Plutonium

Except in minute amounts, plutonium does not exist in nature. It is an inevitable by-product of the irradiation of uranium 238, as occurs in a nuclear reactor. Some of the plutonium that is created as the uranium fuel is irradiated is itself consumed as fuel, the rest leaves the reactor mixed with the spent fuel. Chemical separation or "reprocessing" facilities are required to separate the plutonium from the unused uranium and waste products also contained in the spent fuel.

Research into the development of "mixed oxide" fuels containing plutonium requires reprocessing facilities, and as more countries are investigating this alternative, their construction is becoming more widespread. The possession of such facilities is the critical element in a nuclear weapons programme, however, since plutonium separated in such a facility can also be used in the fabrication of a nuclear explosive device. It takes only a few kilograms of the plutonium (PU) isotope 239 to fabricate a nuclear explosive device. To be most efficient, power reactors "burn" their fuel for two or more years. The plutonium produced in the irradiated fuel becomes increasingly "contaminated" the longer it is in the reactor by the presence of other isotopes of plutonium. The PU-239 contained in most spent fuel from a normally-operated power reactor is heavily "contaminated", even after reprocessing, which reduces its suitability for use in explosive devices. Less costly large research reactors or reactors especially built for weapons production, from which spent fuel is removed before the build-up of contaminants, are more likely means to be employed for producing plutonium 239 for use in explosive devices.

Nuclear Safeguards: IAEA and NPT

It is to limit the risks posed to the international community by the fact that certain nuclear facilities and materials used or produced in the peaceful nuclear cycle may, under the circumstances described in the