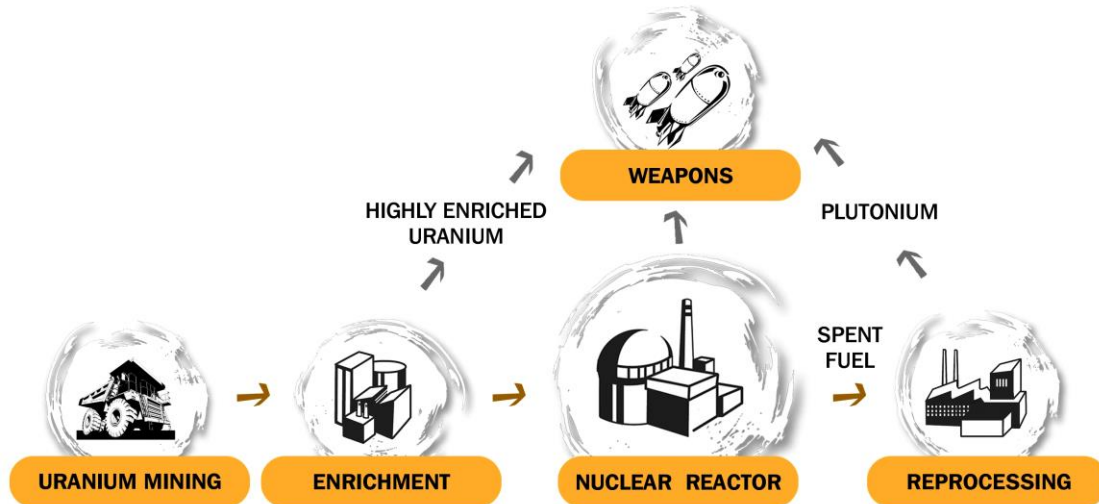


NUCLEAR POWER & NUCLEAR WEAPONS

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www.nuclear.foe.org.au
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The military use of 'civil' nuclear facilities such as research reactors and enrichment plants is so clearly established that nuclear advocates often acknowledge those problems but then claim that nuclear power reactors per sé are not part of the proliferation problem. Such claims are false:

- * Power reactors have been used directly in weapons programs (to produce plutonium or tritium).
- * Power programs have indirectly facilitated weapons programs by justifying the acquisition of enrichment and reprocessing technology.

Of the ten states known to have produced nuclear weapons:

- * Five did so under cover of, and with crucial support from, their 'peaceful' nuclear programs (India, Israel, Pakistan, South Africa, North Korea). The other five nuclear weapons states (US, Russia, China, France, UK) developed nuclear weapons before nuclear power, and separately from nuclear power – but there are still links between their peaceful and military nuclear programs (e.g. routine transfer of personnel).
- * Eight have nuclear power reactors.
- * North Korea has no operating power reactors but an 'Experimental Power Reactor' has been the source of plutonium used in its nuclear weapons tests.

Australian Prime Minister John Gorton had military ambitions for the power reactor he pushed to have constructed in the late 1960s at Jervis Bay. He later said: "We were interested in this thing [a planned nuclear power reactor at Jervis Bay] because it could provide electricity to everybody and it could, if you decided later on, it could make an atomic bomb."

Indirect connections between power & weapons

Nuclear power reactors per sé need not be directly involved in weapons research/production in order for a nuclear power program to provide cover and support for a weapons program.

The nuclear weapons programs in South Africa and Pakistan were connected to their power programs although enrichment plants, not power reactors, produced the fissile material for use in weapons.

Claims made about power reactors also ignore the fact that research and training reactors, ostensibly acquired in support of a power program or for other civil purposes, have been the plutonium source for weapons in India and Israel and have been used for weapons-related research and experiments in numerous other countries including Iraq, Iran, South Korea, North Korea, Taiwan, Yugoslavia, and possibly Romania.

Plutonium production

Power reactors have been responsible for the production of a vast quantity of weapons-useable plutonium. A typical power reactor (1000 MWe) produces about 300 kilograms of plutonium each year. Total global production of plutonium in power reactors is about 70 tonnes per year. As at the end of 2003, power reactors had produced an estimated 1,600 tonnes of plutonium.

Using the above figures, and assuming that 10 kilograms of ('reactor grade') plutonium is required to produce a weapon with a destructive power comparable to that of the plutonium weapon dropped on Nagasaki in 1945:

- * The plutonium produced in a single reactor each year is sufficient for 30 weapons.
- * Total global plutonium production in power reactors each year is sufficient to produce 7,000 weapons.
- * Total accumulated 'civil' plutonium is sufficient for 160,000 weapons.

'Reactor grade' plutonium can be used in nuclear weapons. The only debate concerns the likely cost in terms of reliability and yield.

Another concern is that using a power reactor to produce 150–200kgs of weapon grade plutonium per year could hardly be simpler – all that needs to be done is to shorten the irradiation time, thereby maximising the production of plutonium-239 relative to other, unwanted plutonium isotopes. Just a few kilograms of this weapon grade plutonium is required for one nuclear weapon.

Adding to the proliferation risk is the growing stockpile of separated plutonium, as reprocessing outstrips the use of plutonium in MOX (mixed oxide fuel containing plutonium and uranium) and its (negligible) use in fast neutron 'breeder' reactors. Stockpiles of separated 'civil' plutonium amount to about 290 tonnes, enough for 29,000 nuclear weapons.

Alternative nuclear fuel cycles

All potential nuclear fuel cycles – whether based on uranium, plutonium, thorium or fusion of hydrogen nuclei – pose WMD proliferation risks. Irradiation of thorium (indirectly) produces uranium-233, a fissile material which can be used in nuclear weapons. The

US has successfully tested weapons using uranium-233 (and France may have too). India's thorium program must have a WMD component – as evidenced by India's refusal to allow International Atomic Energy Agency (IAEA) safeguards to apply to its thorium program. Thorium fuelled reactors could also be used to irradiate uranium to produce weapon grade plutonium. The possible use of highly enriched uranium (HEU) or plutonium to initiate a thorium-232 / uranium-233 reaction, or proposed systems using thorium in conjunction with HEU or plutonium as fuel, present further risks of diversion of HEU or plutonium for weapons production as well as providing a rationale for the ongoing operation of dual-use enrichment and reprocessing plants and the construction of new plants.

Safeguards

We needn't worry about the WMD capabilities of civil nuclear facilities if the international safeguards system provided a solid firewall to separate civil and WMD programs. However, the IAEA's safeguards system is seriously flawed and under-resourced. Former IAEA Director-General Mohamed El Baradei has described the IAEA's basic inspection rights as "fairly limited", complained about "half-hearted" efforts to improve the system, and expressed concern that the safeguards system operates on a "shoestring budget ... comparable to a local police department".

More information:

- www.nuclear.foe.org.au/power-weapons
- www.nuclear.foe.org.au/safeguards
- Nuclear Monitor #804, 28 May 2015, 'The myth of the peaceful atom', www.wiseinternational.org/nuclear-monitor/804/myth-peaceful-atom

"For eight years in the White House, every weapons-proliferation problem we dealt with was connected to a civilian reactor program. And if we ever got to the point where we wanted to use nuclear reactors to back out a lot of coal ... then we'd have to put them in so many places we'd run that proliferation risk right off the reasonability scale."

-- Al Gore, former US Vice President