




Fission...

http://www.cna.ca/curriculum/cna_general_res/videos-eng.asp?bc=Videos&pid=Videos



1 kg of Uranium
can be completely
fissioned in 0.82
microseconds!

Nuclear Fission Chain Reaction

-  — ^{235}U
-  — Neutron
-  — Fission Product



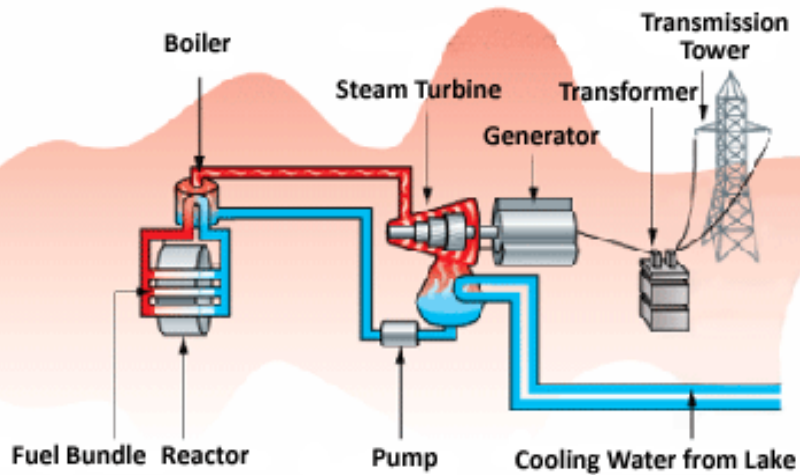
Nuclear Power


http://www.youtube.com/watch?v=L.TnfXLws40Q&safety_mode=true&persist_safety_mode=1&safe=active

http://www.youtube.com/watch?v=quhzpLyM3pI&safety_mode=true&persist_safety_mode=1&safe=active

CANDU:

The Canadian built CANDU reactor is renowned the world over as a safe and reliable method of producing nuclear power. CANDU stands for Canadian Deuterium Uranium. CANDU Reactors get their energy from the fission of Uranium.



 <http://holbert.faculty.asu.edu/eee460/fusion.html>

Fusion

Parts of reactor include:

1. **The core (calandria):**

This is the main part containing the nuclear fuel. The solid fuel material is fabricated into various small shapes - plates, pellets, pins, which are usually put together bundles.

A reactor core may contain from tens to hundreds of these fuels sub-assemblies, held in a fixed geometrical pattern.

2. **Moderator:**

The moderator is a material that has the ability to slow down neutrons quickly and has little tendency to absorb neutrons. Moderator is used slow down the neutrons which makes them more likely to collide with the nuclear fuel and sustain the reaction. The moderator also absorbs heat in the core.

3. Safety Features

Moderator Dump - the moderator is drained from the calandria (reactor core) by gravity, and gravity fed from above. There is no pump to break down. If there is ever no moderator, the reaction stops.

Cadmium control rods - Cadmium rods absorb neutrons, slowing down the reaction. They can be inserted into the reactor to shut down the reaction.

Moderator "poison" - A neutron absorbing solution containing boron can be injected into the moderator which shuts down the reaction by absorbing all the free neutrons.

The moderator will still cool the reactor.

The reactor is surrounded by a 2km exclusion zone.

Nuclear Waste

(1) Uranium and neutrons → highly radioactive

Initially stored in large water-filled pools. The water provides shielding from the radiation and cooling to remove the heat generated by the radioactive material in the spent fuel.

After a few years the used fuel may be removed from the pools and placed in dry storage inside concrete canisters or structures. The fuel can safely be stored in this manner for periods exceeding 50 years.

(2) Clothing and Equipment / Heavy Water

Stored on-site in special containers of concrete and other materials. In Ontario all low and intermediate waste from all of Ontario's nuclear power plants are shipped to a dedicated storage facility.

(3) Waste Heat

To nearby lake...thermal pollution...?

Chernobyl

<http://www.world-nuclear.org/info/chernobyl/inf07.html>



[http://www.youtube.com/watch?](http://www.youtube.com/watch?v=vnjzVNG18jo&safety_mode=true&persist_safety_mode=1&safe=active)

[v=vnjzVNG18jo&safety_mode=true&persist_safety_mode=1&safe=active](http://www.youtube.com/watch?v=vnjzVNG18jo&safety_mode=true&persist_safety_mode=1&safe=active)



Pros and Cons of Nuclear Energy...handout

Pass out STSE - The physics of Movie Sound

Pass out handout #2 - Pros and cons of nuclear power.
Pass out STSE - The physics of Movie sound