

The major types of power reactors currently in commercial use are either heavy water moderated, natural uranium fueled systems (HWR's), like the Canadian CANDU reactor, or light water moderated, enriched uranium fueled systems (LWR's). Most nuclear supplier nations, in particular the USA, have developed LWR Systems, which use light (ordinary) water both as a moderator and a coolant, contained in a single large pressure vessel. Also integral to the LWR and HWR cycles are such facilities as fuel fabrication or conversion plants, enrichment facilities, and in some instances, reprocessing plants.

Enriched Uranium

Unlike heavy water, light water is a relatively inefficient moderator, absorbing many more neutrons than heavy water. Because of this it is necessary to increase the concentration of U-235 in the fuel for LWR's to about 2-4%. Uranium enriched to levels of commercial utilization for use in LWR's present no weapons proliferation risks. However, highly enriched uranium 235 may be used to produce nuclear explosive devices. At present, fissile material used by the nuclear weapons states contains over 90% of U-235. Commercial enrichment plants can be converted from the production of low-level enrichment LWR fuel to highly enriched material suitable for weapons purposes. As of this time enrichment technology is restricted to the nuclear weapons states and to a few industrialized countries, but this situation cannot be expected to last, for advances in technology may well put enrichment plants within the reach of more countries.