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Environment

The evidence from Fukushima: nuclear power means nuclear catastrophe

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Once again the evidence shows that nuclear technology can never be 100% secure. The risks are so frightening that the conclusion is obvious: it is imperative to abandon nuclear energy, and to do so as quickly as possible. This is the first lesson of Fukushima, one which raises absolutely fundamentamental social and political questions, requiring a real social debate about an alternative to the capitalist model of infinite growth.

What has happened is entirely predictable: yet another major nuclear "accident". At the time of writing, it is not yet certain that it will take on the dimensions of a disaster similar to Chernobyl, but that is the direction in which things, alas, look set to evolve. But whether it develops into a major disaster or not, we are once again faced with evidence that the technology can never be 100% secure. The risks are so frightening that the conclusion is obvious: it is imperative to abandon nuclear energy, and to do so as quickly as possible. This is the first lesson of Fukushima, one which raises absolutely fundamental social and political questions, requiring a real debate throughout society about an alternative to the capitalist model of infinite growth.

A dangerous technology

Windscale in 1957, Three Mile Island in 1979, Chernobyl in 1986, Tokai Mura in 2000, and now Fukushima. The list of accidents at nuclear power plants continues to grow. It simply could not be otherwise and it is not necessary to be a doctor of nuclear physics to understand why.

A nuclear plant works somewhat in a similar way to a kettle, with the elements in a kettle corresponding to the fuel rods in a nuclear plant. If there is no water in the kettle and the elements heat up, there is a problem, and in much the same way the central fuel rods must be continuously submerged in water. The steam produced by the resulting boiling water turns turbines that generate electricity. The plant consumes large quantities of water, the circulation of which is ensured by pumps.

If the pumps fail, the water runs out and the overheated bars start to deteriorate. If water is not added quickly, the heat produced by the reaction in the bars is such that they melt and fall to the bottom of the tank (which corresponds to the chamber of a kettle). This tank is in turn enclosed in a double ring of security; we all recognise the outer sillouette of the reactor. If this does not withstand the intense heat of molten bars and it cracks, radioactivity is released into the environment, with fatal consequences.

A fragile technology

The reaction that occurs in a power plant is a chain reaction: uranium nuclei are bombarded with neutrons, and when it absorbs a neutron, a uranium nucleus splits in two and releases a large amount of energy (nuclear fission) while also releasing more neutrons, and each of these can cause the fission of another uranium nucleus. Once the reaction starts, it continues all by itself. The only way to control and monitor the temperature is to insert between the fuel rods bars made of alloy that can absorb neutrons without causing fission. This can cool the core of the reactor. But this cooling takes some time, during which the fuel rods must remain bathed in water, otherwise they might overheat.

The proponents of nuclear power repeat tirelessly that the device is extremely safe, particularly because, in the case of failure of the mains supply, the pumps can be supplied with energy thanks to emergency generators. The accident in Fukushima shows that those assurances are not worth much: because of the earthquake, the stations have automatically triggered a chain reaction, as might be expected in such circumstances. There was therefore no more power to operate the pumps. The generators should have started automatically, but unfortunately they were out of order, drowned by the tsunami. The cooling water is insufficient, as the fuel rods were exposed from 1.8m to over three meters (for a total length of 3.71 meters). This overheating caused an overpressure and a chemical reaction (electrolysis of water cooling) which produced hydrogen. The technicians then released vapor to avoid the explosion of the tank, but hydrogen apparently then exploded in the reactor, causing the collapse of the dome of the building, and steam was released into the environment. This scenario was apparently repeated in a second reactor.

Just like Chernobyl

The distribution of freshwater having been interrupted by the tsunami, the technicians used the water from the nearby sea. Several American experts have said that this was typically an "act of desperation." According to them, it evokes the vain attempts to avoid the melting of the core of the reactor at Chernobyl, when employees of the plant and heroic volunteers poured sand and concrete onto the reactor, paying with their lives. Thhe level of radioactivity measured 80 km from Fukushima is already more than 400 times the permissible levels. Six brave Japanese journalists armed with Geiger counters visited Futaba Town Hall, located 2km from the plant and found that the radioactivity levels exceeded the measuring capacity of some of their devices! Currently, it is estimated that a Japanese citizen is receiving every hour a dose of radioactivity considered acceptable in one year.

As the French network "Sortir du nucléaire" said in a statement, "we are to believe that a dramatically high level of radioactivity in a wide area around the plant, including the health consequences does not have serious consequencers for the health". We should not believe the statements about immunity to the fallout: the precedent of Chernobyl showed that a radioactive cloud could contaminate vast regions. Everything depends on the force with which the particles are sent into the atmosphere. In the case of a very violent explosion, the radioactive elements may rocket to the altitude of jet streams, the strong winds that prevail at high altitudes. In that case, the fallout could affect areas far removed from Fukushima.

Two agonizing questions

The radioactivity comes mainly from two elements: Iodine-131 and Cesium 137. Both are highly carcinogenic, but the former has a lifetime in the atmosphere of about eighty days, while the second remains radioactive for about 300 years. On Sunday March 13, more than 200,000 people were evacuated. The authorities decreed an exclusion zone of 20 km around the first reactor in Fukushima, and 10 km of the latter. The presence of Cesium 137 is particularly worrying.

Precise information is lacking: Tokyo Electric Power Company (TEPCO) and the Japanese authorities are more than likely hiding a part of the truth. The two most worrying questions which arise are whether the fusion of the bars is controlled or if it continues, on the one hand, and also if the structure containing the tank will blow up. According to Ken Bergeron, a nuclear physicist who has worked on simulations of accidents in power plants, this structure "is certainly stronger than Chernobyl, but much less so than Three Mile Island. Specialists are not disguising their concern: "If they do not regain control of it all, we will move from partial melting to a full meltdown, it will be a total disaster," said one expert (Le Monde, March 13, 2011).

But the worst of all would be the meltdown of the core of the second reactor, which exploded on March 13. Indeed, the fuel is MOX, a mixture of depleted uranium oxide and plutonium 239. Plutonium 239 is in fact a waste recycling product of conventional uranium power plants. Its radioactivity is extremely high and its "half-life" (the number of years needed to reduce by half the level of radioactivity) is estimated at 24,000 years. The Japanese are familiar with this element and its fearsome consequences: the nuclear bomb dropped on Nagasaki at the end of World War II was based on Plutonium-239 ...

An unacceptable risk

After the Chernobyl disaster, nuclear advocates have said that poor Soviet technology, poor safety standards and the bureaucratic nature of the system were the basis of the accident. If we are to believe them, nothing similar could occur to plants based on good capitalist technology, especially not in "democratic" countries where the legislature shall take all necessary security measures at all levels. Today we are seeing that these claims are not worth a damn.

Japan is a country of high technology. Fully aware of the seismic risk, the Japanese authorities have imposed strict standards for plant construction. The reactor 1 Fukushima even included a double safety device, with some generators supplied with fuel and others battery operated. Neither has done any good, because the most sophisticated technology and most stringent safety standards will never provide an absolute guarantee, given the possibility of natural disasters or possible criminal acts by insane terrorists (not to mention human error). We can reduce the risks of nuclear power, but we can not remove them entirely. If it is relatively small but the number of plants increases, as is the case now, the absolute risk may increase.

It is very important to make the point that this risk is unacceptable because it is of human origin, it is preventable, and it is the result of investment decisions made by small circles of people, focused on their profits without proper democratic consultation of the people. To write that "nuclear accidents (sic) in Japan are far from causting the loss of as many lives as the tsunami," as it said in Belgium's Le Soir editorial (14 March), is to ignore the qualitative difference between a unavoidable natural disaster and completely preventable technological catastrophe. To add that "like any complex industrial process, energy production from the atom has a substantial risk" (ibid.) also ignores the specificity of the nuclear risk, which includes the fact that this technology has the potential to wipe the human race off the face of the earth. We must relentlessly hunt down and expose these types of excuses, which reflect the enormous pressure exerted at all levels by the lobby of the nuclear industry.

The risk on our own doorstep

If specialists do not hide their utmost concern, policies flaunt their stupidity. Asked on the afternoon of March 12, the French Minister of Industry, Mr. Besson, said that what is happening in Fukushima is "a serious accident, not a catastrophe." To justify his own pro-nuclear policy, the British secretary of energy, Chris Huhne, found nothing better to say than to point out the weakness of the seismic risk in the UK, adding that it would draw lessons from what happens in the Land of the Rising Sun so that, ultimately, security will be even better... These same pitiful arguments are used with variations by all governments who have decided either to stay the course (France), or have been converted (Italy) or are challenging the policies of nuclear power which were established under the pressure of public opinion after Chernobyl (Germany, Belgium). Objectives: To prevent panic and thereby to prevent a new mobilization of the anti-nuclear movement from torpedoing the ambitious plans for nuclear development which exist on a global scale.

To call these arguments unconvincing would be something of an understatement. In Western Europe, in particular,

fear is more than justified. In France, a leader in the field of nuclear energy, reactors do not meet seismic standards of reference. According to the Network "Sortir du nucléaire" EDF ieven went to the lengths of falsifying the seismic data to avoid having to recognize and invest at least 1.9 billion euros to bring the reactor up to safety standards. Most recently, the courts dismissed an application for closure of the nuclear Fessenheim (Alsace), the oldest French nuclear reactor, also situated in an area of high seismic risk. In Belgium, Doel and Tihange are designed to withstand earthquakes of magnitude 5.7 to 5.9 on the Richter scale. However, since the 14th century, these regions have experienced three earthquakes with a magnitude greater than 6.

It is also worth noting that there are no longer enough engineers with specialized training in power plant management, and the nuclear emergency plan only provides for evacuation of an area 10 km around a plant, which is totally inadequate. The prolongation of the active lives of the facilities is another concern. It now stands at in 50 years, whereas incidents are increasing in plants with only twenty years of existence. Thus, because of their age, nineteen of French reactors have unresolved anomalies in their relief systems of cooling ... the same that have failed in Japan. Etc., etc..

A social choice

We have to abandon nuclear energy, as completely and as quickly as possible. This is perfectly possible technically, and it should be noted in passing that the efficiency of nuclear power is very poor (two thirds of the energy is dissipated as heat). The debate is primarily a political one, a debate society must have that ultimately poses a choice of civilization. Because here is the nub of the problem: we must phase out nuclear power and, simultaneously, abandon fossil fuels, the main cause of climate change. In just two generations, renewables must become our sole energy source.

However, the transition to renewables requires huge investments in energy efficient solutions, so sources of greenhouse gas emissions become more and more supplementary. In practice, energy transition is only possible if energy demand decreases dramatically, at least in developed capitalist countries. In Europe, this decrease should be about 50% by 2050. A reduction of this magnitude is not feasible without a significant reduction in material production and transportation. We must produce and carry less, otherwise the equation will not balance. This means that such a transition is impossible in the capitalist system, because the pursuit of profit under the whip of competition inevitably means growth, ie capital accumulation, which inevitably leads to an increasinng quantity of goods, putting increased pressure on resources.

This is why all the responses to the climate challenge presented by capitalists rely on sorcerer's apprentice technology , of which nuclear is the flagship. The "bluemap" energy scenario of the International Energy Agency is telling in this regard: it proposes to triple the number of nuclear power stations by 2050, which would involve building a new gigawatt power plant every week. This is madness, pure and simple.

An alternative to this vicious system is more urgent than ever. It requires that we produce less, which means a radical reduction of working hours, and therefore a redistribution of wealth. It also involves collective ownership of energy and finance, because renewables are more expensive than other sources, and will remain so for twenty years at least. It demands planning at all levels, from local to global, in order to balance the rights of the South to development with the preservation of the ecological balance. It ultimately requires the realisation of the ecosocialist project, of a society producing for the satisfaction of real human needs, democratically determined, in accordance with the rhythms and the functioning of the ecosystem.

Without such an alternative, capitalist growth will always cause more disasters without providing for social needs.

That is, ultimately, the terrible lesson of Fukushima.