

Reprocessing = Plutonium

FACT SHEET #1

Uranium and enrichment

The nuclear industry refers to extracting plutonium or other specific isotopes from nuclear fuel waste as “reprocessing” or “recycling.” It is highly contaminating, practiced in only a few countries, and linked to nuclear proliferation and nuclear weapons.

There has never been commercial reprocessing in Canada. The limited reprocessing done at the federal government’s Chalk River Nuclear Laboratory has left a legacy of nuclear contamination. Canada is currently reviewing its radioactive waste policy. The revised policy must include a formal prohibition on nuclear fuel waste reprocessing in Canada.

Uranium

Uranium is the key element in all nuclear fission technology, whether civilian or military. Every atom of plutonium starts out as an atom of uranium.

Uranium is the only naturally occurring material that can be used to fuel a nuclear reactor. Uranium is also the only naturally occurring material that can be used to make an atomic bomb.

Canada remains the world’s second largest producer and exporter of uranium after Kazakhstan.

When mined from the Earth, “natural uranium” is 0.7% uranium-235 and 99.3% uranium-238. Uranium-235 is the “chain reacting” kind of uranium, whereas uranium-238 is not chain-reacting.

A nuclear chain reaction releases enormous energy through the process of nuclear fission: neutrons split heavy atoms, releasing more neutrons to split even more heavy atoms, and so on.

A nuclear reactor uses a controlled nuclear chain reaction to create heat to boil water and generate electricity. An atomic bomb uses an uncontrolled nuclear chain reaction to create a devastating explosion.

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Canada was a partner with the US and the UK in developing the world's first atomic bombs. Canada's involvement was considered necessary since Canada had easy access to uranium.

All Canada's uranium was sold to the military for nuclear weapons from 1941 to 1965 – 23 years. In 1965 Prime Minister Pearson ruled that Canada's uranium will be sold only for peaceful uses.

The nuclear power reactors currently operating in Canada are all CANDU reactors, and they use "unenriched uranium," also called "natural uranium" as fuel. Natural uranium can fuel a nuclear reactor if "heavy water" or "graphite" slow down the neutrons.

Uranium Enrichment

Any technology that increases the concentration of uranium-235 is called "uranium enrichment."

Most nuclear power plants outside of Canada are fuelled by "low enriched uranium" (LEU). Low enriched uranium (normally between 3 to 5 percent uranium-235) is not weapons-usable. Many proposed nuclear reactors plan to use uranium enriched between 5 and 20% uranium-235.

If the concentration of uranium-235 is 20% or more, it is called "highly enriched uranium" (HEU), or "weapons grade" uranium.

The Hiroshima Bomb was enriched to over 90 % uranium-235 – (a gun-type bomb). For WWII bombs, uranium from Canada's NWT and the Congo was processed at Port Hope, Ontario.

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