

Nuclear reprocessing, plutonium and nuclear weapons

Media briefing

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Nuclear reprocessing was first carried out to separate plutonium from 'spent' nuclear reactor fuel - for nuclear weapons. All countries with plutonium-based nuclear weapons have reprocessing facilities.

Plutonium is the most highly prized material for making nuclear weapons. It has only existed in the environment since the first atomic bomb was detonated in the US in 1945, and does not occur naturally. It was in fact a US plutonium bomb that killed more than 50,000 people in Nagasaki, Japan, in 1945.

Highly enriched uranium can also be used to make nuclear bombs, but as plutonium is far more reactive in its normal state, it is far more efficient. Only four kilograms of plutonium are needed to make a bomb. And because these bombs are smaller than their uranium equivalents, they can easily be used in missiles. Modern intercontinental ballistic missiles carry as many as 10 plutonium bombs (warheads) in their nose cone.

Commercial reprocessing - stockpiling weapons-usable plutonium

Plutonium is a highly radioactive material that has no practical commercial use and cannot be destroyed. Consequently there is a massive world stockpile of 1,370,000 kilograms of plutoniumⁱ, produced by nuclear power stations and by military and civil reprocessing plants.

The real problem lies with the continued production of separated plutonium by civil reprocessing plants – at Sellafield in the UK, and at La Hague in France. Most military plutonium production ceased at the end of the cold war. And while commercial power plants do continue to produce plutonium in 'spent' nuclear fuel, this plutonium is far more difficult to extract for terrorist purposes.

Sellafield already hosts more than 70,000 kilograms of separated plutonium – the world's largest stockpile – and an additional 400,000 kilograms is scheduled for extraction at Sellafield and La Hague over the next two decades. That is the equivalent of 80,000 atomic bombs.

Sellafield – a terrorist's bomb-factory

The stockpile of weapons-usable plutonium at Sellafield poses a huge global security risk. The theft of poorly protected nuclear weapons material is a real danger, as well as terrorist sabotage of nuclear power plants. Rogue states, terrorist networks, fundamentalist groups and even individuals are racing to get hold of weapons of mass destruction. Osama bin Laden described the acquisition of such weapons as a "religious duty", when speaking to an ABC news interviewer three years ago. The events of September 11th illustrate, and increase, the severity of this threat.

There is no doubt that, "reactor-grade plutonium is weapons-usable, whether by unsophisticated proliferators or by advanced nuclear states," admit the US Department of Energy. "Theft of separated plutonium, whether weapons-grade or reactor-grade, would pose a grave security risk."ⁱⁱ

Not only is it possible to make crude nuclear warheads from this plutonium, it is actually very easy, and can be done with as little as four kilograms. The bomb that destroyed Nagasaki contained only 6.1 kilograms of plutonium.

And this threat from rogue states, international terrorist networks and small fundamentalist groups alike is not a hypothetical one. There are already details of over 250 confirmed black-market incidents involving nuclear material or other radioactive sources in the International Atomic Energy Agency's (IAEA) Illicit Trafficking Database.

These include the attempted theft of 18.5 kilograms of uranium in the Urals, nearly a kilogram of fast-reactor fuel pellets seized last year in the Republic of Georgia, and 600 grams of uranium discovered by police this April.

This terrorist threat is just an addition to the ongoing nuclear arms race between nation states. Japan's program of acquiring and stockpiling plutonium, for example, is fuelling tension within Northeast Asia. And Iraq's substantial covert nuclear weapons program was only discovered in 1991.

MOX at Sellafield – a terrorist's dream

BNFL have come up with a novel way to try and deal with some of its plutonium stockpile – the production of mixed oxide fuel (MOX) at a new £470 million dedicated plant at Sellafield. The MOX plant was built five years ago, and has been the centre of controversy ever since. On 3rd October this year, however, the UK government suddenly gave approval for the plant to begin operating in November 2001.

The argument is that the plutonium in MOX is not weapons-usable. The intention is that once MOX has been produced, it can be reused as fuel within traditional nuclear reactors. Sadly, the truth is starkly different:

1. **It is easy to make nuclear weapons from MOX.** "Fresh MOX fuel remains a material in the most sensitive category because plutonium suitable for use in weapons could be separated from it relatively easily," says the US Department of Energy, in a 1997 report. "It would be a relatively straightforward matter to undertake chemical separation of plutonium from MOX fuel," says the UK Environment Agencyⁱⁱⁱ, clearly contradicting BNFL's claim that MOX is safe.
2. **Terrorists would require far less expertise to extract plutonium from MOX than from spent nuclear fuel.** This is because MOX is far less dangerous to handle.

3. **The MOX plant could increase the amount of plutonium in the UK.** This is because when MOX fuel is burnt in reactors, some uranium oxide changes into plutonium, producing more plutonium than existed in the original fuel.
4. **The MOX plant will increase the dangerous transportation of weapons-usable plutonium around the world.** BNFL's economic justification for opening the plant depends on contracts from overseas customers, namely Japan. The last shipment of MOX from Europe to Japan contained twice as much radioactivity as was released from the Chernobyl disaster in the Ukraine. Even under armed guard, such shipments are susceptible to attack.
5. **BNFL cannot be trusted – the company was guilty of falsifying safety data about fuel shipped to Japan in 1999.**
6. **The MOX option is driven by the interests of the plutonium industry.** In a time of threat to its traditional operations, BNFL is trying to extend its business by providing a 'solution' to the plutonium problem that it still continues to create. As MOX and reprocessing provide the justification and the need for each other, the plutonium mountain can only escalate to even greater proportions.
7. **If the MOX plant opens, the Sellafield reprocessing plants and associated facilities – themselves extremely vulnerable to terrorist attack – may never close.** And if penetrated, these plants could release one hundred times the amount of radiation that was released into the environment from Chernobyl.

Lack of international safety standards

There are currently no international standards or requirements for the physical protection of nuclear material within a state – leaving nations to select whatever level of security they choose. The International Atomic Energy Agency (IAEA) budget for safeguarding nuclear materials is under \$100 million per year – less than 10 per cent of the cost of building a single nuclear power plant.

"Most people do not know that Russia alone has enough uranium and plutonium to make more than 60,000 nuclear weapons – some of it stored in locations that have no surveillance camera in the facility and no detector at the door," commented Charles Curtis, President of the Nuclear Threat Initiative, at an IAEA symposium, on October 29th of this year.

The IAEA's statement that, "no international safeguards system can physically prevent diversion or the setting up of an undeclared or clandestine nuclear programme,"^{iv} is even more terrifying.

There is only one way to prevent nuclear reprocessing from feeding the international plutonium trade and nuclear arms industry. The dangerous and unnecessary reprocessing at Sellafield must cease.

ⁱ ISIS, 2000

ⁱⁱ USDOE, 'Final Nonproliferation and Arms Control Assessment of Weapons-usable Fissile Material Storage and Excess Plutonium Disposition Alternatives,' 1997, pp38-39.

ⁱⁱⁱ Environment Agency, 'Document containing the agency's proposed decision on the justification for the plutonium commissioning and full operation of the Mixed Oxide Fuel plant,' 1998, para A7.20.

^{iv} IAEA, 'Against the spread of nuclear weapons: IAEA safeguards in the 1990's,' 1993.