

Dangers of Nuclear Power Generation

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Today the heartfelt sympathy and prayers of the whole world go to Japan. The brave people of Japan have experienced a triple disaster - the largest earthquake ever recorded, a terrible tsunami that followed it, and finally the threat of radiation from nuclear power plants damaged by the earthquake. Besides feeling sincere sympathy and sending help for Japan's recovery we may perhaps wish that Japan's nuclear threat will cast some doubt on world-wide plans to build new nuclear power plants.

The dangers of nuclear power generation are exemplified by the Chernobyl disaster: On the 26th of April, 1986, during the small hours of the morning, the staff of the Chernobyl nuclear reactor in Ukraine turned off several safety systems in order to perform a test. The result was a core meltdown in Reactor 4, causing a chemical explosion that blew off the reactor's 1,000-ton steel and concrete lid. 190 tons of highly radioactive uranium and graphite were hurled into the atmosphere. The resulting radioactive fallout was 200 times greater than that caused by the nuclear bombs that destroyed Hiroshima and Nagasaki. The radioactive cloud spread over Belarus, Ukraine, Russia, Finland, Sweden and Eastern Europe, exposing the populations of these regions to levels of radiation 100 times the normal background. Ultimately, the radioactive cloud reached as far as Greenland and parts of Asia.

The exact number of casualties resulting from the Chernobyl meltdown is a matter of controversy, but according to a United Nations report, as many as 9 million people have been adversely affected by the disaster. Since 1986, the rate of thyroid cancer in affected areas has increased ten-fold. An area of 155,000 square kilometers (almost half the size of Italy) in Belarus, Ukraine and Russia is still severely contaminated. Even as far away as Wales, hundreds of farms are still under restrictions because of sheep eating radioactive

grass.

Public opinion turned against nuclear power generation as a result of the Chernobyl disaster. Had the disaster taken place in Western Europe or North America, its effect on public opinion would have been still greater. Nevertheless, because of the current energy crisis, and because of the widespread (but false) belief that nuclear power generation is an answer to global warming, a number of people are arguing that nuclear energy should be given a second chance. The counter-argument is that a large increase in the share of nuclear power in the total spectrum of energy production would have little effect on climate change but it would involve unacceptable dangers, not only dangers of accidents and dangers associated with radioactive waste disposal, but above all, dangers of proliferation of nuclear weapons.

If many nations throughout the world decide to build power-generating reactors, the number of countries possessing nuclear weapons will increase dramatically because it is almost impossible to distinguish between civilian and military nuclear programs. By reprocessing spent nuclear fuel rods, using ordinary chemical means, a nation with a power reactor can obtain a weapons-usable isotope of plutonium. Even when such reprocessing is performed under international control, the uncertainty as to the amount of plutonium obtained is large enough so that the operation might superficially seem to conform to regulations while still supplying enough plutonium to make many bombs.

The enrichment of uranium¹ is also linked to reactor use. Many reactors of modern design make use of low enriched uranium as a fuel. Nations operating such a reactor may claim that they need a program for uranium enrichment in order to produce fuel rods. However, by operating their ultracentrifuge a little longer, they can easily produce highly enriched (weapons-usable) uranium

The widely held belief that global warming can be avoided by switching to nuclear power is false. In a carefully documented book “Nuclear Power is Not the Answer to Global Warming or Anything Else”, the Australian physician Helen Caldicott points out that if a detailed accounting of CO₂ emissions is made during all the phases of nuclear power generation, including both construction and decommissioning of the plant, together with mining, transportation and refinement of the uranium ore, the CO₂ emissions are

¹i.e. production of uranium with a higher percentage of U-235 than is found in natural uranium

seen to be comparable with those produced by a coal-fired power plant.

Known reserves of uranium are only sufficient to meet the world's total energy demand for two years ². It is sometimes argued that a larger amount of electricity could be obtained from the same amount of uranium through the use of fast breeder reactors. But fast breeder reactors are prohibitively dangerous from the standpoint of nuclear proliferation because both the highly enriched uranium from the fuel rods and the plutonium from the envelope are directly weapons-usable. It would be impossible, from the standpoint of equity, to maintain that some nations have the right to use fast breeder reactors, while others do not. If all nations used fast breeder reactors, the number of nuclear weapons states would increase drastically.

In conclusion, we can list the following arguments against building new nuclear power stations:

1. The danger of accidents, as exemplified by Chernobyl, Fukushima, Three Mile Island and Windscale.
2. The danger of proliferation of nuclear weapons. All of the new nuclear weapons states obtained their weapons under the guise of nuclear power generation. The difficulty of distinguishing between civilian and military nuclear programs is exemplified by the situation in Iran.
3. The problem of disposing of nuclear waste has not been satisfactorily solved.
4. At best, nuclear power generation can supply only a small fraction of the world's energy needs, and because of limited stocks of uranium and thorium, it can only do so for a short time.
5. If a careful accounting is made, the CO₂ emitted by by constructing nuclear power plants, running them, mining and refining the uranium, and decommissioning the plants is comparable to that emitted by coal-fired plants.
6. In the countries where it is presently used, nuclear power generation is heavily subsidized, and if it were not for these subsidies, it would not be able to compete with wind energy or solar energy. It is vital

²Craig, J.R., Vaugn, D.J. and Skinner, B.J., *Resources of the Earth: Origin, Use and Environmental Impact, Third Edition*, page 210.

that the subsidies be shifted from nuclear power to the development of various forms of renewable energy.

Thus while our thoughts and wishes for recovery are constantly with Japan, we may perhaps hope some good will come from this terrible catastrophe. Let us hope that the countries with plans to build new nuclear power plants will think again about the dangers.