THE SAFE ENERGY JOURNAL

SCRAM

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German aid for Pakistan's bomb

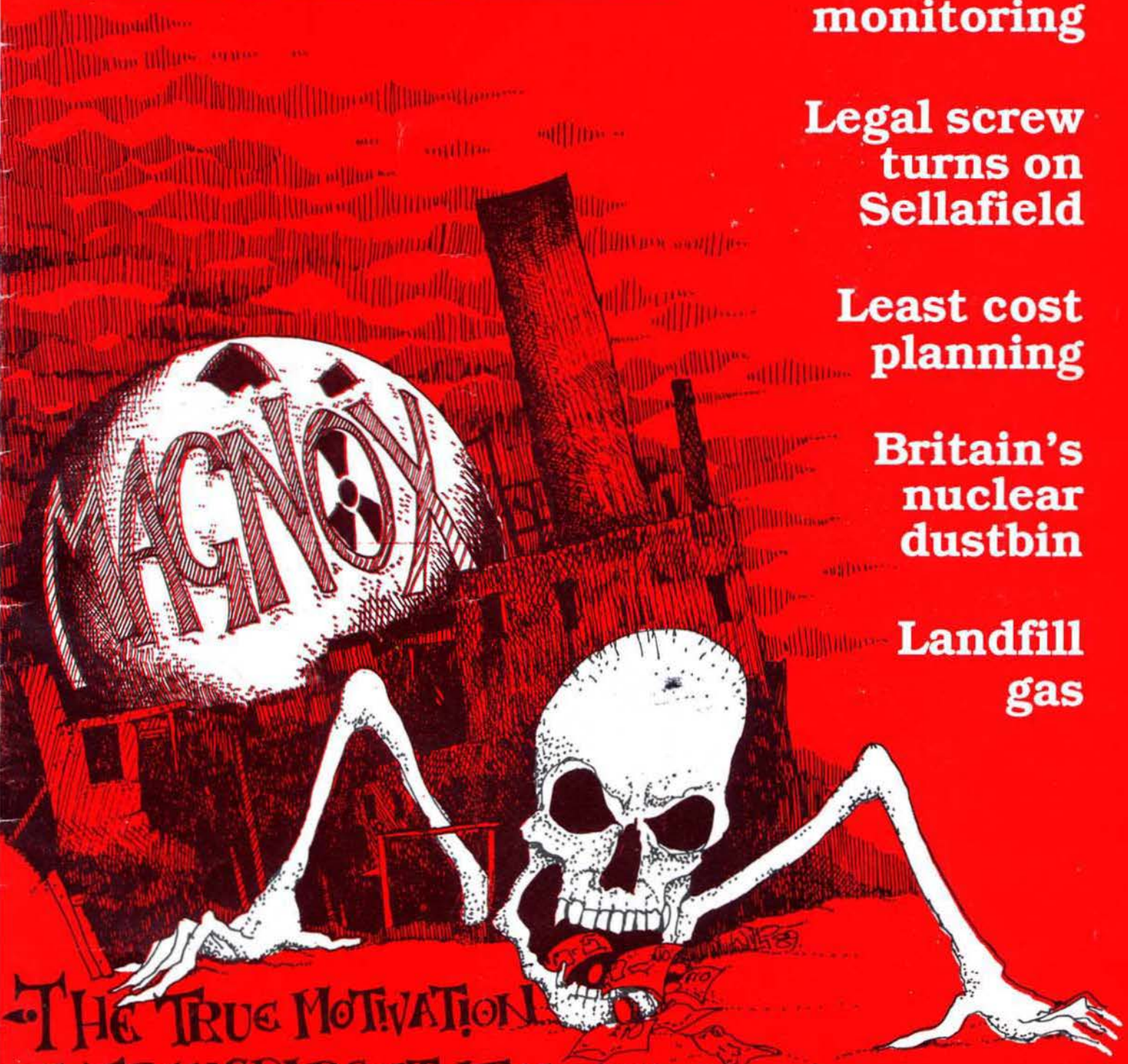
FoE radiation monitoring

Legal screw turns on Sellafield

Least cost planning

Britain's nuclear dustbin

Landfill gas



COMMENT

DESCRIBED by Tony Blair, Labour's Shadow Energy Spokesperson, as "a humiliating farce," last months decision to abandon the privatisation of the Magnox reactors was mostly overshadowed by acres of comment on Mrs Thatcher's botched cabinet reshuffle.

This "most expensive exercise in the political history of clearing one's desk" will, according to Blair, cost the taxpayer at least £4,500m, for the decommissioning, fuel reprocessing and eventual site clearance of all nine Magnox stations. John Large, a consultant for the local authority objectors at the Hinkley Inquiry, put the figure at a staggering £15,000m.

In a widely acclaimed speech, Blair asserted that the "motivation for this is quite transparent - that [Parkinson] will sacrifice anything, including normal commercial prudence, the interests of the taxpayer and the consumer and the future energy needs of this country, provided that, above all else, he can sell his privatisation to the City."

THE new Energy Secretary, John Wakeham will have a tough job convincing a sceptical public that the decision is anything more than an attempt to appease the Tories' friends in the City. Power in Europe, a Financial Times Business Information magazine, said in an editorial at the beginning of July that the Treasury were concerned that nuclear power would jeopardise the whole flotation, whereas the Department of Energy wanted all nuclear stations included in the sell-off.

What has been arrived at is obviously a compromise worked out at Cabinet level. The question is whether it will be enough to convince the City. "Opinion among UK financial analysts and fund managers is more or less unanimous in rejecting the government's nuclear proposals as unworkable," says Power in Europe.

John Wakeham will now have to convince the City that the AGR stations and the yet-to-be-built PWRs will be worth the risk. But the logic which dictated that the Magnox reactors should remain in public ownership should also be applied to most of the AGRs, particularly Hartlepool, Dungeness and Heysham A.

Why is it that investors who were reluctant to stump up the costs of decommissioning the youngest Magnox station at Wylfa in the year 2002, can be expected to foot the bill for decommissioning the oldest AGRs at Hunterston and Hinkley only 5 years later?

SCHEDULE 12 in the Privatisation Bill allows the Government to make £2,500m available to meet nuclear liabilities in the privatised industry. Parkinson told the Commons this money would be for "unforeseeable costs arising from changes in Government policy." But in the Lords it was described more loosely as a fund for factors "outside the industry's control."

What this package amounts to is an attempt to partially privatise the nuclear power stations while the privatised companies incur few if any risks - the risks all remain with the taxpayer. It remains to be seen whether the City will agree that the attempt has succeeded.

IN THE age of the 'Green Consumer' the Government has made a tactical error in rejecting the Lord's amendment which would have given the electricity Regulator the power to force the private companies to conserve energy. It is now clear that a significant minority of the British electorate attach a high importance to environmental issues. The Government, having squandered an important opportunity to prove the sincerity of their statements about global warming, have left their electricity privatisation strategy on very shaky environmental ground.

So far, electricity privatisation has failed to capture the public imagination. But, by the same token, the Government has been largely unsuccessful in convincing the public that nuclear power has a role to play in solving the Greenhouse Effect. It's up to us to make sure that the environmental consequences of privatisation spark off a public storm against nuclear power, which is so fierce that, in the image conscious 90s, no private company will be able to weather it.

SCRAM

CONTENTS

FEATURES

News: Pete Roche
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(Please try to keep contributions to 800 words per page.)

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Leukaemia mystery

For the third time the Committee on Medical Aspects of Radiation in the Environment (COMARE) have found a high incidence of childhood leukaemia near nuclear installations. But the cause of the excess is still a mystery.

The Government-appointed committee of independent scientists was asked to investigate whether there is an unusually high incidence of childhood cancer in West Berkshire and North Hampshire (the area around Aldermaston and Burghfield and if so whether this was associated with environmental radioactivity.

COMARE have previously found "evidence of a raised incidence of leukaemia at both Sellafield and Dounreay" which tends to "support the hypothesis that some feature of these two plants lead to an increased risk of leukaemia in young people living in the vicinity."

Like the Sellafield leukaemias, the high incidence around the two nuclear weapons plants was examined by the Yorkshire TV team led by James Cutler in their 1985 film "Inside Britain's Bomb".

COMARE looked at three studies by Roman et al. (London School of Hygiene and Tropical Medicine and the Royal Berkshire Hospital), the Office of Population Censuses and Surveys and the Childhood Cancer Research Group in Oxford.

From this data the Committee concluded, there was "evidence of raised registration rates for childhood leukaemia and other childhood cancers in the vicinity of Aldermaston and Burghfield and that these are unlikely to be due to random variation or biased selection."

The MoD's discharge data and the NRPB's assessment of the dose to the public both failed to provide a clue as to why the number of cancers are significantly higher. The authorised and accidental atmospheric discharges are "most unlikely" to provide an explanation because they are too low. And an "unknown pathway" involving liquid discharges is "most unlikely to cause an increase in radiation levels sufficient to explain the observed increase in childhood cancer."

COMARE find themselves unable to exclude "some other mechanism of radiation exposure". They suggest that the exposure of workers to plutonium could be one factor which Sellafield, Dounreay, Aldermaston and Burghfield all have in common. Exposure in adults could theoretically lead to the induction of cancer in children.

The Department of Health have accepted the Committee's recommendations for a wide-ranging study into the health of children of nuclear workers; detailed childhood cancer registration to see how the spread of the disease compares with the distribution of nuclear installations; and the measurement of household dust around Aldermaston and Burghfield.

Leukaemia and other cancers at ages 0–4, 5–14, and 0–14 in West Berkshire and Basingstoke/North Hampshire District Health Authorities by distance of the electoral ward of residence from a nuclear establishment.

Age	Source	Diagnosis and Time Period	Distance of electoral wards from a nuclear establishment						Comparison of ≤10 km with >10 km	
			≤10 km			>10 km			Ratio of Registration ratios[4]	95% confidence interval
			Number of registrations		Registration ratio[2]	Number of registrations		Registration ratio[2]		
			Observed	Expected[1]		Observed	Expected[1]			
0–4	Roman *et al*	Leukaemia 1972–85	29	14.4	2.01	24	19.6	1.23	1.64*	0.92 to 2.94
	CCRG	Other cancers 1971–82	30	19.4	1.55	33	26.3	1.25	1.24	0.73 to 2.09
	Combined Data[3]	Total Cancer 1971–85	59	33.8	1.75	57	45.9	1.24	1.41*	0.96 to 2.06
5–14	Roman *et al*	Leukaemia 1972–85	12	14.2	0.85	24	21.2	1.13	0.75	0.34 to 1.56
	CCRG	Other cancers 1971–82	31	28.1	1.10	49	42.0	1.17	0.94	0.58 to 1.51
	Combined Data	Total Cancer 1971–85	43	42.3	1.02	73	63.1	1.16	0.88	0.59 to 1.30
0–14	Roman *et al*	Leukaemia 1972–85	41	28.6	1.43	48	40.8	1.18	1.22	0.78 to 1.89
	CCRG	Other cancers 1971–82	61	47.5	1.28	82	68.3	1.20	1.07	0.75 to 1.51
	Combined Data	Total Cancer 1971–85	102	76.1	1.34	130	109.1	1.19	1.12	0.86 to 1.47

1. Expected numbers based on age-specific registration rates in England and Wales
2. Ratio of observed to expected number of registrations
3. Combined data includes leukaemia registrations from 1972 to 1985 and registration for other cancers from 1971–1982
4. Ratio of registration ratios for ≤10 km and >10 km electoral wards

* $P<0.05$, one sided test

NRPB 2 : ICRP 0

The rift between the National Radiological Protection Board (NRPB) and the International Commission on Radiological Protection (ICRP) will almost certainly have been exacerbated by an editorial in the June issue of the NRPB's Bulletin.

The break between the two organisations opened up in November 1987 when the NRPB made recommendations independently of the ICRP to reduce the annual radiation dose limits for workers in the nuclear industry and members of the public. The ICRP had earlier deferred a change in the dose limits until at least 1990, despite impressive scientific evidence.

The editorial, entitled "A new ICRP" (despite the fact that only 4 changes have been made to the 13 member committee) is full of thinly veiled criticisms. For example the ICRP has in recent years "been increasingly criticised for moving too slowly and not explaining itself in the clearest of terms."

The NRPB point out, perhaps sarcastically, "the importance of ICRP maintaining its initiative in protection standards."

The Commission will be meeting in October this year and the NRPB want its proposed new recommendations to be floated on the international scene, before they are finally published as the formal ICRP recommendations. "It would do a great deal to enhance the Commission's status," according to the editorial "to let people know that it is not inactive but is tackling a number of philosophical problems which need to be resolved."

Food irradiation

The 22 year ban on food irradiation, in this country, will be lifted some time during the next parliamentary session, it was announced in June.

John MacGregor, the Minister for Agriculture, told parliament that food irradiation is not "a panacea for food safety...irradiation cannot improve appearance. It cannot disguise taste. It cannot mask unpleasant odours." It would however be another weapon of protection and extend choice to consumers believes MacGregor. Whilst Labour's agriculture spokesperson, David Clark, described it as "like using gloss paint to cover up rotten window frames."

The Food Bill due to be presented to the next session of parliament will contain the control and supervision processes without which the Government would not proceed.

Shutdown vote

Voters in Sacramento County, California, voted on 6 June to shut down the troubled, 15 year old Rancho Seco nuclear power station. Plant officials say they will shut it down as soon as possible.

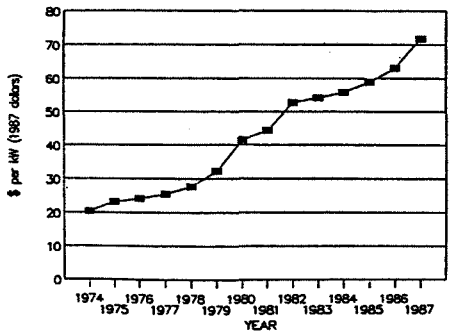
This is the first time US voters have voted in favour of closure. 13 previous referendums on shutdowns over the last decade have all failed. After spending $1.5m on the Rancho Seco campaign the industry can no longer claim popular support.

The shutdown has put the utility, Sacramento Municipal Utility District (SMUD) in a precarious financial position. "What was seen as a $700m asset is now a $250m liability" according to SMUD Vice President, David Cox.

"Citizens will now know they can take on the operators of costly nuclear plant and win," says Scott Denman of the Safe Energy Communication Council.

The vote comes at a time of growing public concern in the US about the safety and cost of nuclear plants, exacerbated by problems in the nation's nuclear weapons facilities (SCRAM 70).

Rising Operating and Maintenance Expenses at U.S. Nuclear Power Plants



PUBLIC CITIZEN RUNAWAY COSTS

Beleaguered Shoreham

The deal hatched between the beleaguered utility, Long Island Lighting Company (LILCO), and New York State has come under attack from Federal officials and the House of Representatives.

The deal, which was agreed by LILCO's shareholders at the end of June, calls for the $6 billion plant to be sold to a State agency, Long Island Power Authority (LIPA) for $1. In return LILCO will receive three annual price increases of about 5% with the promise of seven more, and state assistance in building new baseload capacity.

Department of Energy Deputy Secretary, Henson Moore, has said his department "will continue to do everything possible to prevent the senseless destruction" of Shoreham.

Sub disposal quandary

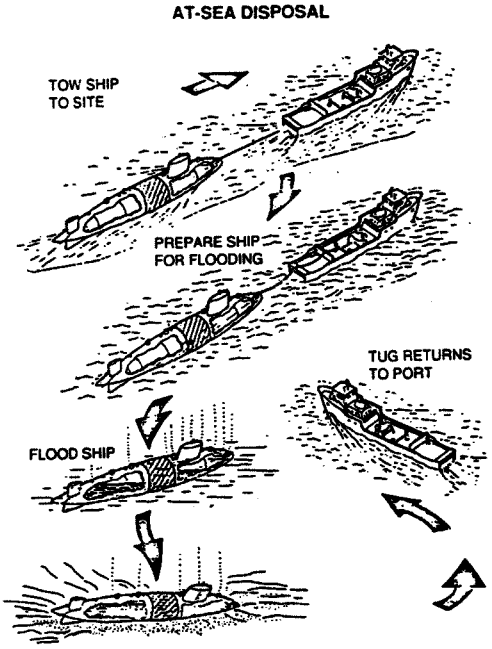
A claim by Sir Albert McQuarrie, Conservative candidate for the Highlands and Islands in the Euro-elections, that the Department of Energy (DoEn) had cleared the way for Dounreay to secure contracts to decommission nuclear submarines has been met with a puzzled reaction from the DoEn, the Navy and Dounreay.

The Navy will have to dispose of 10 nuclear submarines, including the Dreadnought which has already been taken out of service, by the end of the century. The House of Commons Defence Committee has called on the MoD to make up its mind about how to dispose of them.

Rosyth Dockyard's new Trident re-fitting facility could also be adapted for decommissioning submarines. The Dreadnought has been sitting at Rosyth since 1982, and the two Fife Labour MPs, Dick Douglas and Gordon Brown, are concerned that Rosyth could end up with the rest of them.

The debate over the best method for decommissioning the submarines is still highly contentious. The MoD insists that it is still considering the best method of disposal, but environmentalists are convinced they will try to get round the international ban on the dumping of nuclear waste at sea, and sink the submarines. Greenpeace plans to call on the next meeting of the London Dumping Convention to be held in London at the end of October, to foreclose this option.

Dumping nuclear submarines at sea could create a dangerous precedent with around 544 nuclear powered vessels due to be disposed of worldwide over the next 25-30 years. Although the fuel rods would be removed first, the reactor vessel and cooling system would both remain contaminated.



Besides sea disposal, the reactor compartments could be disposed of in a shallow land burial site, the method favoured by the US Navy, or the reactor could be cut up for disposal in Nirex's deep repository.

In keeping with their on-site, above ground storage proposals for waste from nuclear power stations, Greenpeace are calling for the fuel to be taken out and dry stored, and the submarine hulls to be dry-docked where they can be monitored.

Letter: Shareholders for Safe Energy

Dear SCRAM

For a number of years in this and other countries, campaigning groups have used the ability to buy single shares in a company in order to attend Annual General Meetings to make their voices heard. In this respect campaigns against Barclays' involvement in South Africa, and in pursuing RTZ's activities around the world, can be said to have had some success in a) influencing the company and b) educating more people to the company's activities. Barclays lost so many student accounts that they were forced to change. Partizans (People Against Rio-Tinto Zinc and subsidiaries) has supported Aboriginal organisations in their assertion of Land Rights and brought the issue to the attention of people in this country.

Should people buy single shares in a privatised electricity industry? If so, why? To protest against privatisation of a national asset? To protest against nuclear power? The experience of people who have attended AGMs as single shareholders, and know the mechanics of buying a batch of privatised shares for immediate redistribution to a number of single shareholders could be drawn upon.

Prior to AGMs 'dissident shareholders' would meet to discuss the forthcoming AGM, questions to be asked, notification of the press etc.

Pete Lennard

SCRAM would be interested to hear from its readers their views on the above letter. Could shareholders meetings be usefully used to stop companies like the East Midlands Electricity Board and PowerGen getting involved with the Safe Integral Reactor, for example?

Safe reactor?

The winner of a technical competition for $50m of public funds that the US government are prepared to put forward for a 'simpler and safer' nuclear reactor is expected to be announced in August.

The competition is an attempt to rethink reactor design and come up with a smaller and cheaper reactor which has fewer components and a shorter construction time.

The reactor design should also be less heavily dependent on "engineered" safety systems, which can be mishandled by operators as the accidents at Chernobyl and Three Mile Island have shown. It should be a passive design which needs no intervention by operators to prevent the reactor overheating.

Bidders for the $50m prize are:-

- Westinghouse with their 600M Advanced Passive Reactor (APR600) based on their PWR.
- US General Electric with a 600MW advanced passive version of their boiling water reactor (SBWR).
- ABB Atom of Sweden, which is working in conjunction with United Engineers and Constructors on the 600MW PIUS.
- SIR - the Safe Integral Reactor - the newest and smallest of the concepts. It is only 320MW and is being promoted by UKAEA, Rolls Royce, who build small PWRs for the Navy and two US engineering groups, Combustion Engineering and Stone and Webster.

PIUS 600 is handicapped by Sweden's energy policy which will not allow ABB Atom to build a demonstration reactor in their own country. However, the company are currently looking at a site in Italy.

In Britain, Winfrith in Dorset, site of the UKAEA's experimental Steam Generating Heavy Water Reactor, has been identified as the likely site for a prototype SIR. The reactor has already been tentatively backed by PowerGen and several of the Area Boards, including the East Midlands Electricity Board.

Roger Jump, deputy director designate of PowerGen, who will be left without any nuclear power after privatisation, said that his company's interest in SIR was "an acknowledgement of the fact that this company cannot afford to turn its back on nuclear energy."

Emergency plans under attack

The Advisory Committee on the Safety of Nuclear Installations (ACSNI), which gives independent advice to the Health and Safety Commission and Ministers on nuclear safety policy, has criticised existing arrangements for dealing with a large-scale emergency at a nuclear plant. Their report on the committee's work from 1987 to 1988, says that ACSNI concentrated on the review of emergency arrangements which was carried out by Government Departments following Chernobyl.

The Government review concluded that existing plans were adequate, but ACSNI "is continuing to seek clarification about certain aspects of existing arrangements and their development". In particular ACSNI will be looking at "the extendibility of emergency plans in the remote event of a serious accident beyond the design basis."

They will also be looking at the role of the Government Technical Adviser (GTA) who is expected to co-ordinate advice to those organisations who would be involved in responding to a nuclear emergency. "Given the number of Government Departments and other organisations involved, the Committee will wish to satisfy itself that there is a clear line of responsibility culminating in someone with overall executive authority."

ACSNI will continue to consider any further conclusions which arise from the Government review of emergency arrangements. During 1989 they will also be looking at the Heysham Dry Store and the safety implications of the Nirex decision to abandon the search for a shallow disposal site for nuclear waste, resulting in an accumulation of intermediate level waste at nuclear sites.

German waste for Sellafield

BNFL have reached an outline agreement with the West German Government to reprocess about half the nuclear fuel that would have gone to the now abandoned reprocessing plant at Wackersdorf.

The abandonment means that West Germany will be placing 500 tonnes of nuclear fuel per year on to the market for reprocessing at the end of the 1990s.

Cogema had offered to reprocess about 400 tonnes per year at La Hague for DM1,500 per kg. BNFL have undercut them, however, by offering to take 250 tonnes each year between 2000 and 2015 at a cost of DM1,200 per kg.

Critics of the plan to reprocess German spent fuel abroad say that safety measures at Sellafield and La Hague are not as strict as they would have been at Wackersdorf.

Despite the closure, German utilities are still keen, along with the Japanese and BNFL, to invest in internationally owned fuel facilities. Now that there is less interest in saving plutonium for fast reactors, and more interest in recycling it as mixed-oxide (MOX) fuel for existing reactors, a jointly owned MOX fuel plant is a possibility.

Meanwhile Lord Marshall sees no need for National Power to even discuss a contract for reprocessing fuel from its pressurised water reactors (PWRs). They will have enough capacity to store their spent fuel for about 18 years. In contrast the Advanced Gas-cooled Reactors (AGRs) have storage capacity for between only six and 12 months. This is one reason why National Power are planning to build a £200m dry store for AGR fuel at Heysham - they don't want to be forced to shut down the AGRs because the fuel isn't being reprocessed fast enough.

These developments could mean that from early next century Sellafield is reprocessing only foreign spent fuel, whilst all UK spent fuel is kept in storage.

Magnox fallout

The Long Term Safety Review (LTSR) for the Hunterston A Magnox power station was released at the beginning of August. It concluded that the station would be safe to operate up to 1994 subject to the completion by the SSEB of certain modifications.

However the SSEB have announced that Hunterston A is likely to close by March 1990. The Nuclear Installations Inspectorate have therefore agreed with the Board on a limited number of modifications to allow operation up to March 1990.

Despite the glowing end of term report from the NII, and the fact that the government are to retain ownership of the Magnox reactors after privatisation, Hunterston A will still be shut. According to Scottish Office Minister, Ian Lang, this is "for economic reasons" and is appropriate given "the increased costs of spent fuel reprocessing and decommissioning of which we are now aware."

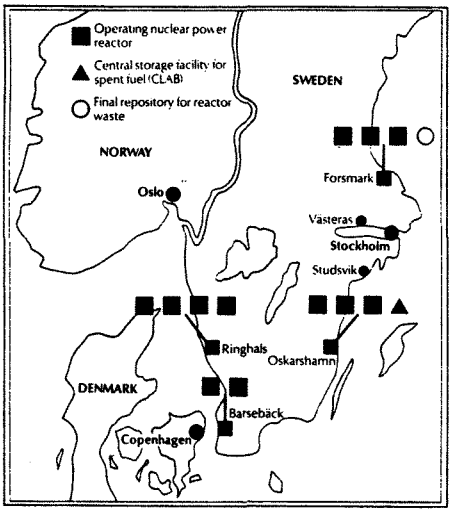
The next LTSRs to be published will be for Calder Hall and Chapel Cross (fully commissioned in 1959 and 60 respectively). BNFL insists that both are in excellent condition and hope to run them for another 10 years. Simultaneously it wants to build larger reactors, probably PWRs at both sites. The company has asked the National Nuclear Corporation to draw up details of four options for the BNFL board.

Nirex notes

The UKAEA are to appeal against the Highland Regional Council's refusal to allow test drilling at Dounreay, to assess the rock's suitability for a national nuclear waste repository. Councillors on the Region's Planning Committee voted 16 to 5 to throw out the application.

This follows a similar application for test bores at Sellafield which was opposed by Cumbria County Council, but, former Environment Secretary, Nicholas Ridley overruled their decision on appeal and test bores are now being sunk.

The five councillors who voted against the refusal wanted to defer a decision until they had visited the Forsmark nuclear waste dump in



Sweden. One councillor put forward a motion to approve the test bores, but failed to find a seconder.

In the run-up to the Caithness referendum on the nuclear waste issue, due to take place in October, more and more significance is being attached to the methods of disposal used in other countries. Douglas McRoberts, Head of Information Services at Dounreay, writing in the John O'Groat Journal, a Caithness local paper, reviewed nuclear waste disposal methods in other parts of the world.

To illustrate the potential success of nuclear waste disposal, McRoberts made the unfortunate choice of the Waste Isolation Pilot Project (WIPP) in New Mexico. The information he gave on WIPP was described in a letter to the 'Groat' by Jean Fazzino of the US Radioactive Waste Campaign as "an outright lie".

McRoberts claimed that WIPP "is already receiving shipments" and the repository "is dry, and has remained stable for over 225 million years." Fazzino points out that WIPP is not opened. Construction work on the dump began in 1981, and it should have opened in July this year. It remains unopened because in 1987 scientists from the University of New Mexico discovered brine, salt-laden water, seeping into the underground repository. They believe the brine could turn the radioactive waste into a pressurised slurry of radioactive and toxic waste. It is for this reason that it has been dubbed the 'champagne' nuclear dump. If ever it was punctured, radioactive brine would spurt to the surface like uncorked bubbly.

Cracks have also been recently discovered in WIPP's storage room ceilings and floors. Critics of the scheme are concerned that brine contaminated with plutonium could make its way into the nearby Pecos River and "destroy agriculture, urban drinking water and ocean fishing resources for thousands of years."

McRoberts contends that "Transportation [to WIPP] is impressive. It's almost all done by trucks, which are constantly tracked and monitored by two separate satellite systems - one for voice communications and the other for automatic tracking." Fazzino argues that "even before the waste can be shipped, a suitable container must be found. Approximately $25m has been spent designing and building TRUPACT 2 (transuranic packaging transporter). It has failed impact tests even after three series of redesigning and testing, and has not been approved by the Nuclear Regulatory Commission."

Concern over transportation and potential leaks has led to the state of Texas and a coalition of environmental groups threatening legal action to stop WIPP opening unless the Department of Energy can prove it is able to isolate radioactive wastes from the environment.

Lastly, McRoberts contends that "local (New Mexico) liaisons are good." State Senator Rutherford told the local press "We have waste we aren't sure about, stored in containers that haven't been approved, travelling over roads that haven't been improved and being put in salt beds we don't know about. We'd like to put the brakes on before we get to the edge of the cliff."

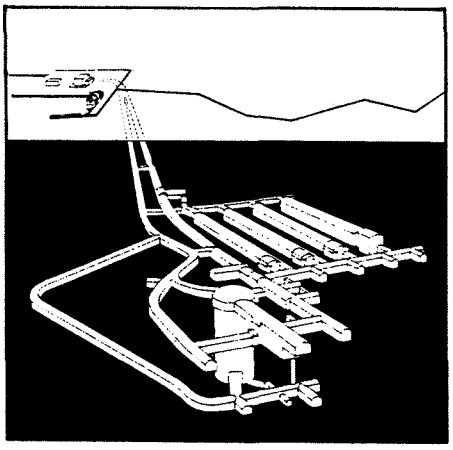
Nirex flew around 30 local business and community representatives, including Caithness District councillors to Forsmark in Sweden at the end of May. McRoberts said "There are many parallels between the permanent deep repository at Forsmark and Dounreay. This visit. . will give people a good idea of one in action." However, delegates were warned by Shetland-based Northern European Nuclear Information Group that the facility is an excellent example of how not to dispose of radioactive waste.

The Forsmark repository, SFR-1, was constructed 50 metres under the seabed, and is accessed from the land. Stage 1 is complete and consists of the surface storage buildings, a tunnel system, and storage space for 60,000 cu.m. of waste. Stage 2 will bring the total storage capacity to 90,000 cu.m. In contrast a UK repository will be 200 to 1,000 metres deep, but it will be designed to dispose of 2 million cu.m. It will therefore be over 20 times the size of Forsmark.

Forsmark is not intended to permanently contain the radioactive waste, but only to act as a barrier to slow down leakage and eventual dilution in the sea. It is accepted that it will fill with water after a few years and that radioactivity will eventually leak into the Baltic Sea. It is in fact simply a form of delayed sea dumping.

SFR-1 is intended to be the final storage area for all the operational low- and medium-level waste from Sweden's 12 nuclear reactors. But unlike a UK repository it will not take long-lived intermediate-level waste. The Swedes have decided to phase out nuclear power, so it's easy to eastimate accurately the of waste to be deposited at Forsmark, and they know it will close in 2010. In the UK we don't have that luxury, and after the first repository has completed its 50 year life, another one could be built next to it.

As in the UK, site selection in Sweden seems to be based more on political expediency than geology or the long-term integrity of the facility. The local Municipality voted in favour of the dump, but if



Phase 1 Development of the SFR

they hadn't they could have vetoed it. If Dounreay were in Sweden the Highland Region's vote could have simply stopped the proposals.

However, Highland Region and Caithness District are not going to be the soft touch Nirex might have expected. Many people are angry that the Government seem to be working to a hidden agenda and have already made their mind up. Councillor Michael Foxley echoes their feelings, about Nirex, when he declares "You wouldn't even trust them to bury your dog."

Independent radiation monitoring

The discovery of a 'hot spot' on Skipton Moor after Chernobyl led to accusations that the Ministry of Agriculture had been negligent. In 1986 the lamb bans were expected to be quite short-lived; nobody in official circles predicted that some areas would remain under restriction for over three years. All this has contributed to a very low public confidence in government science.

Exposure to radiation is an emotive subject. Since Chernobyl there has been a proliferation of organisations carrying out radiation monitoring. These organisations serve to reassure the public when radiation levels are found to be low, and highlight areas of high contamination which need to be looked at more closely.

Now that Local Authorities are beginning to co-ordinate their work, PAUL WATTS, co-ordinator of Friends of the Earth's radiation monitoring unit suggests a strategy for co-ordinating the non-affiliated groups.

FOR many years the public have been told that a major nuclear accident would only happen once in a million years. Twenty nine years after the Windscale fire, seven years after the Three Mile Island accident and four days after the cloud of radioactive fallout from Chernobyl eventually reached the UK, the Government stated that levels were nowhere near those at which there was any health hazard and that it was perfectly safe to drink tap-water and milk. Since then, it has been estimated that over 150 people in the UK will die of cancer as a result of Chernobyl. It has also been estimated that half of the radiation dose to the UK population was from contaminated milk.

Monitoring unit

The level of mistrust in the authorities was evident when, following the Chernobyl accident, Friends of the Earth (FoE) was inundated with requests from members of the public, particularly from the farming community, for independent information. It was not, as a general rule, easy for the general public to get a hold of information

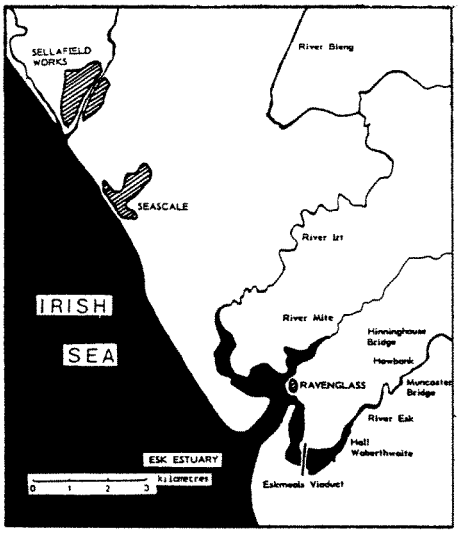
provided by the Ministry of Agriculture (MAFF). Even when the information had been discovered, for people to relate this information to their own situation was an even more difficult exercise.

In response to these requests FoE established a mobile radiation monitoring unit. The aim was not to duplicate the work carried out by the official monitoring agencies, but to clarify the situation that existed at the time, in order that many of the fears, rumours and allegations could be cleared up. Where contamination levels were found to be low, this information would put people's minds at rest, but high readings would indicate areas that should be a priority for further, more detailed, monitoring and compensation.

Childhood leukaemia

The authorities have consistently reassured the public that the situation around Sellafield is 'within the recommended limits', 'insignificant' and 'perfectly safe'. Yet, at one stage, 25 miles of beaches were closed following a spill, there is an abnormally high incidence of childhood leukaemia in the area (a number of families, in the area, are taking British Nuclear Fuels to court) and the company have been forced to spend £200 million on cleaning up its act.

As part of an on-going monitoring programme around Sellafield, FoE examined a four mile intertidal



Map of the River Esk area showing where FoE took samples

stretch of the River Esk, five miles down the coast from the plant. This lead to the discovery that the banks of the river and the adjacent low-lying land were extensively contaminated with a cocktail of radionuclides, including ruthenium-106, caesium-134, caesium-137, americium-241 and plutonium-241, to concentrations up to 50 times the level which the NRPB recommends that exposure to radiation should be investigated (SCRAM 70).

However, when the preliminary results were first reported in the media, both MAFF and British Nuclear Fuels refuted the findings accusing FoE of being 'alarmist' and

stated that there was 'no risk'. Despite both BNF and MAFF claiming prior knowledge of the contamination, information on the estuary is not regularly published and the area is not discussed in their respective annual monitoring reports. Consequently, until FoE released the preliminary results of this survey in February, people living in the area were not generally aware that high levels of contamination existed.

Independent information

The public's confidence in the 'experts', particularly those from the nuclear industry, has been seriously eroded. As a consequence of the Chernobyl fiasco and the defensiveness of organisations such as BNF and MAFF, there has developed an obvious need for an independent source of information, to give a balanced view to an often confused public. The national bodies and the regulating central government ministries clearly are not accepted by the public as fully independent. Supplementing the official monitoring programme, local authority environmental health departments with their existing pollution monitoring responsibilities and established relationship with the local population are ideally suited to fulfil this role. In September of this year local authorities will launch their monitoring and information collation network.

In addition, since the spring of 1986, many non-affiliated independent local monitoring groups have been established in the UK. At present many of these groups seem to be carrying out their work in a vacuum, using different equipment, different survey techniques and different methods of interpreting the data collected. It is unlikely in the event of a national emergency, or even a local contamination problem, that these groups will be a significant help in providing a reliable source of information and advice. Neither is it likely that they will be able to provide a basis on which the adequacy of the official monitoring programme can be assessed. However, there would be enormous potential if the energy and enthusiasm of these groups could be channelled in such a way that the monitoring methods were standardised; resulting in reliable data which is compatible with data from other groups.

Quarterly bulletin

The need to establish a local groups communication network has led to FoE offering to co-ordinate a quarterly information exchange system. This proposed system would work by registered groups submitting to FoE a quarterly bulletin outlining their activities over the previous three months. This bulletin would contain a detailed description of the equipment used, how and where it was used, a summary of the data collected and the way the results were interpreted. FoE would collate the submissions into a newsletter format and would take an editorial role providing advice and addressing any issues that arise from the submissions.

Practical advice

The overall aim is to enable groups to reliably highlight discrepancies in the official data, or indicate where there is a potential radiological hazard, and to provide practical advice and help, where needed, to those people most affected. Ultimately, a data-information exchange system between the local groups should be via a computer communications network eg. GREENNET.

FoE has demonstrated that independent monitoring serves to identify the areas where problems exist and where they do not. Broadly, independent monitoring serves to bridge the gap between the 'irrational' and 'ignorant' public and the scientific 'experts'. By providing easy to understand and freely available information to members of the public, independent monitoring offers the chance for people to assess the risks for themselves and take action accordingly. It is about helping people to take control of their own lives rather than relying on self interested experts.

Least cost planning

A holy grail or a tried and tested approach?

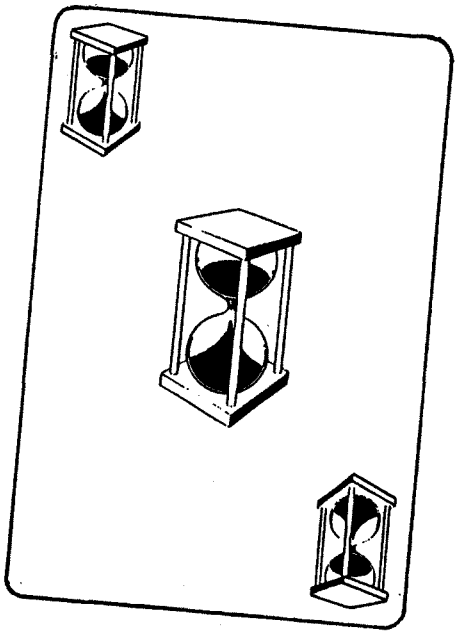
Last Month, July, the Government rejected a vital change to the Electricity Bill. The Lords amendment would have given the post privatisation electricity regulatory body the power to force companies to conserve energy or face the rejection of applications for price increases or capital projects.

Least cost planning, as exists in other countries, ensures energy efficiency and maximises profit. As Commissioner Fredrick R Duda of the Public Utility of California says: "It has saved billions of dollars for California and increased competition in electricity generation" Profit and competition; something the Government seem totally unable to create through their privatisation proposal. With the rejection of this amendment they have truly nailed their colours to the mast.

Here IAN BROWN of the Association for the Conservation of Energy describes how least cost planning can and does work abroad.

CHANGING the 's' in the e.s.i. from 'supply' to 'service' will be the most profound alteration in the way that the electricity industry will be run in the 1990's. With privatisation now impending in the UK it is reasonable to conclude that our industry - like that in the USA - is to undergo a period of rapid and fundamental change.

Energy consumers do not require electricity as a product per se, but rather they require electricity for the services it can provide: thus consumers need not kilowatt hours but the heat, light and mechanical drive which kilowatt hours produce. The most progressive utilities, and



utility regulators in the United States, have recognised this self evident truth, and have understood that they are in business not merely to produce and deliver kilowatt hours, but to satisfy the energy needs of their customers at the least cost.

Planning implications

At first sight this may seem to be a small redefinition of the role of the electricity utilities, which has fundamental implications for utility planning, opening the way for, and being a necessary precursor to, 'least cost integrated planning'.

In the 'suppliers of kilowatts' school of thought electricity demand is seen by utilities as something that they are limited to predicting, in order to ensure that sufficient generating capacity is available to meet that demand. Whilst such utilities argue "least cost" is part of their mission, it is 'least cost of generation' which is alone considered.

By contrast, in the more enlightened 'suppliers of energy services' school of thought, the utility accepts that 'demand' is the sum of millions of end uses: appliances, motors, heating and cooling systems, and lighting, all of which use electricity with differing degrees of efficiency, and that the utility can improve the efficiency of end use through deliberate demand management programmes.

Energy management

Thus least cost planning involves viewing demand not as given, but as a variable, since the efficiency with which electricity is used in the multiplicity of end uses can be improved, through utility investment in energy management programmes. These energy management programmes can deliver differing degrees of end use efficiency improvements, or amounts of 'saved' energy, for differing costs.

The essence of least cost planning is that energy efficiency is a 'resource', the cost of which can be evaluated in comparison with the cost of 'traditional' supply alternatives. Utilities should invest in the mix of resources, whether supply or demand management programmes, that allow them to satisfy the needs of consumers for energy services at the lowest cost.

Comparisons

Any discussion of least cost planning in Britain revolves around two principal questions: can energy demand and energy supply resources be meaningfully compared, and can energy efficiency be acquired with sufficient accuracy for utility planning? The attitude of the Department of Energy, last publicly stated at the time of the Sizewell Inquiry, is that neither is the case. The overwhelming weight of evidence from both North America and

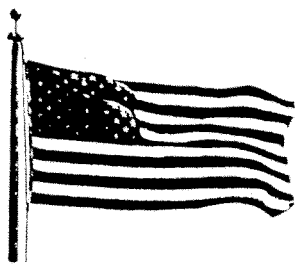
Scandinavia, is that the answer to both questions is an emphatic yes.

In the United States of America and Scandinavia much expertise has been developed in assessing the potential for improving energy efficiency, and the degree to which utility programmes can influence that improvement. In Scandinavia, Oslo Lysverker (Oslo City Light) have undertaken least cost planning for a number of years: as a consequence of such planning they promote energy efficiency investments through a system of grants and loans that covers all classes of end use. These incentives have succeeded in improving energy efficiency exactly in line with their predictions.

Validation

The US Department of Energy is funding research to further refine the methodology used in least cost planning, as is the electricity industry's own research body, the Electric Power Research Institute. However these efforts are only supportive; the bulk of the work undertaken to date to demonstrate the validity of least cost planning has been carried out by the utilities themselves.

As an example, one State in the USA where utilities have demonstrated to their satisfaction that energy efficiency and energy



Lessons from America

supply options can indeed be meaningfully compared through the process of least cost planning is the State of Nevada, where a State law has for five years required gas and electricity companies to undertake least cost planning.

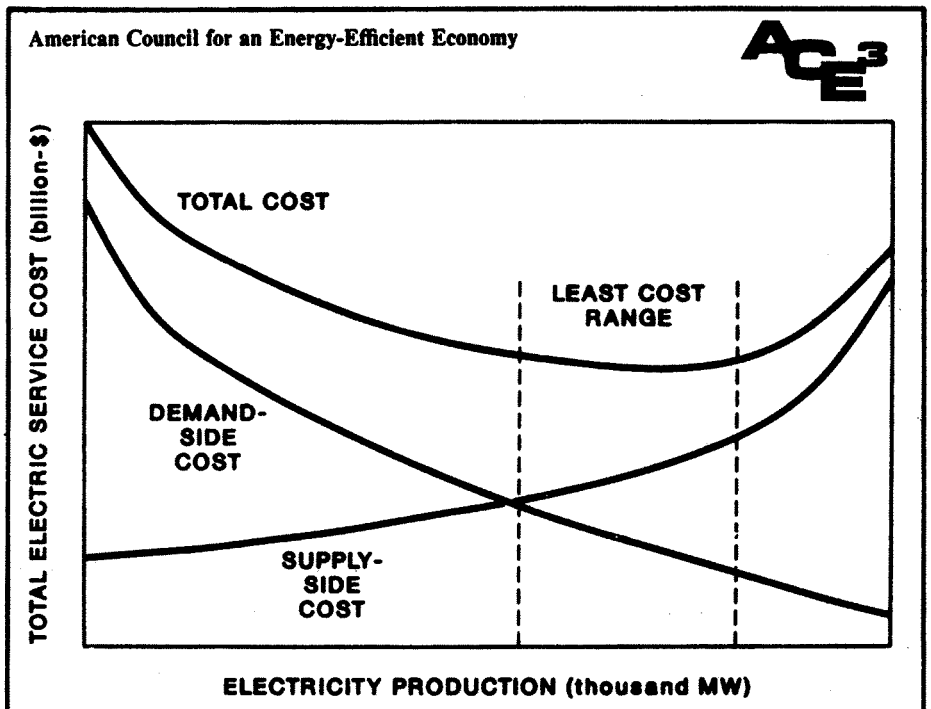
Five years of experience with least cost planning in Nevada has conclusively demonstrated that least cost planning is both possible and in the best interests of both the utility's consumers and shareholders. To quote from the Public Utility Commissioners responsible for introducing the regulations in Nevada: "Least cost planning works. Our utilities in Nevada have been doing it for five years. As a result, we have financially healthy utility companies with lower tariffs."

"Least cost planning has become accepted as standard utility regulation over the past decade. It has been accepted by utility companies as well as regulators." - Steven Wiel, Public Service Commissioner, State of Nevada, and Chairman of the Energy Conservation Committee of the National Association of Regulatory Commissioners.

Demand and supply

The latter point, that least cost planning is now accepted by the privately owned electricity companies in the USA is confirmed by the utilities in Nevada. The two electricity utilities in Nevada have developed considerable expertise in the process of least cost planning, and have much confidence in their ability to accurately assess the potential for both demand and supply options, as the following quote from the 1984 Resource Plan of the Nevada Power Company illustrates:

"A kilowatt of demand permanently removed from peak has essentially the same result as installing a kilowatt of capacity to meet growing demand. The difference between the two approaches is that it is a lot less expensive to shave demand than it is to add capacity. ...Nevada Power is counting heavily on demand-side solutions to meet future resource requirements. The Company's years of experience with load management and conservation give reason for confidence in this aspect of the overall Resource Plan."



Least-cost energy planning identifies the optimal mix of generation and conservation resources for a given level of energy service.

Sound investment

What is perhaps more illuminating is the attitude of the investment community: in the last five years the bond rating agencies have upgraded their assessments of the bond ratings of the Nevada utilities demonstrating clearly their belief that far from overburdensome imposition, least cost planing has improved the financial health of the utilities.

Utility regulators in a majority of US States now require their utilities to show that they have considered all options, including energy conservation and load management, when requesting permission to construct new generating or transmission facilities. By this means they seek to ensure that the utility invests in that mix of resources - and energy efficiency is a resource, like any other - which offers the lowest cost means of meeting consumers needs.

Least cost planning is an approach whose hour is at hand: if the golden opportunity to introduce it in the UK, through a clause in the Privatisation Bill, is lost then the electricity industry, its consumers and shareholders will all lose out.

Britain's nuclear dustbin

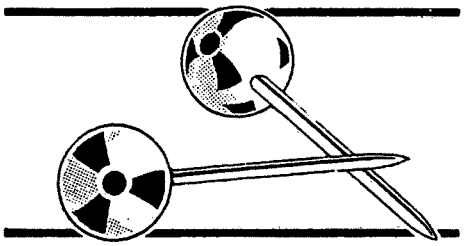
"Britain's Nuclear Waste: Siting and Safety," is a new book by Openshaw, Carver and Fernie, who believe that "nuclear power is becoming essential to the future of Britain and the world", and that crippling the nuclear industry will "probably also fundamentally damage future standards of living in Britain."

The book attempts to "provide an independent geographical view of the disposal of radioactive waste." The authors want to be "provocative to both sides" and hope to "draw the venom out of the debate and . . . provide a basis for an acceptable pragmatic solution to a very important problem."

If no acceptable solution to the radwaste problem can be found then "the ultimate future viability of nuclear power would be threatened."

In the spirit of debate we publish this article by STAN OPENSHAW, Lecturer in Geography at Newcastle University. On page 26 David Lowry reviews the book.

THE disposal of nuclear waste presents many difficulties to everyone. Anti-nukes have to live with the knowledge that quite large quantities exist, if nuclear power is abandoned then even larger quantities will be created and the problem could conceivably become totally unmanageable. The Government (any government) has to live with the massive unpopularity that radwaste dumps readily engender



and poor old NIREX have been given the largely impossible task of solving the problem as soon as possible.

The Department of Environment has to somehow provide a coherent regulatory response in an area notoriously deficient in long term strategy. The Central Electricity Generating Board and South of Scotland Electricity Board (or the private successor companies) have the practical problem of having to handle, fairly soon, increasing quantities of decommissioning waste.

The Ministry of Defence has an increasing fleet of old radioactive submarines to dispose of, and British Nuclear Fuels (BNF) is lumbered as housekeeper to Europe's hottest collection of radioactive waste.

A bad idea

Obviously no community is going to be thrilled at the prospect of being neighbours to x billion becquerels of radwaste, no matter how safe it may be claimed to be. Yet it took an amazingly long time for this simple fact to be understood by those involved. Common sense suggests that disposal under, or near, major population concentrations is a bad idea. It gets a lot of people very excited and creates a situation in which the prospect of subsequent cancellation is nearly certain.

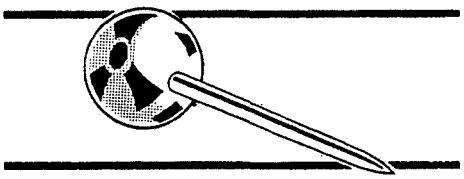
Yet, it has taken a long time before reasonably pragmatic (and not purely engineering optimal locations) have started to be discussed. The sites at Sellafield and

Key policy statements

Date	Event
1955	White Paper (CMND 9389) announcing civilian nuclear power programme
1959	White Paper (CMND 884) Control of Radioactive Wastes
1971	British Nuclear Fuels plc (BNFL) formed from part of UKAEA
1976	Royal Commission on Environmental Pollution, Sixth Report: Nuclear Power and the Environment (Flowers Report)
1977	Government's Response to Flowers Report (Cmnd 6820) setting out basic principles
1977	Windscale Public Inquiry
1978	Radioactive Waste Management Committee (RWMAC) created
1982	White Paper (Cmnd 8609) said HLW not an immediate problem NIREX created
1984	Department of Environment, Radioactive Waste Management: the National Strategy
1983-85	Sizewell B Public Inquiry
1986	House of Commons Environment Committee: Radioactive Waste White Paper (CMND 9852): Government's response to Environment Committee
1986	Special Development Order, July 7th, to allow investigation's to proceed. Near surface facility only for LLW
1987	Way Forward: NIREX discussion document
1989	Short list of sites announced
1992?	Public Inquiry

Dounreay may still appear unacceptable but they are clearly far more realistic than either Billingham or Elstow.

Storing nuclear waste around the country at Britain's nu lear sites, as some people have suggested, is probably even worse than returning



to Billingham. There is nothing really wrong with planning a 50-100 year surface storage facility as an interim measure, indeed this would probably be an ideal strategy, but to distribute them around the country would only serve to increase overall anxiety levels; so many people would feel themselves "threatened" in some invisible way that it would be inviting cancellation and that might be disastrous.

Choosing a site

It is worth remembering that the option not to have a nuclear dustbin is no longer available. The radwaste has to be stored or dumped somewhere and with the end of sea-dumping, the site is going to be either land based or land accessed. Therefore the only real uncertainty is where.

Now in tackling this difficult problem a number of key principles seem to be at stake: (1) you need a long time horizon, (2) you need to be able to demonstrate the optimality in a national context of whatever site or sites are preferred, and (3) you need to pay attention to engineering AND public acceptability criteria.

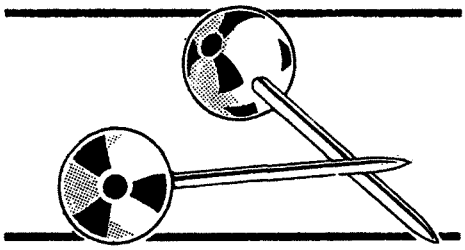
Solutions

Fortunately, the macro-geographic questions can be answered using Geographical Information System technology. The public acceptability problems can be reduced by minimising the populations living "near" to a proposed site (near might be within 30 miles, on the principle "out of sight out of mind").

The long term moralistic concern about legacies for future generations can be reduced by planning long term storage rather than disposal until such time that the engineers can demonstrate they really know what they are doing rather than having a good grasp of the theory. Finally, there needs to be a degree of long term planning with a time horizon of a few hundred years, rather than 5 or 10.

Remaining challenge

It is likely that the need to dispose of radioactive wastes will now always exist, it will not go away and has to be faced. The problem can, however, be managed in a broadly acceptable and common sense manner, this now seems (at last) to be



happening. Nevertheless, the challenge remains. Locating Britain's radwaste dustbin is a most difficult problem.

There is a continuing need by all concerned for flexibility, dialogue, and understanding, as well as some attempt to work together to ensure the best possible solution that will most benefit future generations of Britons (English, Welsh and Scots).

Legal screw turns on Sellafield

British Nuclear Fuels are now facing a barrage of legal cases resulting from their activities at Sellafield, with the first one due to come to court in October. SCRAM put a number of questions to the lawyer representing the West Cumbrian families, Martyn Day.

Q. We understand you are bringing three different groups of cases against Sellafield, could you describe what they are?

A. On 2nd October the case of the Merlin family will commence in the High Courts in London. They used to live in Ravenglass, just a few miles down the coast from Sellafield. Their action relates to the discovery of large levels of radioactivity in their home resulting from the radioactive discharges at Sellafield. As a result of this discovery back in the early 1980s the family lost a great deal of money when they tried to move out of the area only to find that no-one wanted to buy their house. We are suing Sellafield for those financial loses.

The second set of cases relates to the high incidence of leukaemias that have been discovered around the Sellafield plant. I have been instructed by over thirty families from the area to consider whether it would be possible to claim for the pain and suffering incurred by their children who have contracted leukaemia.

The third set of cases relates to local farmers who have been had difficulties selling their farms as a result of the radioactivity levels in the area. We will be claiming here for their economic loss.

Has anything like this been tried before?

Before these actions the only claims against BNFL have been from the workers at the Sellafield plant. About 25, or so, workers have been compensated for cancers they contracted whilst working at Sellafield. These will be the first cases where local people not working for the company have taken on BNFL.

We understand that BNFL attempted to prevent the families receiving legal aid. Is that the case?

Yes! In all of the cases I have tried to obtain legal aid for the families because of the huge costs involved in taking on such an enormous body as BNFL. In the leukaemia cases, I applied for legal aid and was originally told that the Law Society intended to issue legal aid certificates to all those who fell within the financial parameters of the scheme.

However BNFL's solicitors wrote to the Law Society putting pressure on them not to grant legal aid, following which the applications were turned down. I appealed against that decision and following a hearing the Law Society was persuaded to grant legal aid.

What is the basis for the leukaemia claims?

It is now clear that there is a tenfold excess of leukaemias in the Sellafiead area, there is also a six-fold excess around the Dounreay area (the only other nuclear reprocessing plant in Britain), and there are known excesses around other nuclear plants, such as has been shown in the recently published report on Aldermaston and Burghfield. It is increasingly being accepted that these excesses cannot simply be coincidences and that there must be a link with the plants. The crucial question is whether it can be proved that it is the radioactive emissions causing the leukaemias.

What stage has the case reached?

We are now in the process of determining which cases are most likely to succeed. We are likely to take forward four or five cases to concentrate our energies with the intention of coming back for the others if we are successful with the first batch. Once those test cases are agreed upon we will be commencing proceedings in the High Court in London.

What do you think are your chances of success?

I think we have a strong case. Clearly BNFL will put every ounce of effort into opposing these claims and my job is to put together a legal team capable of withstanding all that BNFL will throw at us. I think we have a pretty reasonable chance of succeeding.

What are the implications if you win?

In my view they are enormous. If the British courts were to accept on the balance of probabilities, which is the civil court level of proof, that these nuclear plants were causing the leukaemias, as a result of radioactive emissions, it would fly in the face of the propoganda being pushed out year after year by BNFL that the emmissions are not causing any harm to anyone. Who could ever accept their line again? And, if its true for the Sellafield area what about the other nuclear plants in the UK and all over the world.

Are there implications for other green issues?

Yes! Again if we are successful here it would perhaps encourage individuals to take on other multinational companies who have been polluting and causing illness in local communities for decades with impunity.

We will update readers as these actions progress.

Windscale fallout

Simon Boxer, of Cumbrians Opposed to a Radioactive Environment (CORE), talks to SCRAM about the help they give to people who feel they have a just claim for compensation as a result of radiation at Sellafield.

Q. We understand that CORE takes up claims on behalf of Sellafield workers, ex-workers or their relatives. Can you tell us about what you do?

A. People contact CORE because we're a local group: they've heard we help with compensation cases if one of the family dies or they have a legal problem relating to Sellafield. We get a lot of calls every year, not all of which are followed up, perhaps because they haven't got enough evidence, or there are too many problems or they just want a sympathetic ear and don't want to take legal action. Once we have a definite case we carry out interviews with the people involved and pass the main particulars to our network of solicitors. We also contact doctors and scientists, if there is any need of extra medical or scientific input. At present we are dealing with 15 cases including members of the public, workers suffering from cancer and widows of Sellafield workers. But we don't just cover Sellafield, we've also got cases from Dounreay.

Can you tell us about the Radiation Compensation Support Fund, and why you are asking for donations for the Fund?

On 30 October 1987 (the 30th anniversary of the 1957 Windscale fire) we set up the Radiation Compensation Support Fund. It isn't used to cover legal costs, as most of the cases should be covered by legal aid - but legal aid doesn't cover all expenses, such as travel costs; sometimes medical expenses may be incurred.

We don't believe that the Sellafield workforce get a fair deal from either the unions or management, so we aim to get justice for local people but also to set legal precedents, which will help people all over the country. The support fund is kept completely separate from campaign funds - it isn't very large and we're always looking for more funds.

What is CORE's involvement with the leukaemia cases which Martyn Day is dealing with?

We've got nothing to do with the leukaemia cases that Martyn Day is taking forward, although some of the families came to us first and we passed them on.

Besides Sellafield workers we are also looking at some land blight cases - mostly farmers near Sellafield whose farms have been heavily effected.

Can you give us some examples of the type of cases you are dealing with?

Two cases illustrate the cases we're dealing with:

Mary Thomas (not her real name) was not long married when her husband Fred began working at Sellafield in 1952. The problems began when he phoned home to say he was working late on a 'ghoster'. She remembers him complaining that he had to go into an area where plutonium had come through a wall and had to clean it up. The real shock came when he arrived home late one night after doing another 'ghoster'. He'd been scrubbed red raw. Small fifty pence sized pieces of his scalp showed through where his hair had been cut away. His finger and toenails were pared down to minimum and his ears scraped out, even his watch had been taken apart and decontaminated.

Like most of the men at Sellafield, Fred did not discuss freely his worries about the effects of radiation. In 1975 he began to fall ill with a number of minor complaints. He was diagnosed as having lung cancer and many secondary cancers. He died in 1979 aged 58.

Mary Thomas came to Core in 1973. The union have consistently refused to release papers they have on his case. As a result of this delay medical papers relating to Fred have been destroyed. It was only after several solicitors letters to BNFL that a reply was received. The company have now agreed to review the case, under their own compensation scheme, in the light of further information. Neither the union nor the company have ever written to Mary to tell her what the new informartion actually is. Until the compensation scheme case is settled Mary will not get legal aid. Now 8 years after her husband died she is still waiting for word on her claim.

Arthur Wilson (real name), aged 32, looked through a gag port in plutonium pile No. 1, on 10th October 1957, and saw the flames which signalled the beginning of the Western World's worst nuclear catastrophe. As an instrument technician Arthur's job had been to fit

thermocouples which measured the temperature in the reactor. Due to bad design they were put in the wrong places, alllowing temperatures to build up unnoticed until the fire began. After the accident Arthur began to get tingling sensations in his legs - he then began to experience difficulty in walking, neither his local GP nor the Sellafield doctor could diagnose his illness. Unable to work, Arthur retired in 1962. He never received a penny in compensation. Now 64, he has been wheelchair bound for 12 years, and recently spent the last of his savings on an electric wheelchair, to retain some independence. He has had no help from the unions or the Sellafield Charity Fund. Once a month he gets BNFL News. Until we took up his case no-one had shown any interest, yet as far back as 1968 neurosurgeons agreed that his illness could be radiation induced. When he sent word up to the control room that there was a fire he was told "don't be so bloody daft". The man who said that was plant manager Henry Davy who died in 1960 of the bone marrow cancer multiple myeloma, the only known cause of which is radiation.

Donations to the Radiation Compensation Support Fund should be sent to CORE, 98 Church Street, Barrow in Furness, Cumbria.

Methane - the Landfill Gas - is a major contributor to Global Warming and poses a danger to public health from explosions. Yet, as MIKE TOWNSLEY discovers, it could provide up to 5% of our electricity needs.

Where there's muck there's gas

LANDFILL sites, in which 90% of the UK's 20 million tonnes of domestic and non commercial waste are 'dumped', were described as "time bomb" sites in Her Majesty's Inspectorate of Pollution (HMIP) annual report, published in March of this year.

Fears over the potential dangers of the nations 3,330 active landfill sites led the Inspectorate to call for a closing of loop holes in waste disposal legislation and a tightening of controls under which landfill operators operate.

Methane, an explosive gas, is responsible for a phenomenon that travellers in the middle ages called the 'will-o'-the-wisp' - a malevolent fairy that would lure greedy travellers to their doom, with the promise of gold. However, the eerie phosphorescent light, which hovers over marsh and bog lands is no more than the flaring of methane generated in the bog lands.

Anaerobic digestion

The process was identified in the late sixties as 'anaerobic digestion'. It also occurs in Landfill. Under this process organic matter, such as plants, is broken down, in the absence of oxygen (anaerobic), into sugars then acetic acid and finally methane gas and carbon dioxide. Methane production is roughly twice that of carbon dioxide, and it is the methane which poses the biggest threat. Not simply because it is explosive and poisonous; it is a greenhouse gas - a gas which contributes to global warming.

Methane from landfill can be used constructively, by burning it to generate heat and electricity. Yet the current legislation, which Nicolas Ridley, the former Minister for the Environment, had promised to reform, is so lax it discourages the uptake of this option. This followed a report from the Commons Environment Select Committee which criticised the history of neglect over waste disposal in this country. The report expressed its disbelief over a clause in the legislation that allows licensed landfill operators to simply hand in their licence and walk away from sites where the evolution of methane has reached an unmanageable level.

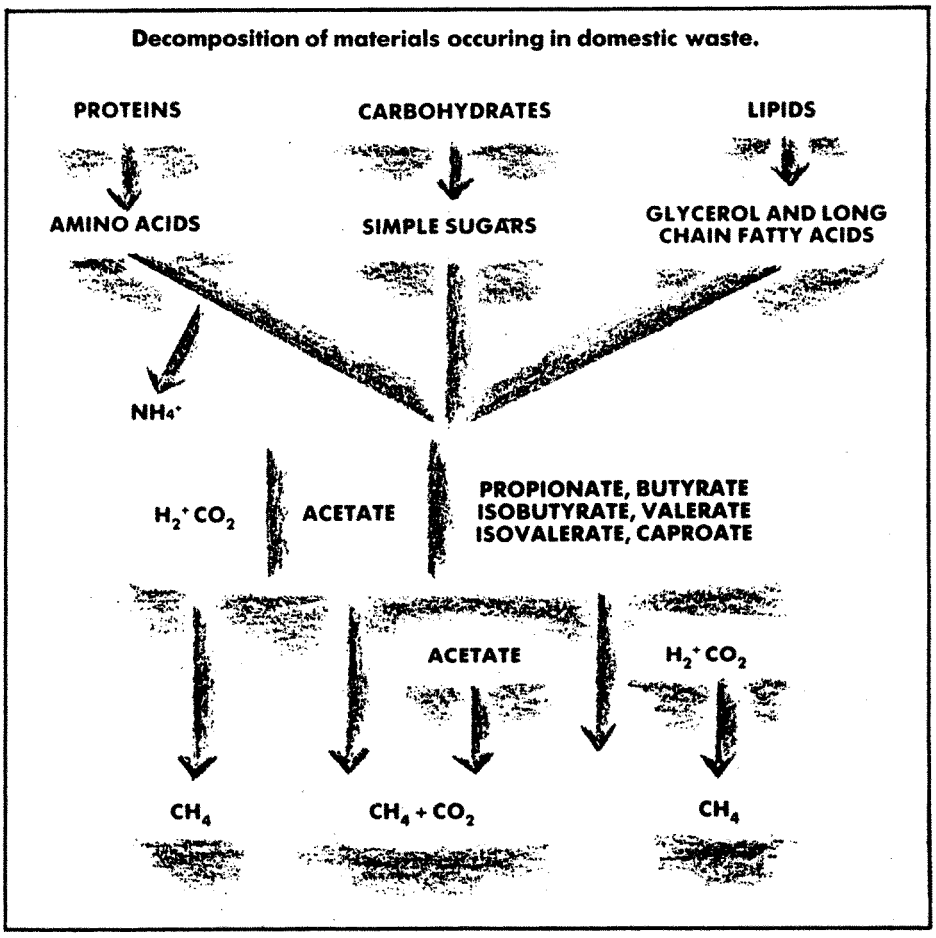
New legislation should make the controlling of gasses produced by landfill a necessary prerequisite for the granting of a licence, and will make the option of using the methane gas an attractive means of recouping some of the cost of disposal.

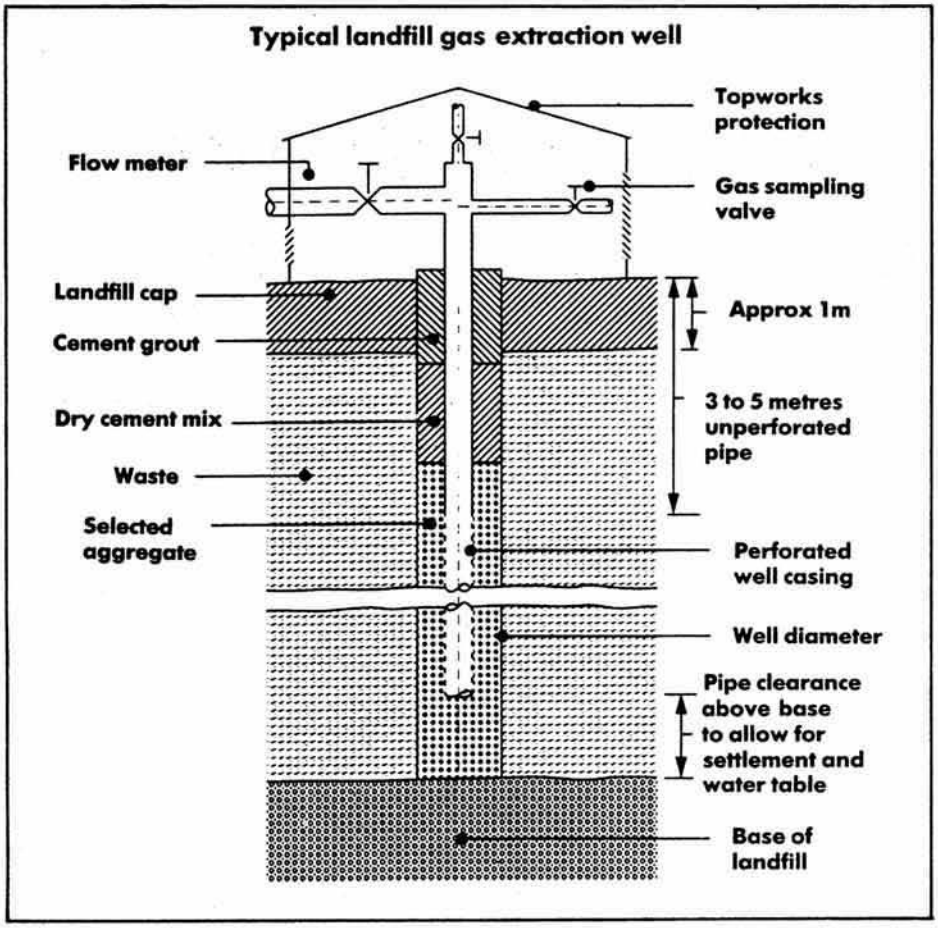
Of the existing sites in the UK some 1,500 may require pumping of gas at some time during the period of waste dumping or the following 15 years, for which they remain active. This involves sinking plastic pipes into the heart of the site or for new sites laying pipes as the filling progresses. However in many cases the amount of gas would not be sufficient for use. In 1986, a Government survey identified 300 sites in England and Wales where significant quantities of landfill gas could be harvested. Currently, only 26 sites are exploited for their energy potential.

The gas has a calorific value of roughly half that of natural gas. The potential output from one tonne of landfill waste is of the order of 400 cubic meters of 'biogas' over a period of 10 to 15 years. Ideally this gas would be burned in the vicinity of the site in boilers, kilns or furnaces to satisfy some or all of the requirements of a local industry. However, often this is not practical. Electricity generation provides another option.

Anthony Biddle, managing director of Packington Estates Enterprises Ltd, who operate 6 licensed landfill sites, argues: "Here is an alternative form of energy which could satisfy up to 5% of the nations needs in electricity demand and consumption. It needs to be nurtured rather than neutered." Packington generate 3.7MW for export to the grid from their landfill site at Little Packington, half way between Birmingham and Coventry. The project won the Commemorative award from the Institute of Wastes Management as part of their contribution to the European Year of the Environment.

Last year HMIP disclosed that 500 landfill sites in England and Wales





were emitting levels of methane and CO_2 that pose a danger to the public health. Thelma Hillman, of the West Midlands Hazardous Waste Unit, told a conference held at Harwell, last year, that the number of incidents being brought to her attention was "quite alarming", adding: "One can rarely speak to a waste disposal authority which hasn't had either a near miss or an incident."

Tougher legislation

In the US, where tougher dumping legislation controls waste management, the use of landfill gas to generate electricity is used at just under half of all landfill sites. It was that tougher legislation that led to a plan to import 2 million tonnes of US refuse to Cornwall for use in Landfill. The company Power, Water and Waste planned to generate electricity for local industry. Public outcry led to the proposal being abandoned.

The US pay $120/tonne for waste disposal, whereas in the UK it costs between £5 and £10 per tonne. The main reason being that American companies must isolate the waste from the surrounding environment, above and below ground, to prevent the noxious gasses from polluting ground water and the atmosphere. "In this country we only use clay," said George Pritchard, the architect of the scheme, "and in Cornwall they don't even use clay." It was perhaps the public fuss caused by the Cornish proposal that led the Government to announce new legislation, rather than the continued criticism of the law from official bodies. The legislation is to be introduced in the new session of parliament as part of the much discussed green bill.

Both methane and CO_2 are greenhouse gasses, and are released into the atmosphere by all landfill sites. Effective waste management and burning the biogas reduce the amount released into the atmosphere. Annually 54 million tonnes of CO_2 equivalent - about 10% of UK CO_2 output - are pumped into the atmosphere from UK domestic waste disposal. However, if landfill gas is burnt the methane is oxidised into CO_2. Methane is a more virulent greenhouse gas than CO_2 - 27 times more. Its combustion would reduce the landfill contribution to about the equivalent of 16 million tonnes of CO_2.

Methane production

The Energy Committee's 6th Report - The Policy Implications of the Greenhouse Effect - "recommends that the Government and local authorities take further steps positively to promote the use of methane from landfill sites. This will act as a considerable spur to the development of these sites for electricity generation. The potential is enormous: if half of all the waste produced annually were used to generate heat and electricity, that would reduce emissions by the equivalent of five per cent of our annual CO_2 production."

Cecil Parkinson, the Energy Secretary, told the Committee that by the end of 1990 he expects 42MW of electricity to be generated from landfill, involving about 20 sites.

Energy paper 55, published during the summer of last year, the most recent Department of Energy publication on alternative energy sources, classifies landfill gas as "economically attractive", but without the necessary legislation to ensure that waste dumps are operated safely these will remain hollow words.

The explosive power of uncontrolled landfill gas at Loscoe, Derbyshire

Arnott untangles Webb

Dr Richard Webb served for four years in the Naval Reactors Division of the US Atomic Energy Commission, and went on to earn a Doctorate in Nuclear Reactor Physics and Engineering from Ohio State University, in 1972. Since 1970 he has been researching the accident hazards of nuclear power stations; including both PWRs and AGRs.

He gave evidence to the Hinkley Inquiry on behalf of Commander Rob Green, who has campaigned against the PWR since the murder of his aunt, Hilda Murrell. DON ARNOTT, former IAEA consultant and radiation physicist profiles Richard Webb, the man whose evidence ran to over 100 pages, and analysed the accident hazards of the PWR.

His claim that AGRs could suffer from a Chernobyl-style explosion elicited a somewhat prosaic response from the SSEB: "There is no limit to the things man can imagine - that is the basis of science fiction, after all."

THE essential facts about Dr Richard Webb will be sufficient to explain why this most essential article has been all but impossible to write. He is an American citizen, aged about fifty but looking younger. For all of his professional life he has been a nuclear scientist and holds a PhD in reactor physics and engineering. Nobody of worth ever remains within the framework imposed by their academic qualifications, he is actually a theoretical physicist with marked mathematical ability who has devoted his life to studying the safety of nuclear power. From that study he has concluded that all existing reactor types are unsafe.

Within that very broad framework he has concentrated his effort on studying their capacity for catastrophic explosions, to the exclusion of other accident scenarios. One misrepresentation of his views is so important that it must be disposed of the moment it arises, he

'he is concerned with massive fires and steam explosions'

is not alleging that reactors can explode like nuclear bombs and has often said so. He believes, as I do, that recriticalities and prompt neutron excursions (as at Chernobyl) can contribute to disaster (SCRAM 64); but in the main he is concerned with massive fires and steam explosions.

PWR experience

Many of us believe similar things, but Richard has one qualification which we lack. He has operational experience. He worked as part of Admiral Rickover's team on the first PWRs - most of his working experience has been with that reactor type - and there can be no doubt that the advice he gave, which was acted upon, at the time of the TMI-2 accident, at least, prevented bad from becoming worse. His critics in this country might reflect - and, to be fair, probably do - that not one of them has his working experience of PWRs.

About ten years ago he had the enormous courage of his convictions and opted out. Weapons and power apart, a nuclear scientist has almost nowhere else to go except into limbo - whatever his abilities and qualifications (there are examples of tragic loss in Britain today). Two things inevitably happened.

Pro safety

First, he was subject to character assassination attempts, which he successfully refuted - unavoidably at the cost of much work and sense of hurt. I have read some of these attemps; Richard being ruthlessly honest and concealing nothing. I give one short example of the sort of thing he has been up against.

Being convinced that all present reactor types are inherently unsafe he is seeking chapter and verse in substantiation. If he encountered a reactor type which was inherently safe ie. no matter what happened to it, he would believe in it because, as Robert Green once put it he is not so much anti-nuclear as pro-safety. (Incidentally, this could happen. So far as I know he has not examined the High Temperature Gas Cooled reactor which might, just might, prove the exception.)

Vituperation

Probabilistic analysis, in the context of reactor safety, seeks to evaluate the efficacy of safeguards, usually engineering ones, as protection against inherent defects ie. those which are Webb's concern. It therefore plays only a subsidiary role in his thinking - he is not concerned with probability only whether or not an accident is possible. Perceiving this, the critic to whom I referred went on to deduce that, therefore, Webb thought that all accidents were equally probable and that his views were without value. Recognising that this was vituperation, not argument, and affronted that a Los Alamos scientist could put his name to such drivel, I read no further. Some other criticisms are better but, in general, his critics are prevented by their own way of thinking from getting to grips with his point of view.

But he is at grips with theirs. He does not deny the value of experiments on reactor safety but he does point out its limitations: the

ultimate test can only be the full-scale one on the finished article - something which, so far as reactors are concerned, is economically impossible and environmentally unsafe. The whole of industrial history proves him right. So far as possible one foresees and prevents accidents - but eventually there is nothing left but, so to speak, to suck it and see.

In purely scientific terms the common ground, without which all argument is sterile, is certainly discoverable. What stands in the way is the Freedom of Necessity: the politics of heavy prior investment (intellectual as well as financial) The French, for example, are forced to believe in nuclear power because

'Nuclear critics everywhere are desperate for minds such as his'

they have no nationally-based alternative. Scientists are no more immune to these pressures than anybody else. Webb deals with them by simply ignoring them - which is one of his biggest shortcomings.

Inevitably Richard got overloaded with work. Nuclear critics everywhere are desperate for minds such as his. So it was the AGR here, the Fast Breeder in Germany - and then again the PWR in Britain, and with almost no time to prepare for it. Had it not been that he works like a force of Nature he would have accomplished nothing at Hinkley.

Brilliantly clear writer

Such pressures take their toll and do not turn men into saints. One casualty has been his writing. His only finished work is his book "The Accident Hazards of Nuclear Power Plants" which must be mentioned because it reveals him as a brilliantly clear writer - given the chance. His voluminous other works are incomplete, each having been overtaken by events demanding his attention. Many contain mistakes, subsequently acknowledged - and Webb is severe with himself about his mistakes.

At the human level his experiences have driven him in on himself and he has become overly self-sufficient intellectually; probably he has had too many rebuffs to make it easy for him to seek the opinions of others. This limits his effectiveness in two ways, both remediable. Firstly, theoretical physics is tautological: it explains itself in its own terms, frequently unconstrained by the rigour of experiment, always unconstrained by contact with any other experimental science. Its practitioners frequently theorise themselves clean off the ground in consequence - and Richard is no exception. These, of course, are the occasions on which his opponents seize. His other limitation arises, in part, out of the first. For the subject which he has made his own is in fact interdisciplinary; it involves both chemistry and biology. On such matters, as I have found before now, physicists are inclined to skate over, or take for granted, or even invent their own - and Richard's chemistry, in particular, does not begin to be adequate to his needs. But is it a rebuke to say that one man cannot know everything?

Basic sympathy

At the purely personal level I hardly know him; yet sufficiently so to realise that he only requires two things of you, both reasonable. Firstly that, even if you do not agree with him, you should have a basic sympathy with what he is trying to do. Secondly, that you should know your subject. I feel that, professionally, we might get on splendidly together. Meanwhile he remains for me the only person who has had the intellectual reach and audacity to take on the whole field of nuclear reactors in a critical and highly fundamental sense: uncomfortable to contemplate, impossible to ignore.

Inquiry system

What has all this to do with Hinkley? Everything: in this thumbnail sketch I have expressed the most important truth of all. You are now to contemplate, if you can, the impact of this larger than life figure upon our Public Inquiry system, originally established to cope with local issues and now uncomfortably grown to encompass national ones. It simply failed to cope with him, nor would it have done had he had time to prepare his case in the detail that he would have wished. To take the point which sticks out like a sore thumb - cross-examinations. These are carried out on the Government side, by QCs who are not able, off the cuff, to cope with extremely obscure technical arguments - but this is not said as a rebuke.

Things were better when he was cross-examining the Industry's scientists; yet here again they were talking from standpoints which never really met. One instance must suffice; if you take them singly this was probably the most valuable point which he established. He calculated that if an AGR lost all its forced gas-cooling, whilst all control rods were withdrawn, the fuel cladding stainless steel would melt very quickly. Brian George, leading the CEGB Safety Team, in fact confirmed (transcript, Day 54) that it would do so in about 35 seconds. Slumping of the oxide fuel pellets would result. There would also be an increase of reactivity since the cladding itself absorbs neutrons. The temperature would be in excess of 1400°C. All the preconditions for an extremely dangerous fire would be met with the additional possibility of catastrophic steam explosion in the event of water ingress. Hardly a fail-safe situation in Webb's view; and he was right.

Dangerous conditions

But the Industry argued that such extreme situations could never arise in practice. They could concede that there were circumstances in which all forced cooling could be lost. But when a new fuel charge of maximum reactivity potential is installed the control rods are fully inserted; they are withdrawn slowly as reactivity is used up; so a condition in which they are fully

'seeking a reactor design which fails safe whatever happens'

withdrawn from the core never arises. Though the argument is in detail somewhat shakier than that, they too are right. But they are talking, as ever, about different things. Webb is seeking a reactor design which fails safe whatever happens. The Industry is talking about the successful containment of potentially dangerous conditions.

Obviously, we are going to agree with Webb. But I am still not going to believe that it is to be forever impossible for scientists to bridge this gap. I therefore briefly supported, at the Inquiry hearing, Webb's proposal for an independent commission of Inquiry which could go into the whole matter properly. Although it remains a superb educator of people the present Public Inquiry system has lost its usefulness for pronouncing on highly technical matters of greater than local importance. Probably the most useful thing which Webb managed to do was to demonstrate this in his own person beyond the point at which it can any longer be disputed.

FRG aid for Pakistan's bomb

The history of Pakistan's nuclear development is a major example of the clandestine acquisition of reprocessing and uranium enrichment equipment in defiance of the international non-proliferation regime.

Pakistan is now believed to have the capability to make nuclear weapons, leading to fears of an arms race between India and Pakistan, or a pre-emptive Israeli bombing against what it is thought could become the 'Islamic Bomb'.

NICOLA LIEBERT, reporting from Berlin, examines the assistance Pakistan has received in developing its nuclear capability, from the export hungry German nuclear industry, and the half-hearted attempts by the German Government and the United States to prevent the spread of nuclear weapons in South Asia.

IN FEBRUARY of this year the Pakistani Ambassador in Washington announced that his country was poised on the threshold of producing nuclear arms. Until then, the government had always asserted that its nuclear programme served only peaceful purposes.

Benazir Bhutto, Pakistan's Prime Minister, has repeatedly denied that her country has nuclear weapons or has any intention of developing them. However, she says she will not sign the nuclear Non-Proliferation Treaty or allow international verification visits unless India agrees to follow suit.

The Federal Republic of Germany always wanted to believe these assertions, as they suited its export interests, since the European market is shrinking dramatically. For example, the German reactor builder KWU has not had a single European order since 1975.

The country has signed the non-proliferation treaty (NPT) and is also a member of the Nuclear Suppliers Group, whose aim it is to control and prevent the spread of sensitive technology. Nevertheless, it has never hesitated to export sensitive nuclear technology to the nuclear threshold countries such as Brazil, Iran, India, South Africa - and Pakistan, allegedly for exclusively civil use.

Safeguards

For the German exporters it is particularly difficult to compete on the international market as they cannot offer a continuous supply of uranium to the buyer nor can they take back and reprocess spent fuel. In order to make up for this disadvantage, they endeavour to sell the complete nuclear cycle to the importing countries. This, however, increases the chance of the importing countries producing their own weapons-grade material.

Moreover, German nuclear companies managed to present themselves as especially attractive to their trading partners by largely abstaining from strict safeguard requirements. Unlike the United States of America, which usually demands full-scope safeguards in countries to which it exports, Germany at most requires safeguards only for the plant which is delivered.

Pakistan is a case where German suppliers stepped in after Canada and the USA imposed an embargo on the country because of its suspected military plans. Pakistan's only commercial reactor, Kanupp near Karachi, a heavy water reactor which could produce weapons-grade plutonium as a by-product, was built by Canadian General Electric. In 1986 Siemens/KWU initiated business connections with Kanupp. First, Pakistani engineers were trained in KWU works, and in 1988 an order came in for a neutron flow gauge, an essential part for the reactor requiring governmental licence according to the regulations of the Nuclear Suppliers Group.

Indian bomb

This deal met with a barrage of international protest, especially as KWU had already come to India's aid when the USA and other countries placed an embargo on it after the explosion of its first nuclear bomb. The venture came to light just after the USA intervened against the German companies who built a factory, capable of poison gas production, in Libya.

Until then the German government always asserted, when there were criticisms of German nuclear exports to threshold countries, that such deals could only happen on the black market and were illegal. In the case of Siemens/KWU, a renowned multinational firm was involved. It had received explicit governmental approval, at least for the Indian contract. Nonetheless in the Pakistani case the deal was planned secretly and was to be carried out via another firm.

Secret location

In March of this year, the USA made new allegations. It now lieves that Pakistan is building or has completed a 50 megawatt reactor, at a so far unknown location, from which both weapons-grade plutonium and tritium, a booster for A-bombs, could be obtained. Unlike Kanupp and another small research reactor, this one would not be under International Atomic Energy Agency safeguards. The proposition begins to make sense of the various contracts awarded for the delivery of sensitive equipment which have been uncovered over the past few years.

Illegal deliveries to Pakistan from the Hanau firm NTG and another company, PTB, were discovered by the public prosecutors during the NUKEM scandal of last year. The authorities had permitted NTG to export technology for the purification of heavy water (which in itself is scandalous enough). In reality, however, the installation purifies tritium - and cannot be used for either of the two known Pakistani reactors. According to evidence provided to the public prosecutors it is actually restricted to military use.

Fissile material

Deliveries from some other companies also hint at the existence of a secret reactor. NUKEM is known to have entered into negotiations with the Pakistan Atomic Energy Commission (PAEC) about the sale of nuclear technology and fissile material.

Meanwhile legal proceedings have been started against 70 German companies which are believed to be involved in the nuclear trade with Pakistan, after a list of trading partners was found during a raid on the National Bank of Pakistan in Frankfurt.

From special steel, optical equipment and computers to tritium, the German companies have delivered practically everything that is needed to construct an atomic bomb.

Private companies aren't the only ones embroiled in the nuclear deals with Pakistan. Three renowned research institutes have also been implicated. For instance, the Nuclear Research Centre Karlsruhe (KFK) has helped the Pakistan Institute for Science and Technology (Pinstech) near Rawalpindi. Now, the Institute can now generate over 40 pounds of plutonium each year.

Closer watch

Since 1983 various, worried, memoranda have been sent regularly from the Foreign Ministry to the Ministry of Economy, requesting that KFK be watched more closely. These warnings were given not because of a concern that Pakistan might develop nuclear weapons, but in the fear that the United States of America might discover the co-operation with Pakistan.

Last year a scientist from the Max-Planck-Institute, who for years had traded with Pakistan, was refused permission to make another trip when the Ministry of Science declared their concern. Does this mean that the Ministry knew about the illegal deals - without intervening - long before the public prosecutors began to investigate?

The US Government and even the West German and the Soviet secret services had warned Bonn many times about the export of sensitive material, but the government ministries responsible chose to ignore the warnings. Washington, which is extremely annoyed about the West German export policy, especially since the poison gas scandal, will be watching the conduct of the Kohl Government with regards to non-proliferation very closely.

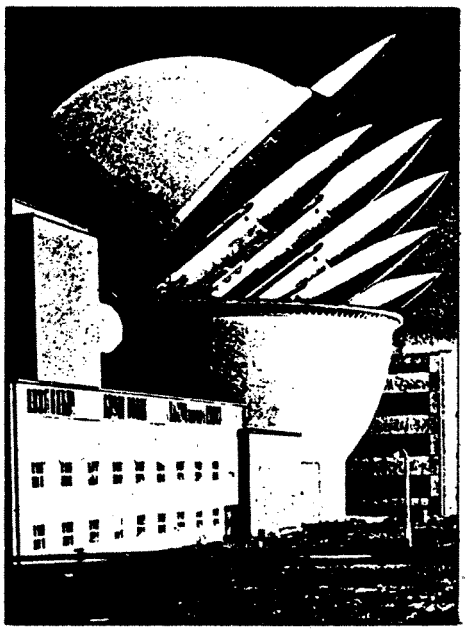
Diplomacy

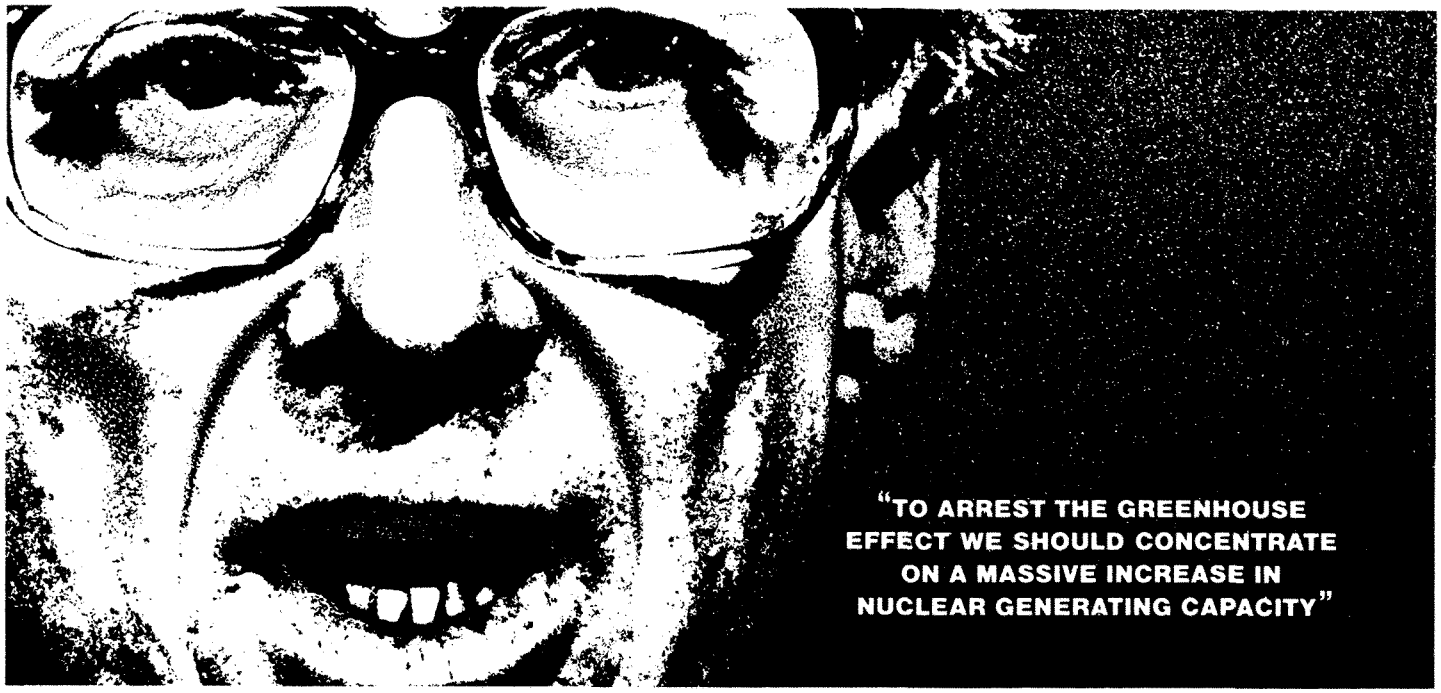
Unfortunately, strong pressure from the US Government is unlikely, because it might upset the delicate negotiations over the modernisation of short range nuclear missiles in Germany.

Consequently, the new draft bill concerning illegal exports of sensitive goods, which is presumably the result of US pressure, turned out to be rather lax. It penalises arms proliferation with a 15 year sentence only when "negligence and thoughtlessness" can be proved. Like the Non-Proliferation Treaty the bill emphasises that the civil use of nuclear power should be promoted. In other words, the bill continues to perpetuate the rather dubious claim that civil and military uses of nuclear power can be separated. This is precisely the kind of thinking which led to the discredited German export policy and the various nuclear scandals uncovered so far.

The Germans appear to be trying to leave themselves the option of developing their own nuclear weapons and continuing with their export strategy as before, whilst attempting to reassure the United States and polish up the image of German exporters.

As Green MP Otto Schily commented, "the fulfilment of the non-proliferation treaty by the FRG is by no means guaranteed."





SCIENTIFICALLY SPEAKING, IT'S JUST A LOT OF HOT AIR.

Nicholas Ridley, the Government, BNFL, and the CEGB claim that nuclear power is an answer to the greenhouse effect.

This view is mistaken.

Moreover, 100 of the country's leading scientists, doctors, and engineers, 40 of whom are listed below, have signed the following declaration:

"NUCLEAR POWER IS NOT AN ANSWER TO THE GREENHOUSE EFFECT.

The nuclear industry is right when it says that the greenhouse effect is a threat to civilization.

It is wrong when it says that nuclear power has an important part to play in reducing emissions of greenhouse gases.

This is so because the amount of carbon dioxide produced by coal-fired power stations around the world constitutes only a small percentage of the overall greenhouse gases currently added to the atmosphere.

Even a decision to eliminate that small percentage by replacing coal-fired power stations with nuclear stations is a mistake.

This is so because energy efficiency measures offer far more scope than nuclear, £-for-£, in reducing the demand for fossil fuels.

It is cheaper to save a unit of energy than to generate an additional unit.

And the scope for energy efficiency measures is huge in our energy-profligate world economy.

The hundreds of billions of dollars which would have to be spent on an expanded nuclear programme would drain the resources available for energy efficiency and other measures.

Energy efficiency measures can be introduced far more quickly than can nuclear power stations.

Time is not on our side when it comes to tackling the greenhouse effect.

It takes a minimum of six years to build a nuclear power station, and a matter of months to implement energy saving measures.

Finally, the nuclear waste issue is unresolved.

Decommissioning has essentially yet to be addressed.

The problems of nuclear weapons proliferation remain.

And the track record of the nuclear industry involves a long history of over-ambitious appraisals of cost and reactor safety. An expansion of the nuclear programme will compound these problems.

The greenhouse effect is a serious environmental phenomenon which requires serious and urgent solutions.

Nuclear power is irrelevant to the prevention of global warming."

GREENPEACE

LIST OF SIGNATORIES

Prof Brebis Bleaney C.B.E., F.R.S. Emeritus Professor of Experimental Philosophy, University of Oxford · **Prof Jack Boag** Emeritus Professor of Physics Applied to Medicine, University of London · **Prof John Burland F.Eng.** Professor of Civil Engineering, Imperial College of Science, Technology and Medicine · **Prof Roy Butterfield** Professor of Civil Engineering, University of Southampton · **Prof John Christian F.R.S.** Emeritus Professor of Physical Metallurgy, University of Oxford · **Prof Paul Fatt F.R.S.** Professor of Biophysics, University College, London · **Dr Richard Fortey** Senior Principal Scientific Officer, British Museum of Natural History · **Prof Michael Green F.R.S.** Professor of Physics, Queen Mary College, London · **Prof Andrew Haines** Professor of Primary Health Care, University College, London · **Prof Denis Hall** Professor of Physics, Heriot-Watt University · **Prof Peter Higgs F.R.S.** Professor of Theoretical Physics, University of Edinburgh · **Prof Robert Hill** Professor of Physics, Newcastle Polytechnic · **Prof Robert Hinde C.B.E., F.R.S.** Royal Society Research Professor, University of Cambridge · **Prof Dorothy Hodgkin O.M., F.R.S. Nobel Laureate** Emeritus Professor of Chemistry, University of Oxford · **Prof Brian Jarman O.B.E.** Professor of Primary Health Care, St Mary's Hospital Medical School · **Prof Tom Kibble F.R.S.** Professor of Theoretical Physics, Imperial College of Science, Technology and Medicine · **Prof Roy King** Professor of Social Theory and Institutions, University College of North Wales · **Prof Nicholas Kurti C.B.E., F.R.S.** Emeritus Professor of Physics, University of Oxford · **Prof Bernard Leake** Professor of Geology, University of Glasgow · **Prof Patricia Lindop** Emeritus Professor of Radiobiology, University of London · **Prof David Metcalfe** Professor of General Practice, University of Manchester Medical School · **Dr Steven Moorbath F.R.S.** Reader in Geology, University of Oxford · **Prof David Morley** Emeritus Professor of Child Health, University of London · **Dr Ian Munro** Former Editor, The Lancet · **Prof Ian Percival F.R.S.** Professor of Applied Mathematics, Queen Mary College, London · **Prof Joseph Pfab** Professor of Chemistry, Heriot-Watt University · **Prof Carl Pidgeon** Professor of Physics, Heriot-Watt University · **Prof Keith Puttick** Professor of Physics, University of Surrey · **Dr Reginald Rainey F.R.S.** Formerly Senior Principal Scientific Officer, Ministry of Overseas Development · **Prof Martin Rees F.R.S.** Professor of Astronomy, University of Cambridge · **Prof Joseph Rotblat** Emeritus Professor of Physics, University of London · **Prof Michael Rowan-Robinson** Professor of Physics, Queen Mary College, London · **Prof Ian Smith** Professor of Geotechnical Engineering, University of Manchester · **Prof David Smythe** Professor of Geophysics, University of Glasgow · **Prof Fred Vine F.R.S.** Professor of Environmental Sciences, University of East Anglia · **Prof Alan Watson** Professor of Physics, University of Leeds · **Dr Michael Whelan F.R.S.** Reader in Metallurgy, University of Oxford · **Prof Maurice Wilkins C.B.E., F.R.S. Nobel Laureate** Emeritus Professor of Biophysics, University of London · **Prof Robert Williams F.R.S.** Napier Royal Society Research Professor, Oxford · **Sir Gordon Wolstenholme O.B.E.** Action in International Medicine, London.

Greenhouse Effect developments

Proposals introduced into the Electricity Bill by the House of Lords, which would have given the Director General of the privatised industry the power to force companies to consider energy efficiency before increasing generating capacity, have been rejected by the Government.

The amendment had the backing of over 40 tory 'rebels', but the Government's enormous majority won through. It was defeated 310 to 216.

However, in an attempt to appease the disaffected conservatives the then Secretary of State, Cecil Parkinson, conceded to the role of the Director General in promoting energy efficiency: "The new Director-General, is set to become a major figure in promoting energy efficiency in this country - indeed [he/she] will have a statutory duty to do so - once the electricity bill is passed." However these powers will exist in name only, unlike the body the Lords had in mind, the Government will not give the Director-General any powers of enforcement, so any standards set will be in fact only recommendations.

"A mixture of regulations, penalties and incentives - all designed to ensure a rising level of energy efficiency, in the UK is clearly required," argues the Commons Select Committee on Energy. They have just published the results of an 8 month survey into the implications of energy policy on the Greenhouse effect (1). "It is unquestionably short sighted of the UK to neglect those energy efficiency investments which yield a genuine economic return."

They call for a "vital" separate Department of State where the sole concern is energy policy, they say: "However important issues like the privatisation of the gas and electricity industry, or the support for the coal industry have been, they are dwarfed by the crucial importance that we have a coherent energy policy applied across all sectors to deal with problems which almost certainly lie ahead."

The Committee does not view renewables as the only solution to the greenhouse effect, nor does it reject nuclear power. It does however warn the Government not to overstate the case for nuclear power, and argue for increased RD&D into renewable energy sources.

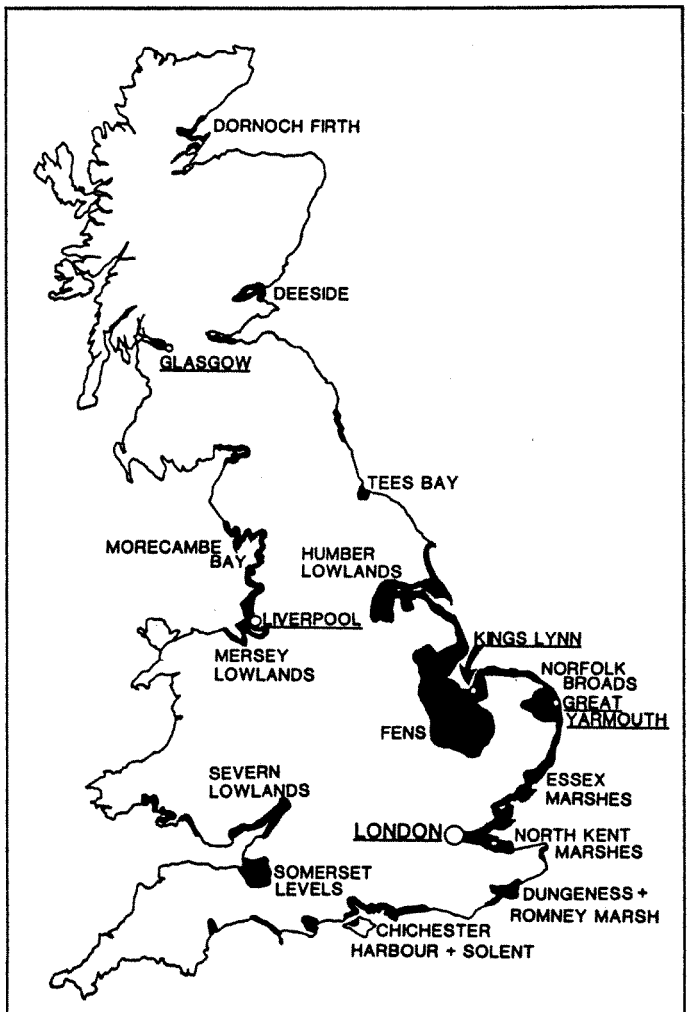
The nuclear option is a non option according to the latest Greenpeace Report (2), "Combating the Greenhouse effect: no role for nuclear power." As it sounds, they have set out to burst the nuclear bubble. The report is backed by over 100 UK scientists including 2 noble laureates and 15 members of the Royal Society. Its conclusions are simple. The nuclear option is too expensive, too dangerous and technically not possible, the Third World could not support a nuclear programme of the size which would be required to have any effect on the greenhouse problem: "Studies have shown that even moderate expansion of nuclear power in Third World countries would cost in excess of $50 billion per year. The total public spending on electricity in such countries is currently only $7 billion per year."

Energy efficiency is a tried and tested technology which can be implemented in a matter of months and time is of the essence in combating the greenhouse effect. It is also more cost effective. They calculate that "each £ invested in nuclear power can remove the need for between 5.5kg and 7.2kg of CO_2 emissions from coal-fired power plants, whereas on £ invested in compact fluorescent lighting instead of incandescent lighting displaces some 27.4kg of carbon. Hence investment in that particular form of energy efficiency is four to five times more effective than investment in nuclear power."

ACE, the Association for the Conservation of Energy, echo the view of Greenpeace in their latest contribution to the greenhouse literature (3). Ace research "demonstrates clearly that in the UK at least, far from requiring detrimental draconian changes to our lives or relying upon risky, unproven, technology the initial target of 20% [as agreed at the Toronto conference in 1988] can be achieved if the will is there." Indeed the programme they promote would achieve the 20% and allow "our overall standard of living" to improve. Their programme relies entirely on proven efficiency technology.

If, as now seems likely, the Government continue to ignore the opinions of the scientific community the effects could be further reaching than we suspect. A study (4) under taken by the Institute for terrestrial Ecology (ITE), on behalf of the Department of the Environment, with changes not only in temperature but in land use and in plant and animal life. Given a sea level rise of between 0.8m and 1.65m over 100 years "improving sea defences to with stand such a rise in sea level would cost at least £5 billion."

Throughout the recent publications on the greenhouse effect there seems to be growing unease about the Government's inaction. Yet, if they do not take positive action the consequences in human and animal suffering and the loss of a stable environment will be enormous.



Areas of Great Britain vulnerable to a rising sea level

(1) Energy Committee 6th Report. Energy policy Implications of the Greenhouse Effect (Vol I).
(2) Combating the Greenhouse effect: No role for Nuclear Power. Greenpeace. HMSO £8.70.
(3) Solving the Greenhouse Dilemma: A strategy for the UK. ACE and The World Wide Fund for Nature.
(4) Climatic Change, Rising Sea Level and the British Coast. Institute of Terrestrial Ecology and the Natural Environment Research Council. HMSO £5.50.

Safe reactor?

The idea that nuclear fusion can be achieved at room temperature, in what amounts to no more than a test tube (SCRAM 71), has been described as "mad" by scientists from the UKAEA's Harwell Laboratories.

A team of 10 Harwell scientists tried to replicate the results of experiments conducted by Prof Stan Pons and Prof Martin Fleischmann into Cold Fusion. Their work began on March 13, ten days before the infamous press conference held by Pons and Fleischmann, which divided the science world and made newspaper headlines around the globe. They conducted over 100 experimental variations on the Fleischmann/Pons design, over a period of 3 months and spent £320,000, to no avail.

Professor David Williams, head of the Harwell team, regretfully announced: "We found nothing, no gamma rays, no neutrons and no heat." Williams said of Fleischmann, a consultant to the UKAEA, "What we have to realise is that brilliant people have mad ideas. A brilliant man has had a mad idea. Not every mad idea works out."

Harwell's results are being widely accepted as the final word on cold fusion in this country; the Government do not intend to fund further research.

In the US a committee of scientists brought together by the Department of Energy to examine the claims have reported: "Evidence for the discovery of a new nuclear process, termed cold fusion, is not persuasive. So far we have seen no experimental results sufficiently clear of ambiguities and calibration problems to make us confident that heat can be expected."

However the US nuclear research 'establishment' at Los Alamos - home of the bomb - claim to have detected "significant amounts" of tritium, in two experiments on cold fusion.

Tritium is described as an unambiguous by-product of a nuclear reaction. It is also an essential ingredient in Hydrogen bombs, and is used to increase the yield of conventional nuclear weapons.

Dr Edmund Storms said after the results of the Los Alamos experiments were leaked to the local paper - the Desert Times - that the level of tritium found was a genuine product of nuclear fusion: "It is not possible that it was the result of contamination." But, remembering the fate of previous pretenders to the cold fusion throne, would be drawn no further: "Unfortunately we cannot discuss our results until they have been through the traditional process of peer review and publication in a scientific journal."

North West energy plan

North West England could be gaining up to 12% of its electricity need from renewable energy according to a study by the North west Electricity Board (Norweb).

Norweb, whose area stretches from the Scottish Border to the Peak District, has identified economic schemes which could supply 400MW. The full potential is in fact six times higher, so further schemes may become economic in the future.

One of the most promising sources identified in the 296-page report is methane gas from decomposing rubbish. The North West already has two landfill sites where methane is used to generate 4-6MW of electricity. Further plans exist for more than 20MW, but the full potential could be as much as 75MW, produced from 30 or 40 of the largest landfill sites in the Region.

Other sources include industrial and domestic waste incinerators, wind generators, small hydroelectric power stations using upland streams and rivers, and incinerators using forestry waste.

More than 12 potential sites are identified for tidal barrages, although they are not considered economic yet. These range from a 20 mile barrage across the Solway Firth which could generate 10,000 GWh per year, to a Wyre barrage at Fleetwood with a capacity of 47MW.

The area's large, open hillsides and coastlines include some of Britain's most promising wind power sites. However, Norweb do not envisage being able to use some of the best sites because of damage to scenery.

CHP scheme collapses

A major independent combined heat and power scheme, which planned to make use of a disused power station in Leicester, has been shelved amidst recriminations between the consortium of developers and the East Midlands Electricity Board (EMEB), which was to have purchased the electricity.

Suspension of the £80m scheme was announced after negotiations had reached an advanced stage to construct a 110MW combined cycle gas turbine and an associated heat distribution grid. Leicester Energy Ltd (LEL), a consortium of six large private companies, local authorities, EMEB and the CEGB, had negotiated a long-term gas supply agreement, and was on target for completion by 1991.

Jim Keohane, EMEB contracts manager, said that negotiations had broken down over the question of who should shoulder the risk of future fuel price increases.

George Rufford, Chair of the Association of Independent 'Electricity Producers (AIEP) is "dismayed that such a promising project has been brushed aside."

The demise of the Leicester scheme has triggered complaints from would-be private generators that there will be little scope for any genuinely independent new power stations in the first years of privatisation.

AIEP say "the independents offer competitively-priced, environment-friendly power. They have been trying to negotiate contracts but, with their investment plans gathering dust, they are now losing patience."

They accuse the generators and Area Boards of carving up the generating business and using delaying tactics to keep out future competitors. "The electricity boards have still not agreed terms with National Power and PowerGen and they refuse to do deals with independents until they have."

Renewable 'Ring Fence'

The Government have outlined details of the targets which the distribution companies will have to meet for purchases of renewable energy.

After 1992, they will have to buy an initial 50MW from renewable sources, as part of the non-fossil fuel obligation. This will be increased in tranches of an additional 100MW-150MW by 1995, another 100MW-150MW by 1997 and a further 300MW by 2000.

The phased tranches will ensure that the final target, already announced (SCRAM 71) of 600MW by 2000 will be achieved.

The obligation is an attempt to reassure small renewable generators who fear that they might be excluded from supplying the market created by the non-fossil fuel obligation. They had feared that National Power would secure the vast bulk of contracts for the non-fossil fuel obligations before their technologies are fully developed.

The minimum proportion of non-fossil fuelled generating capacity the distribution companies will be required to buy by the year 2000 is expected to be 12,000MW. So renewables will be expected to provide a minimum of only 5% of the non-fossil fuel obligation by the end of the century.

Wind developments

Capel Cynon will be the site of the UK's first windpark, if the CEGB's application for planning permission is approved in August.

Lord Marshall said, the Boards preliminary studies were now complete and that they will be publishing an environmental statement: "If all goes well we hope to start work on the site early next year. The wind farm could start producing electricity in the following autumn and be fully operational in the spring of 1991, when it could provide enough electricity for around 5,000 people."

Capel Cynon will be the first of three windparks planned by the CEGB. Also under investigation are sites in Cornwall and the Pennines. The projects are jointly funded by the Department of Energy, PowerGen and National Power. Their aim is to test "the technical and economic viability of generating electricity from the wind," and "examine the effects on the environment and the reaction of the public."

Reaction from the people living around the Capel Cynon site has been favourable. However controversy has sprung up around the other proposed sites. Farmers near Cold Northcott, were concerned about allowing the Board access to their land, even for preliminary investigation work. "They feared the loss of their farming livelihood" says Dr Count, CEGB wind project manager. The fears were perhaps fuelled by the fact that farmers were not told about the proposal until two days before the announcement that the area was under consideration. One farmer was not informed until 11pm the night before. As George Pritchard, a Cornwall based environmental consultant, puts it, "The situation you have there is a farmer who is very irate because he has been told his farm is going to be taken, or part of his farm is going to be taken, for a wind farm by the CEGB."

The other site under consideration is Langdon Common, in the North Pennines. Here the case is not just one of the Board riding roughshod over local feeling. It is a site of outstanding natural beauty, and the Countryside Commission intend to raise an objection.

Many people are now concerned that these excursions into wind parks are no more than a process of setting wind power up so it can be knocked down, as they did with wave power, thus leaving the nuclear industry without competition from renewables.

Such an opinion is strengthened by comments made recently by former Energy Secretary, Cecil Parkinson, who said, with just a hint of self fulfilling prophecy, "What we have to find out is whether the public will accept them, because they certainly are not things of beauty."

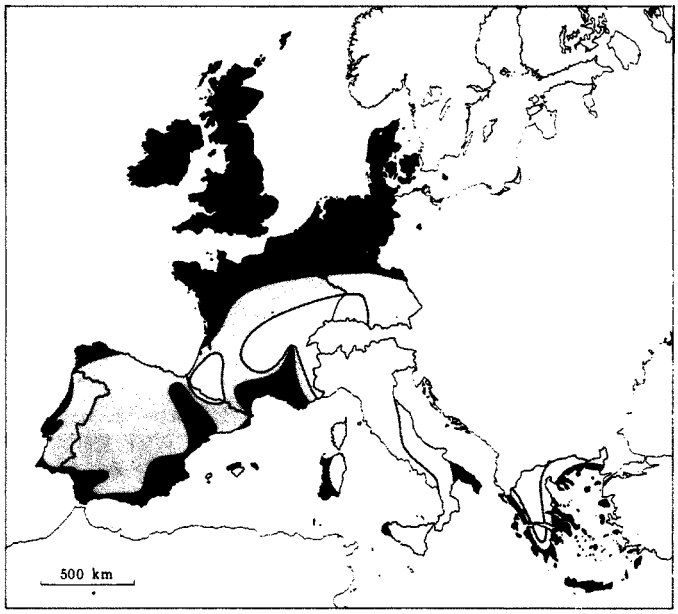
At the European Wind Energy Conference, which absorbed this years British Wind Energy Conference, Ian Lang, Minister of State for Scotland, told delegates, Our intention is to stimulate development and try to ensure the maximum contribution from these technologies so that Britain does not lose out in developing renewables where they are economically competitive and environmentally acceptable.

"However we must be realistic...it is not inconceivable that those who are urging us today to commit more and more resources to renewables will tomorrow be criticising us even more vociferously for ruining the countryside."

Despite the Government's stated commitment, Dr David Lindley, Chair of the Wind Energy Group and President of the European Wind Energy Association, said at the conference, "The Scottish Boards have not been particularly interested.

"Technologically, Britain is number one, but in the implementation of windfarms we lag well behind Europe. The Danish Government have already met their own target of 1,000MW by 1992. They have one tenth of our land and population, yet we only have 5MW. Realistically figures show that 10% of the UK's electricity could be met from 1,000 wind farms with 25,000 machines."

Clearly all is not rosy in the park, the conference was held in the wake of one of the world's leading windpower companies, James Howden of Glasgow, pulling out of the industry. Johnny Johnsen, Howden chair, explains, "Buying decisions for this equipment [wind turbines] have been postponed by a number of customers, both in Britain and overseas, and earlier markets for this equipment have proved to be optimistic."



Wind resources[1] at 50 metres above ground level for five different topographic conditions

	Sheltered terrain[2]		Open plain[3]		At a sea coast[4]		Open sea[5]		Hills and ridges[6]	
	m s^{-1}	Wm^{-2}	m s^{-1}	Wm^{-2}	m s^{-1}	Wm^{-2}	m s^{-1}	Wm^{-2}	m s^{-1}	Wm^{-2}
	> 6.0	> 250	> 7.5	> 500	> 8.5	> 700	> 9.0	> 800	> 11.5	> 1800
	5.0-6.0	150-250	6.5-7.5	300-500	7.0-8.5	400-700	8.0-9.0	600-800	10.0-11.5	1200-1800
	4.5-5.0	100-150	5.5-6.5	200-300	6.0-7.0	250-400	7.0-8.0	400-600	8.5-10.0	700-1200
	3.5-4.5	50-100	4.5-5.5	100-200	5.0-6.0	150-250	5.5-7.0	200-400	7.0-8.5	400-700
	< 3.5	< 50	< 4.5	< 100	< 5.0	< 150	< 5.5	< 200	< 7.0	< 400

The UK has the best potential for wind energy in western Europe, according to a new 'wind' atlas produced in Denmark.

Since 1980 the Danes have tried and tested an atlas technique for establishing an area's suitability for wind turbines. It has been used successfully in siting about 1,500 of their 2,000 machines.

The system has now been applied to the whole of Western Europe. Using data collected from 200 meteorology stations they have published a 650 page atlas, including a computer programme to calculate the exact wind conditions at any location throughout Western Europe.

It was sponsored by the Directorate General XII of the European Commission, the DG with responsibility for wind power, and is published as "The European Wind Atlas."

"Power from the Wind" is the title of the CEGB's latest video. It "examines the centuries old challenge of harnessing the wind."

Presented by David Bellamy and shot on location in Barbados, Holland, Orkney and mainland Britain, it also discusses the role and development of modern aerogenerators and their likely role in future electricity production.

For further information contact: CEGB Film and Video Library, Sudbury House, 15 Newgate Street, London EC1A 7AU. Tel. 01-634 5456.

Uranium and Nuclear Energy: 1988. The Uranium Institute; 418pp, £50, 1989.

It's always useful to know how the opposition thinks - and the Proceedings of the Thirteenth International Symposium of the Uranium Institute give us an insight.

The 400 participants at the conference share the belief that nuclear power "is both economic and, from an environmental perspective, the most benign of any of the options which exist today for electricity base load supplies."

Uranium spot prices have declined to depths never seen before, yet the nuclear industry is said to be "on the verge of revitalisation" because of concern about the Greenhouse Effect and Acid Rain. There was even talk of a shortage of uranium early next decade.

By 1993 there will be over 1000 tonnes per year of reprocessed uranium available in Europe and 3 tonnes of fissile plutonium. There are some interesting snippets about the usefulness of reprocessed material. Plutonium becomes so contaminated with daughter products after 3 years that it is unuseable in PWRs without further reprocessing. Enriching recycled uranium isn't simple either - gamma and alpha activity are both higher than in natural uranium, so the enrichment plant requires greater protection against radiation.

Hidden behind the debate about the economics of recycled uranium and Mixed Oxide Fuel, which makes use of recycled plutonium, there seems to be a suspicion that reprocessing is becoming too much of a weight around the industry's neck.

Fuel designers and users are now seeking to increase fuel burn up. One paper concludes that "uranium savings from recycling are linked to the energy quality of plutonium and reprocessed uranium, which diminishes with the increased burn-up of the assemblies from which they derive." Reading between the lines, this suggests that increasing fuel burn-up may become a more economic alternative to reprocessing.

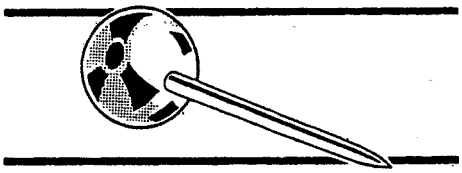
Uranium flag swaps; local authority radiation monitoring; world uranium resources; and the need to develop trust through better communication with the public, particularly doctors and journalists, are all subjects covered. But the section that perhaps gives most away about the thinking of the industry is the section on social factors. In Australia, for example, it is suggested that Aboriginal people would come to terms with uranium mining when they "accept the economics of the developed world and the tangible benefits which flow from the optimum use of land."

PETE ROCHE

Britain's Nuclear Waste: Safety and Siting by Openshaw, Carver and Fernie. Belhaven; 205pp, £8.95, 1989.

One thing that is predictable about radioactive waste is that the volume will increase; that is pretty clear. Another predictable thing about nuclear waste is the increase in the volume of books about the problem. This book is one of the first in a growing number addressing a politically intractable problem.

Due to the ever changing nature of the issue, any book on radioactive waste policies can only ever be nearly up to date, regardless of the promptness of the publishers in getting the book out. This book, its timeliness notwithstanding, has its flaws, many of which may be identified in the author's preface. But let us start with one incontrovertible statement, which has to be the starting point of any analysis "whether we like it or not, Britain today has a sizeable nuclear waste disposal problem, and regardless of



people's attitudes for or against nuclear power, something will have to be done about it sooner or later."

To be sure, one of the baseline arguments over nuclear waste (recognised by the authors) is over whether any form of "disposal" as against long term monitored and retrievable storage is preferable: but the very existence of volume of radioactive waste is an incontrovertible problem.

The authors assert they are "neither anti-nuclear, nor in the pay of the nuclear industry, but as geographers we sincerely believe that nuclear power is becoming essential to the future of Britain and the world." The preface is peppered with pro-nuclear sentiments, reinforcing this belief, which however sincere, has it would seem no relevance to the authors' professional expertise as geographers.

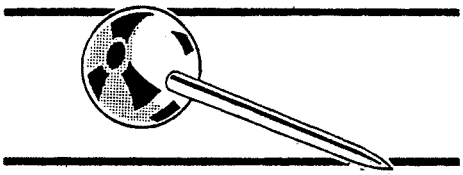
They also naively opine that "there is no conspiracy, merely a strongly motivated group of nuclear interested people in the key positions who honestly and sincerely believe that an all nuclear future is the only future." One might expect considerable more academic scepticism over motives than expressed here, especially as there is ample published literature analysing and exposing the complex conspiratorial way the nuclear enthusiasts often operate.

It is perhaps because the authors address the nuclear waste problem in terms of a geographical poser: 'where do you put your first radwaste dump?' that the book suffers from a failure to ask a broader range of relevant questions. A geographical focus leads to the diminution of key socio-political questions.

The authors have also either been too accepting of the veracity of the nuclear industry's arguments, or too slapdash in their research, for a series of avoidable factual errors are dotted through the book.

To highlight a few more important areas:
On page 5 they claim "the recently commissioned Swedish facility is for the storage of spent fuel rather than reprocessing wastes." This is untrue. The facility, SFR-1, below the Baltic Sea at the Forsmark reactor site is for operating wastes ie. LLW and ILW, not spent fuel, which is targeted for a different Swedish facility the CLAB, at the Oskarsham reactor site in the south.

They assert (p25, 49) that reprocessing "is quite simply an unavoidable corollary of having Magnox power stations". Now although Magnox fuel was designed to be reprocessed and was consequently only expected to be stored for a short



time, there is no technical evidence to demonstrate that it has to be; a point stressed by consultant engineer John Large, in evidence to the Environment Select Committee in 1985.

The book itself comprises a detailed analysis of the political geography of nuclear waste, exploring the role of NIREX (and its problems) in depth. This exposition is the strength at the heart of the book.

Various assertions are made, without supportive evidence, which show the bias of the authors views. Some examples are (p5) "Once it starts, provided the nuclear fuel cycle is closed, the numbers of FBRs can be increased fairly quickly." Yet no country has built a single commercial FBR, and no country has more than a handful (USA, France and USSR) of prototype FBRs. So where does the "fairly quickly" assertion find its support?

They claim (p51) that for high level waste "while deferral is currently popular, there is little support for the idea that indefinite storage is a substitute for disposal

of HLW." The level of support for storage vs disposal option depends crucially on whom one asks. It is true there is "little support" amongst the nuclear industry, but what of environmentalists?

When the authors claim, after reviewing the filtration plants retrofitted to Sellafield to reduce liquid discharges, that "the Sellafield experience is interesting, but not directly relevant to radwaste dumps" (p63), they overlook the fact that any radioactivity contained by SIXEP and EARP, (the new plants) will become solid nuclear wastes that will require future management. This, in effect, becomes part of the inventory of material, for which the authors are set on finding a suitable final home.

On a more positive note, the authors are correct to stress the secrecy surrounding military nuclear waste (p 69) and the ambiguous position of NIREX (p 73) once the electricity industry is privatised.

Despite the various errors, the authors have collaborated on an important book, containing a rich bounty of information on the nuclear waste situation in the UK. A useful book for those who want to find a "solution" as well as those keen to oppose any solution for nuclear waste. I would recommend at least ordering a copy from your local library.

Lest anyone be sanguine enough to believe that siting a "dump" at Dounreay or Sellafield will be the end of the matter, the authors tantalisingly warn (p37) "will anyone be surprised when Elstow, Killingholme, Billingham and Fulbeck are again connected with radwaste dump interest. If it does not happen soon, there is every prospect of it happening before too long."

They say this with regard to decommissioning bulk waste, the biggest unresolved problem. Just when you thought it was safe to stop campaigning!

DAVID LOWRY

* Dr David Lowry is co-author, with A Blowers and B Solomon, of an international comparative study of the politics of nuclear waste management to be published by Macmillan at the end of the year.

The Greenhouse Effect: A Practical Guide to the World's Changing Climate by Stewart Boyle and John Ardill. New English Library; 298pp, £3.50, 1989.
Turning Up the Heat by Fred Pearce. The Bodley Head; 230pp, £12.95, 1989.

"Whenever people talk about the weather, I always feel certain that they mean something else"
OSCAR WILDE

When people discuss the greenhouse effect the conversation inevitably turns to the weather. Will it or won't it be hotter in Skegness? That's one question that neither book can answer.

In fact they provide few hard and fast rules. They don't even prove that global warming - the result of our unbalancing the natural greenhouse effect - is happening. This is hardly surprising. The scientific community, where the general consensus is that global warming is the most serious environmental threat facing the planet, has not been able, so far, to unravel the complex chain of mysteries which conspire to create our biosphere.

However there are theories - both volumes present many. Almost all of which are fascinating and plausible.

Of the two, that written by Fred Pearce, news editor of New Scientist and an unashamed 'techno fixer', presents the most elaborate schemes.

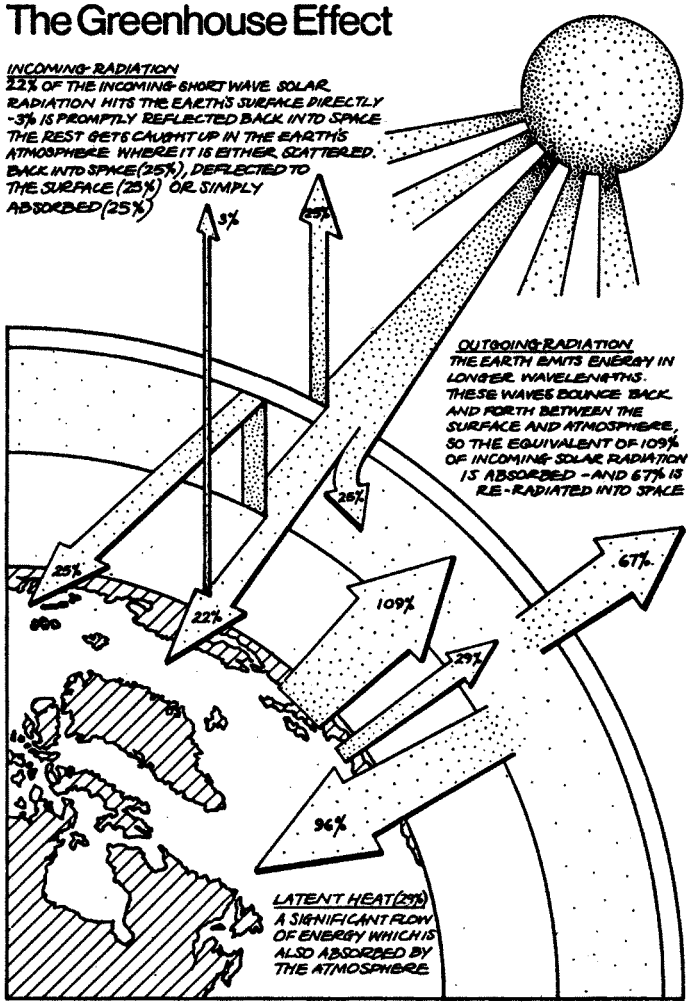
He cites Leon Sadler of the University of Alabama who believes that we could counteract the effect of CFC's by injecting ozone into the stratosphere. Pearce writes, "You could hitch small generators to ordinary commercial and military aircraft, which could spray ozone as they go about their usual flights; you could use 'guns' to shoot frozen ozone 'bullets' into the upper atmosphere...." This is necessary, he believes, because the reductions that will be brought about by the Montreal Protocol will have little or no effect for several decades. CFC's have a high atmospheric residency, about 120 years. They are major greenhouse gases, playing a role directly in global warming by virtue of their presence in the atmosphere, and indirectly through the destruction of the ozone layer.

Turning Up the Heat is an enthralling read but somewhat disappointing in its treatment of the nuclear vs energy efficiency debate, giving over only 3 pages to its direct discussion.

His preferred vision of the post greenhouse era is of a "high-tech Eden in which we took the apple and lived to tell the tale."

Boyle and Ardill, also have an impressive pedigree. Stewart Boyle, former FoE energy campaigner, is the Energy and Environment Programme Director of the Association for the Conservation of Energy; John Ardill is the Guardian's environment correspondent. Their book is far more attractive to those who are worried about a future based on nuclear power.

As both books are on the same subject they have many similarities, however their treatment can be at times surprisingly different. This is best illustrated by their treatment of nuclear debate: Boyle and Ardill try extremely hard to be reasonable, which for my money they manage extremely well, producing a 26 page quest to find something constructive to say about the industry whilst extinguishing any flicker of light on the nuclear horizon.



Their vision is most likely to succeed and least likely to be adopted.

I recommend both. Books to read whilst listening to Leonard Cohen records.

MIKE TOWNSLEY

LITTLE BLACK RABBIT

Little Black Rabbit's friends in the Nuclear Free Local Authorities have wriggled out of a potentially sticky situation by declaring that "the current debate over Labour's defence policy is not an issue" for them.

"Unilateralism" they told LBR "is but one process that can be adopted by Central Government to achieve a nuclear-weapons free Britain." NFZs strive to inform the public about nuclear developments, because "only an informed public opinion can judge how it wishes to see a nuclear-free Britain achieved."

LBR is not going to be drawn into the messy debate about how to rid these Isles of nuclear weapons. Suffice it to say that the 'fast breeding' fraternity are generally of the opinion that an end to reprocessing would be a good start.

Michael Howard, the MP who drank a sample of the liquid effluent from the Magnox Dissolution Plant at Dungeness, (and would-be Water privatiser) has started a new trend.

In February, not to be outdone by the "Poms", Northern Territories Minister for Mines and Energy, Barry Coulter, drank a glass of water from Retention Pond No4 (RP4) at the Ranger Uranium Mine.

Run-off from waste uranium ore is supposed to be retained in the pond. But during February and March, Ranger released water from RP4 on three separate occasions into the Magela Creek. These "irresponsible actions" are making it increasingly difficult for the Aboriginal people to trust the mining company. They weren't even told about the release and are demanding a full inquiry. Hence the need for a PR stunt. LBR wonders if, like Michael Howard, Barry Coulter was ill the day after.

Meanwhile the Australian Labor Party is carrying out its own Policy Review. The antipodean version specifically deals with Uranium Policy and includes public hearings around the country (see SCRAM 71).

The response from anti-uranium activists has so far overwhelmed the Policy Review Committee. Of course they will not have been slow to point out that another way to stop nuclear weapons is to leave uranium in the ground.

Tony Blair's famous speech on the decision not to privatise the Magnox reactors isn't the only amusing speech LBR found in Hansard on 24 July.

Cecil Parkinson congratulated Tony for "a fine display of rhetoric" but explained that "the magnoxes, virtually to a station, were commissioned and built during the lifetimes of Labour Governments." Malcolm Bruce for the Liberal Democrats asks Cecil to acknowledge that he is only interested in maximising the industry's share price. "The only thing that is green about Conservative Members is the colour of their wellies."

Tony Benn, who ordered Torness and Heysham B asked Cecil if he was aware that "nuclear power in Britain is not, and never has been, economic in any sense of the term . . . how could he say that he had no idea of the cost of nuclear power until he tried to sell it off?"

Presumably Tony Benn knew all about the cost of nuclear power when he ordered Torness. Parkinson, of course points out Tony Benn's record and says "for him to come over at his sanctimonious worst is almost beneath contempt".

Alex Salmond (SNP) asks if "there [is] any limit to the amount that the Government are prepared to spend to keep the nuclear show on the road?"

Bruce Grocott (Lab) asks Cecil if he realises that he has exposed "the complete absence of principle behind the Government's privatisation policy? It is based upon the political expediency of rewarding friends in the City."

Alan Williams, one of Labour's environment spokespeople calls the statement "a miserable climb-down". He asks is it not true that the City "is just as unhappy about AGRs and PWRs as it is about Magnoxes?"

Three ways to fight the nuclear industry

Three ways to help SCRAM: fill in the appropriate section(s) together with your name and address and return the form to the address below.

1. **I would like to subscribe to the SCRAM Safe Energy Journal, and I enclose an annual subscription fee of:**

- ☐ £12.50 (ordinary)
- ☐ £15 (overseas)
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- ☐ £5 (concession)
- ☐ £20 (supporting)
- ☐ £100 (life)

2. **I would like to make a donation to SCRAM and enclose a cheque for:**

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To the Manager:.....

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Address .....

.....

.....Post Code.....

Please pay on ..... (date) the sum of

..... (amount) from my account number

..... to the Royal Bank of Scotland,

142/144 Princess Street, Edinburgh (83-51-00) for the credit of SCRAM no.2 account 258597 and make similar payments monthly until further notice.

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