

NUCLEAR MATERIAL

Some atoms are inherently unstable and spontaneously split which releases energy. A few elements can sustain a chain reaction, one atom splitting causes further atoms to disintegrate which in turn lead to the splitting of yet more atoms. In a bomb this process proceeds without restraint and vast quantities of energy are released in an instant. When restrained the energy released by splitting (called fission) is used as a heat source in the generation of steam which then drives a turbine and hence generates electricity.

The important elements are uranium and plutonium. Uranium occurs naturally in two forms of differing weight, uranium 235 and uranium 238. Only uranium 235 is able to support a chain reaction. This form comprises 0.7% of the naturally occurring element.

Plutonium is a man made element, formed from uranium 238 in a nuclear reactor. When uranium 235 undergoes fission neutrons are ejected which can convert non fissile uranium 238 into fissile plutonium.

Nuclear reactors use natural or slightly enriched (2-4%) uranium 235 as fuel. Atomic weapons require very highly enriched (90%) uranium or plutonium. To confuse the issue, material enriched to 20% is referred to as weapons grade, for proliferation purposes. Because it is easier to further enrich 20% uranium than to enrich natural uranium (0.7% uranium 235).

Weapons grade material is also employed as fuel for nuclear powered submarines, further complicating control.

The other material of great importance is tritium which is required for the hydrogen bomb.

of removing a substantial portion of electricity production from the dangers of disruption by coal miners or transport workers. A position entirely consistent with the Government's current attack on the mining industry.

THE SPREAD OF NUCLEAR WEAPONS

Internationally nuclear power programmes are used to circumvent the 1968 Non Proliferation Treaty. The NPT attempted to stop the number of nuclear weapons states increasing. Non weapon holding signatories foreswore the weapons option in return for assistance with nuclear research, fissile material, help in their civil programmes and a commitment on the part of the weapon holding signatories to work towards the abolition of nuclear weapons.

However despite the NPT the number of countries believed to hold or to be about to obtain nuclear weapons has increased. The NPT fails because of the overlap between civil and military nuclear technology. All reactors generate plutonium, the major hurdles are enrichment

and reprocessing. These plants can be built within the terms of the NPT if the declared role is peaceful. This includes the development of submarines fuel (Argentina) and assertions that the highly enriched plutonium is for a breeder reactor. The breeder reactor uses plutonium as fuel but generates more plutonium from uranium 238 and is seen as the solution to any future uranium shortages. A weapons route outside the terms of the NPT involves simply taking advantage of the dissemination of nuclear technology following from the provisions of the NPT and constructing your weapons covertly (Iraq, S Africa, Israel). A blatant approach, arguably, within the provisions of the NPT is that adopted by India, explode a nuclear device and swear it's peaceful.

In conclusion civil nuclear programmes have been used as paths to nuclear weapons by non weapon states and used by weapon holding states to underpin their weapons programme. In the UK and internationally nuclear power has not proved economic but is still underwritten by governments. After three decades nuclear power only accounts for 1% of the total energy used by mankind. ●