Fact Sheet 4: Safe Energy

Catastrophe free nuclear power - wishful thinking

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Serious nuclear accidents

- **Windscale:** October 1957
  Fire in the reactor lasts many days, radioactive cloud reaches Northern Europe
- **Mayak:** winter 1957/58
  Accident, more than 100 dead through radiation, 217 cities and villages with a total population of 270.000 people were affected
- **Idaho:** January 1961
  Accident, three dead
- **Detroit:** October 1966
  Cooling system failure, reactor core melts
- **Three Mile Island (Harrisburg)**: March 1979
  Worst nuclear disaster in the USA, surrounding area evacuated
- **Saint Laurent:** January 1980,
  Tear in a line, radioactive leakage
- **Chernobyl:** April 1986
  Worst nuclear accident in the world, number of dead unclear
- **Tokaimura:** March 1997
  Explosion, 35 workers receive high doses of radiation;
  September 1999, Critical accident, 600 people exposed to strong radiation, two dead
- **Paks:** April 2003
  Overheating of 30 fuel elements, radioactive leakage
- **Tokyo:** August 2004
  Accident, four dead
- **Kashiwazaki-Kariwa:**
  July 2007, Earthquake, transformer fire and radioactive leakage

There is no guarantee against nuclear accidents

Atomic power stations use radioactive material including uranium and plutonium for energy production. Nuclear fuel, as well as other radioactive fission products, which are produced during the process of energy generation are extremely dangerous for the environment. Since ionizing radiation harms all forms of life, it is essential that these substances do not leave the power station and enter the environment. Human and technical errors may occur. A 100 percent guarantee against accidents is not achievable even with the existing comprehensive safety systems. A danger remains, but we are told it is „so small“, that society should accept the risk.

The history of nuclear energy production clearly shows that serious accidents, either in nuclear power stations or other nuclear plants, can not be prevented. Little was known about the dangers of accidents and radiation, when the first nuclear reactors where built during the 1950's – mainly for military reasons. Over the years, serious accidents such as in Mayak or Windscale (today known as Sellafield) were played down or covered up. Not until the nuclear accidents in Harrisburg, Pennsylvania and especially in Chernobyl, Ukraine, did the public become significantly alarmed. After that, the further global expansion of nuclear power for civilian use was dramatically slowed down.

The global reactor inventory is 'aging'

Nuclear reactors were designed to run for 30-40 years. Most of the active nuclear power stations are now older then 30 years. Aging leads to wear and tear and changes in the used material. These processes are difficult to anticipate and to detect. They include high temperatures, strong mechanical forces, an aggressive chemical surrounding and the continuous neutron radiation from the nuclear fission impact on essential safety components. Corrosion, brittleness, and surface tears along welds of central components have occurred again and again in the past. Anyone who thinks about a 60 year life-span must consider that these dangerous conditions will increase. In addition, the liberalisation of the energy markets in many countries leads to more financial pressures. The consequences: less staff, fewer safety checks, and more time pressure during repair work and routine exchange of fuel rods. In order to produce more electricity, the burning of fuel and the performance of the reactors are increased by 10 % through structural measures. The components are under more stress and the safety margins become narrowed, placing everyone at more risk.

The probability of serious accidents is increased

„An accident such as Chernobyl can not occur in Western reactors.“ This is stated again and again. But the fact that no accident of this magnitude has occurred is probably pure luck. A safety report of nuclear power stations written after Chernobyl (1) shows a continuous number of abnormal occurrences. Recently, such occurrences have been increasing. This is documented in the following examples:

- **Great Britain**: Leakage in the control rods of the most recent British reactor Sizewell B (commissioned in 1995)
- **Germany:** A too low boric concentration in the emergency cooling system of the German reactor Philippsburg-2 (August 2001)
- A heavy hydrogen explosion in a pipe of the German boiling water reactor Brunsbüttel close to the pressurized reactor chamber (December 2001)
- The regular quick shut down of the German reactor Krümmel could not proceed due to a transformer fire, which resulted in the failure of the emergency power supply (June 2007)
- **Bulgaria:** While shutting down the WWER (water-water-energy-reactor - certain type of reactor) Kosloduy-5, control rods were stuck in upper position (March 2005)
- **USA:** A long undetected corrosion on the pressurized reactor chamber of the US reactor Davis-Besse. Only the presence of the thin stainless steel coating of the reactor tank prevented a massive leakage (March 2002)
- **Japan:** Manipulation of safety data during a 25 year period within the Japanese nuclear power company Tepco (discovered in August 2002)
- **Sweden:** An external short circuit and failure of the emergency diesel electricity in the Swedish nuclear power station Forsmark, core meltdown was prevented only through the actions of a station worker (July 2006)

Targets for terrorist attacks

The “new” threat dimension: terrorists could target nuclear power stations, reprocessing plants and above ground storage sites as targets for attack and accept their own death in the process. Following the attacks on the USA in 2001, the vulnerability of power stations to air attacks was assessed in Germany (2). The results: older power plants are vulnerable to any kind of aircraft regardless of size, type or speed and an impact would lead to a nuclear inferno. Either the safety container would be broken or the piping system would be destroyed by the concussion or kerosene fire. In any case, an impact would most likely result in core meltdown and widespread radioactive contamination. The newer reactors are equipped with a sturdier containment, but an impact might still result in a disaster. Nuclear energy with its highly dangerous facilities offers terrorists additional targets of opportunity.

Karin Wurzbacher,
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Sources:

(1) Schneider M. et al. Residual Risk – An Account of Events in Nuclear Power Plants Since the Chernobyl Accident in 1986, May 2007, Commissioned by The Greens/European Free Alliance, www.greensefa.org/cms/topics/docbin/181/181995.residual_risk

(2) GRS Gesellschaft für Anlagen- und Reaktorsicherheit, Schutz der deutschen Kernkraftwerke vor dem Hintergrund der terroristischen Anschläge in den USA vom 11. September 2001. Zusammenfassung der Studie unter www.bund.net/lab/reddot2/ar/ar2004.pdf