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## **Sellafield should stop nuclear reprocessing**

*This year's embarrassing leaks and other mishaps at the Sellafield site of British Nuclear Fuels have provoked former political defenders to open dissatisfaction and dissent. These include the MP for Sellafield, Dr John Cunningham, who is, ironically, Labour spokesman on the environment.*

The Sellafield site employs some 10,000 people in an area desperately short of jobs. Is it nonetheless creating an unacceptable hazard, both for its workforce and for those outside the plant and, indeed, as far away as Ireland and Norway? If the hazards of Sellafield are unacceptable, what are the alternatives?

Years of convoluted statistical argument have failed to produce any generally agreed conclusions as to the specific radiological risks arising from Sellafield's various activities. The official position is that the risks are small and within the limits laid down by the responsible regulatory bodies. Other analysts and commentators - some of international eminence, such as Professor Edward Radford, former chair of the US National Academy of Sciences Committee on the Biological Effects of Ionizing Radiation - challenge this. So, how is the stalemate to be resolved?

The British Government's Department of the Environment has - perhaps unintentionally - shown the way. In its evidence to the Select Committee on Environment study of radioactive waste, the Department set out its objectives for radioactive waste management. Objective (i) declared that: "All practices giving rise to radioactive waste must be justified, that is, the need for the practice must be established in terms of its overall benefit."

Reprocessing of spent fuel at Sellafield gives rise to the great majority of radioactive waste in Britain. Reprocessing involves dissolving the fuel in acid and extracting uranium and plutonium. The reprocessing produces low-level, intermediate-level, and high-level radioactive wastes (gaseous, liquid and solid). Low-level wastes are discharged directly to the atmosphere, into the Irish Sea, and onto the primitive tip at Drigg, south of Sellafield. The more concentrated intermediate-level must be treated and stored, pending the establishment of a dump site. The high-level wastes - now amounting to over 1,200 cubic metres - will have to be resolidified in a plant still under construction, then stored for at least 50 years as glass blocks.

Is this reprocessing justified "in terms of its overall benefit"? BNFL claims that reprocessing brings three categories of benefit: it recovers reusable uranium and plutonium; it converts the spent fuel into a more suitable form for disposal; and it makes a profit. In 1986, none of these claims stands up. The spot price of fresh uranium is now less than US\$20 a pound, much cheaper than the cost of reprocessing. The Uranium Institute does not expect the price to rise significantly for many years to come.

The recovered plutonium is stockpiled in expensive top-security facilities for eventual use as fuel for fast breeder reactors. But the UK already has an acknowledged store

of separated plutonium amply large enough to fuel the largest plausible programme of fast breeder reactors. Also, official policy now concedes that no such programme could be ordered before 2015.

Metal "Magnox" fuel from the old gas-cooled reactors is clad in magnesium alloy, which has always been said to corrode rapidly in water. All but one of the Magnox nuclear stations nevertheless discharge spent fuel directly into water. Nuclear executives insist that the limited physical durability of such fuel leaves no option but to reprocess it.

On the other hand, ceramic oxide fuel from the modern advanced gas-cooled reactors and water-cooled reactors is clad in durable stainless steel or zirconium alloy. Research in the UK and elsewhere indicates that oxide fuel can be stored for decades, either in water-filled ponds or in gas- or air-cooled magazines, with essentially no corrosion or deterioration. If any element should happen to develop a leak, it can readily be "bottled" in a sealed canister and returned to the store. In the UK, both the National Nuclear Corporation and GEC have for years been broadcasting the advantages of such long-term storage.

### **Storage**

It will be many years before UK research and policy has established agreed ground-rules for the final disposal of high-level waste. Prudence, economics and technology all suggest that oxide fuel should be stored intact pending establishment of such ground-rules. BNFL's Thermal Oxide Reprocessing Plant, now under construction at Sellafield, should be converted into a long-term storage facility for oxide fuel. The foreign contracts that have paid for the plant thus far include a provision for BNFL to do just this, if it so wishes. After 1993, indeed, BNFL can return spent fuel unprocessed, and keep the foreign payments, to date; this provides a measure of how eager Japan and other countries have been to get BNFL to take the spent fuel away from their power stations. BNFL could similarly offer storage for domestic oxide fuel. Domestic electricity users should not have to pay BNFL for unnecessary and uneconomic reprocessing.

The real problem for BNFL is Magnox fuel. All its current headaches stem from Magnox reprocessing. The new Fuel Handling Plant and clean-up facilities, such as the Site Ion Exchange Plant, will improve the position, although, even then, Sellafield will still discharge more radioactivity than any other nuclear installation. But the crux of the Magnox problem is the B205 chemical separation plant, already 22 years old. Whether this plant can operate safely until the last Magnox station finally shuts down seems increasingly debatable. Dry storage of Magnox fuel may be not merely desirable but imperative.

Reprocessing of any kind fails signally to fulfil the first criterion of the Department of the Environment for radioactive waste management, that it produces an "overall benefit". Reprocessing at Sellafield has left a radioactive legacy whose clean-up and decommissioning will guarantee many thousands of jobs for many years. The sooner reprocessing can be ended the better.

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