The Anti Nuclear & Safe Energy Journal

SCRAM

NUCLEAR POWER? NO THANKS

NUCLEAR SELL-OFF

NO 60

Special Tenth Anniversary Issue

60p

CONTENTS

STEWART BOYLE is FoE's energy campaigner.
CRISPIN AUBREY is a journalist and local organiser for Stop Hinkley Expansion.
MAUREEN SEARLE lives in Waberthwaite, a village near Drigg.
PHILIP CADE & PETER BUNYARD work with Greenpeace.
PATRICK GREEN is FoE's radiation consultant.
BRIAN DURRANS is Chairman of Dounreay Staff Side.
MARTIN INCE is features editor of "The Engineer".
FRANCOIS NECTOUX & MALCOLM FERGUSSON work with Earth Resources Research Ltd.

This Journal is produced for the British Anti-Nuclear and Safe Energy movements by the Scottish Campaign to Resist the Atomic Menace.

Editor:	Steve Martin
News Editor:	Thom Dibdin
Features Editor:	Pete Roche
Appropriate Technology:	Mike Townsley

COMMENT

As we go to press the draft of Part 1 of the Dounreay Inquiry Report has just been issued. But, surprise surprise, SCRAM isn't allowed to get one. It has only been circulated to Inquiry participants, and along with many other organisations, we boycotted the Inquiry. It is possible to see the report by going to the Scottish Office, but that's not much help if you happen to live in London or Shetland. Admittedly its only a draft, and only participants can comment, but it would have been more in the spirit of democracy to lodge copies of the draft at local libraries, in the North of Scotland at least.

The conclusions of the report, which we have seen, vindicate SCRAM's decision not to participate in the Inquiry. The Reporter is constantly deferring to "Government Policy" and agencies such as the NII: "The merits of government policy cannot be the subject of review at this inquiry"

OK, so the Reporter was restricted in his actions by the politicians in St. Andrew's House, but this line of reasoning can be taken to laughable extremes. For instance Mr Bell finds that the "Joint Islands Councils' submission that the existing state of scientific knowledge cannot justify the deliberate emission of long-lived radioactive pollutants - is in clear contradiction of the government policy." Why are Scottish Office employees allowed to include jokes in their reports?

The recommendations (Part 2) will not be out until after September, but this draft is obviously laying the groundwork for a final recommendation to go ahead with EDRP. The report, however, has a few concessions to the objectors. Well, we counted three anyway. Most interesting of all he says that the draft emergency plan needs more time, effort and resources if it is to give confidence of a realistic response to a major incident. He even suggests that a 100 mile evacuation zone may be more appropriate than the present 3 miles. Wouldn't that be interesting if applied to other nuclear installations.

Mr Bell may be about to recommend that EDRP is given the green light, but it will not be so straightforward for Scottish Secretary, Malcolm Rifkind. After all he only has two taxi loads of MP's to back up his decisions on Scottish Affairs. But then, this Government is more interested in pursuing its nuclear ambitions than furthering the cause of democracy. The ball almost certainly will fall in the French court anyway.

Legal Challenge to Sizewell

Friends of the Earth have submitted an application in the courts to quosh the Government's decision to build Sizewell B. The application is based on a number of issues which can be briefly summarised as follows:

1. The key legal point in the submission is that Sizewell B has been designed to inappropriate and inadequate safety standards. FoE argue that the correct legislation should have been the very demanding 1965 Nuclear Installations Act, rather than the 1974 Health and Safety at Work Act. Even if the Health and Safety at Work Act was the basis of Sizewell B design, nowhere do the Board prove the case that a risk of 1 in a million is "acceptable", or indeed that they have adhered to the ALARP principle (As Low As Reasonably Practical).

2. The rules of the Inquiry were clearly and flagrantly broken on a number of occasions, not the least of which by the inclusion of a huge range of materials after FoE and other objectors had finished giving evidence.

3. The full safety case for Sizewell B was not submitted in advance of the Inquiry as had been Government policy prior to this, but was in fact not finally submitted until nearly 18 months after the inquiry had finished.

The implications of the action are quite major. If FoE win then all of Britain's reactors, including Torness, are illegal and new legislation would have to be brought in retrospectively to make them legal. This would be extremely embarrassing for the nuclear industry and the Government.

FoE have taken detailed legal advice and believe they stand an excellent chance of winning this case. But should they lose, they could face legal costs as high as £200,000. This is the last chance to stop Sizewell B and it can only be taken if there is an assurance that the costs can be covered. You can help, and your support is urgently required so that FoE can continue this challenge. Letters of financial support and pledges to underwrite costs are essential. Please send them to:

Sizewell B Legal Campaign.
Friends of the Earth,
377 City Road,
London,
EC1V 1NA.

Foriegn News

SCANDALS DOG WEST GERMAN NUCLEAR INDUSTRY

THE PAKISTAN CONNECTION

Speculation that Pakistan is trying to obtain a nuclear weapons capability has been reinforced by the discovery of uranium enrichment plant destined for the country.

The complex international intrigue is detailed in a recent issue of *Nuclear Fuel* (V12 No10). The allegation centres around parts of the plant's design, which would allow uranium to be enriched to over 93%. For enrichment to go over 20% uranium 235 (weapons grade material), certain parts of the plant called desublimers need to be less than 5cm in diameter, because of problems of criticality. For civil fuel, the desublimers are about 15cm diameter.

The enrichment equipment was made in Switzerland for Leybold-Heraeus GmbH, the Hanau based company, using blueprints stolen from the German company Uranit. Leybold had access to the designs because they are a key contractor to Uranit. As well as ruining Leybold's reputation, the affair is likely to have serious affects on Uranit's operations, as they are in the process of upgrading their Gronau enrichment plant using Leybold supplied equipment.

CORRUPTION HITS NUCLEAR TRANSPORT

The Hanau based nuclear transport company, Transnuklear, has become embroiled in a bribery scandal involving about 100 employees over the last four years.

The company, a subsiduary of Nukem, removes and transports nuclear waste from West German nuclear power stations. Personnel from Germany's two largest nuclear utilities: Preussenelektra and RWE, are known to be involved in the scandal. The DM6 million affair has already claimed one victim: a Preussenelektrica manager responsible for nuclear waste transport committed suicide after being sacked for involvement in the affair.

Iran

Iran is reported to be buying uranium from Namibia, despite ideological opposition to the South African run regime. Iran has a 10% stake in the British owned Rossing mine, and is said to have access to 8000 tonnes of uranium yellowcake.

US NUKE CLOSED

The LaCrosse nuclear power station in Wisconsin has been permanently closed by its owners because it is uneconomic to run.

The Dairyland Power Cooperative shut the plant on 2 May because alternative sources of power offer a "significant economic advantage over nuclear power". Replacement electricity will, in part, be generated by coal.

The cost of operating, maintaining and repairing nuclear plants in America has been increasing at over 10% above the rate of inflation since the early 1970's. While nuclear costs were about half that of coal-fired costs in 1980, they had more than doubled by 1985, according to America's second largest nuclear utility: the Tennessee Valley Authority (TVA). Coal fired stations are now cheaper to run than nuclear stations.

The Cooperative bought the 55MW Boiling Water Reactor from the now defunct U.S. Atomic Energy Commission in 1974 for one dollar. According to Public Citizen, a US consumer organisation, other utilities are unable to close uneconomic nuclear plant because they can only recoup their initial investment if the plant is operating.

Chernobyl U.K.

Chernobyl UK, a new report from Greenpeace, claims that an accident on the scale of Chernobyl, or worse, could occur in a British gas-cooled reactor. The CEGB have denied the claim out of hand.

Greenpeace state that in both the Magnox and AGR reactor designs, a combination of several serious mechanical accidents, including the loss of coolant, or coolant flow together with the failure of the emergency shut down systems, would cause the core of the reactor to overheat. This could lead to a "positive moderator temperature effect", and the consequent destruction of the reactor core. They believe that it is irresponsible of the nuclear industry not to have informed the public of this potentially dangerous effect, which is well known to the nuclear physicists who developed the gas-cooled design.

The CEGB, however, claim that the scenario put forward by Greenpeace is "simply not sustainable under the laws of physics". They have stated that the fuel would have been reduced to a state "where it would not sustain the necessary nuclear chain-reaction to produce a power surge before any rise in moderator temperature could be of significance".

Philip Cade, co-author of the Greenpeace report, told *SCRAM* that "the CEGB criticisms of our scenario are merely statements which prove nothing". He would only accept a criticism containing proper technical backing for these statements. This would need to "prove conclusively that the gas-cooled design could not suffer a reactivity excursion in the manner postulated".

Torness

The SSEB claim to have solved the control-rod vibration problem that has beset the Torness AGRs since last November.

The Chairman of the SSEB, Mr Miller, has said that following repairs to the rods costing £3.5 million, the first reactor should start loading fuel in the late summer and be generating electricity by next year. Reactor two would follow about six months later. Commencement of fuel loading is dependent on the SSEB receiving a licence from the NII.

Sellafield

The thirtieth anniversary of the Windscale fire will be commemorated on 10 September with a rally at Sellafield.

Further information and publicity material is available from CORE, 98 Church St., Barrow-in-Furness, Cumbria.

Heysham

Two ex-workers on the Heysham Two AGR in Lancaster have made disturbing allegations concerning the safety of pipework at the plant. The CEGB are taking the allegations "very seriously".

The two workers, Mr Elliott and Mr Prescott, were employees of Babcocks: the main contractor for the CEGB at the site. Mr Elliot, a pipefitter with ten years experience, was employed as a quality assurance engineer. He was the first to make his allegations public, in the *Northwest Evening Mail*. He claimed that his specific allegations about the safety and quality control of the CO_2^1 pipework would be upheld by papers held by Me Prescott.

Serious as these detailed allegations were, more frightening are those levelled at Babcocks' handling of the whole project. Mr Elliott told *SCRAM* that it was badly organised "from start to finish", that "corners were cut" because the company were in a rush to hand the plant over and that certain testing procedures "just weren't adhered to".

When we contacted Babcocks for their response, they said that as contractors for the CEGB, they could not comment on the charge that they had carried out the contract too fast, cutting corners: "We cant speak for the CEGB, its their problem". Their only involvement in the affair has been to help the CEGB obtain the documents held by Mr Prescott.

The CEGB also refused to comment on the general allegations, but were more forthcoming over the specific charges. They claim that Mr Elliott's allegations were based on "his limited knowledge of the total design, construction, inspection and test process". They say that when they aproached Mr Elliott to explain the process he "freely withdrew" his allegations.

While the specific points made by Mr Elliott and Mr Prescott may have been cleared up, their general allegations have not. As Mr Elliott said, "I'm not against nuclear power, not if its done right, but in this case it wasn't".

ACSNI

Concern over low staffing levels in the NII and the safety of reprocessing plant personnel has been expressed in a new report from the government's Advisory Committee on the Safety of Nuclear Installations (ACSNI).

The report recommends that the Nuclear Installations Inspectorate (NII) should increase its staff by 50% to allow it to carry out its responsibilities.

ACSNI are also "concerned to encourage the right balance between the dose (of radiation) to workers and that to the public". They fear that decreased discharges from Sellafield would increase doses to workers there.

Colin Hines of Greenpeace told *SCRAM* that ACSNI should be looking at "the cause, not effect" of discharges: "While reprocessing continues, workers and the public will continue to be contaminated."

Sizewell

If Sizewell B suffered an accident, "visitors to the beach might be asked to move" - Sir Frank Layfield, Sizewell Report (42.22) This and three other postcards are available from: "Stop Sizewell B", P.O. Box 9, Leiston, Suffolk. @ 15p each + p&p.

News

U.K. Waste

The Government's abandonment of the shallow burial concept for nuclear waste was greeted with delight by the anti-dumping lobby.

However, the 1 May announcement, by Mr Nicholas Ridley, Secretary of State for the Environment, came as a total surprise to most people, not least members of the Government's Radioactive Waste Management Advisory Committee (RAWMAC) and the staff of NIREX.

The Government's sudden U-turn was attacked by opposition MPs as "squalid electioneering" prompted by waning Tory support in the areas under threat. This view was confirmed in a letter to LAND from Douglas Hogg MP, the sitting Tory member for Grantham, which stated that the decision "shows how responsive to local feeling the Government can be". Mr Hogg went on to increase his majority to over 21,000. The cost of the abandonment has been put at over £21 million.

The abandonment followed a letter to Mr Ridley from Mr John Baker, Chairman of NIREX, dated 30 April, seeking "a major change of approach" to waste disposal. The letter introduced four new reasons for this change: the presence of uranium in the low level waste; the generation of explosive gases in the repository; the low marginal cost of placing the low level waste (LLW) in the same repository as intermediate level waste (ILW); and that it would "reassure the public that we are not blindly pursuing a predetermined course".

Mr Baker did not, however, rule out the possibility of disposing of "bulk decommissioning items, in particular the heat exchangers, near the surface."

Mr Ridley's response was immediate: "I agree that, in the light of these developements in our policy, no further work should be done on the assessment of the suitability of Bradwell, Elstow, Fulbeck or South Killingholme as possible near-surface disposal facilities.

"I recognise that this could mean that a facility for LLW would not be developed as early as was originally hoped. The continuing availabilty of Drigg and the possibility of interim storage of waste at nuclear establishments will satisfactorily accomodate this extended timescale. I also appreciate we may need to give separate thought to the disposal of bulky, lightly radioactive, decommissioning items."

The decision angered RAWMAC: this is the fourth time that the Government has made a policy decision on waste disposal without consulting them. The acting chairman of the committee, Professor Greening, is said to be reserving his position and has stated that RWMAC does not have sufficient information to assess the full impact of the U-turn.

RAWMAC are also concerned about the future of Drigg, which they believe will become full some five or ten years earlier than NIREX estimates. Furthermore its suitability for waste disposal has been attacked. (see page 10)

FUTURE POLICY

In a recent letter to SCRAM, NIREX outlined their current policy. They are assessing three construction options: deep geological disposal on land; disposal beneath the seabed, based on an offshore structure sinking shafts vertically; disposal beneath the seabed based on tunnelling from a shore base. A consultation document reviewing these options will be published "by the Autumn of 1987".

The document will also address several other issues which will influence the site selection process. These include geological, planning, transport, population and environmental aspects. A map identifying potentially suitable geological environments was published in the *New Scientist* (28.8.86).

POSSIBLE OPTIONS

Although Mr Baker has stated that NIREX will "avoid premature commitments" to sites for investigation, several sites are believed to have been identified.

An unconfirmed leak from the Scottish Office identified Altnabraec, 15 miles south of Dounreay, as possible. The geology of the site is already known from a survey, abandoned in 1982, into the site's potential for a HLW repository. According to the leak, the site is favoured because of local support for nuclear power. *SCRAM* understands that Glensanda, near Oban, may also be under consideration.

In addition to the NIREX inquiries, several commercial firms are developing their own schemes. Notable among these are the Copson and Wheeler schemes. Both of these are for sub-seabed repositories.

A 30 page waste dumping information pack is available from SCRAM, price £1.50

European Waste

FINLAND

The Finnish nuclear utility, TVO, is undertaking geological surveys at five possible nuclear waste storage sites. The five sites are: Eurajoki, near TVO's Olkiluoto nuclear power station; Konginskangas, 300 km north of Helsinki; Sievi, 450 km north of Helsinki; and Hyrynsalmi and Kuhma near the Russian Border. A decision on one site is due by the year 2000.

SWEDEN

The safety and legality of the Swedish SFR1 waste repository for LLW and ILW being constructed off the coast from the Forsmark nuclear station has been questioned.

While the nuclear industry guarantee the integrity of SFR1 for 500 years, they make no claim that radiation can not leach out into the Baltic Sea. The Peoples Movement Against Nuclear Power claim that, as well as the radiological hazard, this constitutes "delayed sea dumping" which is against the Baltic Sea Convention.

SPAIN

Plans by ENRESA, the Spanish nuclear waste authority, to build an underground waste laboratory in the Salamanca region have met local and international opposition.

The project, subsidised by the European Community, is to investigate the suitability of granite as a storage medium for HLW. Assurances by ENRESA that the site will not be used for waste storage have done nothing to assuage local fears. Dummies, dressed in business suits with the message "He was a representative from ENRESA who tried to build a waste dump here" hang from lamp posts in many local villages.

Opposition is not confined to Spain. Portugal has formally protested to the project, because it is sited close to the border on the edge of a prime port wine region.

WEST GERMANY

A fatal accident at the Gorleben HLW site, could undermine the whole legal basis for nuclear power in West Germany.

The accident on 12 May, which killed one construction worker and left five others injured, occurred in the first access shaft. At a depth of 237m, it was discovered that the walls of the 11m wide shaft were collapsing due to instabilities in the surrounding rock strata. Steel rings were used to line the last 12 metres of the shaft, but after four weeks, one sprang out of place. The bottom 14m of the shaft have now been filled with concrete.

Under federal German nuclear law, licences for nuclear power plants are dependant on a guaranteed solution for radioactive waste. Each completed stage at Gorleben is regarded as legal proof of this guarantee. If, as the site's operators have indicated, Gorleben is abandoned, then this guarantee could well be nullified.

Waste

S.A.N.D. Scotland Against Nuclear Dumping

A new federation of anti-dumping groups has been formed in Scotland. Scotland Against Nuclear Dumping (SAND) was launched at a one day conference in Glasgow, attended by delegates from all over Scotland - from Shetland to Galloway.

SAND's aims are:

- To oppose all nuclear dumping anywhere in Scotland,
- To seek responsible and acceptable solutions to the problems of storage and disposal of nuclear waste.
- To co-operate with anti-dumping groups in other countries.

Linsay Stevenson, SAND's convenor, said that nuclear waste dumping is a "major issue in Scotland with over 100 islands, as well as several mainland sites, identified as possible dumps for long-lived radioactive wastes."

Affiliation to SAND costs £5 per group. Details from the Secretary, SAND, c/o 11 Forth St. Edinburgh EH1 3LE

Radiation Levels

Caesium levels in sheep grazing on unrestricted pasture contain more than the 1000 becquerel per kilo (bq/kg) government limit according to a new survey* by Friends of the Earth.

According to Pad Green, radiation consultant to FoE, official announcements about radiation levels in sheep have been consistently proved wrong; in May last year it was stated that the restrictions on the movement of lamb would only last three weeks. He told SCRAM that the Government restrictions are based on computer models designed for lowland pasture, which have a totally different soil structure to the upland pasture which is largely contaminated. "This is despite the fact that caesium is one of the best understood radionuclides. Research was undertaken in the 1950's into its passage through upland pasture."

According to FoE, contaminated lamb should be moved to areas free of radioactivity, so that they are not continually ingesting radiation and prelonging the effects of Chernobyl. Current Government policy is to ban the movement of lamb away from contaminated pasture.

- FoE have also criticised the Government's attitude towards radiation limits in contaminated food as "totally unacceptable".

During recent European Community discussions to set new limits in food, Britain and France argued that they should be set at 4000 bq/kg. FoE say that this attitude is out of line with international opinion, which now indicates that the effects of low level radiation are worse than previously thought. According to Pad Green, the move indicates that they expect another nuclear catastrophe. "The Government should be planning to avert an accident, not elleviate the economic costs at the expense of radiological protection."

In the event the EC ignored the British and French overtures and only slightly increased the limits. The new regulations will come into effect on 1 November.

EEC Radiation Limits (bq/kg)

	Dairy Produce	Other Food	Drinking Water	Animal Feed
Strontium & Iodine	500	3000	400	-
Plutonium	20	80	10	-
Caesium	1000	1250	800	2500

** FALLOUT OVER CHERNOBYL: A review of the official monitoring programme in the UK. FoE, 377 City Rd. London. £1.50*

Accidents Will Happen...

HUNTERSTON

● Following refuelling on Tuesday 12 May, a mechanical problem in a fuel channel gag unit caused the gas outlet temperature of the AGR reactor B1 to rise above normal operating limits.

The normal temperature of the carbon dioxide coolant leaving the fuel channels is 648°C, this has recently been reduced because of carbonisation of the fuel elements. During the incident, the temperature reached 710°C for two minutes. Such sudden surges in core temperature can lead to an "asymmetric reactivity fault" - a potential precursor to an AGR core meltdown. The SSEB would not tell *SCRAM* what had caused the problem, but emphasised that "an investigation is now underway."

HEYSHAM

● Radioactive oil was emitted from Heysham 1 AGR during a cleaning operation on 29 May.

The oil was being cleaned out of the shut reactor's gas circulators and was released from the ventilation stack as vapour. It condensed and fell within the station's grounds.

HARTLEPOOL

● The CEGB have now admitted that the boiler tube leak at the Hartlepool AGR (*SCRAM 59*) will take until September to mend.

They are having problems locating the leak, because of the reactor's design. The boilers are encased inside the concrete around the core. To get at them involves removing large concrete caps in the reactor containment. This modification is unique to the Hartlepool AGR. The CEGB estimate that the cost of the shutdown will be £100,000 a day. Since the reactor started in 1984, it has only produced power at 17.2% capacity.

WYLFA

● One of the Magnox reactors at Wylfa in Anglesey has shut because of a failure in the fuel loading machine.

Wylfa was the last Magnox to be built, and is designed to be refuelled "on line", without having to close the reactors down. However, the charge machine is broken and the reactor will be shut for three months while modifications are made.

HINKLEY POINT

● A leak in the water cooler of one of the generators at Hinkley Point on 8 May caused the associated reactor to be closed down.

BERKELEY

● A fire broke out in lagging in the turbine hall of Berkely in Gloucestor on 18 June, closing the reactor.

TRANSPORT

● The possibility of a tunnel collision between trains carrying nuclear and inflammable cargoes has been removed, according to British Rail.

They say that they will make timetable changes when trains carrying the two types of material are scheduled to pass or precede one another in tunnels. The announcement follows a report on the incident in 1984 when a train of petrol tankers crashed inside the Rochdale Summit Tunnel. The ensuing fire burned for four days reaching temperatures of 8,000°C.

● A container of irradiated fuel was derailed in a siding while leaving Dungeness A on 24 June. The container was removed from the train and returned to the power station.

SUPERPHENIX, FRANCE

● The Superphenix Fast Reactor in France which is leaking liquid sodium (*SCRAM 59*) has now been shut "indefinitely", until a licence to run the plant without the affected piece of equipment can be obtained.

The leak is in a fuel handling tank, which is integral to the refuelling process. The plant's new director, Mr Schmitt, said in June that the operators have until September to prove they can run the plant without the tank for "at least 405 days" (the life of the fuel).

The exact location of the 1 mm hole is still not known. NERSA, the plant's builders have said that "we must continue to believe that the it is possible to repair the leak, but the prospect is thin". To replace the tank will take 2 to 3 years. The cost of the incident is already well over £40 million, but final costs could be as much as £100 million.

PETTEN, HOLLAND

● Overheating of the cooling water at the European Commission's nuclear reactor dt Petten in Holland, caused a radioactive leak in May. The plant was shut down and no radiation escaped into the environment according to an EEC spokesman.

FORSMARK, SWEDEN

● Oil, washed ashore from a ship wrecked last year, threatened the safety of the reactors in early May. Only a small amount of oil entered the reactor's cooling system, but a site spokesman said that a larger incursion could have caused a shutdown.

BROKDORF, WEST GERMANY

● The 1350MW PWR was shut down on May Day because of a generator leak. Workers attempted to restart it three weeks later, but the generator short-circuited.

CATTENOM, FRANCE

● Scientists in Luxembourg claim to have discovered an abnormally high level of radiation in the Moselle river, which they believe emanates from the Cattenom nuclear plant. The Government has demanded an explanation from France.

DOEL, BELGIUM

● The Dutch Government is reported to be "deeply disatisfied" that the Belgium Government did not close the Doel nuclear complex, only a few miles from their border, during a five week strike.

The Dutch say that with 650 of the 800 workers at the four-reactor site away from their posts during the dispute, reactor safety must have been jeopardised. The Belgians claim that 150 workers and 150 management turned up for work, allowing four staff to be on duty in each control room at all times.

HANAU, WEST GERMANY

● There has been another leak of radiation in Hanau, in the State of Hessen, West Germany. This time at the Reaktor Brennelement Union (RBU) fuel fabrication plant.

Uranium hexaflouride leaked into the control room at the end of April, 23 workers were tested for contamination. The Hessen government have temporarily closed the affected part of the plant.

RBU is 40% owned by Nukem and 60% owned by Kraftwerk Union (KWU). This is just one part of the ongoing saga of the West German nuclear industry (see *SCRAM 59* and story on page 4).

IAEA LEAK

● A secret list of nuclear accident and breakdown reports kept by the International Atomic Energy Agency (IAEA) has been leaked to the German weekly *Der Spiegel*.

The magazine obtained details of 48 incidents, from over 250 reported to the IAEA's Incident Reporting System between 1980 and 1985. Only one, at Grohnde in West Germany, had hitherto been made public, and the IAEA report differs greatly to the previously published account.

16 of the accidents occured in Soviet built "VVER" reactors, while 9 out of the 11 US accidents were caused by human error. Nearly every accident was as a result of some trivial event. A full translation of the article is available from SCRAM for 50p.

****

Whilst we would like this list of "incidents" to be comprehensive, we do not hear of every accident. Any information and press cuttings will be gratefully received.

****

SW Radiation Checks

Armed with geiger counters, tripods and special meters, local council officials in Somerset have recently taken on a new task. CRISPIN AUBREY reports on the decision by Somerset County Council to establish an "independent" radiation monitoring scheme and describes it as a reflection of the growing concern about the substantial nuclear presence in the region.

There are already two reactors each at Berkeley and Oldbury power stations north of Bristol and four at Hinkley Point on the Somerset coast. Hinkley Point is also the Central Electricity Generating Board's next choice after Sizewell for a Pressurised Water Reactor.

In the past year, both Somerset and Avon County Councils have adopted policies firmly opposed to a PWR. And at a special conference in Bristol, all six counties which border the Bristol Channel - including Gloucestershire, Gwent, South and West Glamorgan - decided to proceed with a joint monitoring programme, at a cost of about £130,000.

Somerset's own scheme, the most advanced, started collecting data in May. At each of 63 monitoring points around the county they have started collecting monthly readings and making spot checks. The results, analysed at newly equipped laboratories in Taunton, should provide the first comprehensive picture of radiation levels in the area. They could also warn of another Chernobyl. Initial readings round the Magnox reactor at Hinkley Point show considerably higher levels than background, although the significance of this still has to be confirmed. The man in charge of the monitoring, County Scientific Adviser Wilfred Cassidy, sees several justifications for an independent network.

QUICKER THAN GOVERNMENT

"It's partly the fact that the nuclear industry is into a crisis of confidence", he says. "But there are also gaps in the present system which neither the regulatory bodies nor the CEGB fill, especially at over 15 miles from the stations. In any emergency it would be really good value. If central government could have turned to local authorities at the time of Chernobyl, they would have been much better informed."

This was precisely the experience of Lancashire County Council, which pioneered its own (until now unique) monitoring programme in 1985. Although it was the proximity of British Nuclear Fuels sites, including Sellafield to the north, which prompted the move, it was Chernobyl which proved its worth. "We got the results for milk, for example, a lot quicker than the government agencies," says Senior Analyst Maurice Green. "So we were able to work out a likely dose to local people. And we dealt with a lot of enquiries from people who didn't understand the statistics." Lancashire is still busy monitoring such things as hay, silage, lamb, beef, and even honey for post-Chernobyl fallout. One member of the public recently brought in an unusual Polish drink for analysis.

Following Lancashire's example, Somerset has now established its own county-wide network of monitoring points, one for each five mile square. At each point, the monitors will make a monthly collection of a matchbox-sized "thermo-luminescent dosimeter", which measures gamma radiation, and replace it with a new one. They will also take on-the-spot gamma reading with their geiger counters. The dosimeters will then be analysed and the readings collated by a radiochemist at the council's Taunton laboratories.

MORE SOPHISTICATION

The results will not only provide an accumulative map of background radiation levels in the County, but also pick up any "blips" from something like Chernobyl. Such a map could be equally useful in relating radiation variations to clusters of leukaemia cases. Including purchase of initial equipment, to run this basic monitoring scheme will cost the Council about £45,000 in the first year.

In parallel with this, regular monitoring will also be done along the North Somerset beaches, particularly those like Minehead and Burnham which attract a lot of summer visitors. A gamma and beta radiation probe will be used to check tideline debris, especially seaweed.

Eventually, the Council intends to expand into a second, and more sophisticated stage. This would inolve the radiochemical analysis of soil, plants, and foodstuffs, and would show the precise disposition of seperate radionuclides like caesium and iodine. In turn, it should be possible to see what extent an changes in levels can be laid at the door of the local nuclear sites. Lancashire, for example, with cruder instrumentation, can detect the caesium in fish brought back to Fleetwood from the sea off Sellafield.

The bulk of the cost for this second stage - over £100,000 in instrumentation alone- has already been approved by Somerset. But its operation may depend on how it blends in with the similar scheme being worked upon by Avon, the other authority in the region with a scientific laboratory. One plan is that these two better equipped councils rent out their services to the smaller severnside authorities.

Although none of this monitoring will actually forestall the effects of low level radiation, the readings may still prove useful, for example, in the planning enquiry into a Hinkley PWR. "If we can get the Severnside system going it's a start," says Wilfred Cassidy. "But I'd really like at the end of the day to see a total national network."

Contact: Stop Hinkley Expansion, c/o Avon FoE, Arnos Castle Estate, Junction Rd, Brislington, Bristol. BS4 3JP (0278) 732921.

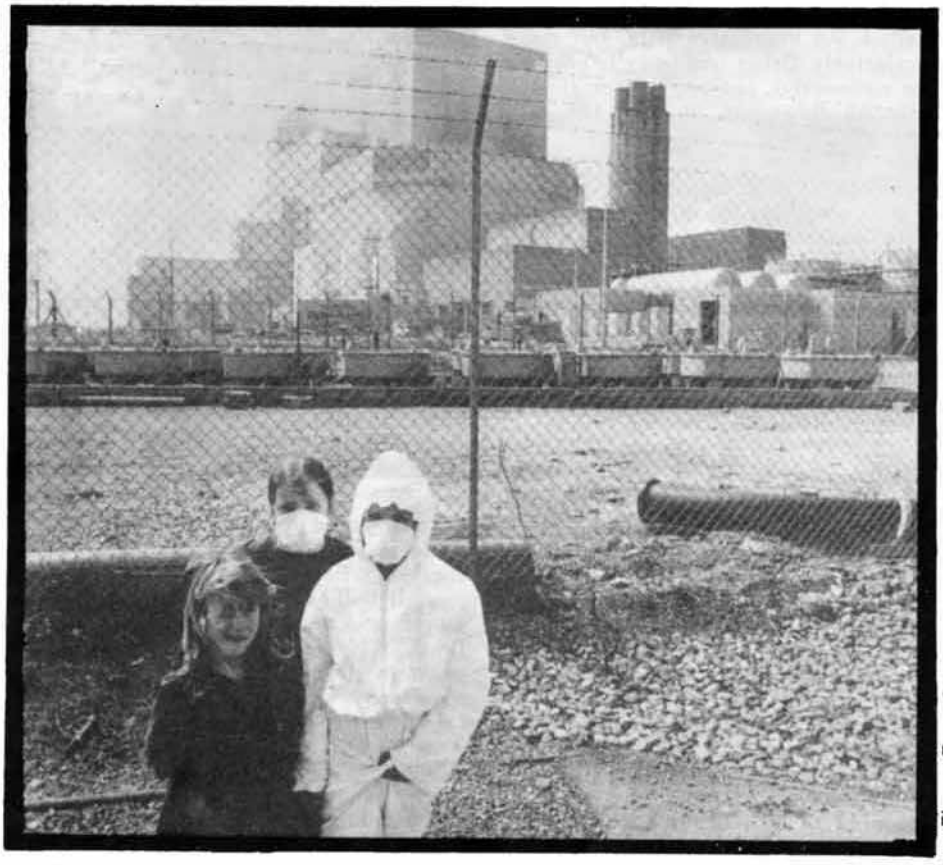


Photo: Fototek

Drigg Flavour Floods Out

The Government, noted of late for its U-turns, has yet again sacrificed avowed policy to political expediency. In the face of strident opposition to the siting of low-level waste dumps in the backyards of four Tory constituencies, the Government has taken the easy option of dumping the issue rather than the waste. MAUREEN SEARLE looks at the current situation and asks us to remember the people who live near Britain's existing nuclear waste dump at Drigg.

NIREX seem to have been suddenly struck with the revelation that a low level waste (LLW) dump is no longer immediately essential: its previous determination to develop a modern surface dump apparently vanishing in the mists of the Government's electoral concern. Four weeks before the General Election, NIREX appears to have discovered that it would be more economic to dump LLW not in surface trenches as originally proposed, but in some deep underground repository which would also house intermediate level waste (ILW).

None of the complex and expensive projects currently under discussion, which vary from deposition in boreholes in the sea-bed to storage in disused mineshafts, have been given the green light, and it would, at best, be 15 years before such a site would come on stream. In the meantime ILW is stored on site at Sellafield. In its concentrated form it presents the industry with no immediate storage problem, and there is the added advantage that it can be regularly monitored. But the Government's climb-down over LLW means that it will continue to make its way by road and rail some 4 miles south of Sellafield to Drigg, where the "major radioactive waste disposal site in the UK" is situated. An impressive title, but more descriptively Drigg has been likened to a radioactive tea-bag; water flows in flavour flows out. In 1986, the House of Commons Environment Committee gave Drigg the thumbs down when it concluded that "Drigg is not an acceptable model for any future disposal site."

NO ADEQUATE RECORDS

The fears they voiced are not mere quibbles. The management philosophy behind this major radioactive dump is the much discredited one of "dilute and disperse". Large volumes of water are allowed to percolate through the waste-filled trenches, from where it drains into the site stream and then into the River Irt, some half a mile above the Ravenglass estuary. The premis is that the dilution of radionuclides is sufficient to minimise any hazards arising from the dispersal of radioactivity via the site stream into the surrounding environment. The site stream is monitored daily but it is tempting to ask why, since no remedial action could be taken if dangerous levels of radioactivity were discovered to be leaking into the environment. Unlike its French counterpart at Centre de la Manche, Drigg has kept no adequate records of the types of waste dumped at the site, so it would be impossible to retrieve a hazardous radioactive source even if the post-dumping monitored revealed its presence.

This latter point leads directly on to another criticism of the management of the Drigg dump. Packages and containers being sent to Drigg are not always monitored prior to their disposal. Dr Feates of the Department of the Environment, in his evidence to the Select Committee, admitted that "individual packages which are outside the LLW definition could be disposed of at Drigg." Because waste is assessed for its radioactivity on a daily basis, and because large amounts of waste have little or no activity associated with them, Dr Feates agreed that "the overall daily limit could well very well admit packages well above the LLW limit." The Select Committee was blunt in its condemnation of a site philosophy which they suggested "has the double disadvantage of adding unnecessarily to the volume of waste and of letting through dangerous long-lived radionuclides." In the light of this remark, it is particularly disturbing to learn that there have been several fires on site. These were the result of the indiscriminate mixing of disused sodium lamps with the contaminated wastes. Sodium lamps are specifically prohibited from the site, but their presence on several occasions led the Committee to conclude that "it is not unreasonable to question what else forbidden gets to Drigg."

SERIOUS CRITICISMS

Given the serious nature of these criticisms, it was not surprising that the Government displayed a sense of urgency in its determination to find an alternative site, which would be both technologically and environmentally superior to Drigg. As the Environment Minister, William Waldegrave, stated in 1985 "we are behind our European counterparts in having disposal sites and we have got to get on with it now." To his credit he followed this statement a year later with the reassuring comment that "the Department of the Environment is committed not to the nuclear industry but to a safe environment." A Drigg replacement seemed imminent, but 1987 gave rise to electoral considerations which have obviously outweighed those of establishing serious policy on nuclear waste.

Drigg, its brief notoriety already almost forgotten, will continue to remain "the major radioactive waste disposal site in the UK" certainly into the next century. Nothing to do, it is hoped, with the fact that Drigg lies in a quiet rural parish in the backyard of a Labour constituency.

Photo: BNFL

Filling and monitoring of a trench at Drigg

Nuclear Waste Strategy

There is no solution to existing nuclear waste. There are only measures which can be taken to attempt to isolate it from living things. The answer to the problem of nuclear waste is not to create it in the first place. PHILIP CADE and PETER BUNYARD present an interim strategy for dealing with the problem.

The radwaste problems in the UK result primarily from attempts to manage spent reactor fuel. The radioactivity of spent fuel falls away rapidly after the reactor has been shut down and the fuel removed. Nevertheless, at after a year, the fuel still contains, in a highly concentrated form, some 270,000 times more radioactivity than the uranium ore from which it is derived. Even after 10,000 years it is still about 200 times more radioactive. One kilogram will still be some 18 million times more radioactive than "Chernobyl lamb", containing 1000 Bequerels per kilogram - the UK ban level.

STRATEGY IN TATTERS

Britain's nuclear waste disposal strategy is in tatters. The Government has tried to thrust upon the public *its* solutions while its policy has become increasingly confused. If one places the value of life and of protecting the environment at the top of the list of priorities when deciding what to do about the waste already created, the interim strategy would be along these lines:

- bring to an end its production by abandoning nuclear power;
- bring reprocessing to an immediate end. It serves merely to multiply the volume of waste, disperse it more effectively through the environment, promote the production of nuclear weapons and swallow precious resources;
- spent fuel should not be sent to Sellafield. It should be stored on the power station site in naturally cooled, dry storage repositories at surface or sub-surface, where it can be carefully monitored. This also eliminates the risks involved in transporting spent fuel. (At present spent fuel from the Magnox station at Wylfa is dry stored on site);
- THORP (Thermal Oxide Reprocessing Plant) should be abandoned and the project redesigned and modified to serve as a repository for the dry storage of existing spent fuel;
- the import of all foreign fuel must cease immediately and all contracts should be cancelled. Foreign fuel at Sellafield should not be returned to the country of origin to eliminate the risk associated with transportation, and should be dry stored on site.

These proposals can and should be implemented without delay.

The High Level Waste (HLW) at Sellafield should be solidified, since in liquid form it presents a potentially serious health and environmental hazard, and should be suitably dry stored. BNFL's intention is to vitrify it using the French AMV method. Vitrification, however, is by no means a satisfactory option in this respect and a thorough investigation into alternatives such as ceramic encapsulation and the "synroc" process should be undertaken. ILW should be conditioned along similar lines and also dry stored.

Having abandoned the search for a sub-surface shallow landfill site for Low Level Waste (LLW) to replace Drigg, the government now appear to favour a deep "multipurpose" facility for both Low and Intermediate Level Waste (ILW). According to Nicholas Ridley, the Environment Secretary: "They (NIREX) are already evaluating the relative merits of techniques for deep burial of ILW in a repository on land, tunnelling under the sea-bed from the shore, and disposal into the sea-bed from a sea-based rig and they now intend to extend this study to embrace LLW as well.'

GLOBAL COMMONS

Of the three possible radioactive waste repositories - space, land and sea - the latter is the worst thinkable place on at least five grounds.

First and foremost, we inhabit a planet built to recycle everything. The oceans are a living, interconnected environment that can return radioactive wastes to humans via the food chain. The objective of radioactive waste management should be to isolate the waste from the bioshere.

Second, the ocean is a formidable environment. Pressures and temperatures reach planetary extremes, and the corrosive powers of the ocean waters are legendary. It is the most destructive environment for placement of waste containers. This also applies beneath the sea-bed where emplacement of radwaste is no guarantee of isolation.

Third, although rapid strides have been made in the last 20 years, the oceans are still relatively unknown. New discoveries are made on an almost annual basis. Scientific opinion on the capacity of the seas to absorb wastes is constantly being revised downward.

Fourth, the oceans represent a global "commons" for the benefit of all people and our descendents. For a minority of the planet's population to damage this resource and thus deprive the vast majority - including future generations - is fundamentally unfair.

Fifth, this moral principle is codified in international law, which places the burden of proof on those who damage the global commons rather than on those who stand to suffer from the damage.

Finally, on decommissioning of nuclear power stations; apart from defuelling, where the spent fuel is dry stored on site, the core and all contaminated components of the power station should *not* be dismantled.

Dismantling the plant serves to disperse radioactivity into the environment in the form of the "waste" components, and multiplies the waste through the contamination of people, machinery and equipment employed in the process. These installations should be encapsulated, sealing in the contamination as best as technologically possible, and then continuously monitored.

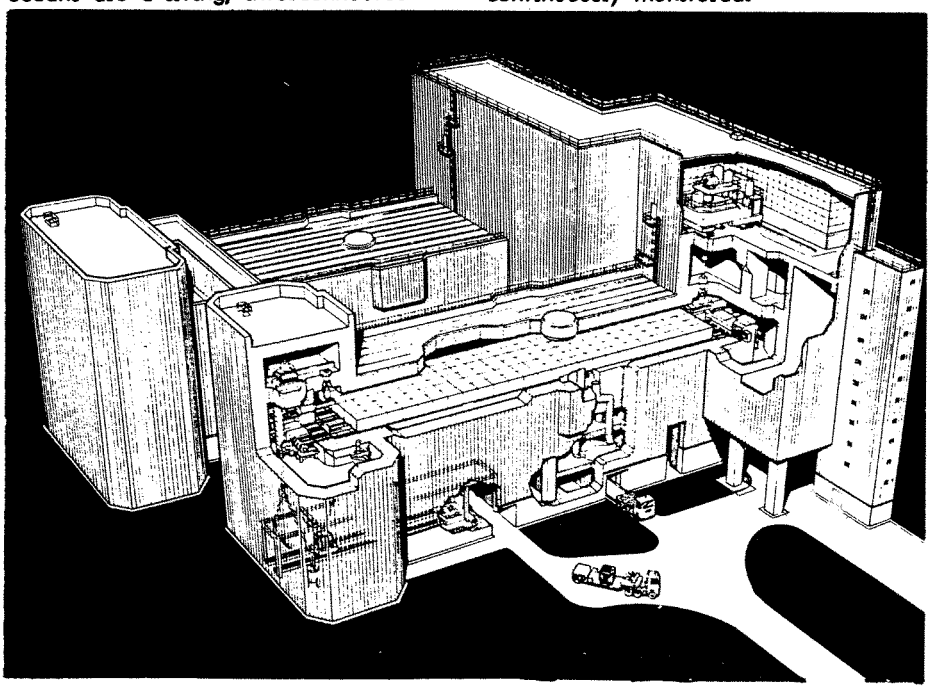


Diagram of the Wylfa dry store

ICRP - Gentlemen's Club

Since 1950 the recommendations of the International Commission on Radiological Protection (ICRP) have been accepted as the basis of both national and international radiological protection standards. PATRICK GREEN introduces a new Friends of the Earth campaign to expose the deficiencies of this organisation.

An ICRP Information Pack and full details of the campaign and how people can help are available from:
Patrick Green, Radiation Consultant, FoE, 377 City Road, London EC1.

The ICRP sees its role as considering the fundamental principles upon which appropriate radiation protection measures can be based. Since different conditions apply from one country to another, detailed elaboration of the ICRP's recommendations into laws or codes of practice is left to other national or international organisations. Consequently the ICRP accepts no responsibility for practical application of its recommendations, even though they have always been accepted as the basis for radiological protection standards.

The ICRP claims to comprise a group of doctors and scientists independent of governments or commercial interests. Members of the Commission, according to the ICRP, are selected on the basis of their expertise in a scientific field relating to radiation protection, namely: medical radiology, radiology, radiation chemistry, physics, health physics, biology, biochemistry, biophysics and radiobiology. The scientific balance of the Commission, it is claimed, is based upon expertise rather than nationality. The selection of members is made every four years by the Commission itself, and is subject to approval by the International Executive Committee (IEC) of the International Congress of Radiology.

MEN ONLY

The Commission consists of 13 persons, all of whom are men (in its entire history no woman has ever been appointed. The rules governing selection of members of the ICRP state that not less than three but no more than five members can be changed at any one Congress. In addition the ICRP is served by four committees dealing with different aspects of radiological protection. Members of these committees are appointed by the ICRP itself and do not require the approval of the Congress. Each committee is chaired by a member of the main Commission.

The ICRP is regarded as the "acknowledged authority in the field" of radiological protection. The "independence" of the ICRP and the expertise of its members is widely stressed in scientific literature and also in publicity material or information documents issued by the nuclear industry, its regulatory organisations or from governments. The following quote is a typical example:

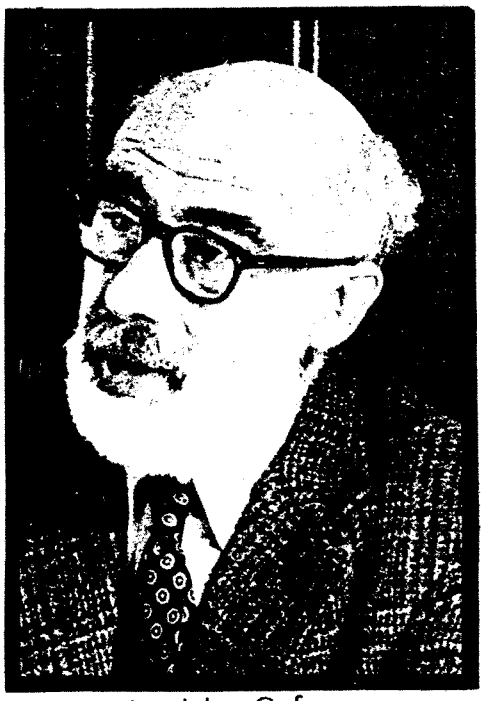
> "The ICRP is a unique organisation. For the 51 years of its existence, it has been universally regarded as the prime source of authoritative advice on radiological protection . . . They represent no one but themselves - they are chosen solely for their eminence in the relevant fields of science. Thus the authority of the ICRP's recommendations depends entirely on the regard in which its members are held by their peers and, given such a high regard, on the fact that therefore governments frequently adopt the recommendations. Such is ICRP's reputation that some governments boast that they allow no practice which will cause radiation doses that exceed ICRP's recommended limit irrespective of the cost".

(David Richings, deputy director of policy at the NRPB, *New Scientist*, April 1979.)

Given the ICRP's apparent reputation it is surprising to find that its recommendations have been at the centre of a bitter controversy for the past thirty years. An explanation for this lies in the structure of the ICRP itself.

NO SAFE LEVEL

Far from being an open independent organisation, the ICRP is little more than a highly selective club, whose membership is only open to a small group of individuals. Its members are primarily drawn from the international nuclear industry and its regulatory bodies as well as from sections of the medical profession involved in the use of ionising radiation, namely medical radiology. The longest serving members of the Commission and its Committees, ie the ICRP's policy makers are primarily drawn from the first two of these groups. In addition the ICRP is scientifically unbalanced: the largest single type of scientific group represented, since 1950, is physicists; next largest is medical doctors and radiologists who use ionising radiation, not by general practitioners. Only three geneticists, one radiobiologist, one pathologist and one biophysicist have sat on the Commission since 1950. This imbalance is surprising given the ICRP's terms of reference.



Dr John Gofman

The recommendations of the ICRP clearly reflect the interests of the nuclear industry, and are not about the protection of health from ionising radiation. Standards are chosen on what the industry can afford to achieve.

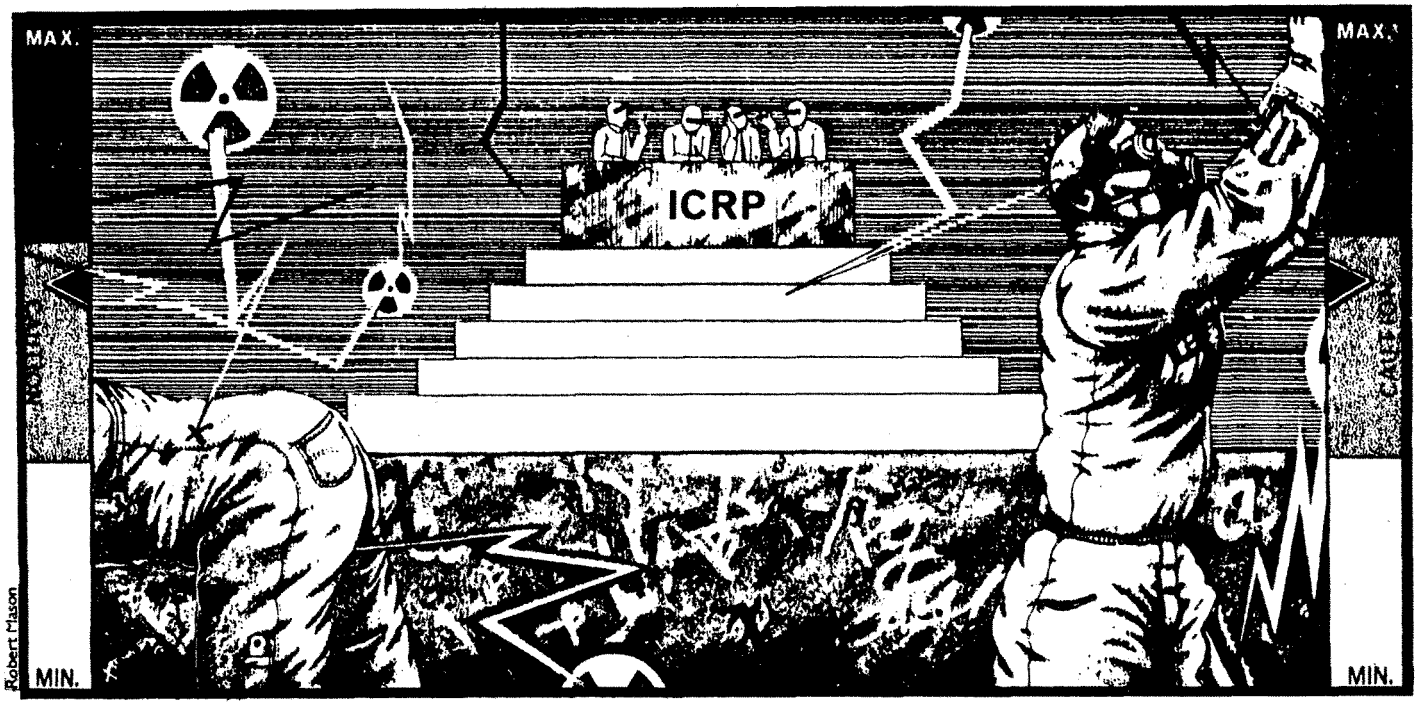
In 1950, the ICRP stated that a threshold or tolerance dose existed below which no damage would occur, at least in the lifetime of the exposed individual. A position that did not change until 1959, when the ICRP stated that new information meant that they now recommended the "conservative" assumption that a threshold did not exist. They accordingly reduced the dose limit for radiation workers from 15 rems per year to 5 rems. ICRP Publication 1 clearly shows that the 5 rem limit was chosen on the basis of what the nuclear industry could achieve. Recently uncovered evidence also suggests that some members of the ICRP knew as early as 1947, that for genetic damage at least, no threshold existed.

CONSERVATIVE ESTIMATES

In 1966, ICRP Publication 9 stated that the 5 rem per year dose limit for radiation workers was retained because the "Commission believes that this level provides reasonable latitude for the expansion of atomic energy in the forseable future". This dose limit is still in use today.

During the 1970's several ICRP members supported the US Atomic Energy Commission in their dispute with Drs John Gofman and Arthur Tamplin. Other scientists who have spoken out against the officially accepted risk estimates have found themselves rejected as irrational by the scientific community, their funding removed and their reputations subjected to an unprecedented level of personal attack.

The most recent recommendations from the ICRP were published in 1977 as ICRP Publication 26. Central to the ICRP's philosophy is the belief that their risk estimates err on the side of caution. This is not the case. Even reports which are frequently quoted by the nuclear industry as



representing the consensus view on radiation effects, contain risk estimates which are 2 to 10 times higher than ICRP. These are reports by the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) and the United States National Academy of Sciences Committee on the Biological Effects of Ionising Radiation (BEIR III).

UNDERESTIMATED RISK

Members of the ICRP have constantly refused to accept that the real risk from radiation exposure is greater than they claim. In 1980 L S Taylor, one of the founder members of ICRP and president of the US National Council for Radiological Protection and Measurements stated "today we know all we need to know to adequately protect ourselves from ionising radiation". A statement that was made when many scientists were beginning to question the validity of risk estimates based upon studies of the Hiroshima and Nagasaki Bomb survivors. Since 1980 the Japanese data has been re-evaluated: the most recent studies from Japan confirm that the ICRP's risk estimates need increasing by a factor of at least two.

ICRP 26 did not only underestimate the risk from radiation, it also permitted increases of between 2 and 8 times in the permissable exposure of internal body organs. This change cannot be justified by the ICRP's own requirements that "all doses must be kept as low as is reasonably achievable" (ALARA), or at least that "no practice should be adopted unless its introduction produces a positive net benefit".

Furthermore the ALARA principle is less stringent than previous recommendations. In 1965 they stated that all doses must be kept as "low as practicable", in 1958 it was as "low as readily achievable" and in 1950 "as low as possible".

Following the publication of ICRP 26, a EURATOM directive instructed EEC States to incorporate the recommendations into their national legislation. In many cases this led to a further weakening of standards. The Ionising Radiation Regulations (IRR) which became law in the UK in 1986, permit increases in exposure of individual body organs of between 2 and 10 times that which was allowed before.

For example, whilst ICRP increased the permissable exposure of the lungs for radiation workers, from 150mSv (15 rems) to 420mSv, the IRR allow the lungs to receive an annual dose of 500mSv. The largest increase has occurred in the case of Red Bone Marrow. Under ICRP 9 the maximum permissable dose to this tissue was 50mSv per year. ICRP 26 increased this to 420mSv, and the IRR have allowed a further increase to 500mSv per year.

ICRP 26 is now 10 years old, yet it has not been fully implemented across Europe. In September this year, in Como in Italy, the ICRP will meet to produce a new set of recommendations to replace ICRP 26. They will be meeting at a time when the scientific evidence clearly shows that the ICRP underestimates the risk from radiation by between 2 and 10 times.

The increases in risk estimates resulting from the Japanese studies is no longer disputed by the ICRP. Several leading members of the ICRP in the UK have made statements which acknowledge that they will have to modify their risk estimates. The question is no longer whether the ICRP will make changes, but by how much will they do so. A recent paper by John Dunster, one of the longest serving ICRP members and Director of the NRPB even suggests that the ICRP might reduce its dose limits by a factor of between 2 and 5!

The Como meeting will be vitally important - it will determine the course of radiological protection standards around the world for the next 10 years. The ICRP know that their reputation is under attack. John Dunster has made the previously unheard of move, of offering to take the case of environmental and trade union groups to the ICRP. Friends of the Earth UK has accepted this offer and will also be making a direct representation to the ICRP Secretariat outlining our case for an immediate ten fold reduction in the dose limits for radiation workers and for a twenty fold reduction for members of the public. In addition FoE will be mounting a publicity campaign to run throughout the summer, which will focus on the record and vested interests of ICRP. Following the European Conference on Radiation and Health, held in Amsterdam in May, FoE will be coordinating this campaign at an international level.

ICRP UNTRUSTWORTHY

Whilst the scientific evidence clearly shows that radiation risks are greater than stated by the ICRP, governments continue to maintain that the ICRP are an independent organisation and that the risks from low level radiation are insignificant. Experience shows that the ICRP cannot be trusted, they have never spoken out against any practice which involved excessive or unnecessary exposure to ionising radiation. During Chernobyl they only acted to play down the risks.

The most telling statements about ICRP do not come from governments, but from one of their former members. Karl Z Morgan, who is widely regarded as the founder of the science of health physics, stated in 1977 "in spite of its usefulness in the past, the ICRP has never been willing to offend the establishment and I'm not sure its an organisation I would trust my life with."

Dounreay Replies

We asked BRIAN DURRANS, Chairman of Dounreay Staff Side to reply to Pete Mutton's article, "Pandora's Pox", in the last issue of *SCRAM*. This article has been cleared by Dounreay management.

It's tempting to take Mr Mutton's article apart bit by bit, showing up his exaggerations, distortions and facile arguments - but it would be a waste of time, because I suspect that (a) it wouldn't change the collective mind of your readership, and (b) it would probably produce another sloganised diatribe.

The only thing that worries me is that some members of the public, who are concerned about such matters, may actually read Mutton's piece. It's always easier to create alarm with such articles, than to allay fears among a population who may not possess the necessary knowledge and understanding of nuclear power.

Perhaps I might be allowed, therefore, to make a few points on the two centres of Mr. Mutton's concern - transport of nuclear material, and the question of nuclear weapons capability.

Nuclear Transport

Transport of nuclear materials may be classified into three categories:
i) Irradiated fuel.
ii) Fuel recovered for further use.
iii) Waste arisings from nuclear operations.

IRRADIATED FUEL

By its very nature this material is highly radioactive, and is required to be transported inside heavily shielded flasks each weighing up to 100 tonnes. The construction of these flasks complies with stringent regulations issued by the International Atomic Energy Agency and to comply with these regulations a testing programme is carried out consisting of both impact and fire tests. It has been demonstrated that the peak forces exerted on a flask during the impact test are almost twice those of the CEGB demonstration train crash, when a flask was struck by an engine and three coaches, weighing 245 tonnes and travelling at 100 mph. The flask was found to be virtually undamaged - and it didn't leak - whereas the train was completely wrecked. In the year 1984/5 over 2,500 flasks were transported by rail without incident.

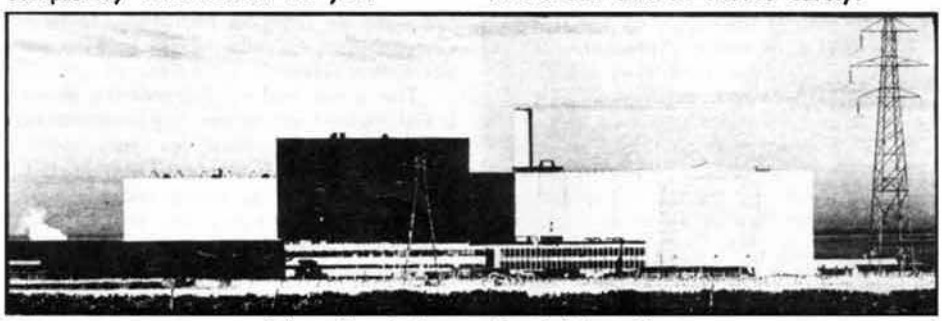
RECOVERED FUEL

At present, plutonium recovered from the reprocessing of PFR irradiated fuel is transported, as a solution of plutonium nitrate, by sea from Scrabster to Workington. Although we don't advertise shipments in advance, they're hardly "secret" - you can't hide a ship the size of the "Kingsnorth Fisher" in a harbour like Scrabster!

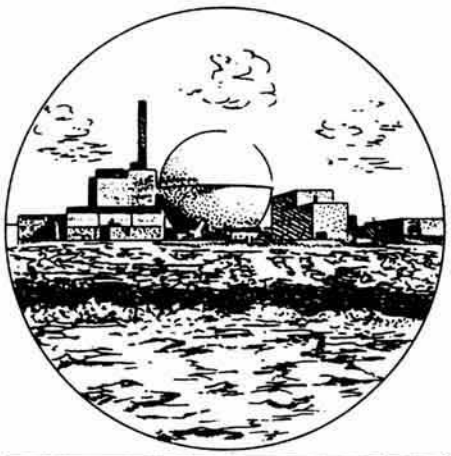
The proposals for recovered plutonium from EDRP will be to transport the material as plutonium dioxide powder by air from Dounreay to an airfield close to the fabrication plant. There is nothing new in this. Plutonium dioxide has been carried safely by air internationally for the last sixteen years or so. All such movements are of course subject to IATA and ICAO regulations, and the Type B containers used must have current certificates of approval issued by the Department of Transport. The testing is stringent; containers meet the necessary criteria and, in the real world, that is surely sufficient reassurance. If we can design "black box" flight recorders which survive crashes intact - every time - then even more robustly-designed and engineered nuclear material containers are safe.

NUCLEAR WASTE

Of the three categories of waste (high, intermediate, and low level), it is reasonable to assume that if high level waste can be transported safely then there should be no problem with the other two types. Liquid High Level Waste, containing the highly-active fission products, will be allowed to decay in activity for several years before being vitrified (ie turned into borosilicate glass), which will then be sealed inside a steel container. These will be stored for some 50 years before removal from the site. As the transport of irradiated fuel causes no problems, the less radioactive vitrified waste can also be moved safely.



The Prototype Fast Reactor



Nuclear Weapons

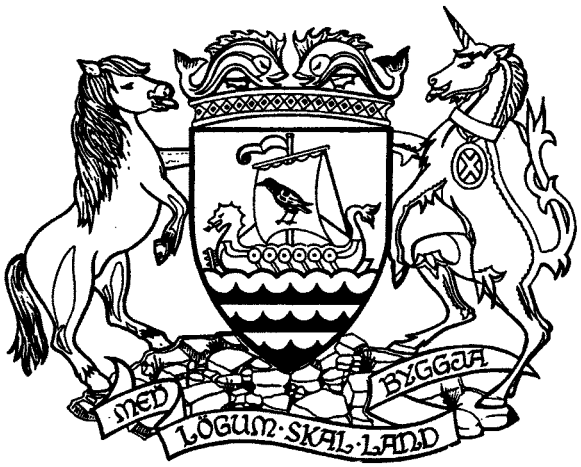
Nuclear Weapons have been with us for over forty years. While it is my hope that the countries possessing them will be able to come to an agreement on dismantling them, it is likely to be some time before this happens.

The European Collaboration on Fast Reactor Development have stated that none of the facilities developed under the agreement will be involved in supplying plutonium for weapons manufacture. All the processes will be subject to international inspection to ensure that no fissile material is diverted into weapons manufacture. Specifically, the entire Dounreay site is under safeguards; our fast reactor plutonium is simply not used for military purposes, for which it's isotopically unsuited anyway. It's time this red herring was dropped.

Finally, I must take Mr Mutton to task for employing the old Catch 22 situation regarding security. He queries why certain information is not available, and why it's necessary to use armed police. I am quite sure that the general public would be disturbed if there were no such security, either at Dounreay or on shipments of nuclear material.

In the real world, nuclear power is not going to go away. We have a responsibility - now and in the future - to make the technology as safe and environmentally clean as possible. The fast reactor system, with its inherent safety characteristics, its extremely low radiological impact to workforce and public alike, and its ability to utilise waste from other reactor systems, is the way ahead. It's also, of course, the ideal way of getting rid of military-grade plutonium; something which should greatly appeal to Mr Mutton. It doesn't produce it, but it can certainly burn it.

Mr Mutton will probably feel the necessity to get the last word in - he's welcome to it. I have neither the time nor the inclination to indulge in a running debate in which most of his efforts appear to be aimed at producing heat, rather than light. His final slogan was rather ironic ". . . don't die of ignorance", he said. It's reassuring to note that ignorance doesn't kill - that's why Mr Mutton is still alive and well, complete with his deathless prose . . .



SHETLAND ISLANDS COUNCIL

— *FIGHTING THE EXPANSION OF DOUNREAY*

- As one of the leading objectors at the Dounreay Inquiry
- Through the Nuclear Free Zones Movement
- By supporting CADE and other pressure groups

— *ASKING THE RIGHT QUESTIONS*

- Why was Dounreay chosen as the site for EDRP in Britain?
- How can EDRP be considered safe when no plant design has been revealed?
- Why was no full Environmental Impact Assessment produced?
- How will wastes from EDRP be managed and disposed of?
- What are the transport routes for waste?
- How can a decision be reached before health impacts are fully examined?
- Why do the monitoring proposals not follow best current practice?
- Why did the developers not analyse economic impacts on the islands?
- Is BNFL competent to play a part in running EDRP in view of its record at Sellafield?

— *PROTECTING SHETLAND'S FUTURE*

- Our industries — agriculture, fishing, fish farming and tourism — rely on a clean, unpolluted environment. It is our duty to safeguard our future health and prosperity.

Shetland Islands Council wishes SCRAM best wishes on its tenth birthday and thanks all the Scottish local authorities who are supporting the campaign against EDRP.

Public Power – Private Profit

The Government is planning to privatise the electricity industry. Cecil Parkinson, the Secretary of State for Energy, is said to be already at work drawing up proposals. It has been suggested in some anti-nuclear circles that this might not be such a bad idea, because of the American experience where the financial risks of investing in nuclear power are no longer acceptable to investors in the mainly privately-owned utilities. PETE ROCHE has been looking at some of the scenarios being put forward for privatisation in this country and argues that far from being a good idea, it would be an unmitigated disaster. He concludes that environmentalists should be working to form coalitions with trade unionists in the energy industries to fight this latest ploy of Thatcher's Nuclear State.

At £18bn (more than 3 times the price of British Gas) privatisation of the Electricity Supply Industry (ESI) would dwarf the sales of other nationalised industries. Although the industry itself will argue strongly to be sold off en bloc, none of the scenarios being put forward seem to think this is likely. The ESI already consists of 16 companies, and amalgamating this into one enormous private monopoly is seen as a missed opportunity to introduce more competition into the industry.

Financial Times Business Information (FTBI) put forward two scenarios. One retains something of the present structure and the other is more radical. Both assume that government will retain control of nuclear power, because of the age of the Magnox stations and the technical problems associated with AGRs. Research into decommissioning is still at an early stage, so it is unlikely that private investors would be prepared to bear the uncertain costs. A third, more radical scenario is put forward by the Centre for Policy Studies (CPS), which was set up by Mrs Thatcher and Sir Keith Joseph. This does not rule out the possibility of selling the AGRs to the companies which built them. (see Box 1).

Either nuclear power will remain the responsibility of the Government, or as in two of their scenarios, new stations would be subjected to the "disciplines of the market." It has been suggested that had Sizewell B been expected to meet commercial criteria, it would never be built. However, as we shall see, the effect of privatisation on world coal prices is likely to make nuclear power the only profitable option open to private electricity companies, in the near future.

Moreover, Thatcher's Government is unlikely to sacrifice nuclear power for the sake of privatising another state asset. We have the prospect of new PWRs being built and operated privately, and some observers believe the Scottish Boards will be sold with the nuclear capacity intact. The SSEB is so dependent on nuclear electricity it wouldn't make sense to privatise it without this major strategic asset. The SSEB management are so committed to Torness that they would resist any suggestion of this being hived off. Prospective buyers would not want the SSEB to be at the mercy of a state nuclear supply company, with the Treasury ultimately setting tariffs.

The privatisation of the ESI has serious implications for nuclear safety. The European Parliament's Committee on Energy, Research and Technology, which is generally sympathetic to nuclear power, believe that for safety reasons the construction and running of nuclear installations, and the management of nuclear wastes, should be a public sector responsibility:

> "There is always the risk that the pursuit of cost efficiency and the need to balance the books, so typical of the private sector, may lead to deficiencies in safety or the consequences of accidents being underestimated or even covered up."

THE EFFECT ON COAL

Whichever method of privatisation is chosen, it is clear that it will be disastrous for the coal industry. The CPS, for example, describe the present situation as "the CEGB is forced to buy expensive British Coal" and "... imported coal has offered potential savings of between 12% and 38% against the average price of coal from British Coal."

The FTBI suggest that "... a radical closure programme is likely in the years following privatisation, the only question is how far and how fast this programme proceeds."

In other words, deep mining would be devastated (see Box 2), and there would be a large increase in opencast mining. Investment would be focussed on a few large super-pits in the centre of England. The emphasis in these pits is on winning the quickly and easily mined coal. The end result is that instead of having 300 years worth of coal, the UK will have only enough for 50 years. Within about 5 years there will be no going back.

It is difficult to imagine a policy which places so much emphasis on short-term gain to the detriment of the future. Opencast mining is disastrous for the countryside, and should anyway be kept for emergencies. A wholesale turn to coal imports would make the UK the biggest coal buyer in the world. Prices may be low at the moment, but UK led growth in demand would lead to price rises by the mid 1990s probably to a level higher than home produced coal. This will have an adverse effect on our balance of payments at the same time that North Sea oil revenues are declining. By the time world coal prices start to rise, it will be too late to fall back on home produced coal, because many of our mines will have been shut. As well as coal imports, there is also likely to be an increase in electricity imports from France via the Channel Link.

BOX 1 THE THREE SCENARIOS.

SCENARIO A - FTBI

The area boards in England and Wales become five regional distribution companies, and the SSEB and NSHEB would form a sixth. A UK Grid Company would be retained by the government, and would be responsible for existing nuclear stations. A new private generating company takes over the non-nuclear stations as well as Sizewell B and any new nuclear stations. Nuclear development depends on the disciplines of the free market.

SCENARIO B - FTBI

Six regional utilities would have responsibility for generation and distribution but nuclear capacity, including new stations, will remain in state control. Although not in the free market, nuclear power would have to be cheap enough to compete with other privatised sources.

SCENARIO C - CPS

Ten generating companies, each with a mix of coal, oil and gas generating sets, are geographically dispersed. The area boards are sold as private distribution firms. The SSEB, probably with NSHEB, is sold off as one power board. The present nuclear stations (at least in England and Wales) would probably be kept in public ownership. Any new stations would have to be built by the new companies.

Box 2

THE EFFECT ON BRITISH COAL
(FTBI prediction)

SCOTLAND: reduction from 4mt to 2mt (opencast) by mid 1990s.
NORTH EAST: closure by mid 1990s.
YORKSHIRE: largely unaffected in production terms.
NORTH DERBYSHIRE: closure by late 1990s.
NOTTINGHAMSHIRE: reduction from 19mt to less than 12mt by mid 1990s.
SOUTH MIDLANDS: closure by 2000.
KENT: closure by late 1990s.
WESTERN: reduction from 9.4mt to 5mt (opencast) by mid 1990s.
SOUTH WALES: little change.

At present the CEGB has agreed to "forgo the use of road support for coal supplies from rail-connected sources to rail-connected power stations." During the miners' strike they used road transport heavily and found it to be 30% cheaper. A privatised industry would obviously use the cheapest form of transport available without regard for the effect on British Rail or the environmental costs. If privatisation were to cause the collapse of the rail freight market for coal haulage, it could make the rail freight network unviable in certain areas. Scotrail, for example, get 20% of their freight revenue from coal. The loss of this could lead to the closure of the East coast line north of the Forth, taking out the passenger network as well.

CPS describe the ESI's policy for ordering plant as being dictated "not by commercial considerations, but by the political interplay of vested interests." The market is currently closed to imports. Under privatisation this would change. The power engineering industry needs orders of at least 2GW per annum to survive. If future orders are put out to tender on the world market, things could become very difficult for the industry with even larger job losses than we have already seen. The ending of the "Buy British" policy would probably extend to transmission equipment as well. Foreign imports of equipment will place a further burden on our balance of payments.

THE EFFECT ON SCOTLAND

A private Scottish Electricity Board would be a very unusual animal when compared to other privatised firms. It would probably be sold off with its nuclear component, becoming the largest company in Scotland. It would have to be sold at a heavy discount to cover the uncertain costs of decommissioning Hunterston A. It has a huge capital debt run up by its nuclear construction programme. Its profitability will depend on how this debt is handled. If privatised with its debt intact, management will have to increase profits dramatically. If the Government decide to write off the debt, they would be virtually giving it away.

Privatisation would immediately threaten Monktonhall and Bilston Glen collieries, with employment in the Scottish Coal mines falling from the present 5000 to around 2000. In all probabilty the new Board would be non-Scottish in ownership, so there would be a flow of earnings out of Scotland affecting perhaps a further 4000 jobs. In order to sell its surplus power, the Scottish Board would have to sell cheaply to England. This would subsidise cheap electricity for direct competitors of Scottish firms, and thus destroy more Scottish jobs.

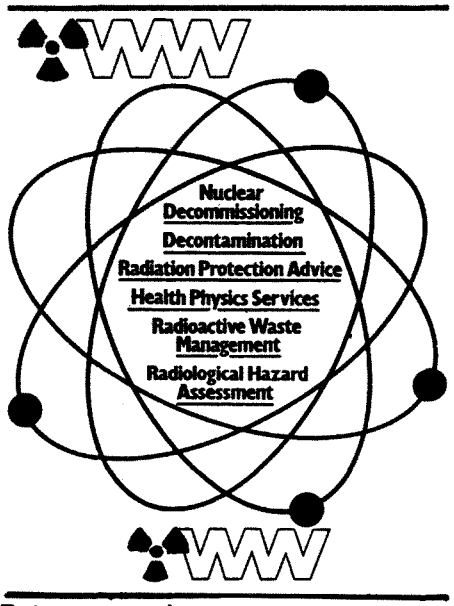
A private firm would have to become tougher with bad debtors, leading to increased disconnections.

The trend started by the SSEB of reducing the number of people employed would undoubtedly continue, and the Board's showrooms would probably be closed or sold off.

Privatisation could well kill off any prospect of introducing Combined Heat and Power. Despite the provisions in the 1983 Energy Act, which broke the nationalised industries' monopolies, private power has actually dropped by 26% since the Act became law. The CEGB have started a "scorched earth policy" of selling off disused power station sites and demolishing small power stations. Some of these would be ideal for CHP, by refurbishing existing plant or building new stations on the site. Short of extensive state subsidy, CHP is also in direct competition with gas. There is always a risk that British Gas might start a price war.

The Severn Barrage, too, is a very risky investment with a real rate of return of only 4%. Unless there was a compromise, with the Government underwriting the risks, a better deal as far as electricity sales are concerned and no public inquiry, the project would not be economically attractive.

The prospect for other appropriate technologies will very much depend on the attitude of the government when they are drafting the legislation. Unless small private producers are able to get a more realistic price for the electricity they produce than they get at present, and are not unduly penalised by the rating system, then they will never get off the ground.



Private nuclear company advert

Box 3

PRIVATE DECOMMISSIONING

Some of the more profitable parts of the nuclear cycle could be seen as worth selling off. BNFL is already a private company, albeit publicly owned. There is no shortage of companies keen on winning decommissioning contracts. It could become a major growth area with considerable safety implications both for the workforce and the rest of us. Can we leave this to the private sector? Remember what happened to asbestos?

SERIOUS IMPLICATIONS

Privatisation has serious implications for British Coal, British Rail, the Power Engineering Industry, and the economy as a whole. It has very disturbing implications for employment and nuclear safety. From a resource management point of view it is insane. Opencast mining, increased transport of freight by road, and the demise of pits in Scotland producing low sulphur coal should worry environmentalists. Subjecting new technologies like CHP and the renewables to the "disciplines of the market" could well kill them off. These proposals must be fiercely resisted.

This does not mean that we should support the status quo with its large inflexible bureaucracies dominating the decision making process. It makes technical, social and ecological sense for some energy systems to be run locally by local agencies and municipal enterprises or even co-operatives. There should also be a growing investment by local authorities in energy conservation and schemes like passive solar building projects.

The hope is through building a coalition between environmentalists and trade unions against Cecil Parkinson's crazy scheme, we can begin to plan a truly democratically-controlled alternative.

REFERENCES

Power on the Market by A Holmes, J Chesshire & S Thomas. (FTBI)1987.
Privatise Power by A Henney (CPS) 1987.
Privatising the SSEB: A report on the consequences for Scotland by G Kerevan & R Saville. (Scottish Coal Project) 1987.
Privatisation by D Elliott. (NATTA paper No.6) 1987
Report of the European Parliament Energy, Research and Technology Committee, (PE107.523/fin.)

Thanks to Dave Elliott for providing some of the information used in this article.

Established 1918

The Fire Brigades Union

CONGRATULATIONS

SCRAM

ON YOUR FIRST 10 YEARS.

KEEP UP THE GOOD WORK.

Ken Cameron
General Secretary

Stan Fitzsimmons
President

Coal - The Future's Fuel?

Coal-fired power stations are on their way back as a power option for the British electricity industry. The electricity industry needs coal - and it could well be that the opponents of nuclear power need it too. MARTIN INCE reports on the CEGB's latest plans.

No coal-fired power stations have been ordered for the British electricity industry for a decade, when the Callaghan government paid the Central Electricity Generating Board (CEGB) to extend the Drax station in North Yorkshire with three new 660MW generating units. Since then, the electricity industry throughout the UK has been in severe trouble, with few orders for any kind of power station. The only two stations to be ordered have been nuclear - Torness for the SSEB and Heysham 2 for the CEGB.

The main reason why this log-jam has broken is the Layfield report. Without knowing that it would be able to start building PWR's at Sizewell and elsewhere, the CEGB would not commit itself to any programme of power station ordering. And while it was trying to get permission to adopt the PWR technology, the CEGB could not afford politically to look too enthusiastic about new coal-burning stations.

But now the politics are right for new coal stations - especially the ones the CEGB wants. The first pair it will order will be at Marchwood near Southampton and at West Burton in the West Midlands. Both sites are far from the North East where the CEGB's big coal-fired stations are now.

EFFECTIVE ARGUMENT

Instead, the Marchwood station will be at a site where it can be run on British or imported coal, allowing pressure to be placed on British Coal to match the low coal prices in world markets. And West Burton is in the Midlands coal mining area which did not join in the miners' strike and are now the heartland of the breakaway Union of Democratic Mineworkers rather than the NUM.

So these power stations are likely to be profitable, and they will use advanced technology - a new 900MW design produced by the CEGB, and incorporate emission control technology to reduce sulphur and nitrogen oxide pollution. They will also be quicker to build than nuclear stations and will cost less, because coal stations have lower capital costs and higher fuel costs than nuclear ones.

At the moment, the Magnox nuclear stations used by the CEGB and the SSEB produce dearer power than coal-fired ones, according to the CEGB's figures. Given the cheap fuel and effecient technology of the next generation of coal stations, it is entirely likely that they will undercut the AGRs and PWRs by a good margin, especially if the full costs of nuclear power, like waste management and decommissioning, are taken into account.

This means that the opponents of nuclear power will have yet another effective argument against Sizewell and the rest of the planned expansion of nuclear Britain. There are already good cases for thinking that energy efficiency is one alternative route, that renewables could be another, and that alternative choices like CHP could be yet another.

CHEAP COAL

But the new coal-fired stations will be important in a different way. They will be large, centralised power stations, the sort the electricity industry likes, competing directly with the nuclear stations. Given the cheap coal they will be fed with, there is every chance they will compete successfully.

As part of the overall business of putting nuclear power out of business, this gives them special importance. Coal already has supporters within the CEGB, and among politicians. The Tories want the coal industry profitable enough to sell, or at least to stop subsidising, and Labour's links to the NUM are well-known. Senior politicians and top managers in the CEGB are not the flag-bearers of the anti-nuclear movement. But more coal-fired power stations are a way of getting them to act in a way which seriously damages nuclear power's future prospects.

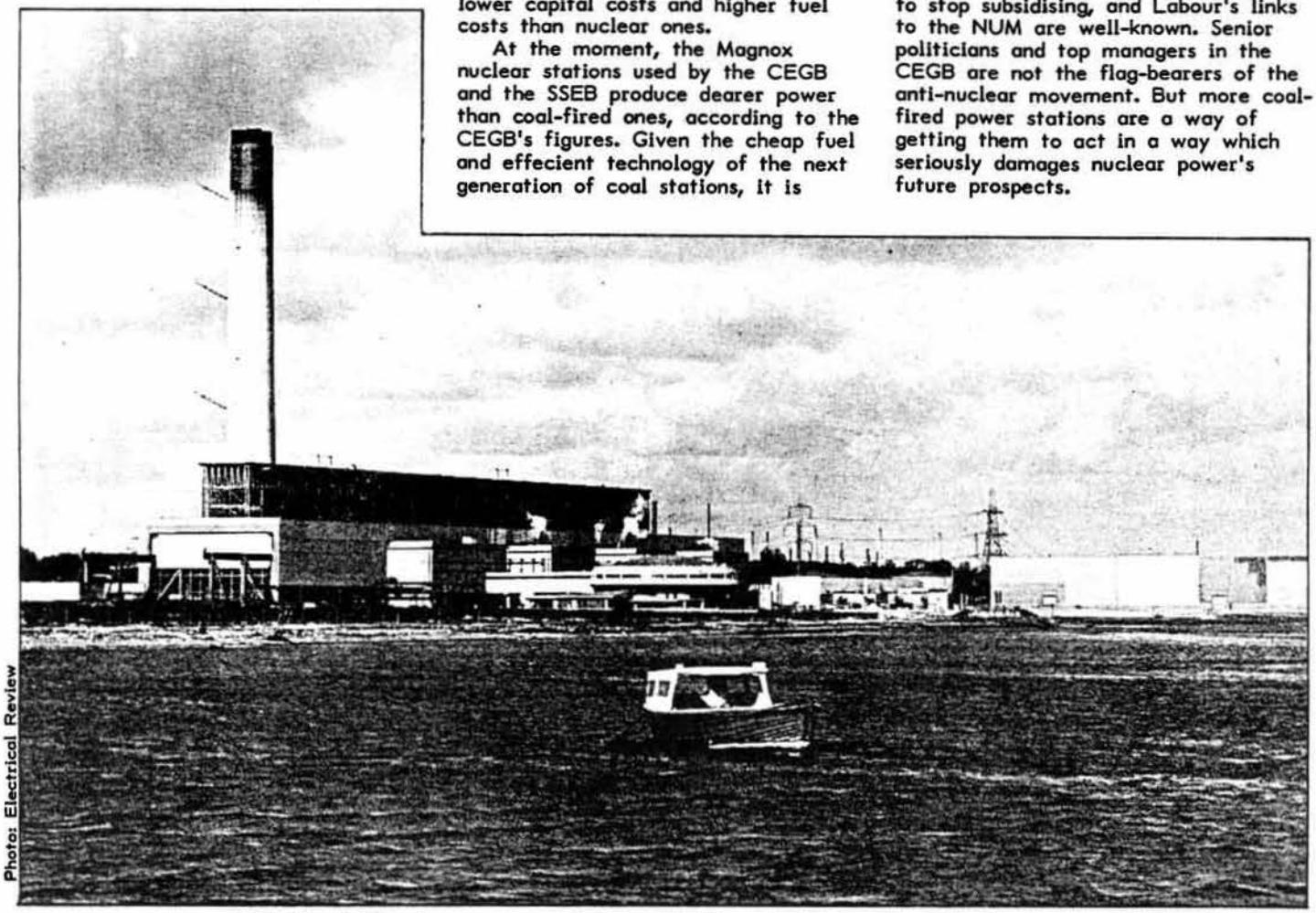


Photo: Electrical Review

Oil-fired Fawley power station at Marchwood near Southampton

Planning for Disasters

FRANCOIS NECTOUX and MALCOLM FERGUSSON take a look at Emergency Planning procedures around nuclear power stations and ask "Couldn't they organise something useful for a change?"

Well, it looks like the Chernobyl disaster has elicited much the same response from our "expert" emergency planners and the Home Office as the Three Mile Island did nearly a decade ago. Convene a working party (behind closed doors, obviously, and without inviting local authorities, who would have to bear the brunt of the effort in case of an accident); have this toothless body marinate in its own juice for a couple of years; and leave it to conclude that most of our current emergency arrangements are perfectly adequate.

Last time, the only "improvement" to come out of this honoured process was a regional information centre controlling all media material. So what will we get this time? The odds are that no major change will occur, and that the Home Office will simply organise procedures to "co-ordinate the response of the authorities" in case of accidents occurring overseas, as it was painfully obvious that everybody ran round in circles like headless chickens after Chernobyl.

Such an outcome will be a tremendous opportunity gone to waste.

THE CURRENT POSITION

The twin tenets of the Health and Safety Executive (HSE) are firstly that a beyond-reference accident is too unlikely to merit serious planning attention; and secondly that existing plans could in any case be scaled up to order. Yet both of these assumptions are highly questionable.

The "reference accident" concept is fatally flawed: probably as a design control concept, but certainly as a basis for emergency planning. Such planning is essentially about "thinking the unthinkable", and planning a response to it. The idea of planning only for the reference accident, which is artificially selected on a circumscribed basis, has been widely criticised (see Taylor 1984).

And the idea of extending the current limited arrangements to deal with larger accidents is patently absurd. There is surely very little similarity between the need to inform a handful of souls who live within sight of a reactor, and a requirement to evacuate tens of thousands over a thirty kilometre radius. If there is a lesson from Chernobyl, it is that even relatively well developed emergency planning procedures (which those of the USSR most certainly are by comparison to our own) will be stretched to the limit in a real crisis.

So now is the time to propose something positive and concrete. There are six main areas in which improvements in preparations and procedures could be made.

WARNING & MONITORING

Firstly, a proper network of radioactivity monitoring stations with remote interrogation capability should be established in the areas around nuclear installations, as they have been in Holland and Germany. In a crisis, the fixed systems should in principle be complemented or replaced by a NRPB/MAFF/HSE monitoring system; but only a fixed system could be in place in time, and could be reliably linked to a system of alarms and sirens, to signal the decision to shelter or evacuate. The logic is obvious; and the current Land Rover based system is patently inadequate.

Secondly, the authorities need a warning system able to forecast the path of the plume in the hours and days after a release. The Meteorological Office recognises that the present system is haphazard, and says that a system aimed at providing a "proper advance warning of any high deposition" should be set up. Deposition, plume tracing and forecasting should all be handled by a single centre with adequate computing facilities and special expertise, to disseminate coherent and up to date information to all of the other agencies involved.

RESPONSIBILITIES

A major problem at present is that there are many grey areas of responsibility in the event of a large scale nuclear emergency, and current instructions regarding communication and co-ordination with other agencies are of limited practical value.

There are three specific areas in which better organisation is needed:

1) The degree of responsibility vested in the reactor operator and site manager in the event of an emergency in the UK is far in excess of that found in other European countries. The conflicting pressures under which on-site personnel are placed in any emergency are clear, and arrangements should be reviewed to facilitate handing over responsibility to the Regional Operational Support Centre (OSC) far earlier in the course of events.

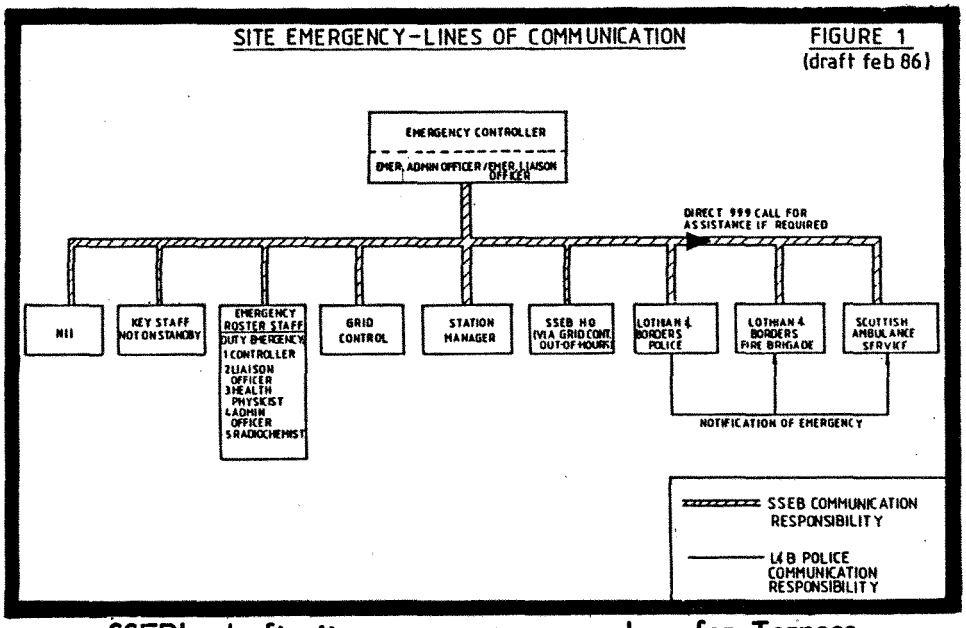
2) During every station emergency, but before it is clear whether major off-site measures are required, the standby position of certain bodies outside the station should be upgraded, and a number of appropriate preparatory steps should be taken automatically. For instance, the NRPB could send monitoring teams immediately; reception centres for evacuation could be checked; and the available vehicle capacity evaluated in nearby areas. Pressure on the site management would also be reduced by these measures.

3) The position of local authorities should be reviewed. They are expected to provide the necessary facilities for the injured and evacuated, and to be answerable to the local electorate for the outcome; yet in essence they are required to respond passively to decisions taken by the police on the advice of the OSC Controller or of the Government Technical Adviser.

MORE INFORMATION NEEDED

Information is clearly crucial if public confidence in the emergency planning process is to be maintained. This is so even during day to day operation, when far greater efforts are needed to inform the general public of the nature of the emergency plans, and what it might mean for them.

For a crisis situation, the dissemination of information within



SSEB's draft site emergency procedure for Torness

the UK regarding the Chernobyl release provided a classic example of "how not to do it." Hard facts were scarce, slow in coming, obscure in presentation, and often contradictory. Not surprisingly, the result was widespread mistrust of all governmental organisations from whom information would normally be expected.

The alternative would be to establish a centralised but clearly independent source for the rapid dissemination of all the available data (warts and all), and to have a panel of experienced people, preferably with a range of technical and political standpoints, available to help the media to interpret and publish the facts as fast as possible. This could best be done via some form of standing press conference.

It was clear from the Sizewell Inquiry how poorly emergency workers who could be in the front line in case of accident were trained and informed. Proper training for radioactivity release emergencies should be mandatory for specialist teams of firefighters, ambulance crews, health workers and police in every County likely to be immediately affected.

ZONE PLANNING

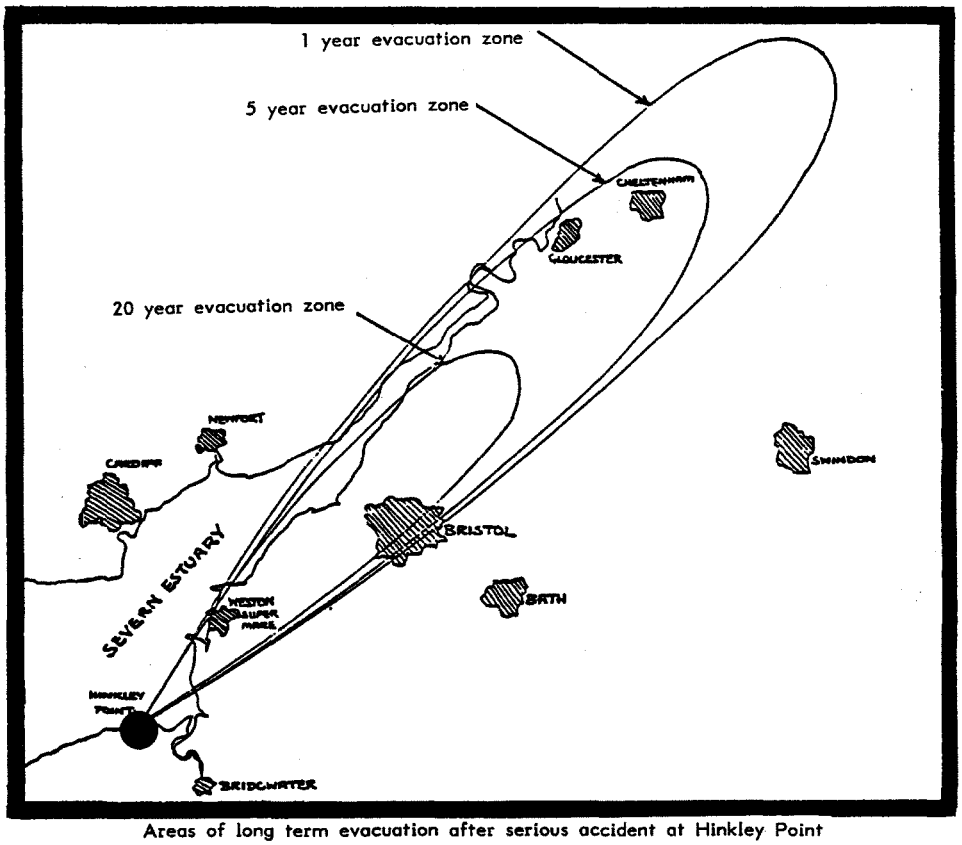
Official insistence that no effects would be felt beyond 2 or 3 kilometres from the source of a release (except perhaps with respect to restrictions on agricultural produce) are a major impediment to the development of realistic plans for major accidents.

There is therefore a need to establish clear zones of action in the event of an emergency; to determine in advance what reference criteria would trigger each mode of action; and to communicate this information to emergency workers, and thence to the public.

It is beyond the scope of this article to discuss precisely what the emergency reference levels should be: but suffice it to say that those for the UK are now generally far higher than those of other European countries or the US. The list of remedial actions, each of which should have its own ERL, would include: siren warnings to local residents to take shelter; distribution of iodine tablets; evacuation; relocation; and restriction of the sale of foodstuffs.

Once these activities were clearly distinguished, emergency workers could be trained accordingly, and the logistics of transport and iodine distribution, or of exposure levels of evacuation teams, could be considered more clearly. Only by this route can it be ensured that the institutions and workers will respond in a way which is appropriate to the scale of the problem, rather than according to preconceived ideas based only on the proximity or otherwise of the reactor.

For practical reasons it will always be desirable to set limits to the emergency planning zone; but experience in the US has shown that a potential evacuation zone of 20 or 30 kilometres is both reasonable and operable, and that a 2 kilometre zone (as we have in the UK) is inadequate. It would also seem sensible to consider zones of different sizes for different types of installations, and to distinguish an immediate response zone from an outer ring in which a little more time would be available to institute appropriate measures.



Areas of long term evacuation after serious accident at Hinkley Point

POSITIVE & CONCRETE

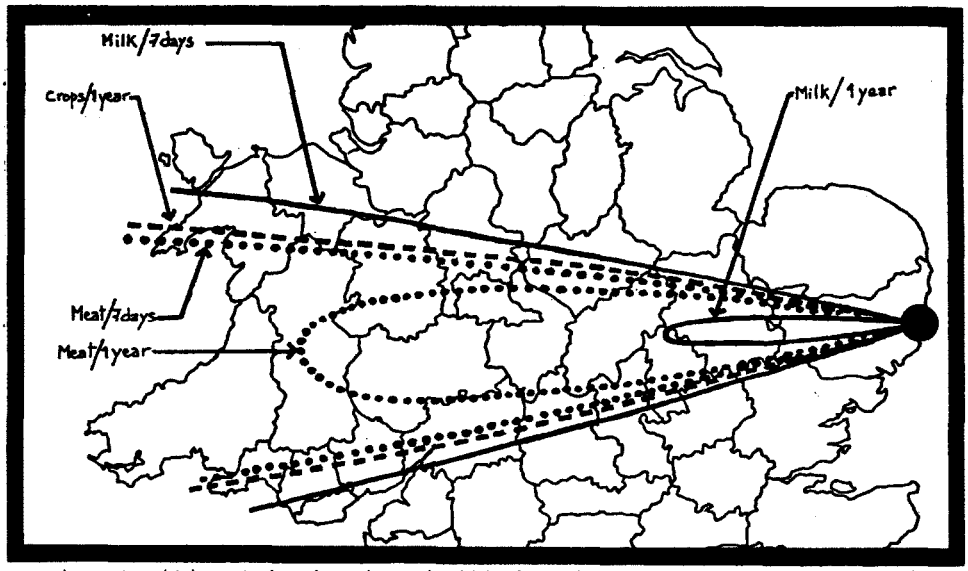
Whether we like it or not, we all have to live with nuclear power, and to cope with it as sensibly as possible. This brief resume indicates some of the areas in which we believe that there are positive and concrete changes to be made. These proposals would not be too expensive; would make sense out of the existing shambles; and would create some confidence that a co-ordinated and credible response to an accident could be organised in this country.

And if the impetus for change came from members of a pro-nuclear establishment, it would show that they are nor merely the high priests of a religious belief that "it cannot happen here", but realistic technicians who are aware of the limitations of the technology they are using, and sensitive moreover to popular anxieties.

A truly sensible set of emergency plans would not only be in the public interest; it would also serve the interests of the emergency planning authorities themselves, if they wish in the future to enjoy the confidence and co-operation of the public whom they are intended to serve.

REFERENCES

HSE, Emergency Planning for Nuclear Facilities, HMSO. London, 1982.
Meteorological Office, Annual Report 1986, HMSO. London, May 1987.
Taylor, P J and Kayes, R J, A Critical Review of Emergency Planning for Reactor Accidents and Spent Fuel Transport in the UK. Research Report RR-12, PERG. Oxford, 1984.



Areas in which agricultural products should be banned after serious accident at Sizewell

Chernobyl Controversy

The NRPB have produced their preliminary assessment of the Radiological Impact on the EEC's population of the Chernobyl accident. PATRICK GREEN looks at the report, and concludes that the media's coverage of the report failed to recognise its provisional nature.

The National Radiological Protection Board (NRPB) report was published in April this year. Its main conclusion was that the doses received were small compared to background radiation and that approximately 1000 fatal cancers will occur within the EEC as a result of Chernobyl. A number that is presented as insignificant compared to the so-called normal incidence of cancer.

This estimate of the likely health detriment has been widely quoted in the media to illustrate the point that "Chernobyl was not so bad after all." What these statements totally ignore is the provisional nature of the NRPB report. It is clearly stated in the abstract to this report "there are significant uncertainties in parts of the assessment....the results presented in this paper should therefore be regarded as preliminary." Consequently the estimate of 1000 cancer deaths in the EEC should be treated with a great deal of scepticism and is at best a serious underestimate of the real health effects from Chernobyl.

NO CONSENSUS EXISTS

The NRPB estimate that the collective effective dose in the EEC from Chernobyl is about 80,000 person sieverts. In calculating the likely number of fatal cancers, they use a risk estimate of 125 fatal cancers in a population with a collective effective dose of 10,000 person sieverts. This, they say, is based on UNSCEAR (UN Scientific Committee on the Effects of Atomic Radiation), and it has been used because it is "based on a worldwide scientific consensus". This statement is absolute rubbish.

Regular readers of SCRAM will know that no such consensus exists. Furthermore UNSCEAR have never recommended the use of the above risk estimates. UNSCEAR 82 which is referenced in the NRPB report merely observes that the risk estimates have not changed since UNSCEAR 77. This document quotes a range of estimates for the expected number of fatal cancers per 10,000 person sieverts of 75-175, with an average of about 100.

The 125 figure is actually from the ICRP (International Commission on Radiological Protection). Even they now expect that, because of the revision of the Hiroshima and Nagasaki data, they underestimate the risk by about a factor of two. Other studies suggest the ICRP underestimate the figure by about 5 times (See *SCRAM 57*). Even John Dunster of the NRPB acknowledges that the risk estimates could be increased to around 400 fatal cancers per 10,000 person sieverts. Dunster wrote this last November, so why does the NRPB persist in using risk estimates which even they admit are out of date?

Taking this into account, the information in the report is actually consistent with up to 3200 fatal cancers in the EEC (using Dunster's upper estimate) or up to 4008 (if the upper BEIR III - Biological Effects of Ionising Radiation - estimate is used). It is important to note that the latest information from the Japanese studies of the atomic bomb survivors suggests that the real risk could be larger still, especially for children.

In addition to this, the NRPB report states there is an uncertainty of the order of 2-3 in the dose estimates. Consequently if the doses were 2-3 times higher, the number of fatal cancers expected, even using ICRP risk estimates would be 2-3000; using BEIR III estimates between 8,016 and 12,024 would be expected. If such uncertainty exists in the dosimetry why does the NRPB report not take this into account when predicting the number of fatal cancers?

The uncertainty in the NRPB's dosimetry, both for individuals and for members of the most exposed critical groups, is particularly important. Both actual measurements and mathematical modelling have been used in the assessment. The report states "in this preliminary assessment only those pathways which are likely to give rise to significant radiation exposures have been considered". This has led to several pathways being ignored: "it should be noted that in calculating theoretical critical group doses, doses were not included which may have been received through drinking undiluted, contaminated rain-water or through eating goats' and sheeps' milk, fish or game meat".

In Greece the report estimates that the consumption of sheep and goats milk would have led to a 3500uSv effective dose to the critical group (1 year old children). However because the Greek authorities introduced a three month ban on the consumption of these products, the report observes "the three month ban on the consumption of these products effectively reduced the dose to that estimated without including sheep and goats milk." What statements like this ignore, is the dose received before a ban was introduced, and the doses received by people who either ignored or were unaware of the ban. The latter may be particularly relevant in some of the smaller greek islands.

The report states that in general there was no information on whether individuals were likely to have drunk rainwater. Although for the UK, it states, "taking account of the advice issued concerning rainwater, the effective dose to the critical group from this pathway is estimated to be 320uSv. This figure is actually excluded from the NRPB's estimate of the dose to the critical group (840uSv in Cumbria, N Wales and S W Scotland).

If members of this critical group had drunk rainwater the real critical group dose would have been 1160uSv, ie over the NRPB's recommended dose limit for members of the public. It should also be noted that the critical group doses are not the highest doses received by a person in the group, but are merely representative doses. Higher doses could have resulted.

Other food products were also ignored, in particular shellfish and fungi. However the report states "the

omission of these extra foods is unlikely to affect the doses significantly". Although radionuclides can also be ingested by the inadvertent consumption of contaminated soil and dust, these exposure routes have also been ignored.

Two other pathways were also ignored:
(1) Doses from mains water supplies. This may be relevant where reservoirs are above ground in high rainfall areas;
(2) Doses from food from non-EEC countries. This is unlikely to be particularly important, since most countries were restricting imports of food from Eastern Europe before the EEC agreed maximum levels for radionuclides in foodstuffs.

The report also assesses the effectiveness of the various countermeasures introduced throughout the EEC. The effectiveness of these measures is ground for concern. The report estimates that the collective dose was only reduced by about 5%.

One cannot help wondering how much the collective dose could have been reduced if countermeasures had been introduced earlier and had been more widespread. For instance in the UK the bans on the movement and slaughter of lamb were introduced in mid-June, yet press reports from last year, clearly show that the government knew that caesium levels in the meat were rising steadily from early May.

The ban on drinking rainwater in the UK was issued on Monday 5 May. The NRPB estimate that this led to a reduction of 1/3rd in the critical group dose. The reduction could have been larger if the advice had been introduced earlier. No bans were issued in the UK on the consumption of milk, primarily because the DERL (Derived Emergency Reference Level) was not reached. (Milk is withdrawn from sale when the Iodine-131 level reaches 2000 Bq/l). The use of DERLs however creates a false picture of the hazard from consuming contaminated food.

The NRPB's DERL system assumes that food is contaminated with only one radionuclide. Consequently if a member of the critical group was to drink x litres of milk contaminated with 2000 Bq/l of Iodine-131 they would receive a dose equal to the public dose limit (5mSv). What this theory totally ignores is that people would consume many food products, each of which could be contaminated with more than one radionuclide. When deciding to restrict an item of food, the doses received from all the radionuclides present should be considered, as should the doses from other items of foodsuff.

Furthermore, the practice of not restricting an item of food because it has not reached the DERL for any particular radionuclide, is actually contrary to the recommendations of the ICRP. The ICRP state in Publication 40, that the only real consideration in deciding to introduce countermeasures is whether the cost or risk of the measures is less than the cost or risk of the dose it will prevent. They state that action should be taken at doses lower than the ERL if a cost benefit analysis shows a positive net benefit. Therefore there is no reason why selective milk bans could not have been introduced in the worst affected areas of the UK.

NO EXCUSE

The criticisms outlined here are based upon information contained in the NRPB report. The NRPB have stated that the report will be accompanied by a detailed set of technical annexes, which will contain all their calculations and assumptions. These are still not available. To be fair to the NRPB, as I have said, they do acknowledge the preliminary nature of the report. There is, however, no excuse for persisting to use the risk estimates of the ICRP at least without acknowledging that the possible health detriment is likely to be much larger.

The main criticism of the NRPB comes from the way they have allowed their report to be used by the media. Their 1000 fatal cancers figure has been widely used to claim that Chernobyl was not really that bad. If there are so many uncertainties in the report it is unscientific of the NRPB not to publically say so. The fact that they have not spoken out against those with a vested interest in playing down the risk from Chernobyl, only serves to lend weight to those who maintain that the NRPB also have the same vested interests.

Note: Thanks to David Webster for supplying some of the information used in this article.

A Preliminary Assessment of the Radiological Impact of the Chernobyl Reactor Accident on the Population of the European Community, NRPB 1987.

Energy Efficiency - an Action Call

British investment in energy efficiency is severly inadequate with major consequences for national economic efficiency, and many social groups suffering cold and damp living conditions; according of a report by Earth Resources Research setting up a National Energy Efficiency Agency, "An Agenda for Action", commissioned by the Charter for Energy Efficiency. MIKE TOWNSLEY reports.

In Britain, over 50,000 more people die every year in winter than in summer. This is mainly due to respiratory illness suffered by the very young and old, aggrevated by cold and damp conditions in the home, a major study explains:

"Cold air...accelerates the progress of respiratory illness by cooling down the lining of the upper respiratory passages, which slows down the immune response mechanisms necessary for resisting virus infection in these tissues, and there are also some viruses which thrive better at a temprature somewhat below normal body temperature. Even if the baby's body is kept warm, simply breathing cold air accelerates the progress of respiratory illness."

"LACK OF DIRECTION"

Government Select Committees on Energy have been extolling the virtues of Energy Efficiency, Combined Heat and Power and District Heating ever since the 1973 oil crisis. In 1974 the Select Committee on Science and Technology, referring to energy efficiency policy, commented that "In view of the lack of direction at the centre, we recommend a task force of Ministers, officials, and a few outside experts be set up." Again in 1982 an Energy Select Committee, proposed that a new body should be set up with the express role of overseeing the energy efficiency programme - although they failed to decide between a new government department or an autonomous agency.

This gave rise to the Rayner Scrutiny, entitled "How the Government handles Energy Conservation", which provided a detailed description of the Government's action on energy conservation, it concluded with

"...a need for organisational changes which will improve Ministerial control, increase the effectiveness of policy formulation and programme execution, clarify areas of responsibility and eliminate uneccessary work".

The result: the 1983, revamped Energy Conservation Department of the Department of Energy, under the stage name of the Energy Efficiency Office (EEO), the existance of which gave rise to no great increase in public sector investment.

Simon Hodgkinson the author of "An Agenda for Action" and "Too Cold for Comfort", both commissioned by the Charter for Energy Efficiency, feels "The Monergy Pigs of the Governments advertising campaign are no substitute for a real and effective policy".

Agenda for Action calls for an Autonomous Agency, the Energy Efficiency Agency (EEA), to be set up, in the early stages of the new p[arliment; with powers covering the full spectrum of energy efficiency. All the main opposition parties have expressed a commitment to the setting up of such an agency.

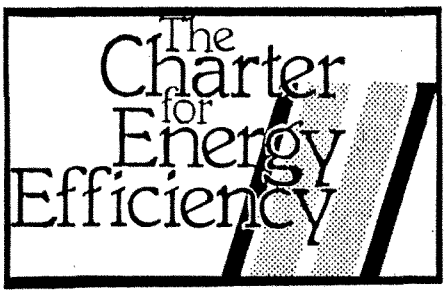
AUTONOMY IS VITAL

The Eighth Report of the Select Committee on Energy (1983/84), reviewing the EEO felt it had failed to address the fundamental imbalance in the public sector between the energy supply and energy end use options, concluding that:

"A major problem which the EEO, faces arises from the Office's origins in the relativly uninfluential parts of the Department of Energy and its predecessor Deparments."

Autonomy is vital in placing the EEA on an institutional par with the supply idustries; coal, oil and gas.

Its role would be one of promotion and coordination through the existing range of experienced bodies, ie local authorities, housing associations, supply and efficiency industries, building societies and Neighbourhood Energy Action projects. The nature of energy efficiency means, the authors believe, the key to a successfull national policy is a "bottom up" approach. Local agencies, and in particular local authorities, must be involved in assesing the extent of problems, in drawing up programmes of intervention and implementing them.



Among the Agency's priorities would be:

- Dramatically improving insulation standards in the existing housing stock;
- Implementing practicable standards to improve the efficiency of new homes by around 50%;
- Systematically installing adequate and well controlled heating systems;
- Installing CHP/DH and power systems in larger cities.

Efficient supply plays a vital role in the inner cities and commerce. In the domestic sector solid walls cannot often be cost-effectively insulated therefore cheap heat plays an important part of the answer to high fuel bills. In industry a small CHP scheme can often provide both the heat and power needed by a plant and its associated buildings. A considerable proportion of energy inefficiency in both industry and commerce may be accredited to inadequate monitoring of energy consumption and loss, this can be overcome without any great investment. The major savings in industry are to be made when replacing old production machinery and equipment, introducing microelectronic control systems.

The estimated benefits of such a programme are:

- The creation of over 2.5 million person years of work, over 30years, (this was to have been a significant part of Labour's proposed reduction in unemployment);
- A saving to the Exchequer conservatively estimated at £225 million through reduced expenditure on unemployment benefit and social security, as jobs came on stream;
- Aiding the revitalisation of the inner cities.

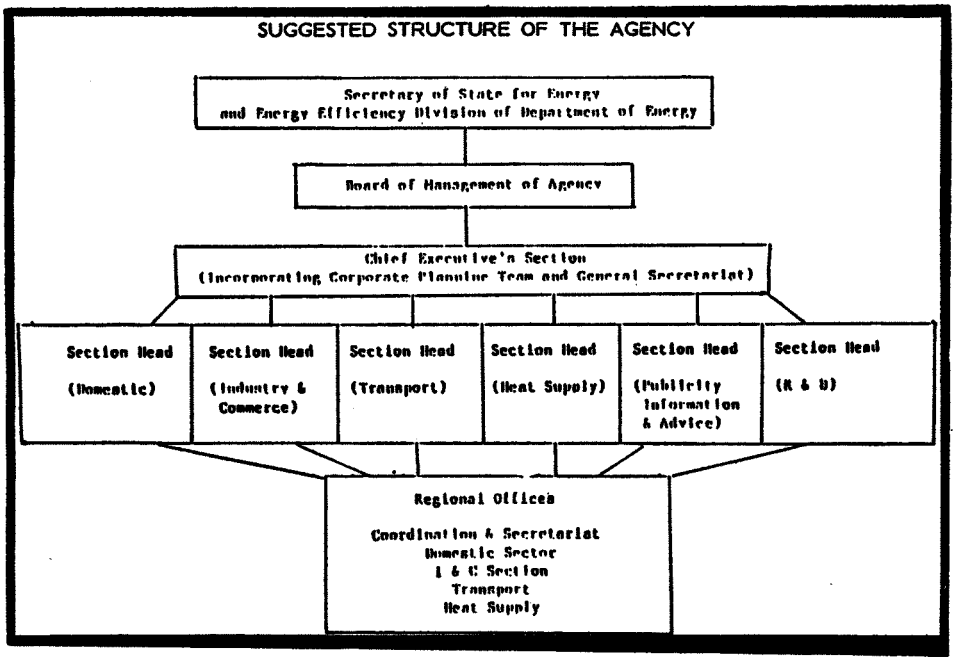
FUEL POVERTY

The number of people living on or just above the poverty line increased from 11.5 million to 16.3 million between 1979-83 to account for one in three people in this country. The desperate need for the alleviation of fuel poverty is a vital factor in the call for an effective energy efficiency agency; however the report shows this can be a by-product of cost effective investment, rather than income support or other temporary measures.

The "How the Agency Might Work" section, the authors stress, is for illustrative purposes only. It draws upon two established and successful institutions - in this country the Housing Cooperation set up by the 1964 Housing Act to fund and coordinate the development of the housing association sector, and the Agence Francaise pour la Maitrise de L'Energie (AFME), established in 1982 as an independent agency with responsibility for energy efficiency. AFME with a budget of around £130 million was the focus of a French national energy efficiency drive, to which the government contributed around £400 million.

Fundamental to the long term success of the EEA is comprehensive monitoring, by the Agency, of all its projects. Only by demonstrating the real costs and benefits of the programme will it be able to make a substantial claim on public resources.

In deciding the Agency's budget the Department of Energy and the Treasury should be required to consider what the balance of national investment on energy efficiency and supply should be,



given the net economic benefits of the options available. Another important impediment to energy effieciency is the non-availability of long term capital at reasonable rates of interest. A great deal of energy efficiency could be triggered by the Agency through guaranteeing loans - on the same basis as those obtainable by the supply industries. Roughly speaking, if the Agency were required to generate a total, in all sectors, of £2 billion/year of investment by year five of its operation, one might envisage it starting with a budget of £100 million/year rising to £400 million/year over five years.

DRAFT BILL

The report concludes by setting out a draft Parliamentary Bill, to bring the new agency to life. The Bill proposes the Agency be a non-departmental public body, with a board of up to 15 members, appointed by the Secretary of State for Energy: the members should be drawn from a wide range of interests from within; local authorities, energy efficiency technology manufacturers and installers, energy consumers, etc, to provide expertise in a number of areas.

The Agency would report to the Secretary of State through its sponsoring division in the Department of Energy, to be renamed the Energy Efficiency Division. The Bill provides, subject to the Secretary of State's approval, powers to enter into any type of transaction it feels conducive to the achievment of its aims. The Agency would be expected to present its proposed budget to the Secretary of State for approval, who in turn would submit the budget for inspection to Parliament, under the Finance Bill.

Section 1 of the Draft Bill:
(1) In the exercise of their functions under any enactment every minister, government department and public body shall have regard to energy efficiency.
(2) It shall be lawful for every Minister, government department and public body to incur extra ependiture in carrying out its functions where that extra expenditure is incurred solely in pursuance of the duty under sub-section (1) of this section.
(3) In this Act the expression 'energy efficiency' means the efficient and economical production, transmission or use of energy and the avoidance of waste of energy.

Under section 2 of the Draft Bill, in conjunction with section 10 of the (1957) Electricity Act; it shall be the duty of each Electricity Board and Electricity Council to report on the performance of their duty implementing an energy efficiency program under section 1 of the Draft Bill.

Of particular importance to the economics of CHP and private generation is the fair appplication of electricity and other buy-back tariffs. To promote this goal the Agency would have the additional task of policing the 1983 Energy Act.

Public statements from both the Labour and Alliance parties have shown their commitment to the establishment of an energy efficiency agency. Labour's spokesman on energy, Stan Orme, said "the structure and functions set out in this report will make the task that much easier."

At the begining of last month the all-party Charter for Energy Efficiency expressed its amazement at the total lack of any reference to the Government's own energy efficiency efforts in the Conservative Party Manifesto. "Peter Walker has spearheaded a vital national campaign to improve energy efficiency over the last four years..Now the Tory Manifesto completely leaves out all reference to this - not only highlighting the Government's commitment to energy policy, but also a clear comment on Mr Walker's political future by the Conservative Central Office and the Prime Minster" prophesised Stewart Boyle on behalf of the Charter for Energy Efficiency.

The unfortunate re-election of the Conservative Government and subsequent desertification of the Department of Energy, gives little hope to the proponents of this report. The new Secretary of State for Energy, Cecil Parkinson, in his first speech since his return to the Cabinet, delivered an enthusiastic exposition promoting the virtues of privatisation - using British Gas as a shining example, claiming that the corporation had achieved price cuts and record profits.

It seems unlikely that he has even considered the problems of energy efficiency.

Copies of the Report are available from the Charter for Energy Efficiency, c/o Earth Resources Research Ltd, 258 Pentonville Rd, London, N1 9JY. Price £9. Cheques to be made out to the Charter for Energy Efficiency.

Wind Energy

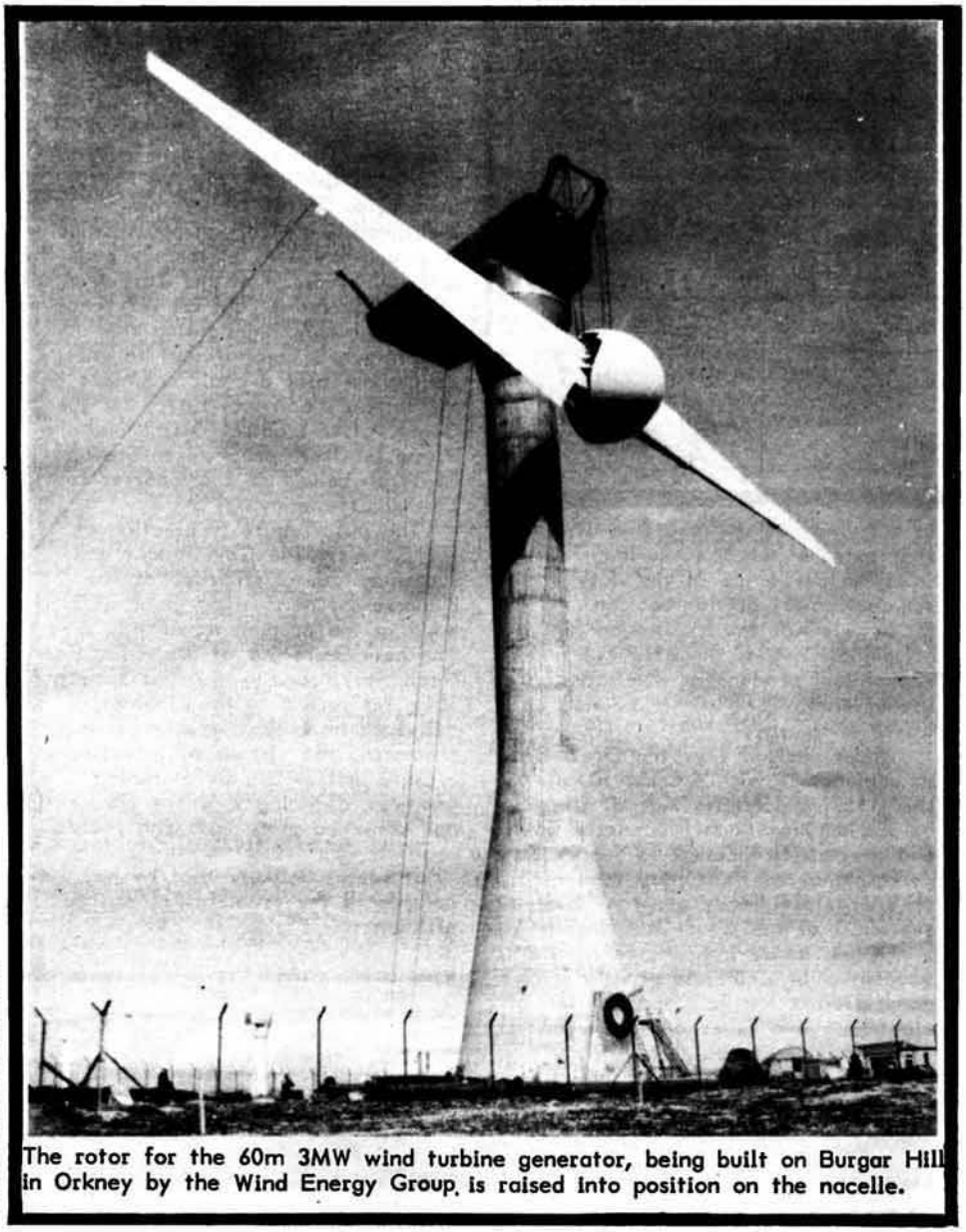


Photo: Wind Energy Group

The rotor for the 60m 3MW wind turbine generator, being built on Burgar Hill in Orkney by the Wind Energy Group, is raised into position on the nacelle.

A revolutionary new design in wind turbines has been developed by a Scottish company, MMEW Ltd of Dundee, using funds provided by the Scottish Development Agency and the Royal Bank of Scotland.

The horizontal axis wind turbine, consists of three aluminium or composition blades which are set evenly on a circular support giving a set up that revolves irrespective of the wind direction. It incorporates a unique self-starting device which also enables speeds to be maintained in high winds.

MMEW, a small company, with only 6 employees, currently have two models in production; a 12-15 feet high, 72W machine selling at £400, and a 25 feet high, 400W machine selling for £1,400. The wind turbines used to charge 12-48 volt batteries can be used in hill top radio stations, feeder systems on fish farms and a variety of other uses, say MMEW.

David McKenzie, the Director of MMEW, said "Our systems have been tested by the National Wind Turbine at the NEL in East Kilbride and our prototype wind turbine at Lochailort in the north west Highlands has performed well for over a year. We are now discussing trials both in Knoydart and on a hilltop at Glen Shee for producing energy for radio stations."

Eric Pryde, the technical advisor to the SDA in Dundee, commented: "The design and production of this new wind turbine is a technical breakthrough in the important area of seeking energy from alternative sources."

* * * *

A 3kW wind turbine has been designed, to provide space and water heating for homes, representing around 80% of the annual household energy bill, by Energy Services of Glasgow.

The turbine will generate electricity at between 1.3-4p/kWh, depending on the average wind speed.

Although targeted for use in space and water heating a battery inverter system can be fitted to provide a steady voltage for lighting and electrical equipment.

Energy Services estimate a pay back period of one year for the £3,000 aerogenerator if used to replace a diesel generator in a remote area.

The turbine will work at windspeeds of 4.5m/s. Given an average wind speed of 7.5m/s it is expected to produce about 10,000kWh/year.

CHP

The City of Leicester is considering buying a small North Sea gas field to fuel its proposed CHP scheme, for the next 20 years.

The operators - a consortium of 5 public and 6 private groups - are currently holding negotiations with 6 oil companies, with holdings in the North Sea basin. Such arrangements are already common place on the Continent.

Mr Jarvis the manager of the project commented on the apparent reluctance of the oil companies to strike a deal: "they seem very frightened of upsetting their biggest customer, British Gas." The 1986 Gas Act, exposes British gas to competition, giving private suppliers access to the Corporation's distribution network. Ofgas, the watchdog body set up to ensure fair play in the gas market, have been called in to investigate.

Although the consortium say they would prefer to do a deal with British Gas, so far they have failed to reach an agreement of index linking the gas price to future prices of electricity, which will provide 70% of the scheme's income. The consortium must secure such a deal in order to attract private investment.

Mr Jarvis who is on secondment from John Laing, sees the project proceeding in four phases:

- a feasibility study which has been completed showing considerable interest in the scheme;
- the setting up of a company to run the scheme;
- securing interlocking contracts for the station's fuel (80% of the running costs) and selling price of the electricity to the grid;
- the scheme becomes operational by 1991 if the project can be started next year.

Eventually the plan is to supply the whole city with heat.

The consortium are awaiting British Gas to make a new offer. Even if the consortium fail to reach an agreement the scheme may still go ahead.

Acid Rain

The CEGB have announced a 10 year plan to cut their emissions of nitrogen oxides (NOx), a significant proportion of the deadly acid rain cocktail, by 30% of the 1980 level.

The £170 million emission control programme, to be implemented in conjunction with CEGB's £600 million plans to fit flue gas desulphurisation (FGD), announced last September, to "ensure a continued decline in its emissions of sulphur dioxide." This will involve the Board's 12 largest coal fired power stations, 23,000 megawatts of generating capacity in England and Wales, fitting them with low-NOx systems, covering nearly 2,000 burners in 44 boilers. Low NOx burners are also to be fitted to all new coal fired power stations. The modifications are to be made during scheduled plant closure, and should be completed by 1997.

The SSEB, however did not reply to *SCRAM's* enquiry to ascertain if they are also considering methods of reducing the emissions of SO_2 and NOx, from their stations.

NOx reacts with hydrocarbons in sunlight to produce ozone resulting in catastrophic damage to forests on mainland Europe. They are also converted into nitric acid which falls as acid rain.

According to the Department of the Environment Britain is the second largest producer of NOx in Europe; unpublished data of a United Nations Committee states that in all but two of the 16 sites where measurements were taken Britain is in the top five of the 28 countries monitored and never falls below tenth (*Observer* 21:6:87) - retaining our claim on the title of "dirty old man of Europe".

The overall effect of the CEGB's plans will be a total reduction in UK NOx emissions of only 10%, at 1980 levels; vehicle emissions account for about 40% and Industry the other 20% of the total UK NOx emissions. Although this is a step in the right direction, it is only that - current scientific consensus is that reductions of 75% NOx and 80% SO_2 are necessary if we are going to tackle the problem of acid rain.

The announcement made on the 8 May by William Waldegrave the Government's Green Minister, came a few weeks before a meeting of the UN Economic Commission for Europe on the Convention for Long-range Air Pollution, to try to decide on a protocol governing NOx emissions; similar to the one governing SO_2 emissions - the 30% club, which commits its signatories to reducing their SO_2 emissions to 70% of their 1980 levels, by 1993. Britain has refused to join; Sweden wants a similar rule for NOx. The delegates failed to establish a protocol, but decided to extend their next scheduled meeting in September, from three to five days, to allow time to discuss the three main scenarios put forward:

- an immediate freeze on the quantity of NOx produced, with a gradual reduction until 1995;
- reduction governed by technology available and the economic viability of that technology - the main supporters of this option are the US and UK;
- reductions linked to the amount of NOx that can be emitted without damaging the environment.

* * * *

The US supreme court refused, on 8 June, to force the administration of President Reagan to adopt pollution control commitments made by the administration of former President Jimmy Carter.

The highest court in the US, without comment, rejected appeals made by eight north-eastern states, a Canadian province and environmental groups to bind the administration to the 1977 Clean Air Act: to identify states where pollution occurs and take steps to reduce it.

Congressional investigators have reported, that managers of the Federal Government's expensive acid rain reasearch programme have stopped trying to assess the economic benefits of reducing the pollution.

Wave Power

Western Australia is set to be the site for a one megawatt demonstration wave generator, Wave Power International LTD (WPI) are awaiting the decision of the State Environmental Protection Authority on their £8 million proposal.

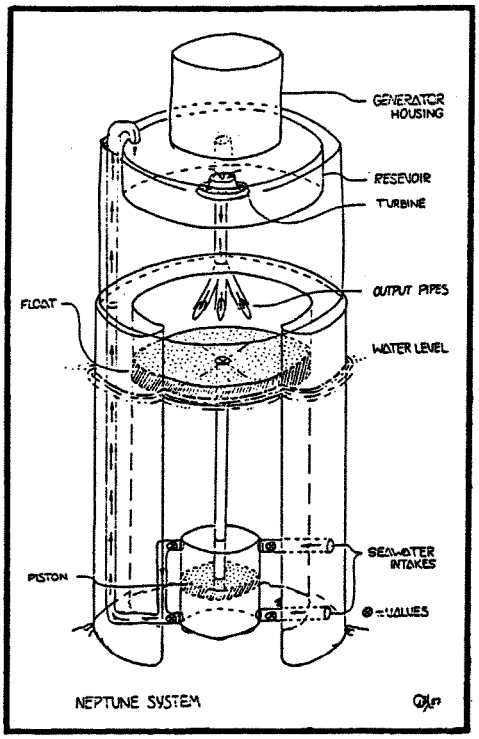
If the proposal to build the plant 700km south of Perth, is approved, it could be operational within 18 months; supplying at peak output 20% of a small town's power needs. The town, Esperance currently powered by an oil fired station, is not connected to a grid; the Western Australia state energy commission has already agreed to buy the plant's entire output.

This is a pilot scheme to demonstrate the Neptune system to potential buyers all over the world - commerecial stations would involve a duster or row of caissons.

The generator system is similar to an oscillating water column such as Toftestallen in Norway - the waves are trapped within the huge circular concrete caisssons, which acts as a reasonant chamber amplifying the vertical motion of the water, causing the 17m diameter concrete float to rise and fall sharply. This drives the operating pumps, which work on both the up stroke and down stroke producing a steady flow of water. The water pumped into the reservoir located at the top of the structure is then released through conventional turbine-driven generators, into the sea.

WPI have identified an initial 50, 000 miles of suitable coast line - some of which is in Britain. WPI's proposed site requirements are; a constant wave height; minimum impact on the environment; silt free conditions; water depths of between 12m and 20m, half a mile off-shore.

Mr Amador the president of WPI claims construction costs of £1, 000/kW installed capacity and power production costs equal to that of an equivalent sized coal fired power station - making it more economical than gas, oil or "even" nuclear power. Stephen Salter, of Edinburgh University, however thinks that WPI are being over cautious "...they should be able to double the efficiency of their power take-off from the waves" and is investigating "phase control" principles to achieve this.



Mr Amador is quick to point out - developing countries need water and a wave power station can be linked to a desalination plant.

WPI's stated remit is to sell the technology to potential customers or act as a private utility. Perhaps we shall see a Neptune based station set up off the North of Scotland (an area high on the initial survey of potential sites), selling electricity to the Hydro Board.

Energy Efficiency

The world's largest energy efficiency event will take place at the NEC, Birmingham in June next year.

In one of his final statements as Secretery of State for Energy, Peter Walker announced that 'Energy Efficiency International 88' will have the full support of his department. In fact, this exhibition is the only event of its kind to be supported by the Department of Energy.

This will, for the first time give British companies a chance to put their products before an international audience, replacing the National Energy Confernce and Exhibition, also held at the NEC, previously not open to them.

Oil & Gas Reserves

The proven and probable reserves of recoverable oil are nearly double the official Department of Energy estimate, according to a report by Midland Valley Exploration.

The Glasgow based exploration company, working with Aberdeen University and economists from the Royal Bank of Scotland, claim there are 50 more years supply of North Sea oil, than estimated in the Department of Energy's May edition of "The Brown Book" - Development of Oil and Gas Resources of the United Kingdom - which includes onshore oil.

The report also states, that gas reserves may be 20% higher than Government estimates, about 6 trillion extra cubic feet, in the Southern North Sea. With Central and Northern areas of the North Sea, having reserves of nearly double the official estimates - 35.9 trillion cubic feet, not 18 trillion.

"We see no technical basis for the commonly expressed idea, that the UK is likely to suffer oil and gas shortages around the turn of the century. Should such a situation arise, it will be the result of political mismanagement rather than because the hydrocarbons have all been produced," say the authors of the report.

The blame for the Government's low estimates lies with their failure to take into account new exploration wells drilled in the last year or so.

The report concludes: "It is damaging to the interests of the UK's oil and gas industry to carry such unrealistically low estimates of the magnitude of the resources, discovered or yet to be discovered, in the North Sea."

If true these findings could have a significant effect on the UK energy scene; making large scale investments in nuclear power even less sensible, giving an even greater breathing space to implement a safe energy policy, and staving off a balance of payments crisis for a few more years.

Coal

The CEGB have announced plans for a third coal-fired power station, in addition to those at Fawley and West Burton - the likely site is at Kingsnorth, on the Medway.

Like Fawley, it would also be able to negotiate for imported coal, if the Board was not satisfied with domestic prices.

The CEGB, have also placed orders for 300,000 tonnes of foreign coal, to feed its three Thameside power stations. The orders almost all involve coal from Colombia, at extremely low prices with a delivered price of almost half that of British Coal.

The Financial Times Business Information predicts that a privatised South-Eastern Electricity Company would become one of the world's largest coal importing utilities.

The building of Kingsnorth is part of a strategy to displace "long-haul coal". These developments will serve to hasten the decline of the North-East, North Nottinghamshire and North Derbyshire regions of the Coal Board, which supply the Thames Estuary stations.

In Scotland, British Coal has won an important long-term contract to supply coal to the new paper mill being built at Irvine. Caledonian Paper, owned by a Finnish firm have agreed to buy 175,000 tonnes of Ayrshire opencast coal. The firm will also become the SSEB's second biggest customer, adding £9 million to their revenue.

The Opencast Executive is seeking to raise its output by up to 35%. Current ouput is 13.3 mt and could rise to between 14 and 18 mt per annum. Opencast operations are carried out by members of the TGWU, who work for private companies contracted by British Coal.

Hydro

Contracts valued at £270 million, have been signed for the supply of 20 turbines to the 2,760MW hydro-electric scheme at Vacyreta on the Argentine-Paraguayan border, after almost seven years of complicated negotiations.

The project, started in 1973, has been plagued with stoppages, caused by financial difficulties, and is now expected to be completed in 1997 - contributing more than half of Argentina's current electricity demand.

The first turbine is expected to be operational by 1993. So far over £1.25 billion has been spent on the project, with the total expenditure forecast at around £3.5 billion, at today's prices.

A similar project, is also underway in Argentina, at Piedra de Aquila. The contract to supply its generating equipment was signed recently with the Soviet Union, adding a further 2,100MW to the grid. The station is expected to come on line in 1990.

Although, the figures sound very impressive, we must remember, big is not always beautiful. A dam large enough to produce 2,000MW of electricity, could have severe environmental impact. For example, the Itaipu complex, on the Brazil-Paraguay border, (*SCRAM 34*): during construction some 20,000 animals and 40,000 people were displaced; with an additional 500 people evicted from their homes because their land was required for military security around the dam.

Argentina were not happy about the Brazilian dam, and withdrew their ambassador, after reports that a result of the scheme would be the flooding of north east Argentina.

Perhaps they would be better advised to construct a number of smaller, less environmentally intrusive schemes.

Solar

Photoelectrochemical cells (PECs) have taken a huge step closer to commercial viability. A team of scientists in Israel have developed a cell capable of internal electrochemical storage, enabling it to supply electricity at night. In California another team of scientists have set a new record for solar conversion efficiency in a PEC.

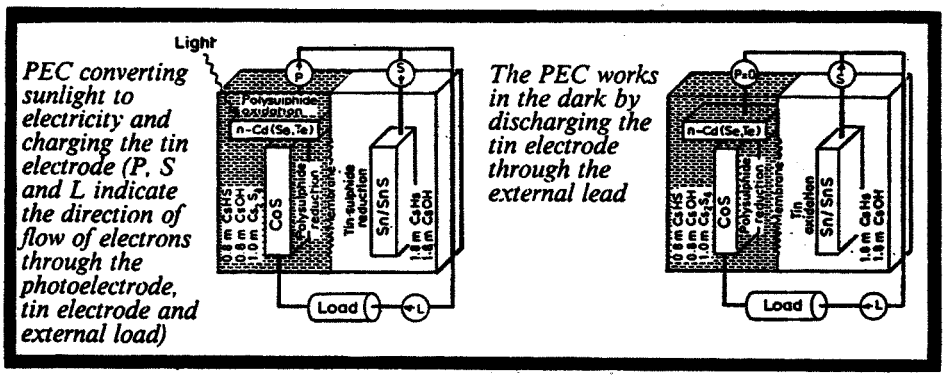
PECs have two main advantages over the more widespread photovoltaic cell (PV): they are cheaper to manufacture and can store solar energy as chemical fuels, such as hydrogen which can either be burnt or used to generate electricity in a fuel cell.

At the beginning of this decade scientists thought breaking the 10% barrier in solar conversion efficiency, would take until the late 1990s. But now Nathen Lewis, who broke the 10% barrier in 1984, and a team of scientists at Stanford University in California have achieved efficiencys of 15%. This puts PECs in competition with PVs, leaving chemists to solve the problem of photocorrosion.

Stuart Licht and his team at the Weizman Institute, in Israel, have designed a PEC which will continue to generate electricity when the level of light falls, or even in the dark - the cell has a respectable 11.8% solar conversion efficiency.

A base-load power station involving a few million of these devices would generate power at around the same cost as a fast breeder reactor.

The Licht device will make solar power a definite alternative in more temperate climes.



PEC converting sunlight to electricity and charging the tin electrode (P, S and L indicate the direction of flow of electrons through the photoelectrode, tin electrode and external load)

The PEC works in the dark by discharging the tin electrode through the external lead

Nuclear Power in Crisis, eds. Andrew Blowers & David Pepper; Croom Helm. 327pp, £10.95.

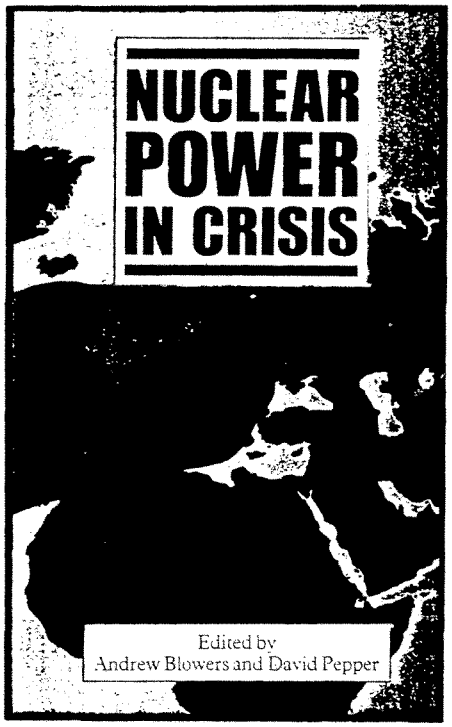
Easy to read and well-structured, this is a seminal work for the anti-nuclear movement, and should not be missed. Covering all aspects of the nuclear debate, setting out clear and concise arguments that no-one with an open mind could could fail to heed.

The Sizewell Inquiry: a fair, unbiased, comprehensive report, with a decision being reached after all the relevent information had been gathered, and assessed by a team of suitably qualified "inspectors"? Not So! Jennifer Armstrong, exposes the public inquiry for what it was, a sham. Public money was used to fund the CEGB's case, yet the Public, whose concern gave rise to the inquiry received no such consideration. A letter issued by a Department of Energy press office, 23.9.87, remained unconvinced that a lack of financial assistance "will make it impossible for the inquiry to be full, fair and thorough."

A public inquiry logically would be held in a format easily accessible to the public - it seems unlikely that the choice of a semi-judicial format was accidental:

"Certain aspects of the debate clearly did not receive fair hearing, and the semi-judicial nature of the inquiry - in particular the adversarial character of the hearing - was inappropriate for much of the qualitative data."

Nuclear Waste: The Achilles Heel, gives insight to one of the most interesting, confusing and politicaly suspect aspects of the debate. It examines the proposition that waste disposal strategy in the UK is a political rather than rational or scientific process, "In the nuclear field predetermined ends determine the means." The ultimate responsibility lies with the Cabinet, at which the Ministers concerned can settle their differences - although some carry more weight than others.



It is the view of Andy Blowers and David Lowry, that the nuclear industry has become more vulnerable to its critics, who have deployed three lines of argument;

"First, they maintain there is no waste management strategy, merely an incremental approach leading to a predetermined solution. Second, they argue that in the absence of a strategy there is no case for the expansion of either reprocessing or producing electricity from nuclear reactors. And, third, they recognise that existing and future levels of waste constitute a problem but that it should not necessarily be resolved by imposing the risk of radiation on communities where there are not existing nuclear installations."

The Editors see their remit as, examining "the relationship between the state, the nuclear industry, and the anti-nuclear movment."

The future - "the post chernobyl era" - will see a battle for public confidence and credibility, not scientific or technological justification. Chernobyl has irreversibly shifted public opinion against nuclear power, and eroded the trust that many used to have in the accident scenarios, predictions and fail-safe technology. Perhaps more importantly of all, Chernobyl has immunised the public against arguments that the Industry is safer than any other method of electricity production. Current public attitude, leaves the "Senior managers of the nuclear industry genuinely mystified", turning them to patronising "arguments of scientific rationality and conventional public relations gimmicks, to overcome the credibility gap."

The book sets the history of the nuclear debate into four epochs; the age of innocent expectation (1946-66), the age of doubt (1966-74), the age of anguish (1974-81), and the age of public justification (1981-present). Hopefully, we shall soon experience "The age of Reason".

In the final analysis, after giving a number of possible future scenarios for the nuclear industry, the book finishes on a high note - "Also possible is that the nuclear industry will fall victim to its own failures."

MIKE TOWNSLEY

The Politics of Renewable Energy (Natta 7) & Renewable Energy: A Review of the Government's Strategy (Natta 8) Both by Dave Elliott (£1 & £2).

The title of the first paper is slighlty misleading. I expected it to be a discussion of the pros and cons of a decentralised renewable energy system versus the centralised nuclear state. However, it is a useful description of "the state of the art" of renewable energy.

Both papers give a potted history of the various research and development programmes and ACORD (Advisory Committee on Research and Development) reviews. The second paper, however, covers it in much more detail - it's going to be extremely useful to have all this information in one place instead of having to wade through ETSU (Energy Technology Support Unit), ACORD and House of Commons reports.

These discussion papers raise a number of key issues, like which of the renewables should be developed to full scale initially?; who should fund the development?; what would be the effect of privatisation?; and what sort of public consultation should there be. There are also two useful appendices on the possible environmental objections to wind and tidal power.

It concludes that, although there is no hurry in energy terms to introduce renewables if sufficient attention is paid to energy conservation and efficient use of coal, if they are forced to compete with nuclear power, it may be necessary to push ahead rapidly.

The second paper attempts to assess why renewables have been played down. Was it because the technologies were not (yet) sufficiently attractive (as the Government claims)? Or was the situation brought about by lack of funding and political commitment, so that development of renewables has been consciously inhibited?

Despite there being some overlap between the two papers they are both worth getting. Natta's prolific production of discussion papers certainly makes it easy to keep up with the Alternative Technology scene.

Why not join the Network:
c/o Energy & Environment Research Unit,
Faculty of Technology,
The Open University, Walton Hall,
Milton Keynes. Bucks.

PETE ROCHE

Save Our Planet: an anti-nuclear guide for teenagers by Jim Eldridge; Magnet. £1.95

With the vast library of pro-nuclear literature available to schools, this avowedly anti-nuclear introduction to nuclear power for teenagers is welcome.

Eldridge uses a clear, well illustrated and simple text to show the nuclear industry, from uranium mining to waste and weapons, for what it really is. Unfortunately he makes a few errors on the way. The worst of these is to describe uranium as a fossil fuel (on pages 23 and 88, for those who buy the book).

While this, and the odd piece of shoddy editing, an appallingly cliched FoE type cover, and a less than fastidious adherence to the rule that like should always be compared to like do not negate the central argument, they add nothing. I would wait and buy the second edition, when these oversights have been ironed out.

THOM DIBDIN

Radiation Monitoring: an introduction by Paul Hayward and Don Arnott. £3.50 incl p&p from Greenpeace Nuclear Campaign, 30/31 Islington Green, London NX1 8XE.

After Chernobyl Greenpeace received many requests from the public asking where they can buy radiation monitoring equipment. This booklet was produced in response to that demand.

It begins with a brief description of radioactivity and radiation units, which is easy to understand. It then describes the three main types of radiation detectors; Geiger-Muller Tubes, Scintillation Counters and Ionisation Chambers.

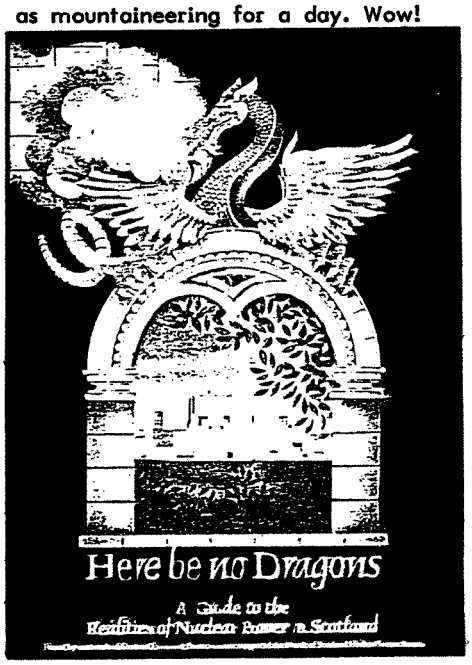
Before buying *any* radiation monitoring equipment it is essential to get expert advice on the best type of monitoring programme appropriate for the area in which you are based. The type of monitoring needed in one area may differ from that needed in another. This is because of the great difference in type and degree of radiation due to the different sources of radiation; nuclear power stations; reprocessing plants; nuclear waste transport, storage and disposal; atomic weapons installations and fallout from Chernobyl to name but a few. The report gives advice on whether to go for equipment which will help locate radiactive contamination in the field or to make exact measurements of samples in a laboratory; also on where to get your equipment calibrated.

The best way, it is suggested, to raise the cost of monitoring equipment could be to form a local monitoring group. The booklet mentions two such groups already in existence. At the end of the book is a list of the monitoring equipment manufacturers and a description of equipment presently on available.

PETE ROCHE

Here be No Dragons: A Guide to the Realities of Nuclear Power in Scotland. SSEB.

Here be the same old half-truths, lies, evasions, omissions and downright misconceptions trotted out again for the umpteenth time; such as the cost of nuclear power includes the cost of waste disposal and decommissioning. This is untrue, because there are no realistic cost-estimates. They suggest that leukaemia clusters don't matter and that the risks from radiation are comparable to being struck by lightning. Apparently being 60 years old for six hours carries the same risk as mountaineering for a day. Wow!



They ask "How many people go around worrying about being struck by lightning?" I consider that to be an insult to all those people who were genuinely concerned after Chernobyl.

So we need waste no time on the SSEB's latest glossy except to be grateful for two highly accessible quotes which can be used against the PWR. First, that gas-cooling is stable and water cooling unstable. Second that AGR core-materials don't react with each other. At Chernobyl they did; and they did at TMI as well - remember the steam-zircaloy fire.

DON ARNOTT

Did anybody know that there was a Minister for Renewable Sources of Energy? Well, maybe LBR missed the announcement. The Minister's name is Michael Spicer, and he seems to have missed the announcement that wave power funding has ended. He's just announced the construction of a new experimental inshore wave project on the Island of Islay. The device, which is being developed by Queen's University Belfast, could lead to major cost reductions in the exploitation of wave energy. Good job Mr Spicer didn't read the ACORD review, then he'd already know wave power isn't expected to make a significant contribution on economic grounds.

Michael Spicer obviously likes to live dangerously; besides giving Queen's University £230,000, he's planning a major new publicity campaign for the autumn on the benefits of work in renewable energy. LBR is thinking of offering to be his bodyguard after the nuclear enthusiasts down the corridor find out.

O O O O O O

Another job LBR was thinking of applying for is financial adviser to Malcolm Rifkind, the Secretary of State for Scotland. He needs help to develop proposals for the privatisation of the Scottish Electricity supply industry. Thinking that it might be a chance to sell Torness to a demolition company, LBR rang for a job description. 'No way' came the reply, 'only Merchant Bankers need apply'. The job will probably go to one of those firms who have proved their expertise by sequestrating money from the NUM.

O O O O O O

Perhaps LBR should introduce Michael Spicer to the CEGB, so that they can learn about the benefits of renewable energy. They seem to have plenty of money to splash around these days. They're spending £1 million painting their Hinkley Point nuclear power station a special shade of blue and mushroom to make it blend in with the Bristol Channel. That's enough money to fund research into four different wave power devices.

O O O O O O

A statement made by Tam Dalyell 16 months ago, returned to haunt him during the General Election. The Scottish National Party seized on the remarks and placed advertisements in local newspapers in West Lothian identifying Mr Dalyell as the man "who will campaign for nuclear waste dumping in West Lothian."

In February 1986, Mr Dalyell said in the Commons that if a geologically suitable site was found in West Lothian, "I will go up and down my constituency and argue for its acceptance, such is my confidence in British nuclear industry on these issues."

The adverts provoked a public row, and one newspaper refused to take them, because they believed they were unfair to Mr Dalyell. He says he's against nuclear dumping, but in favour of reprocessing. He believes waste should be vitrified and then stored so that it can be monitored. When he was talking in the House of Commons he was referring to decommissioned reactors from nuclear submarines. Because of their huge weight of 800 tons, a coastal dump site will be required.

Isn't it about time Tam Dalyell got in line and wholeheartedly supported Labour's anti-nuclear power policies. He wouldn't get himself in such a pickle if he did - the least he could do would be to keep quiet.

O O O O O O

Hurrah! Chapelcross nuclear power station have found an invisibly small piece of radioactive material on the floor of a workshop, with a highly sensitive geiger counter. The radioactive speck was picked up with a piece of sellotape and "safely" disposed of. It's a pity that Chapelcross don't export this neat technology to the German town of Hanau, where Alken recently found 25kg of Uranium which they didn't even know they'd lost! It's uncertain whether this uranium was recovered using sellotape or some other kind of modern technology.

O O O O O O

Little Black Rabbit's Antipodean cousin: Little Black Wallaby reports that the Australian Atomic Energy Agency has changed it's name to ANSTO, the Australian Nuclear Science and Technology Organisation. LBW reports that ANSTO say that this has nothing to do with the recent fire at the Lucas Heights experimental reactor near Sidney.

SUB FORM

I would like to subscribe to SCRAM. I enclose cheque/postal order, payable to SCRAM for:

Concessionary £5
Ordinary £10
Supporting £15
Institutional £25
Life sub. £50

Name . . . . . .
Address. . . . . .
. . . . . .
. . . . . Tel

WAGES FORM

Please fill out the standing order form below and send it to us.

To the Manager:

. . . . . Bank
Address . . . . . .
. . . . . .
. . . . . .

Please pay on . . . . (1st payment) the sum of . . . from my account number . . . . . to the Royal Bank of Scotland, 142 Princes Street, Edinburgh (83-51-00) for the credit of SCRAM number 2 account 258597 and make similar payments monthly/yearly until cancelled.

Signed . . . . . Date . . . . .

Return this form to:
SCRAM, 11 Forth Street, Edinburgh
EH1 3LE. Tel: 031 557 4283/4.

We welcome contributions of articles, news, graphics and photographs.

Deadline for next issue:
Articles (900 words/page), 14 Aug
News & Graphics, 21 August.

ISSN 0140-3540 Bi-monthly.