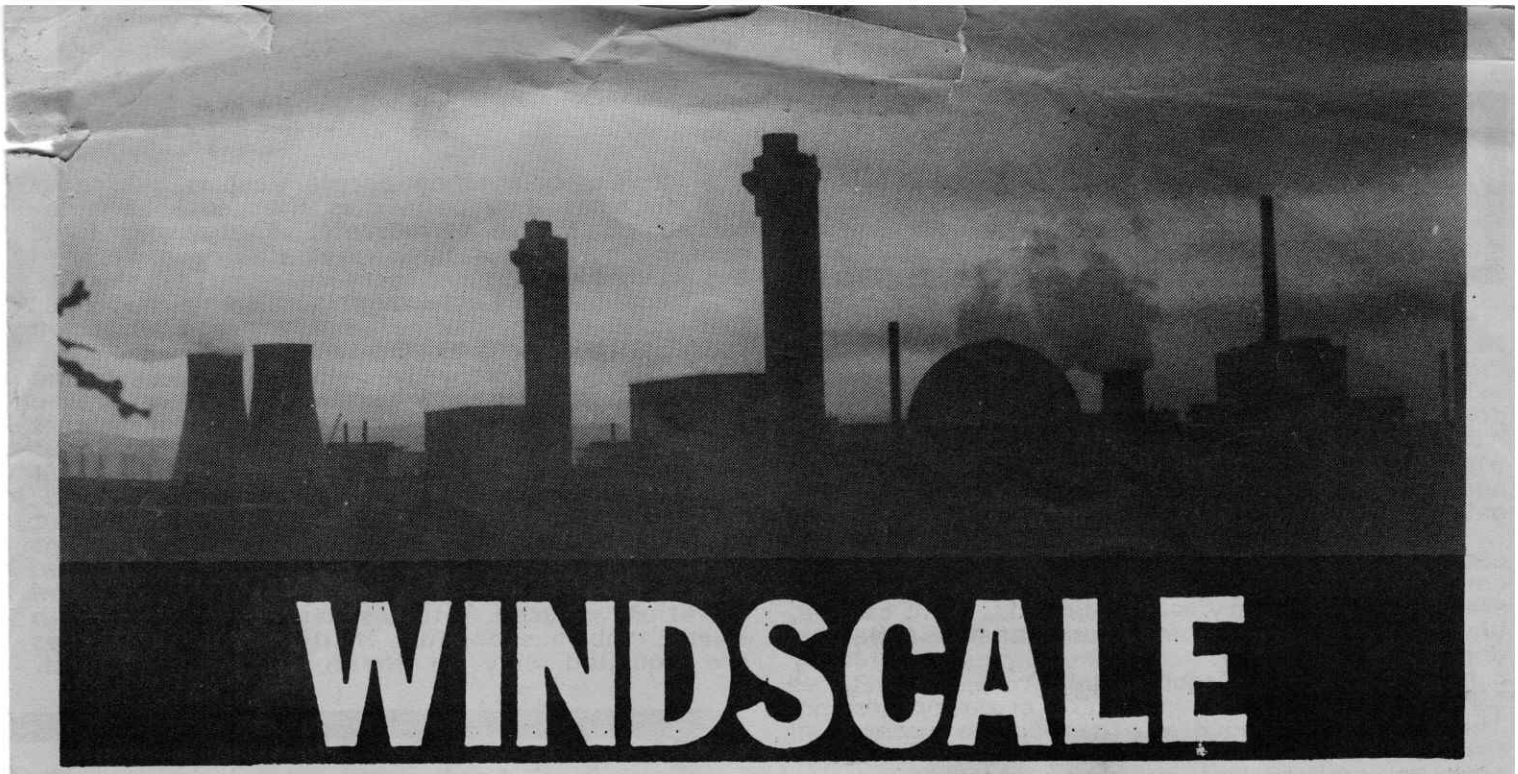


WINDSCALE

History

In 1946 work started on two atomic piles at Windscale, the former ordnance factory in Cumbria, under the auspices of the Division of Atomic Energy at the Ministry of Supply. This followed the 1945 decision by the British government to produce atomic weapons. The two gas graphite reactors went 'critical' in 1950 and the now infamous reprocessing plant was under construction. In 1952 the first British Bomb was exploded and a hydrogen Bomb followed in 1957.

The Magnox reactors were built at Calder Hall, adjacent to Windscale, in 1956. This supplemented the plutonium production of the piles. The name 'Magnox' came from the magnesium alloy used for the fuel rods. The reactors were scaled up for the first generation of nuclear power stations. After the 1957 fire, Calder Hall became the only UK source of plutonium.

The second nuclear reactor programme, the Advanced Gas-cooled Reactors (AGR), also started at Windscale where the prototype was built. It was developed from the Magnox design and was hoped to make nuclear power competitive with coal. The AGR's are a commercial catastrophe; the lead station, Dungeness B, was 12 years late and, in 1984, is still not fully commissioned.

In 1954 the plant was transferred to the UK Atomic Energy Authority and, following the 1971 Atomic Energy Act, ownership passed to the newly created British Nuclear Fuels Limited (BNFL). Sellafield appeared in 1981 when BNFL changed the plant's name in an attempt to dissociate the facility from its well-deserved reputation.

At present plans exist for a new plant, the Thermal Oxide Reprocessing Plant (THORP), to deal with AGR and foreign Light Water Reactor (LWR) spent fuel. To date this material has been stored on site in huge cooling ponds; a tempting target for terrorists and a serious liability in the event of war, whether conventional or nuclear. Also planned is a vitrification plant for the solidification of high level nuclear wastes.

Accidents

More than 300 accidents of "reportable significance" have occurred at the Windscale site. Most were restricted to "on-site" incidents: workers receiving exposures exceeding international limits, malfunctions of machinery, and various spillages and "minor" fires. Several incidents deserve special mention:

1955 The works manager, who subsequently died of Multiple Myeloma, led a team to work on a reactor face to avert a catastrophe. Although "potentially very serious", not revealed for a year.

1957 The "Windscale fire". 20,000 curies of Iodine-137 released from the number one plutonium-producing pile. **Two million litres** of milk poured away and between 250 and 2500 cancers, 12 to 250 fatal, produced.

1976 A leak of radioactive water from a silo reported to the Energy Secretary **one month after its discovery.** It is still leaking.

1978 Contaminated clay discovered from a leak years earlier; 100,000 curies of radioactive strontium and caesium had leached into the subsoil.

1981 An attempt to reprocess insufficiently-cooled fuel rods released Iodine137. Milk found to contain **2500 times** the normal level of contamination; BNFL pronounced it **"perfectly safe to drink".**

1983 Purex solvent and crud released into the Irish Sea. Greenpeace divers contaminated and 25 miles of beach closed off. BNFL to be prosecuted for this accident.

BNFL constantly claim to have a good safety record yet all of the accidents are inherently similar, a result of inadequate operating instructions, instrumentation, monitoring and emergency planning compounded by personnel error.

Windscale is the 'dirtiest' reprocessing plant bar none. It is killing people.

Windscale

The Site & Employment

The Windscale and Calderhall complex comprises four 50MW Magnox reactors, a small AGR (now defunct) and the reprocessing facility which dominates the site. The reprocessing plant operates around the clock, day in day out, stopping only for the annual shut-down.

Two to three shipments of spent fuel arrive each day, of four or five flasks. The origin varies: coming from UK Magnox and AGR nuclear power stations, UK military establishments, from Europe, via east coast ports, and from Japan via Barrow docks.

The spent Magnox fuel rods are stored for a period to 'cool down' before reprocessing. The AGR, and much of the foreign spent fuel cannot yet be dealt with and is stored at Windscale in huge tanks - a risk to which Cumbrians are exposed in the 'national interest'.

The local economic 'importance' of Windscale is enormous. BNFL is the biggest single employer in what has always been an economic blackspot. Out of a county population of 500,000, about 7,000 people work at Windscale and 12,000 in Barrow shipyard (soon to build Trident). The nuclearrelated work at these two sites comprises the biggest capital investment in Europe. This investment supports many off-site jobs from direct equipment suppliers to local shops and pubs.

If reprocessing ceased there would still be work at the plant; essential maintenance, waste management and decommissioning. That a whole community is so dependent on one industry is frightening. One **on-site** accident would destroy the whole economy of the area.

Reprocessing

All nuclear power stations require fuel to be removed regularly because the build up of fission products reduces the efficiency of the reactor. The spent fuel is transported by rail to Windscale in flasks after an initial cooling-off period at the stations.

After a further storage period, the Magnox fuel rods are reprocessed; the fuel cladding is stripped away and the unburnt uranium and the plutonium is reclaimed. Reprocessing is only undertaken to reclaim the plutonium; unburnt uranium has never been reused as nuclear power station fuel and is not commercially attractive.

The fuel cladding is classified as "intermediate level" waste intented for burial at Billingham in Clevelend, in ICI's disused anhydrite mine. Water used in the reprocessing is discharged into the Irish Sea as "low level" waste. The remaining fission products are "high level" waste and are stored at Windscale awaiting the discovery of a technique for safe disposal.

The storage of Magnox fuel under water is unsatisfactory because the magnesium alloy corrodes. An alternative system exists, although the industry prefers to ignore it; dry storage in gas cooled warehouses. This is presently being used at Wylfa nuclear power station on Anglesey. This would get around the need to reprocess Magnox fuel. We could also cease transporting highly radioactive spent fuel flasks through our towns and cities and the rods could be stored at power stations. The sea discharges from Windscale would then be unnecessary.

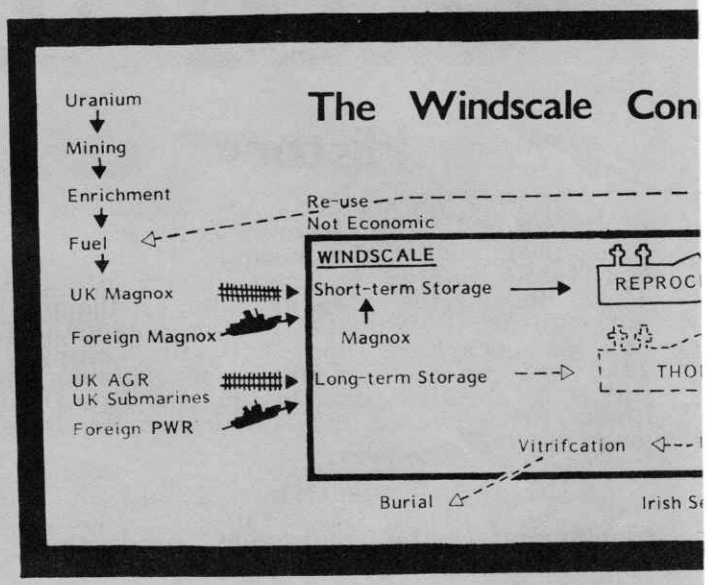
Effects

In Cumbria many people have a gut reaction to what they believe is the cause of widespread ill health, Windscale. Those who lived here when it was a clean rural area have watched the incidence of cancer increase.

Children in East Cumbria still enjoy a cancer rate 25% below the national average whilst in the West the rate is 25% **above.**

The sea discharges alone (ie. excluding all the accidents and aerial emmissions) cause 2-3 cancer deaths each year, 2-3 nonfatal cancers and 2-3 genetic defects for each year's output from the pipeline. This is based on the most optimistic dose models, and is accepted by BNFL.

The two diseases which establish the impact of Windscale on health and the environment are **multiple myeloma** and **childhood leukaemia,** both are extremely rare and are known to be radiation induced. Studies undertaken in south west Cumbria show that multiple myeloma rates are equalled only in Hiroshima and Nagasaki.



Radioactive

Every day **2.2 million gallons** of radioactive waste water are discharged into the Irish Sea in what has been admitted to be a **CONTROLLED EXPERIMENT.** The Irish Sea is now the **most radioactive sea in the world.** Despite a wealth of scientific material showing the impact on health, these discharges continue.

The widely publicised accident in November 1983 forced the government to initiate an inquiry under Sir Douglas Black. Between **'1,500 and 4,500 curies'** of radioactivity, predominately Ruthenium 106, were discharged and formed a highly radioactive slick of Purex solution and crud. Had Greenpeace volunteers not been in the area at the time the accident would almost certainly have been hushed up.

As this washing-out procedure is performed annually; has this previously resulted in the contamination of fishing vessels, nets and beaches? Greenpeace submits that the closure of 25 miles of beach was not linked purely with the accident; the Department of the Environment took the opportunity to close the beaches to avoid public exposure to the 'normal' levels of radiation to be found any day on Cumbrian beaches. The beaches were opened after heavy pressure from the tourist industry which faced collapse and against the advice of the Ministry of Agriculture, Fisheries and Food.

The currents sweep the radioactive contamin-

Windscale exists to provide plutonium for nuclear weapons . . . . . The u

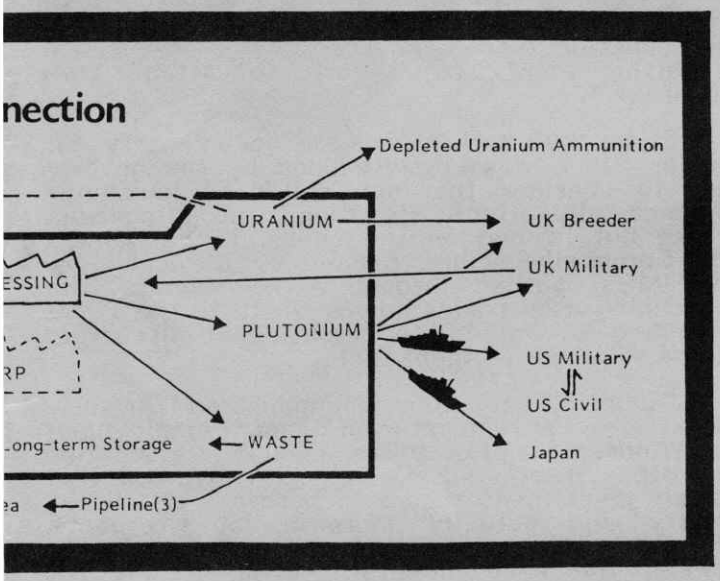
n Health

This disease is a consequence of plutonium contamination.

Sir Douglas Black's report confirms the findings made public by Yorkshire Television in the documentary 'Windscale - the Nuclear Laundry'. Childhood leukaemia is **ten times** the national average in Seascale (the closest village to Windscale) and **five times** higher in Waberthwaite and Bootle.

Black also accepted that the only known cause of childhood leukaemia is radiation. These are not the only diseases suffered by the people of Cumbria, and further afield, as a result of Windscale's operations. **Heart disease, diabetes, brain tumours** and signs of premature aging may result from low level doses of radiation over a long period of time.

What is of major concern is the genetic consequences of Windscale's operations, which could take generations to appear. It is already too late for many families.



Discharges

ation slowly northwards, the waste stream eddies around northern Scotland and then sweeps into the North Sea reaching the Scandanavian coast. Even Soviet and Arctic waters contain radioactivity traceable to Windscale. 75% of the man-made radiation dose received by Scandanavians originates from Windscale.

The effect of Windscale on other European countries made the June 1984 meeting of the International Watchdog, the Paris Commission, the most important ever. The Nordic Bloc presented a resolution calling for the introduction of the 'best available technology' to **minimise** sea discharges from all existing and future reprocessing plants. BNFL attempted to pre-empt the Paris Commission in a statement issued on the 7th June: they would carry out a 'high level' study to reach as **'close to zero discharges as possible'**. The UK therefore had to support the Nordic resolution. However BNFL foresaw a ten year programme of gradual reduction **BASED ON COST/BENEFIT ANALYSES.**

Last year BNFL discharged about **400 curies** of alpha emitters annually through the Windscale pipeline. Japan discharges **less than ONE curie**, France **NINETY curies**, the USA's Hanford Military no. 1 plant **less than ONE curie in the last five years**, and Hanford no. 2, when complete, will employ a totally closed system - **ZERO discharges!**

Home & Abroad

A country can choose to develop reprocessing for one of three reasons: **Military, Commercial** and **Research & Development.**

All the countries with nuclear weapons have military reprocessing facilities: Britain, France, USA, USSR and China.

Only two countries operate commercial facilities: **Britain** at Windscale and **France** at La Hague. These plants reprocess spent fuel for both their own electricity boards and for foreign customers. BNFL has contracts with **Japan, Switzerland, Spain, Sweden, Holland and West Germany**, boasting an overseas order-book worth £2,700 million.

Ten countries have, or are building, pilot plants as a part of their R&D efforts: **Argentina, Belgium, Brazil, India, Italy, Israel, Japan, Pakistan, Spain and West Germany.**

R&D is often a cover for military activities. The Argentine plant, for instance, will provide enough plutonium for 10 bombs a year.

The reprocessing business of Britain and France is used to justify the spread of reprocessing technology by Countries with military ambitions. Thus if the link with Britain's own bombs was broken, Windscale would continue to fuel the arms race by legitamising ambiguous civil/military activities.

Bombs for Britain...

Every nuclear bomb, depth charge or Chevaline warhead in Britain's armoury contains plutonium from Windscale.

The Calderhall reactors were originally designed to provide weapons-grade plutonium. Four similar reactors were later built at Chapelcross near Dumfries.

Impurities progressively accumulate with radioactive decay reducing the reliability of nuclear weapons. They are reprocessed in an operation similar to reprocessing spent fuel. The 1977 Windscale Inquiry revealed that this was done at Windscale. The Inquiry was told that certain types of radioactive pollution, including $^{2}/_{3}$ of the plutonium, derived from the treatment of "aged plutonium". Details were said to be classified.

Used fuel from the reactors which power Britain's four Polaris and twelve hunter-killer submarines is stored at Windscale.

...and for America

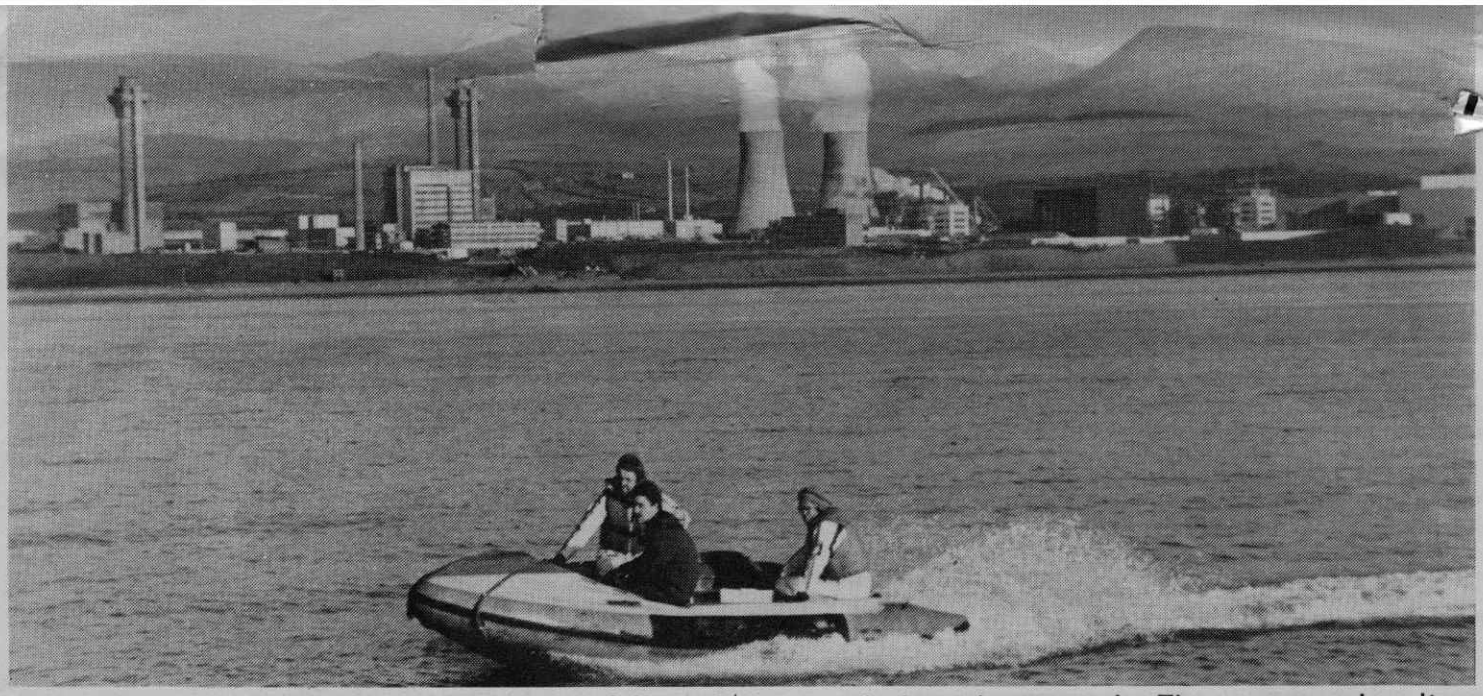
Windscale has contributed plutonium to the US nuclear stockpile, including material from civil nuclear power stations.

In 1958 and 1959 Britain and the US signed agreements for cooperation in the military use of nuclear energy. Britain has sent an estimated 6.5 tonnes (enough for 1000 warheads) to the US, in exchange for "highly enriched" uranium - for warheads and nuclear submarine fuel - and tritium for H-bombs.

Geoffrey Pattie, a defence Minister, recently told Parliament: **"The US has been free to put this material to such uses as it has decided".** This trade has continued over the last 13 years. Some of the material came from the military reactors at Calderhall and Chapelcross but, between 1964 and 1971, approximately 4 tonnes of plutonium from civil reactors were involved in the trade.

Successive British governments have accepted assurances from US governments that the plutonium would not be used in weapons. However, Reagan's nuclear arms expansion has run into a plutonium shortage led to them reclaiming part of the stockpile "on loan" to the fast reactor programme including Britain's civil material.

ranium extracted by reprocessing has never been reused as nuclear power station fuel.



The campaign against Windscale followed the 1977 Public Inquiry which gave approval for the THORP facility. THORP's completion would ensure Windscale's long term future.

In 1978 Greenpeace decided to expose the dangers of spent fuel transport by sea. This inevitably focused on Barrow, the entry point for Japanese spent fuel. A series of actions were undertaken in 1980 against the **Fisher Line** vessels that carry the spent fuel. Greenpeace dinghies were crushed against the quayside by incoming ships and the courts intervened, imposing an injunction and an £800 fine for contempt of court. Similar actions in France led to arrests, fines and, on one notable occasion, a stun grenade attack on a Greenpeace vessel!

The government and the Windscale management have consistently refused to acknowledge that any health risk attends the plant's operation. Therefore, in the summer of 1983 drastic action was felt necessary; the decision to seal the pipeline was taken. The first attempt was pre-empted by BNFL who had altered the mouth of the discharge pipe. Further action was curtailed by a High Court injunction, an unprecedented £36,000 fine and the threat that Greenpeace funds would be sequestrated.

Amid this legal flack the notorious purex slick appeared, contaminating a party of Greenpeace volunteers. This leak, for which BNFL are now being prosecuted, added momentum to the campaign which was then directed at the Paris Commission.

Eire and the Nordic Nations were already concerned about Windscale's discharges and, prompted by Greenpeace, pressured the UK. Meanwhile Netherlands Greenpeace, not bound by the High Court injunction, threatened to seal the pipeline if the UK did not accept the Nordic 'zero discharge' proposal. The compromise 'ten year reduction' plan is not acceptable; Greenpeace has given BNFL two years to attain **zero** discharges.

Stung by Yorkshire TV's documentary Sir Douglas Black was commissioned by the government to consider the high childhood leukaemia incidence allegations. He found the allegations correct but hedged on the cause. In Parliament Dale Campbell-Savours, backed by a record 230 other MP's, pushed through a Ten Minute Bill. Ten leading Irish trades unions wrote to the Times demanding an immediate cessation of discharges and the shipment of spent fuel.

Cumbria's economic dependence on Windscale necessitates the restructuring of local employment once Windscale is closed. Greenpeace, in assocation with other interested parties, is convinced that capital investment could generate new heavy industry and actually **increase** job prospects. A Report is being prepared. A new era of discussion between the environmental movement and the trades unions is dawning.

An agreement to stop the transport of spent fuel to Windscale would signal the end for the Magnox nuclear stations which are due for closure soon anyway. Storage of AGR spent fuel at the power stations is technically feasible and with the subsequent closure of this second generation of nuclear power stations Britain could become nuclear free.

The battle has not yet been won, but Windscale's operation is become increasingly embarassing for the government and unacceptable for the public. The opposition is gathering momentum. Jim Slater of the National Union of Seamen described this as the 'unique alliance'.

photos from Greenpeace

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Useful publications:
Peace News, 8 Elm Avenue, Nottingham. 0602 503587
Sanity, 14-16 Farringdon Lane, London EC1. 01 253 2001
SCRAM Journal, 11 Forth Street, Edinburgh 1. 031 557 4283.
Sizewell Reactions, 2 St. Helens Street, Ipswich, Suffolk. 0473 214308

The Irish Sea is the most heavily radioactive in the World.

October 1984