductivity.

³ A becquerel is a measure of radiation emitted by a radioactive source, and 1 becquerel represents one nuclear decay per second. The figure for the first week at Fukushima is about one fifth the total radiation released by Chernobyl, or 3.7 million terabecquerels. A terabecquerel is one trillion becquerels.

⁴ A sievert is a measure of radiation energy absorbed by a living body.

⁵ <http://news.discovery.com/earth/hot-spots-of-radiation-raise-risk-in-fukushima-110804.html>

¹ For a discussion of the quantities of spent fuel on site, see “How Much Spent Nuclear Fuel Does the Fukushima Daiichi Facility Hold?” <http://www.scientificamerican.com/article.cfm?id=nuclear-fuel-fukushima>. Note that in addition to the spent fuel on top of the damaged buildings, there is also 1450 tons of spent fuel elsewhere on site.

² For a map, see http://en.wikipedia.org/wiki/Chernobyl_Nuclear_Power_Plant_Exclusion_Zone. See also <http://blog.thecheaproute.com/chernobyl-pripyat-town-ukraine/> and <http://blog.thecheaproute.com/exploring-chernobyl-with-google-maps/> for a better idea of the continuing human cost of the Chernobyl disaster.

Japanese food and drinking supplies have been contaminated: radiation has been found in significant amounts in meat, vegetables, seafood, tea, milk, seaweed and water. But the Japanese government didn't take aggressive steps to keep these foods from the market because they thought it was more important to protect TEPCO from liability claims from farmers than to protect the public from contaminated food.

The pseudo-scientific International Nuclear Event Scale

The big capitalist news organs placed a lot of importance on the International Nuclear Event Scale (INES), the seven-point scale for estimating the seriousness of a nuclear “event”.

Initially, the INES declared the Japan disaster a 5 and much was made of the fact that Chernobyl was a 7, “proving” that it was far worse. But it turned out that initial rating was a lie, as a commissioner of Japan’s Nuclear Safety Commission famously admitted: they didn't rate Fukushima a 7 earlier because it “could have triggered a panicked reaction” if they had.

But more than this, the INES scale itself is highly subjective, and is applied to suit the needs of the nuclear industry⁶. Its administrators claim the scale is logarithmic, yet first, it is inherently not a mathematical scale – several different things are being measured: breakdown of the redundancy of protection, loss of nuclear material, number of plant workers exposed, release of material to the environment, number of people offsite exposed, the lethality of the exposure, things which certainly cannot all be measured on the same mathematical scale.

Second, even though levels 4, 5, 6 and 7 do include a purely mathematical component – quantity of radiation released into the environment – this is still not applied scientifically. To illustrate: The earthquake magnitude scale is a true logarithmic scale, and as such there is no pre-defined top end. Each whole number – 6.0, 7.0, 8.0, 9.0 – represents ten times more energy released than the whole number below it. The main Fukushima quake was a magnitude 9.0, and of the thousands of aftershocks, several were magnitude 7.0, for example. A 9.0 quake is defined as 100 times more energy released than a 7.0 quake, and 10 times more energy than an 8.0 one. And theoretically, there is no top end to this scale. A 10.0 quake would be 10 times the energy of the Fukushima 9.0 quake, and so on, though an earthquake that strong has never been measured.

However, with the pseudo-logarithmic INES scale, level 7 is defined as “release to the atmosphere of more than several tens of thousands of terabecquerels”, and no event can be rated higher than this. But this greatly downplays the seriousness of the most serious nuclear disasters. For example, the Chernobyl disaster is estimated to have spewed 3.7 million terabecquerels of radiation, and on a true logarithmic scale it would have been rated a 9, rather than the 7 it was given. There has been no official estimate of the total radiation released by Fukushima, but by TEPCO's estimate of 770,000 terabecquerels in the first week, it would already have rated a level 8 at that time, and is almost certainly at a 9 by now (if the scale went that high).

Another distortion inherent in the INES scale is that it is limited to “events”. Mayak is the site in Russia of two types of serious radioactive contamination. First is the Kyshtym disaster in 1957, in which an explosion resulted in the release of as much as 1.8 million terabecquerels (i.e. about half as much as Chernobyl). Later, Mayak was designated a permanent waste site, which has a routine policy of dumping radioactive liquid into the local river for the last several decades. Estimates are that the total of these two together has been 8,900,000 terabecquerels, or almost two and a half times the release at Chernobyl – but since it has happened over a several decades, it isn't considered an “event”.

⁶ The definition of the 7 levels is contained in http://www-pub.iaea.org/MTCD/publications/PDF/INES-2009_web.pdf. The scale is described this way: “The aim in designing the scale was that the severity of an event would increase by about an order of magnitude for each increase in level on the scale (i.e. the scale is logarithmic)”.

TEPCO's malfeasance before, during and after

Before this disaster, the Japanese nuclear regulatory agency regularly colluded with TEPCO in its habitual safety and regulation violations, including falsifying safety and maintenance documents. These weren't just meaningless violations of worthless regulations: in numerous incidents, these violations resulted in burst pipes, radiation releases, worker injuries and deaths. Over the last 20 years at Fukushima, TEPCO rigged tests to hide cracks and radiation leaks in the reactor pressure vessels and pipes.

From the outset, TEPCO failed utterly to consider human safety or the reality of nature. No reasonable energy planning would site any nuclear plants in Japan, which is in the Ring of Fire earthquake zone, and in a region where big tsunamis are most frequent in the world⁷. In building the plant, TEPCO didn't even build multi-layered emergency backup systems. The backup generators for the cooling systems, required to perform the fundamental job of keeping the fuel cool in a power outage, were installed in the basement of the plants, so that once the waves breached the minimal tsunami wall it was inevitable they would be swamped and fail.

It took until April 21, five weeks after the start of the disaster, for TEPCO to announce a roadmap for initiating cleanup and protecting public safety, and even then they only did so at the direction of Japan's Prime Minister, Naoto Kan. This meant that until then they were making up the containment plans as they went along. And why was no plan written up beforehand? TEPCO management, like the BP despoilers of the Gulf of Mexico, wasn't required to have any real disaster plans. This left it helpless in the face of the double whammy of earthquake and tsunami.

In typical disregard for worker safety, TEPCO chronically ran the plant short of radiation badges for workers. Thus when the disaster struck, many of the workers had to carry on work without any idea how much radiation they were being exposed to. The company used the excuse that the badges in the plant were destroyed during the earthquake, but then why not quickly get new ones? They also sent workers to work in highly radioactive seawater in street shoes. The excuses for this ring hollow: supposedly the workers had worked there the day before when there was no water, and when they came back and saw the water, they ignored their off-the-chart badges assuming they were faulty.

More concerned about salvaging the reactors and maintaining a facade of control, TEPCO delayed dousing the exposed fuel in seawater until forced to by the government⁸. But once they started dumping seawater on the fuel, it took weeks to figure out that highly radioactive water was pouring out as fast as they were dumping it in. And even after they discovered plumes of radioactivity in the Pacific, TEPCO had no choice but to continue cooling the fuel the same way⁹. When they finally discovered that the water was coming from cracks in the plants' containment, they attempted to seal those with concrete, polymer, sawdust and shredded newspaper, piling failure upon failure.

The point is that capitalism's willful blindness to the human and environmental costs of the *unnatural* environmental disasters it creates guided TEPCO's every move, dictated every misstep it took, and determined every piece of

⁷ See <http://jenniferclaro.files.wordpress.com/2011/03/map-of-tectonic-plates-under-japan.jpg> for a detailed map of the tectonic lines under Japan.

⁸ Even the pro-business pro-nuclear Wall Street Journal reports this damning point about TEPCO's anti-people priorities, although of course they say nothing about the roots of these priorities in the capitalist mode of production. See “Bid to 'Protect Assets' Slowed Reactor Fight” at

http://online.wsj.com/article/SB10001424052748704608504576207912642629904.html?mod=WSJ_hp_LEFTTopStories.

⁹ Early measurements in the ocean were above a million becquerels per liter, from Iodine 131, Cesium 137 and Cesium 134 each. This figure means that in every liter of seawater, there were a million Iodine 131 decays, a million Cesium 137 decays, and a million Cesium 134 decays every second. Each decay produces destructive rays in the region of the decaying atom.

misinformation it delivered. The capitalist drive to maximize profits informed decisions it made decades ago: (1) to place the plants on the tsunami-prone coast; (2) to build the reactors as cheaply as possible, including doing minimal emergency planning; and ridiculously, (3) to store thousands of highly radioactive spent fuel rods *on the roof* of an active nuclear reactor! At every step, TEPCO's only concern has been to run the plant on the cheap to maximize profits. And of course these policies aren't limited to TEPCO or Japan or nuclear power. One look at the BP gulf oil disaster last summer shows the very same patterns and priorities, the priorities of capitalist organization of production: Profit, profit, uber alles!

Japanese government promotes nuclear power and protects TEPCO

But TEPCO obviously isn't the only culprit here. The Japanese government continued to allow the company to operate its dozen plus plants, despite TEPCO's long history of violating the minimal governmental "nuclear safety" regulations. Further, the Japanese government's policy of promoting nuclear power as a significant source of the country's energy production, regardless of the environmental and human risks, is as much to blame.

The Japanese government has never treated TEPCO as the chronic criminal that it is. Instead, prior to this disaster, it levied small fines, handed out some slaps on the wrist, and allowed the company to keep operating the plants in the same criminal manner. Now, on top of this, it allows this criminal control of the cleanup operation!

Nuclear power is inherently too dangerous

All the above shows that the risk inherent in nuclear power is too great when weighed against any supposed benefit. And the potential hazards that have been made real at Fukushima don't even take into account the problems endemic to normal, everyday operation of nuclear power – such as long term storage or reprocessing of spent fuel and radioactive waste. Considering just the hazards involved in normal operation of a nuke plant only sharpens the conclusion: Mining and refining nuclear fuel is a carbon-intensive operation; it leaves highly radioactive waste and poisons communities around the mines; building a plant which is immune to all natural events and human error is nearly impossible; and storing spent fuel safely for millennia is a challenge humans haven't even begun to tackle. One example of the dangers of uranium mining is the Church Rock, New Mexico, uranium spill in 1979, in which millions of gallons of radioactive mine waste broke a dam and flowed into the nearby river, which Native Americans used for watering their livestock.

And following close on the heels of Fukushima, reactors in Nebraska and New Mexico were threatened by record floods and record wildfires respectively – two more examples of natural forces which people can't control. Trying to harness nuclear reactions in the face of such natural forces makes nuclear power an unacceptably dangerous alternative. With all these considerations in mind, nuclear power is a no choice for energy generation, despite its boosters calling it "clean" and "green".

Obama and damage control for the nuke industry

Obama came into office pledging to license new nuclear reactors in the U.S., arguing that it is "clean energy" needed to replace greenhouse-gas-producing oil, natural gas and coal. But this is a lie, because his commitment to expanding offshore drilling, expanding fracking, and opening yet more land to coal mining, all show that he has no real enthusiasm for reducing greenhouse gasses. And an objective analysis of nuclear energy indicates that, even regarding greenhouse gasses, it isn't clean: mining, refining, building the massive power plants with all their required redundancy, require far more fossil fuels than sources such as wind, water and solar. Touting "clean nukes" is just dressing up the rotting mess that is nuclear power. But Obama has held to his hard pro-uke line even as the worst disaster since Chernobyl (perhaps even worse than Chernobyl) has unfolded and nuclear fallout spreads over the northern hemisphere.

Immediately after the disaster, opposition to nuclear power in the U.S. is high – 64 percent oppose new plants, and 47 percent oppose them strongly. But this opposition may fade given the promotion of nuclear power and the pooh-poohing of renewable sources as a realistic alternative to greenhouse-gas-producing fossil fuels. Plus the opposition isn't consistently militant or well organized in the way it would need to be to effect policy. This leads Obama to believe he can still play the "green nukes" card without fear of too much exposure.

Obama has strong ties to three of the biggest nuclear power companies in the U.S. – General Electric (up to its elbows in the Fukushima disaster), Duke Energy and Exelon. CEOs of these companies hold positions in his administration and have pledged millions of dollars to the 2012 Democratic National Convention¹⁰. Thus in promoting the interests of industry (in this case nuclear) above and before the interests of the masses he's just doing what he's paid for. The U.S. nuclear industry has been campaigning for new subsidies and looser regulations. It is trying to rebrand itself as "green", in an attempt to bring itself back from the near-dead state it's been in in this country since the series of disasters in past decades, and Obama is acting as its spokesperson.

Now, even as the officials have gradually admitted that Fukushima is far more serious than they initially let on, Obama is working to soften public opposition, assuring us that he is going to ask the Nuclear Regulatory Commission to review the safety of existing U.S. plants. Yet, this is nothing more than soothing words. Is this the same NRC which candidate Obama said was "a moribund agency that needs to be revamped and has become captive of the industries that it regulates"? The same NRC which when asked how much confidence he had in it, Biden said "None, none, none"? This NRC is going to review the safety of existing nukes? Oh, good, we can all feel so much better about Obama Nukes!¹¹

This Obama NRC is relicensing plants, such as the decrepit Oyster "Creak" Generating Station in New Jersey, without any serious review. This NRC is working overtime to weaken safety regulations so that old reactors can carry on despite faulty seals and cables, corroded and rusty pipes. Already, in an alarming number of U.S. reactors, corroded valves and rusted pipes, often buried in concrete and impossible to repair, are just given a pass. Because of the difficulty and expense of bringing the reactors up to the previous stronger standards, NRC finds it expedient to "pencil engineer", or weaken the regulations¹². NRC staffers even complain that they're directed to relicense plants despite being in areas with high earthquake risk. Yet these are the same kind of failings which the Japanese regulators ignored in the Fukushima reactors. Even this minimal debate within the agency, and their "decisive" plan to study their previous study, led the VP of the Nuclear Energy Institute to cry: "I'd caution against reacting too much to the data"!! That is, we should listen to his opinion that the plants are safe instead of the data, which shows they're falling apart!

And it's not only the NRC. Look at the Environmental "Protection" Agency web site on nuclear energy: it's titled

10 For details of how he's owned by the nuke industry see <http://thenewpolitical.com/2011/04/05/us-clinging-to-nuclear-power-despite-japan-tragedy/>.

11 The videos at <http://www.youtube.com/watch?v=xRx12cVFTLw> and <http://www.politico.com/news/stories/0311/51576.html> show the then-candidates posturing against the NRC. Note that in the first video, Obama slips in that the NRC is among a "whole bunch of agencies that over the last seven years have been filled with cronies", i.e., during the Bush years. But for a catalogue of the ways in which it is still "captive of the industries that it regulates" and still "filled with cronies", see "U.S. Nuclear Regulators Weaken Safety Rules, Fail To Enforce Them: AP Investigation" at http://www.huffingtonpost.com/2011/06/20/us-nuclear-regulators-safety-industry_n_880222.html.

12 For an overview of the NRC's corruption and the dismal state of the nuclear plants in this country, see "US nuke regulators weaken safety rules" at http://old.news.yahoo.com/s/ap/20110620/ap_on_re_us/us_aging_nukes_part1.

“Nuclear Energy | Clean Energy | US EPA” (in fact, the top of every page – nuclear, oil, coal – reads “Clean Energy”). One page features “RadTown USA”¹³, which you might expect to be a horror story of cancer and radiation sickness and mutations. But no, this page paints nuclear power in playskool-safe colors, in which “Radiation is natural and all around us. It can be man-made too. But it's nothing new. It is, quite simply, part of our lives.” Sure, radiation is all around us, in very tiny quantities, but this bland statement is like justifying the murder of millions through imperialist war by saying “Well, death is natural”.

Obama's EPA appears to be on a closed-door fast track to drastically raising “safe” levels of radiation by thousands and even tens of thousands of times¹⁴. Independent scientists agree that with each increase in exposure of a population, it is possible to predict with a high degree of accuracy the resulting increased mortality. In other words, each increase of “safe” levels trades life for profit.

Like at Fukushima Daiichi, the U.S. nuclear industry has the policy-by-necessity of storing spent fuel waste on site. This means that by now over 70,000 tons of spent fuel are stored in at least 77 sites around the U.S., with 2200 tons added each year, and all of it in “temporary” holding. This is highly radioactive material, which must be stored safely, protected from natural disaster. Wet storage has the problems pointed up by Fukushima – loss of coolant – while dry storage is experimental, and subject to corrosion of the metal containers. In addition, on-site storage magnifies the problem that many nuke plants are located near population centers. Not that nukes would be safe if they were located in isolated areas, but the combination of both active fuel and decades of spent fuel makes the question of safety that much more critical. On the other hand, “permanent” storage requires a site which can be commandeered for the use – Yucca Mountain on traditional Shoshone Native American land in Nevada, for example. And whatever method is used, the fuel must be kept contained and stable for tens or hundreds of thousands of years.

While other governments are at least talking about scaling back, shutting old reactors or placing a moratorium on new ones, and while Germany now generates one sixth of its energy with renewable sources, Obama insists that expanding U.S. nuclear energy beyond the current 20% of U.S. capacity remains a “vital” part of an overall “clean” energy plan. So “vital” that he's called on Congress to triple Federal government loan guarantees for nuclear energy, to \$54 billion – meaning that the masses will be on the hook for plant bankruptcies and defaults, whether due to economic failures or nuclear disaster. This while the country is still reeling, and vital services like education and unemployment benefits are being cut left and right – due to the Feds guaranteeing the banks and financiers and auto-manufacturers to the tune of \$trillions. No amount of cash is too much to give to the billionaires, though.

Nuke-onomics

Obama's call for federal loan guarantees shows that nuclear energy isn't viable without them. The extreme care that must be taken to reduce the risks inherent to mining, refining, use and disposal of radioactive fuel and byproducts, plus the redundancies and fail-safes which must be built into the reactors, make it an expensive form of energy. Despite this, the nuclear industry publishes documents purporting to prove that nuclear power is the cheapest form of energy. But to do so requires convoluted logic.

Take for example the World Nuclear Association, an advocacy group of the world nuclear industry (its members include

¹³ <http://www.epa.gov/radtown/>

¹⁴ The organization Public Employees for Environmental Responsibility is working to bring to light the plan to raise these levels, and the cavalier attitude which the NRC bureaucrats are taking toward this push to relax these standards. See http://www.peer.org/news/news_id.php?row_id=1325 for a press release on their efforts, and some links to EPA documents discussing the plan. See also <http://www.collapsenet.com/free-resources/collapsenet-public-access/item/723-fallout>.

TEPCO and nearly 200 others: energy producers, fuel mining companies, fuel processors, nuclear regulatory agencies, and pro-nuke think-tanks). Their “Economics of Nuclear Power” web page¹⁵ starts by breaking down the cost of processing 1 kg of raw Uranium Dioxide into fuel rods: mining, enrichment and fabrication. But their calculation leaves out the costs of managing the spent fuel and other radioactive waste, except to say “There are other possible savings [!]. For example, if used fuel is reprocessed and the recovered plutonium and uranium is used in mixed oxide (MOX) fuel, more energy can be extracted.” Then later in the page, they write that the costs are “rather less [!] if there is direct disposal [permanent storage] of used fuel rather than reprocessing”. So the costs are both less if fuel is reprocessed *and* less if it is disposed of in a permanent repository. No wonder nuclear energy is so cheap: Each method is cheaper than the other!

The truth is that on the one hand, reprocessing is very expensive and increases the overall energy costs. On the other, storage requires a permanent waste repository site, immune from all geologic events for tens or hundreds of thousands of years – many thousands of times longer than the life of these poison-producers. This is to them a cost savings, but to future society it's a semi-permanent cost – long after they're gone, the masses will be left to deal with their mess. In other words, one might with greater justification say instead that each method is more expensive than the other.

Returning to their document:

It is important to distinguish between the economics of nuclear plants already in operation and those at the planning stage. Once capital investment costs [a]re effectively “sunk”, existing plants operate at very low costs and are effectively “cash machines”.

The TEPCO management considered their reactors cash machines, and the result was burst pipes, radiation releases, injury and death even before the March 11th earthquake. The General Electric management considered its Vermont Yankee reactor in a cash machine, and the result was that it's cooling tower collapsed due to lack of maintenance. These reactors can only be seen as “cash machines” because the owners disregard the critical need for maintenance. But nothing matters to these money grubbing crooks but “Cash!”

Further – and here is where the government guarantees are most important – the costs of even a medium sized breakdown of the system, with radiation release, worker injuries, environmental contamination, are so high that without these guarantees, financiers wouldn't invest in such a risky proposition. Only when the government commits the masses to shoulder the risk are nuke plants economically viable. That's the real “cash machine” here.

New plants versus old nukes

In an environment where regulatory agencies are rewriting their regulations to guarantee that decades-old decaying plants meet lowered standards, and where reactor owners have to falsify tests to make it appear that their decaying reactors meet these lower standards, some nuclear defenders have raised the call to replace them with newer, better-designed plants. First, new plants *might* be better designed, and they *might* be built with redundant systems to protect against disastrous failure. But there is little reason to think that they will be built as robustly as is claimed, since the regulatory agencies are running so fast to weaken standards.

Second, even if they were everything they're claimed to be, this still requires the large-scale mining, refining, transport, and fabrication of new fuel rods, and the cooling and virtually permanent storage of spent fuel rods, and these factors still make the use of nuclear power unacceptably dangerous.

Engineering may have found some ways around already-encountered hazards. For example, newer reactors are designed so that the control rods automatically “fall” into the shutdown mode when power from the outside grid is lost, like happened at Fukushima. But even after the control rods are

¹⁵ Available at <http://www.world-nuclear.org/info/inf02.html>.

fully inserted, the fuel needs to be both contained and actively cooled – requiring significant energy – and this can't be counted on, as we've seen at Fukushima. If the grid is down, energy can be provided by backup generators, but Fukushima shows that this too is not failsafe.

Newer-design pressurized water reactors count on maintaining the entire enclosed system at 150+ times atmospheric pressure to control the reaction. But of course, maintaining that pressure through a large earthquake, or even just through the normal wear and corrosion during the several-decade normal lifespan of a reactor, raises its own problems. It also raises the stakes when there is a breach of containment and loss of coolant like we've seen at Fukushima, because with those plants, super-heated super-pressurized water and steam spew into (or out of) the plant.

The attitude of the bourgeoisie of the developed world

A section of the ruling classes of some nations is agnostic about energy sources, as long it's cheap, and there isn't too much trouble with it. On the other hand, the nuclear industry and its allies around the world are powerful and well-organized. They've been positioning themselves for years as the answer to global warming.

The mass opposition and protests sparked by Fukushima have had apparent victories in some countries: After some stonewalling, Japanese Prime Minister Kan has questioned whether private companies should be running nuclear plants, and talked about “eventually” phasing out nuclear power. In Taiwan and Switzerland, there has been official talk of at least not relicensing the oldest, least safe plants (“What?”, you say, “They were planning on relicensing old, unsafe plants?”), even perhaps not replacing any plants when they reach the end of their lifespans. There were indications that the Chinese government might place a moratorium on new plant approvals, but the finance capitalists seem to believe differently, expecting new plants in China and India to double world uranium production, ending the uranium market slump since the Fukushima disaster¹⁶.

In the last 10 years, the German bourgeoisie has had a two-sided approach. They've doubled their renewable energy production to one sixth of their total use (mainly wind and biomass¹⁷). But on the other hand they are still heavily dependent on coal and other fossil fuels, and nuclear, and before Fukushima planned to license their reactors beyond their planned lifespan. In the wake of Fukushima, even conservative Prime Minister Merkel has had to bow to pressure, and now talks of replacing nukes entirely with renewable energy and getting serious about greenhouse gas reduction.

But other governments use economic- and carbon-blackmail against the masses to avoid ending their reliance on nuclear energy. For example the Swiss government emphasizes the supposed high cost of phasing it out, and threatens that it would lead to higher greenhouse gas emissions because well, we'll have to burn more oil! Likewise, Obama repeats that “[Nuclear] has important potential for increasing our electricity without adding carbon dioxide to the atmosphere”.

These governments talk as if their hands are tied in setting a real green energy policy, and yet they promote and subsidize nuclear power as a “green” alternative to oil. But if you don't buy that, tough luck, you've got to decide between that and environmental disaster due to global warming. What about devising a truly green energy policy and enforcing it through regulatory agencies independent of the industries they're regulating? Not a chance!

¹⁶ For a discussion of the official plans of the Chinese government regarding nuclear power see <http://www.guardian.co.uk/world/2011/mar/16/china-suspends-approval-nuclear-plants>. For the analysis of “uranium futures” see <http://www.bloomberg.com/news/2011-05-22/uranium-recovery-seen-as-atomic-plans-from-china-to-india-offset-fukushima.html>.

¹⁷ Biomass subsidies have their own problems in that they often create incentive for farmers to convert to fuel production resulting in higher food prices. Depending on how they're structured, biofuel subsidies can also increase tree cutting.

International mass opposition

In Japan, both TEPCO and the government have been the targets of many protests against their handling of the disaster and calling for an end to nuclear power altogether. Demands include:

- an end to TEPCO secrecy and lies
- the government take over of the cleanup
- a return to the significantly lower radiation exposure limits in place before the disaster – which the government has raised even for children
- financial compensation and medical care for those sickened
- the replacement of all nuclear power in Japan and everywhere with renewable, green forms of energy

Japanese farmers have been protesting the contamination of the lands and crops, and their loss of livelihood as their contaminated crops rot in the field. Japan is a country in which mass protest is relatively rare, which makes the large and growing demonstrations – 20,000 in Tokyo and more around the country recently – all the more remarkable. Polls show almost 60 percent disapprove of the government's handling of the disaster.

Fukushima has inspired protests around the world also. In India, there's been a movement to stop the Jaitapur plant, slated to be the world's largest when it is completed and also sited on a fault line, and this has been given steam by the Japanese disaster. Police shot into the crowd killing one protester and injuring several others, and authorities are pressing forward with the plant despite protests. Along the border between France and Germany demonstrators called for an end to all nuclear power around the world. Hundreds of thousands have protested at nuke plants around Germany. In Spain, protesters called for the replacement of their nuclear reactors with clean energy sources. In Taiwan, thousands called for the end to construction of a plant there, and opposed the extension of the three existing plants' lifespans. In Switzerland tens of thousands protested the use of nuclear power. Here in the U.S., Fukushima has given strength to the smaller anti-nuclear movement as well, inspiring angry denunciations of the platitudes spouted by NRC flacks during a public hearing on Indian Point, New York, also sited near an earthquake fault.

But to overcome the vested interests in nuclear power, it isn't enough to demand that bourgeois leaders “listen to us”. The masses will have to wage a militant and determined struggle, building on these struggles already going on.

Energy and anti-people environmentalism

Some environmentalists argue that nuclear power is a necessary evil, to cut back on the worse evil of CO₂-emitting carbon compounds. They argue that without nuclear energy, the technology doesn't exist (and maybe never will) to meet world energy needs without devastating the environment. In other words they buy the “green nukes” line.

Others reach another conclusion: we can't meet world energy needs today because we've exceeded a supposed “carrying capacity” of the earth. So, they argue, it is likely that a significant part of the population of the earth will have to die off. This amounts to a kind of genocide by neglect – sit back, let the disaster unfold, and soon enough we'll be back within the “carrying capacity”. As though they're citing baseball statistics they dispassionately observe that increased deaths are inevitable as everyone is forced to use less energy. From their tone, one certainly doesn't get the sense they imagine themselves among those “made redundant”, and their class status as bourgeois intelligentsia suggests they're probably right¹⁸.

¹⁸ Consider for example, Paul Chefuerka, a Canadian scientist and environmentalist. In “Population The Elephant in the Room” at <http://www.paulchefurka.ca/Population.html> he writes: “While humanity has apparently not yet reached the carrying capacity of a world *with* oil, we are already in **drastic overshoot** when you consider a world *without* oil. In fact our population today is at least five times what it was before oil came on the scene, and it is still

Others are quick to add that they'd do it by reducing the birthrate, rather than “increasing the deathrate”, but this is a hundred-years solution and we don't have that kind of time. Second, such advocates are often quite vague about *how* they'd reduce the birthrate: By a worldwide China-style enforced one child policy? By some aggressive economic policy which makes it too expensive for the poor to have more than one child while allowing the rich to have as many children as they please – a kind of market mechanism for childbirth? By death panels, denying food or other means of subsistence to anyone who has lived past their “usefulness”?

So what instead?

Enforceable and enforced energy regulations: In the past, various governments have regulated lead in paint and gasoline, certain bio-accumulative chemicals in pesticides, chlorofluorocarbons in propellants and coolants, industry effluents into waterways and air, and they *could* write and enforce regulations and laws to phase out and eliminate nuclear, coal, oil and gas energy industries. These are the large-scale energy industries which are having some of the most destructive effects on the environment today. Yet, rather than strengthening and broadening existing regulations, governments have been busy gutting them. Obama is right that the regulatory agencies have been captured by the industries they're supposed to regulate, but he lies when he implies that this state only exists under the Republicans. And a significant section of the bourgeoisie is wedded to the idea that any serious regulation impinging on the right of industry to make maximum profit is terribly unjust.

But the current crises also run deeper and broader than those of the past. It is true that industrial pollutants have in the past threatened species and ecosystems, while major industrial accidents such as Bhopal, India and Chernobyl and other human atrocities such as the use of depleted uranium weapons, or even major wars have trashed huge swaths of land, even semi-permanently, and so forth. But we're now in a new era when we've discovered that human activity is causing global warming, and we're at the start of a crisis which threaten inundation of low-lying cities and whole nations, world food supply, and massive ecosystem collapse. Whole swaths of farmland will likely become desert, fish populations already highly stressed by commercial fishing will die off due to warming water temperatures, large numbers of species are going extinct, unable to adapt to the changes that have already happened to their habitats.

All of this means that any solution through regulation has to run deeper and broader as well. To bring about the necessary changes, regulation will have to consider all these questions and more, and will have to use different mechanisms, mechanisms which break free of the neo-liberal religion of market measures, and which reach farther than the old model: write a law, set up a regulatory agency, hire some inspectors. These new regulations will have to involve the masses of people in policing violators, and for that to happen, they'll have to be written so they don't cost jobs, but instead secure them and create more. Only the masses of workers have an undivided interest in the elimination of destructive, polluting technologies such as nuclear and fossil fuels, and it is the masses who demanded the last generation of regulations. They'll have to be the ones to take the lead in demanding the new ones.

A switch to truly renewable energy: More than the feel-good nostrums of the ruling class, and their words without substance, the working class is going to have to demand a switch to renewable sources: wind, water, and solar being the main practical sources already in wide use. This has to include the demand to shut down all existing nuke plants and replace them with real green sources. There have been calculations

growing. If this sustaining resource were to be exhausted, our population would have no option but to decline to the level supportable by the world's lowered carrying capacity.” [his emphasis] In other words, without much apparent concern, he is arguing that 80 percent of the world's population will die off in the next few years, when he predicts oil will run out.

suggesting that it would be possible to meet the world's projected need even several decades down the road, assuming only that efficiency continues to improve at the current rate on existing technologies. One study would use large-scale wind farms where there's sufficient wind, solar farms where there's sufficient sun, and hydroelectric to even out ups and downs in generation capacity¹⁹.

But studies and calculations aren't enough. To make an overall renewable energy policy will require careful study of what generating technologies are best to use where, and it will require massive cooperation on a world scale, something bourgeois nations are spectacularly bad at. But the masses can demand that “their” governments adopt new energy policies. And such demands will have to include open planning and democratic decision-making. And for *that* to happen, will require extended struggle led by the workers.

An end to anarchic production: Today energy policy everywhere is decided not by what production technologies produce the least effects in terms of greenhouse gasses, or use the safest plants for the workers, or release the fewest pollutants into the environment. Instead, for the most part it is decided solely by what makes the most money for owners and shareholders. Around the world, bourgeois governments are wed only to those energy policies which make maximum profit of capital, with nuclear devastation and global warming only figuring secondarily, if at all. Therefore the working class will have to take the lead, as it is only the working class which has nothing to lose and everything to gain by a switch to policies which preserve the environment. In the end, it is only by eliminating production – including energy production – for profit and replacing it with production planned in a democratic way by the workers to meet their own needs – that is, by replacing capitalism with socialism – that we'll overcome these environmental and human travesties.

As long as they exist, the ruling classes of the various nations will have to be dragged kicking and screaming from their wanton destruction of the environment. And that will take a force strong enough to overwhelm them and their established interests: the united class of workers. And, in most countries the ruling class is well organized and practiced at lying, manipulating, murdering, anything, to get what it wants and keep what it has, and it is conscious of its common interests as a class, and has class solidarity against the workers. To effectively fight them will require a force not only strong enough numerically, but also strong in understanding its common interests as a class, and united in international class solidarity.

Battles to stop the building of individual nuclear power plants, or to demand the closure of existing ones, are a place to start building that consciousness and solidarity. These battles have to include building a trend which upholds a proletarian line within these movements, a line based on the conscious and objective interests of the workers and poor.

19 For one technocratic, apolitical discussion see “A Plan to Power 100 Percent of the Planet with Renewables” at <http://www.scientificamerican.com/article.cfm?id=a-path-to-sustainable-energy-by-2030>. They're good as far as showing that it is possible to meet the world's energy needs in a reasonably green fashion, but they fall down when it comes to projecting a realistic path to achieving this program. They appear to believe that it is simply a matter of putting forth a good idea for policy-makers to take it up.