

## **1. Conventional Nuclear Fuel for Reactors.**

Nuclear fuel is fabricated from natural uranium imported from overseas by BNFL who operate a fuel fabrication plant at Springfields near Preston and a uranium enrichment plant at Capenhurst in Cheshire. Natural uranium is composed largely of two elements – Uranium 235 (U-235) and Uranium 238 (U-238). Whilst this is suitable for making fuel for Britain's ageing Magnox reactors, it has to be enriched before it can be made into fuel for the newer advanced Gas-Cooled Reactors (AGRs). The enrichment process entails removing, via a series of centrifuges, some of the U-238 which is less fissionable, thereby increasing the proportion of the more fissionable U-235 and thus enriching it. AGR fuel will normally be enriched to between 3% and 5%.

The amount of fuel in a reactor depends on the reactor type, and normally the fuel will stay in the reactor for 3-4 years. During this period, fissioning of the uranium takes place creating other radioactive elements as it does so, including plutonium. Whilst the industry claims that the plutonium and the uranium which has remained 'unburned' are re-useable, the remaining fission products are categorised and treated as nuclear waste.

Once the fuel has served its time in the reactor it has become 'spent' and is removed from the reactor and pond-stored at the power station for a number of months or even several years to allow cooling and the decay of some short-lived radioactivity. Following this period of wet-storage the fuel is then ready to be transported to Sellafield. This is where the separation of plutonium and uranium from the fuel takes place in an operation known as reprocessing.

## **2. Transports from Power Stations.**

Spent fuel transports from the UK's nuclear power stations form the majority of movements to Sellafield and are undertaken almost wholly by use of the railway network on a regular weekly basis. BNFL operates two Magnox power stations, Calder Hall at Sellafield and Chapelcross in Scotland, each with four reactors. Along with all UK Magnox stations, their spent fuel is reprocessed at Sellafield in building B205. Spent fuel from Chapelcross is the only UK fuel to be transported to the Sellafield site entirely by road.

Other **Magnox** power stations currently operating within the UK are Bradwell, Dungeness A, Hinkley Point A, Oldbury, Sizewell A and Wylfa. Those at Hunterston A, Berkeley and Trawfynydd are closed, the latter two being decommissioned. All Magnox stations are now operated by BNFL Magnox and remain in the public sector following privatisation which saw AGR stations transferred firstly into the hands of Nuclear Electric and Scottish Nuclear, and then to British Energy who also operate UK's only Pressurised Water Reactor (PWR) at Sizewell B. **AGR** power stations are Dungeness B, Hartlepool, Heysham 1, Heysham 2, Hinkley Point B, Hunterston and Torness, and their spent fuel is contracted to be reprocessed at Sellafield's THORP plant.

Periodically transports of spent submarine reactor fuel, usually one flask at a time, arrive at Sellafield on Ministry of Defence flatroll wagons. The fuel is stored on site. Transports of overseas spent fuel arrive by train from Barrow Docks.