

Achtung: Die Texte enthalten einige Grammatikfehler!!!

Auch nach dem Zwischenfall in Fukushima stehe ich zu den Kernpunkten dieser Ausarbeitung.

Safety of Nuclear Power Plants...

... and why Chernobyl isn't everywhere.

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The accident in the nuclear power plant in Prypjat / Chernobyl which occurred on April 26th, 1986 is today a strong argument against the civil use of nuclear energy. In order to decide if this argumentation is right or wrong it's necessary to understand the huge differences between the reactor design like the one that the Soviet Union developed and a modern "water-water" reactor design that was build everywhere else in the world.

The Soviet Union mainly build nuclear power plants with an RBMK reactor (high-power channel reactor - *reactor bolshoy moshchnosty kanalny*). Instead of water as moderator, the RBMK reactor use graphite.

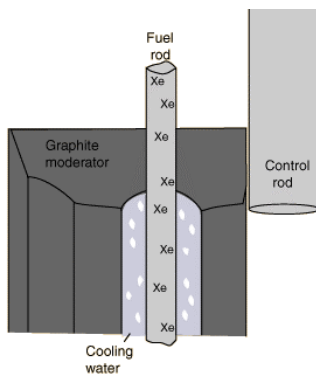
RBMK (only build in the Soviet Union)

Advantages:

- efficient for producing plutonium that can be used to build nuclear weapons.

Disadvantages:

- no containment building -> a high dose of radioactivity can easily escape in case of an accident.
- the graphite used as moderator can start burning.
- emergency shutdown procedure is too slow.
- if the water cooling system failed the nuclear chain reaction continued.



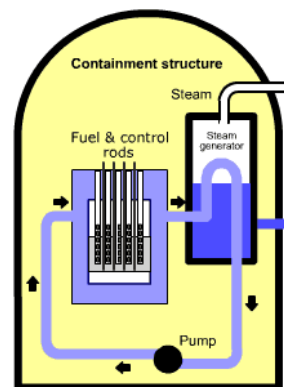
WWR (water-water-reactor)

Advantages:

- containment building -> only a small dose of radioactivity escapes in case of an accident.
- different emergency cooling system
- advanced controlling system

Disadvantages:

- control system and safety system is sometimes linked.



The use of Graphite as moderator has a significant disadvantage: In case of a cooling system failure the nuclear chain reaction still continue and the reactor is going to overheat and finally the complete core melt down. This fact is one of the main reasons for the MCA in Chernobyl.

In contrast of this is the process that would have happened if the same case had taken place on a WWR:

The water inside the reactor is going to boil and leave the reactor as steam and without the water as moderator the nuclear chain reaction breaks down.

There are round about 25 accidents and nuclear events in the history of the civil use of nuclear energy, but only the one in Chernobyl had such enormous results for the environment and the population.

Today there are 4 nuclear power plants with totally 12 RBMK reactors in use, one in Lithuania (Ignalina) and eleven in Russia: Sosnowij Bor (St. Petersburg), Smolensk and Kursk.

Sources:

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