The Anti Nuclear & Safe Energy Journal

SCRAM

NUCLEAR POWER? NO THANKS

47

50p

Contents

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Comment

The Government's nuclear waste policy is in disarray. Sea dumping has been postponed for further research, Billingham has been abandoned and the Orcadians are opposing ENSEC's sea dumping proposals for Stormy Bank. Against this background experienced 'Wally Watchers' will have noticed the CEGB supremo expressing his opinion on the problem to the Commons environment committee. He suggested storing high and intermediate level wastes for a 'couple of hundred years' and discontinuing reprocessing of spent fuel. His reasons are that there is a surplus of uranium and plutonium in store making reprocessing the expensive option, and the urgency of nuclear waste disposal has been exaggerated. If Sir Wally's opinion carries any weight, and past records indicate that it does, then a change in policy may be on the cards. (However, the CEGB may just be using scare tactics to reduce their fuel cycle costs.)

SCRAM is closely watching the waste debate and Don Arnott's waste column (part 1 appears on page 13) will keep our readers up to date.

The Sizewell Inquiry is finally over. Frank Layfield can have a rest before he begins to read 16 million words and produce his Report at the end of the year. No such respite for the opposition - FoE is preparing The Alternative Sizewell Report for publication in the autumn, with the help of other individuals who were involved at the Inquiry.

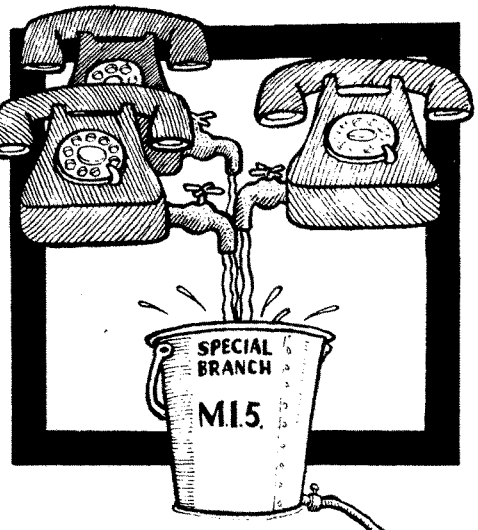
Following the conclusion of our AGR series in the last SCRAM journal, we intend to run a series on the Magnox stations starting next issue. Any reader with knowledge of their Magnox neighbour please get in touch with us. We hope to produce a pamphlet on the AGR's soon, so could anyone interested in buying a copy please contact us to give us an idea of the print run required.

SCRAM

The SCRAM Annual General Meeting was held at the Forth Street Offices on February 12th this year. Although attended by only 10 people, much was discussed and SCRAM's future seems secure.

The interim steering committee appointed at the emergency meeting in January was expanded and agreed to carry on until SCRAM manages to incorporate as a limited company. Steve's appointment as full time worker was confirmed and it was agreed to contact the tax office. Another worker to run the office systems is still desperately required as the production of the Journal is taking up most of the time which means that important administrative work is losing out.

Nuclear State



Events during the miners' strike and those of the past couple of months clearly indicate that the Police State is definitely with us, and has been for some considerable time. The erosion of civil liberties is accelerating at an alarming rate. Citizens involved in industrial disputes and those openly critical of government policy have been the targets of surveillance, restrictive legislation and even violence by servants of the state. The whole issue of civil liberties is moving itself to the top of the political agenda and, with the Freedom of Information Campaign receiving considerable backing from all political parties, the days of our secret laws seem to be numbered. However, new legislation not yet on the Statute Books could be worse than our present laws.

Apart from the right to work, cherished by the Conservatives during the miners' strike, there are other rights which have been ignored at best, and crushed at worst. Road blocks erected during the strike are a blatant infringement of the right of freedom of movement. This tactic was used against supporters of the Molesworth Peace Camp when the alert went out on the phone tree that eviction was imminent. Some people did manage to arrive only to find a massive policing operation like at the Orgreave coking works, or even Goose Green.

And now we learn that residents of villages surrounding Molesworth are to be issued with identification passes 'in the interests of good community relations' - the thin end of a substantial wedge. Religious services at the site had more police officers than worshippers, when they were allowed at all, with the carefully built chapel confined behind coils of barbed wire. Such images from behind the Iron Curtain would have attracted vehement condemnation from Cabinet ministers. Here Field Marshal Heseltine presided over the scene in full battle dress!

Official Secrets

Then there is the Official Secrets Act, particularly Section 2. Sarah Tisdall made a brief appearance last year in the trailer for the main programme: the Ponting Show Trial. The incompetent way which the Government dealt with the case drew more publicity than it may otherwise have attracted, and the Judge's direction to the jury must have contributed as much as anything to the not guilty verdict. Even a vetted jury realises when it is being used for political ends. The result could be seen as a leakers' charter, in the interests of the State of course. This should have been the last nail in the coffin for section 2, but it wasn't. The sequel, Massiter - Ponting 2, may hammer it home.

By not screening the *20/20 Vision* programme on MI5 when it was scheduled the IBA have performed a great service for the Freedom of Information Campaign. Many more people must have seen it when it was eventually transmitted on Friday 8th March than the probable original audience. The IBA banned the original screening on the advice of their lawyers that it might attract prosecution under section 2. However, following the screening of the film in three cinemas and the distribution of the tape by that defender of the free Captain Richard Branson through Virgin record stores, and Sir Michael Havers' decision not to risk political suicide by prosecuting so closely on the heels of the Ponting acquittal, the IBA lifted their self-imposed ban.

The ban itself, and the subsequent revelation of the content of the programme, whipped up a storm of protest in Parliament and in the media, which resulted in the appointment of Lord Bridge of Harwich to carry out an inquiry into phone tapping, or so we were meant to believe. The remit of the inquiry was so strict as to make the whole exercise completely useless. No warrant was issued in breach of the guidelines, the report stated. This means either that the report is not factually correct or that surveillance was carried out without knowledge of the Home Secretary of several governments.

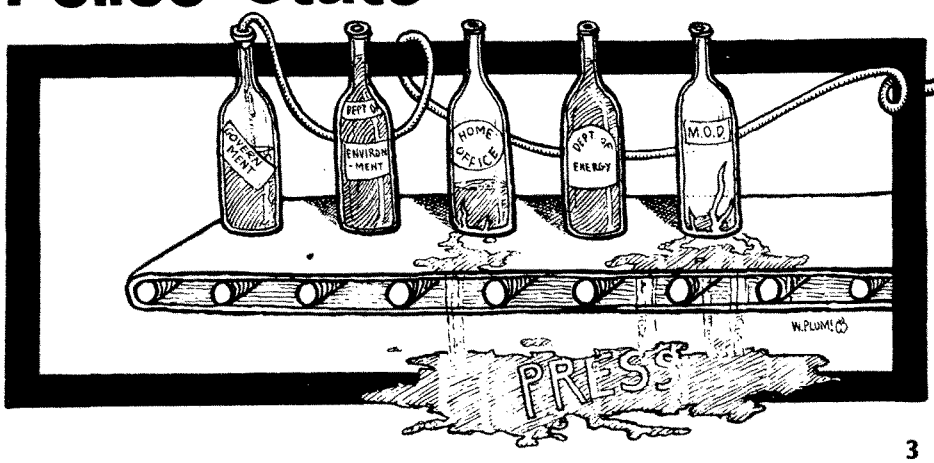
Official Leaks

Another recent (official) leak, which may not initially seem to be connected to civil liberties is the Cabinet's reported 'serious concern' about delays caused by public inquiries. It is felt that allowing public discussion on policy issues may be a bad idea. Instead the suggestion is to get general approval in Parliament for large and important developments then to carry out a brief local inquiry where objectors could voice their opinion on the height of the boundary fence or the colour of the walls. In fact the voice may not even be heard. Written submissions only may be requested, as in France. Of particular concern are the proposals for the dumping of nuclear waste. Ministers fear that the wastes will continue to accumulate while the inquiries hear evidence from a large number of interested parties. There is one way to stop this happening, as hinted by Lord Flowers in the Royal Commission report of 1976. Stop producing the stuff until you know what to do with it, and where to put it. We all agree that Public Inquiries are not ideal methods of dealing with such serious issues, but the answer is to make them better and to introduce public involvement in the decision-making process at the beginning, not to scrap them and push decisions on people just because you have an impregnable majority in the House of Commons. Because we won't accept it.

On top of all this is the abolition of the Metropolitan Councils, Rate Capping, banning of trades unions at GCHQ, the attempt to remove the funding of the major opposition party and many more. And don't forget Hilda Murrell. Whoever murdered her, it was not a petty burglar. When the truth is eventually known there is going to be one hell of a banana skin for someone!

Steve Martin

Police State



Industry News

Brazil is considering a shake-up of the nuclear industry since President Tancredo Neves was elected after 21 years of military rule. Neves is committed to social and economic reform and may not see the nuclear power programme, which has already swallowed up $4 billion and needs new investment, as a high priority, especially as Brazil has plentiful hydroelectric potential.

To complete the two reactors already under construction will cost $850m a year until 1990, including all the back up services. This contract is with West German firms who are insisting that a further four plants must be built to justify the fuel-cycle facilities. For this reason the government may get out of the contract to cut their losses and rely instead on an 'indigenous' programme based on the early National Commission for Nuclear Energy (CNEN), largely responsible for nuclear research, instead of the present Brazil Nuclear Corporation (Nuclebras) which is running the programme with the West German firms. This would be welcomed by the Brazilian scientific community who have resented the international involvement in their programme.

Argentina is also having nuclear programme problems since President Alfonsin's civilian government came to power in December 1983. It no longer has a high priority and its budget has been severely reduced. The electricity distribution office has reduced the rate it pays for nuclear electricity, which has meant that the two plants, Atucha 1 and Embalse, are running at a loss.

The Argentina National Commission for Nuclear Energy (CNEA) required $950m for maintenance and construction in 1984 but finally received only $250m by the time all the money was released in November 1984. At $800m, CNEA's foreign debt requires $42m per year up to 2003 in repayments. However, because the programme still has popular support, is less dependent on foreign technology and represents the most significant energy source, it could still be salvaged by reasonable funding.

New Scientist 24.1.85

France is ready to sell Israel two nuclear reactors for electricity production. Sources in Paris have confirmed that the issue was raised last month when the Israeli Prime Minister Shimon Peres met the French President Mitterand and Prime Minister Laurent Fabius.

The French readiness was expressed last March, when a secret French delegation met their Israeli counterparts. Under consideration is a type of reactor capable of generating 950Mw. The deal is estimated at $4000 million.

Unlike the USA, the French Government will not make the deal dependent on Israel's signing of the non-proliferation treaty. Israel has refused to sign the treaty since French technicians built the nuclear plant at Dimona in the Negev desert in the late 1950's.

French officials have been embarrassed and describe the reports as 'irresponsible leaks from both sides', because they are also conducting secret negotiations with Iraq to rebuild the nuclear reactor near Baghdad, destroyed three and a half years ago by the Israeli Air Force.

The official Israeli nuclear policy, declared in the early 1960's by Prime Minister Levi Eshkol, was that, 'we will not be the first to introduce a nuclear weapon in the Middle East.' During 1977-1984, however, the policy was modified into 'not allowing Arab countries to develop nuclear capabilities.'

Jane's Defence Weekly
Vol. 2. No. 24. 22.12.84

'China is facing a decisive choice...between whether or not to make nuclear energy a long-term development strategy.' This quote comes from a paper entitled 'The decline of the world nuclear industry' written, not by antinuclear activists but by Yang Haiqun of the Economic Insitute of the State Planning Commission in China.

Yang proposes that, apart from those projects already under way, no more nuclear power stations should be built in China. Instead, the paper argues, renewable energy technologies should be investigated and industrialised as fast as possible. Yang blames the slowing down of world nuclear programmes, as seen in OECD publications, on economics, nuclear waste management and the problems of decommissioning nuclear plants.

The paper was published in a leading Beijing journal and it is believed that it therefore must have had high level support. Political observers state that such articles in the past have indicated a shift in policy. Western nuclear power companies must look on this with some apprehension - they have been expecting large orders from China in the future. The Guangdong power station, China's first full-sized plant, could be the last.

New Scientist 14.2.85

Druridge

The Druridge Bay Campaign is picking up recruits all along the way for the campaign against the construction of a nuclear power station on the picturesque coastline of Northumberland. A sponsored run along the beach was held on 24th February which attracted nearly 350 participants. Among the runners were 9 members of the Royal Shakespeare Company. The run raised £800 for the campaign.

A surprise recruit is the Northumberland area SDP who have adopted a 'No Nuclear Power Stations at Druridge' policy in contrast to the leadership's view that nukes are the greatest thing since claret. The Northumberland policy states its opposition for reasons of: safety, visual intrusion, cost, no proven need, and employment prospects being better with coal fired power stations in relation to jobs in mining. Berwick Tories have attended meetings and have indicated that they may affiliate.

Bridget Gubbins, the Campaign Press Officer, commented, 'The campaign is broad based. Despite divergent views on other matters, opposition to nuclear Druridge is one matter upon which we all agree. As in Billingham, all party opposition is a strong weapon. We welcome Conservative involvement, and hope more Tories will join us.'

The possibility of spent fuel movements from Hartlepool, Torness and Druridge through Northumberland is also strongly opposed by the Campaign.

Atomic Energy Agency's 'Regulation for the Safe Transport of Radioactive Materials' has just been published. The new edition was approved by the Agency's Board of Governors in September last year and contains the first major changes in the Regulations since the 1973 revision. It is the result of four years of international effort.

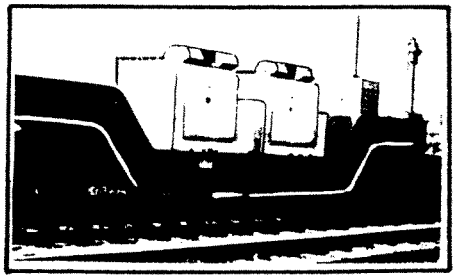
One major difference from previous editions is the replacement of the word 'exempted' by the word 'excepted'. Excepted packages are those which contain sufficiently small quantities of radioactive material to be excepted from most design and use requirements, although certain requirements, assuring that their contents will be identified on opening and they will be handled and transported safely, must be met. Three types of 'Industrial Packages' are now recognised.

Two new tests have been introduced. A 'dynamic crush' test involves dropping a 500kg mass from 9m onto a specimen package positioned on a target so as to suffer maximum damage. This test is only for light weight and low density packages. The other test is a 'water immersion' test for packages containing irradiated fuel. The specimen package is immersed under a head of water of at least 200m for a period of not less than one hour.

Low Specific Activity (LSA) Material and Low-Level Solid Radioactive Material categories have been replaced by three groups of LSA material and two groups of Surface Contaminated Object (SCO) - an object which is not itself radioactive but has radioactive material distributed on its surface. The previous categories could be transported in packages requiring much less stringent procedures. Low-Level Solid Radioactive Material could be transported in strong industrial packaging. The modification of package activity limits have taken into account previously unconsidered exposure sources.

The new Regulations are generally tighter than the previous ones, with a more specific packaging procedure. It therefore follows that what was before presumed safe is now regarded in a less favourable light: individuals handling radioactive materials in the past may have been inadequately informed about these packages. Are future revisions of the Regulations going to produce even tighter restrictions?

NRPB's Radiological Protection Bulletin 63



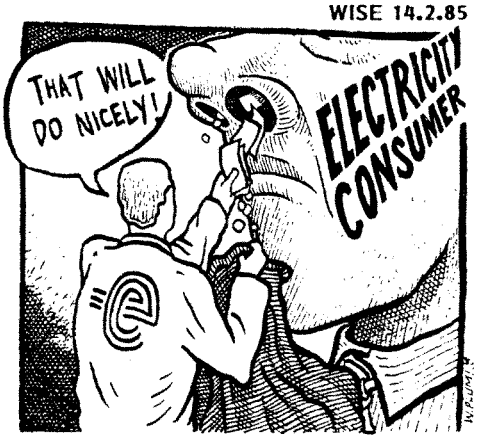
At the FoE conference in January it was agreed to revive the anti-dumping network that had been formed at the time of applications for drilling for high-level waste dumps.

A publication along the lines of the now demised *Atomic Times* will probably be produced to act as a clearing house for information on dumping. There is no intention to restrict this information to FoE members or groups.

Contact: Ed Darby, Loughborough FoE, 51 Barrow Road, Quorn, Loughborough, Leics.

A 'major international business group' has approached the government of Namibia with a proposal to dump nuclear waste from German and America nuclear firms in return for about $800 million per year. The proposal was first aired in the South West African white assembly by Finance Minister Jannie de Wet who urged that the proposal not be rejected 'out of hand' as they could earn more than the nation's annual budget by accepting the proposal!!

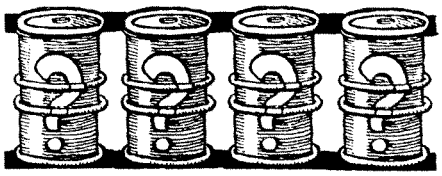
WISE 14.2.85



Electricity

The Government is considering replacing the present statutory break-even duty on the electricity supply industry and replacing it with a system of legally-based financial targets. The proposals would 'almost inevitably lead to dearer electricity and are totally contrary to the interests of electricity consumers', warns the Electricity Consumers' Council.

The Council will 'vigorously oppose the proposals' which run contrary to the Electricity Boards' legal duty to produce electricity at the cheapest possible price. The Government proposes that the Industry's reserves will be capitalised and converted to Government debt on which interest or dividends would be paid to the Treasury. 'These reserves. . . morally belong to the consumers who have contributed to the Industry's finances over the years. Such a move would be a quite improper diversion of funds', concluded the Council.



A referendum in 1982 in Massachusetts registered a 68% vote in favour of a law requiring state-wide approval before a low-level nuclear waste site is built on before the state enters into joint ventures with other states for a regional site (medical and bio-research institutions are exempt from the law.) The work of the Masschusetts Nuclear Referendum Committee (MNRC) was responsible for the overwhelming public vote. The MNRC was formed as a result of the failure, and subsequent difficult and expensive clean-up, of 3 out of the 6 national dumps.

Since government and industry have failed to repeal the law, and they realise that it could politically destroy any chance for a dump in the state, representatives of MNRC have been appointed to the Special Legislative Commission on Low Level Waste and the Governor's Advisory Group. MNRC have also been hired to draft the procedures by which siting regulations would be developed. However, even with this political influence MNRC are still holding by their five primary demands:- development of a comprehensive management plan; maximum source reduction; waste separation by toxicity, longevity and other hazards; use of technologies that allow for multiple barriers, monitoring and retrievability in case of leakage; and a meaningful decision-making role for the public throughout the process.

Federal law requires each state to find a 'solution' to its radioactive waste problem by 1986. Policy decisions are being made this autumn.

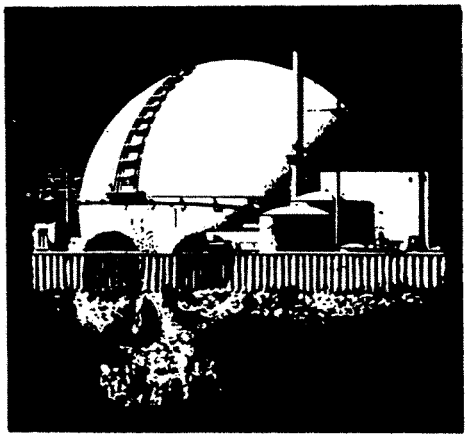
In this country this sort of programme could make a lot of difference: NIREX should be more publicly accountable, they should publish their list of potential dump sites now and the environmental movement should be involved in the policymaking discussions - so long as we keep to our principal demands, very similar to those of the Massachusetts group.

No Nuclear News
Winter '84

Uranium

The largest uranium mine in the Middle East could be developed 'within two years' according to Reza Amrollhai, the head of Iran's Atomic Energy Organisation (AEO). Three years after the initial discovery the AEO has confirmed that the reserves in the Saghand region are 5000 tonnes. The grade of the ore is not known.

New Scientist 14.2.85



A team of Australian nuclear specialists has been invited by Indonesia to work at a new atomic research reactor built in Java. The move is intended to dispel Australian fears that Indonesia might be developing nuclear weapons. The offer was announced during a four-day official visit to Indonesia by Australia's Science Minister, Mr Barry Jones.

An Iranian claim that Iraqi aircraft executed an unsuccessful attack on the uncompleted 1300Mw nuclear power station at Boushahar on 12 February has been rejected in Baghdad. A military spokesman denied that Iraq had carried out such a raid. An earlier attack was mounted on 24 March 1984.

Jane's Defence Weekly
Vol. 3. No. 9. 2.3.85

Nuclear Links

China has no intention, now nor in the future, of helping non-nuclear countries develop nuclear weapons, Vice Premier Li Peng said in Peking. China would abide by the stipulations of the International Atomic Energy Agency, and restrict nuclear co-operation with other countries to peaceful purposes only, he added.

Jane's Defence Weekly
Vol. 3. No. 6. 9.2.85

The Non-Proliferation Treaty Exporters' Committee (known as the Zangger committee after its Swiss chairman Claude Zangger) is to publish an expanded list of components and materials likely to be used in reprocessing plants. The so-called 'trigger list' should be part of supplier countries' national legislation by May. The trigger list contains 'dual-use' equipment and materials which could be used for clandestine weapons production. The Zangger committee updated the gas centrifuge trigger list last year and is expected to begin work on updating the heavy water production plant list.

Nucleonics Week 14.2.85

The clean-up of the infamous Three Mile Island PWR is proving to be far more dangerous and expensive than anyone imagined. The orginal estimate in 1979 was that it would cost $200 million and would take two years to complete. Five years later, halfway through the clean-up, the cost has escalated to $500 million and is expected to reach $1 billion.

Workers are bought for $10 an hour to work in intolerable conditions without adequate safety precautions. One worker, Terry Stickley, who fought in the Korean and Vietnam wars, said working at TMI was more stressful than war. 'I never had any problem with alcohol until I went to TMI. We worked all day and drank all night.'

Dr John Gofman, professor of medical physics at the University of California, believes federal regulations on allowable radiation exposures 'are perhaps the greatest fraud perpetrated on workers.'

'The whole idea of these limits is to con people into thinking that there are safe levels of radiation,' said Gofman, co-discoverer of Uranium 233. 'There are no safe levels.'

The Charlotte Observer 17. 2. 85

Torness

A wing nut was lost in the core of the number 1 reactor at the Torness nuclear power station, under construction near Dunbar in East Lothian. It was reported that the offending item was removed by workmen using 'makeshift fishing rods with a magnet at the end.' The South of Scotland Electricity Board, however, hotly disputes this view.

The SSEB spokesman stated that, 'There are rigorous checking procedures to ensure that any object such as this is located as soon as possible. It was located on Friday evening in this case...It was not the sort of thing we could expect to happen very often because there are rigid controls. But it is a building site and things go wrong...There was no question of makeshift fishing rods. That would be too silly to be true. As far as we can say, they use some sophisticated electromagnetic device'...on the end of makeshift fishing rods we presume.

However, we remember 'Harry the Hammer' left in the core of the Heysham 1 number 1 reactor!

Scotsman 18.2.85
East Lothian Courier 22.2.85

The Peace Camp got its 5 year planning permission without much problem. We haven't got rats, have got sanitation and the dustbins get emptied every Wednesday. . .

Anyway, the nuclear warhead convoy got stopped on its monthly trip to Coulport from Burghfield. We decided we would do the action in Helensburgh as we wanted the local people to realise what risks the MOD are prepared to take with their lives - and how it could be stopped!! We'd been watching out for 10 days - we'd had a message it had been seen north of Birmingham and it wasn't until a week and a half later that it appeared, having come via Stirling and going through Bonhill,which is a particularly dangerous road.

Knowing it usually took the same route on the way back (though not always!), we got into Helensburgh before it left Coulport on its return journey and hid in the public toilets on the pier. A police van arrived just before the convoy. We tried to walk calmly out in the road in front of it with a banner saying 'Stop!' but the police started chasing up the road after us and we were roughly bundled off the road. We did manage to hold it up for a few minutes and seven of us were arrested (for 'breaching the peace'. . .) The support unit, it turned out, were 'V' unit, a riot police unit from Glasgow, and complaints have been made at the way they handled us. In the cells the local police were completely different, asking folk how many sugars in their tea they took, and dishing out cigs generously (they'd been handed in by supporters). After being thanked for their hospitality, the local inspector almost asked us back. And one of us mananged to smuggle in wool and an embroidery needle, leaving a rainbow coloured message:

The camp's extended now with caravans on a new site. We still need more visitors, money(!), and we are willing to visit groups to talk about the camp, Trident (which is getting close) and the nuclear warhead convoy.

Phill

Work on the new Coulport extension where new silos are to be built is due to start this spring.

The Case for Coal

The coal strike hasn't left the pages of the Press or the screens of the Television for the last year. Even now, as the media and Government are proclaiming the defeat of the NUM, and particularly the 'leadership', we are bombarded with propaganda. Yet the real issues have rarely, if ever, been discussed. The Government continues with its energy policy of no policy and refuses to listen to critics, from whichever quarter. For this reason SCRAM is printing this article, by Rab Amos of the NUM at Monktonhall Colliery in Midlothian, to put the case for coal. It is a sorry story of disproportionate investment, a headlong rush into nuclear power without considering the long term effects and a systematic attack on the democratic institutions of this country.

There are two dominant energy sources used for generating electricity in this country: indigenous fossil fuels - coal, oil and gas - and nuclear power. Gas and oil have a limited future and will probably be almost exhausted by the end of the century, whereas coal, using present technology, has a lifespan of 300 years which could extend by another 500 years with new technology. Nuclear power relies on outside sources for its fuel - uranium - and if the Pressurised Water Reactor is adopted it will also have to rely on foreign technology.

To understand the arguments for coal or nuclear we must look at the economics because that is the basic criterion that the present Government works by (or so it would seem.) First, let us look at the coal industry. Coal mining, like any other industry, relies on investment to ensure high productivity, but because of the Government and the National Coal Board (NCB) attitude over a number of years, 81% of investment has been concentrated in the central coalfield belt of Yorkshire and Nottinghamshire, leaving the residue to be divided between Scotland, South Wales and the North East. This starvation of investment reduces productivity and increases costs, leaving these areas open to the charge of being uneconomic.

Coal is Cheap

The NCB and the Government argue that cheap coal can be imported to meet the needs of industry. This is certainly true but it is not as simple as that. Coal from Germany, France and Belgium is subsidised by an average of £14 per tonne, compared with £3/tonne in Britain. South African coal is produced at the expense of the freedom and liberty of our black brothers and sisters who daily risk their lives for a mere pittance and live in abject poverty to ensure high profits for the South African coal magnates. American coal comes largely from opencast mines: the US coal companies are prepared to tear up much of the land in their desperation for profits. Thus, comparisons between British and foreign coal are not as obvious as MacGregor and Thatcher argue.

However, the state of the pound against the dollar, as economists and the CBI argue, is a tremendous boost for British exports. British coal should be able to undermine our main competitors in the international coal markets. The miners' dispute has cost the Central Electricity Generating Board over £2 billion due to the substitution of oil for coal, turning the electricity industry from one of profit to one of loss. This clearly indicates that British coal has been subsidising industry for many years. Not only has the CEGB increased its reliance on oil but the inefficient nuclear power stations are working well below their design capacity. This view was supported by the 1981 Monopolies and Mergers Commission report on the CEGB which clearly stated that the past nuclear investment has shown little direct return and a serious net loss.

The major problem in trying to find the true costs of nuclear power, as with other nationalised industries, is the CEGB's obscure accounting methods, methods which would be totally unacceptable in private industry. Nevertheless, the Committee for the Study of the Economics of Nuclear Electricity, chaired by Sir Kelvin Spencer, published its Special Report in 1982. The conclusion the Committee came to was that, if one compares two power stations of equal capacity, one coal and the other nuclear, the nuclear station, over its 20 year operating life, would cost £2 billion more to run.

Environmental Factors

Then we must consider other factors in our comparison, namely safety and the environment. The pro-nuclear lobby often uses the argument that there have been less fatalities due to nuclear power than there have been due to coal mining. This is without doubt true, but we must look at the *potential* danger if we are to appreciate the safety problems of both industries. In the coal mining industry, with all is inherent dangers, the maximum credible accident would affect some 1000 miners but have no effect on the surrounding area. The potential dangers of a nuclear power station accident is of a different order of magnitude, affecting not only workers but also hundreds of thousands of people in the surrounding area, not to mention the effects that such a disaster would have on the environment for years to come.

Even without accidents nuclear power poses a serious threat to the environment in how to dispose of the waste. The waste from a coal mine can be used in many ways, e.g. road building or simply to fill in the roads and shafts of an exhausted colliery. Similarly, coal-fired power station waste has many uses:- reclamation of land, building materials, etc. Moreover, after its useful life a coal station can be demolished and the land returned to its natural state. The same cannot be said of nuclear power stations or their waste. We must applaud the environmentalists for bringing these problems to the notice of the public, which resulted in the National Union of Seamen's ban on the dumping of nuclear waste at sea. Without this type of pressure there would not have been inquiries into the controls of waste disposal from Sellafield nor the criticisms that are contained within the reports previously mentioned.

Political Decisions

In my view there are important decisions to be made, and they are undoubtedly of a political nature. The 'Ridley Report' published in the Economist in 1978 outlined a future Conservative Government's policy on how it would deal with trades unions, especially the National Union of Mineworkers. Further to that, the stance the Government has taken during the miners' dispute, where the original demand that 4 million tonnes of capacity must be removed from the output of the British coal mining industry, has been nullified by the 80 million tonnes lost due to the dispute. It is quite clear that if this Government is to carry out its monetarist policies then it must neuter the Trade Union Movement. Furthermore, the US cutback in the domestic nuclear power programme and their stance of non-proliferation of nuclear technology to other countries (especially of a socialist nature) is putting severe pressure on US companies such as Westinghouse, whose PWR design is proposed for Sizewell B. It would appear that Britain is being used as a back door to sell their nuclear technology throughout the world - particularly to China.

Finally, when multinational oil companies are buying up coalfields throughout the western world and turning themselves into energy corporations, we must question this Government's rationale in cutting back this country's coal production...or is that rationale a ripening of plum investments for these companies? British coal belongs to the British people. It is a product with many uses, only one of which is the generation of electricity. The same cannot be said of nuclear power, whose main by-product is plutonium for the creation of weapons of mass destruction.

NPT ~ No Peace Tomorrow

This is the third article in our series on the Non-Proliferation Treaty. The series is discussing the issues involved in the Treaty and examines particular clauses in some detail. Here Jos Gallacher looks at Britain's responsibilities to negotiate on nuclear disarmament as embodied in Article VI of the Treaty. He is critical of the way Britain's unilateral rearmament and refusal to include Polaris in the START and INF talks have undermined non-proliferation discussions. He suggests that British unilateral disarmament and support of the Comprehensive Test Ban Treaty could facilitate non-proliferation.

In the 1950's and 1960's British governments used to argue that the possession of nuclear weapons gave Britain entry to the 'top table' where disarmament was discussed. However in the 1970's and 1980's, when limits and reductions of nuclear weapons were negotiated, Britain excluded herself from the talks. The SALT (Strategic Arms Limitation Talks), START (Strategic Arms Reduction Talks) and INF (Intermediate Nuclear Forces) talks have all been bilateral and covered only American and Soviet weapons.

Britain's exclusion from SALT, which ran from 1969 to 1979, is understandable. Britain's 64 strategic launchers are insignificant compared to the 2,250 limit on launchers set in SALT 2. The impetus for SALT derived from the belief that the USA and the USSR had reached a rough parity in the numbers of strategic nuclear weapons. In addition the Soviet Union participated in the talks to gain recognition of its status as a Superpower equal to the United States. Britain's absence simplified, and probably facilitated, these talks.

By contrast the negotiations on START and INF could not ignore the British and French nuclear forces, and British refusal to let them be counted became a major obstacle to agreement. At the INF talks the Soviets argued that their missiles should be balanced against *all* Western missiles, the Americans argued that only weapons belonging to the US or the USSR could be discussed. In fact, under US law (the Jackson amendment), passed at the time of SALT 1, all arms control agreements must impose equal limits on the two countries.

East/West Imbalance

Britain argued that her weapons could not be included in INF as the Polaris missiles were not 'intermediate' but 'strategic' weapons. Logically, this argument implies that British weapons should be included in the START talks. The decision to replace Polaris with the far more capable Trident makes the logic even more compelling. In 1980 the government announced its decision to buy the 8 warhead Trident C4 missile. This would increase the number of targets Britain's strategic missiles could attack from 64 to 512. In 1982 it was decided to opt for the Trident D5 instead. Although D5 is capable of delivering 14 warheads, increasing the total of targets to 896, the government declared that the D5 force would carry no more warheads than had been intended with C4.

In START the US was proposing an overall limit of 5000 warheads on each side. Britain's planned force would have given the West an extra 10% - at least - above the limit.

French nuclear force modernisation presented similar problems but Britain is more culpable for two reasons. Firstly, Britain's nuclear weapons are committed to NATO and therefore jointly targetted with the US weapons. And secondly Britain is obliged, under Article VI of the NPT, to pursue negotiations on disarmament.

Britain Undermines NPT

Britain's unilateral rearmament has undermined non-proliferation in a more direct way. In order to justify the expansion of the British arsenal, the Government has emphasised the advantages the possession of nuclear weapons brings. Peace, it is claimed, is guaranteed by nuclear deterrence. Further, Britain justifies owning its own weapons in addition to the American nuclear force in Europe on the grounds that a 'second centre of decision' increases Soviet uncertainty. Finally Trident is presented as an insurance for an uncertain future in which NATO may cease to exist.

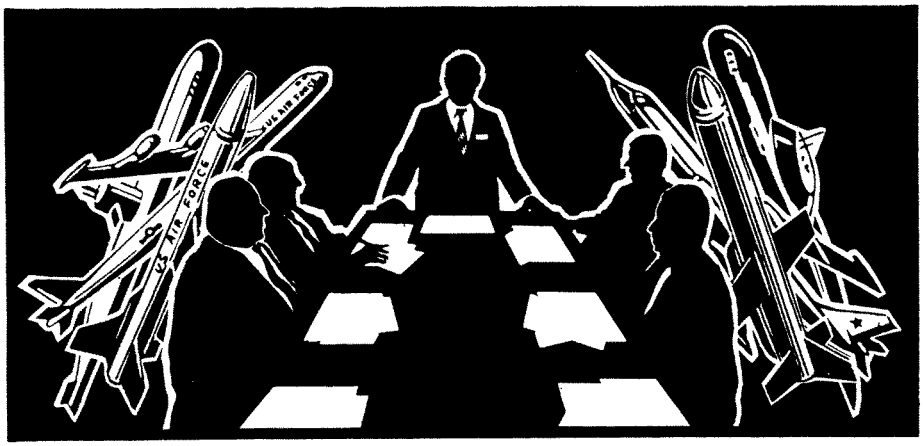
No-one will be persuaded of the advantages of non-proliferation by a country whose actions demonstrate a powerful belief in the security benefits of nuclear weapons. If a 'second centre of decision' enhances deterrence then would not also a third? Or a fourth? If the security offered by the North Atlantic Treaty cannot be trusted, then neither can the security offered by the Non-Proliferation Treaty.

Test Ban Treaty

One set of nuclear arms negotiations to which Britain has been a party is the talks on a Comprehensive Test Ban Treaty (CTBT). From 1977 to 1980 the UK, USSR and the USA held tripartite talks on CTBT. British and American lack of interest has prevented talks being resumed since 1980, despite strong pressure from the non-aligned countries at the United Nations Conference on Disarmament (UNCD). However, there are now signs that the UK and the US may allow a committee of the UNCD to begin negotiations this year.

Non-aligned countries see a parallel between the NPT and the CTBT. One puts a cap on the number of countries with nuclear weapons, the other puts a cap on the arsenals of existing nuclear weapons states. The obligations of one falls mostly on non-nuclear weapons states and the other on nuclear weapons states. The CTBT would also complement SALT type limits by preventing the qualitative improvements in nuclear weapons designs.

Britain cannot sustain both a policy of nuclear deterrence and a policy of nuclear non-proliferation. British unilateral disarmament, coupled with support for a Comprehensive Test Ban Treaty, would bring new strength to the collapsing non-proliferation regime.



Calling All Subs

The Ministry of Defence has plans for a huge communications complex capable of transmitting signals thousands of miles to nuclear submarines deep beneath the ocean. A possible site for it is Mullwarchar in the south Ayrshire hills, which featured in a fiercely contested public inquiry into the proposals for a high level nuclear waste dump.

The MoD plans were exposed in a recent report issued by the Armament and Disarmament Information Units of the Sussex University Science Policy Research Unit, entitled *Extremely Low Frequency (ELF) Communications for Submarines: a Background Briefing on British Plans*. The report states that the Minister of State for the Armed Forces, the Rt Hon John Stanley MP, replied to a written Parliamentary Question on December 5th 1984 that an ELF communications system for submarines was needed and would be sited on the mainland of Scotland.

Local MP's, councillors, council officials and conservationists are outraged about the plans, particularly because they had been kept in the dark. 'This is the first I have heard of this complex,' said George Foulkes, the Labour MP for Carrick, Cumnock and Doon Valley in whose constituency Mullwarchar lies. 'It would ruin one of the most beautiful areas in Scotland. It would not even bring work to a badly depressed area. The MoD would bring in their own technicians to build and staff it.'

Now the secret is out a vigorous protest campaign is certain to develop, possibly even rivalling the successful campaign against the proposals to test drill to ascertain whether the area was suitable for disposing of nuclear waste. Mullwarchar was chosen for the nuclear dustbin because it is part of the Loch Doon Granite Intrusion, which was thought to be particularly suitable for the deep geological disposal of the heat producing wastes. The same rock type is apparently an important requirement for the ELF communication systems.

Aerials and Signals

ELF is a radio communications system designed to transmit messages to submerged submarines, particularly those carrying ballistic missiles (SSBN's) such as Trident. Because of their much longer wavelength, ELF radio signals are able to penetrate the oceans to much greater depths, thereby reducing the vulnerability of patrolling SSBN's. The long wavelength also means that ELF communications have a very long range, providing that the transmitter is sufficiently powerful.

There are two major problems with ELF. Firstly, its extremely long wavelength requires a very long transmitting aerial. A standard half-wavelength antenna would need to be at least 1250 miles long which is obviously physically, economically and environmentally impractical. To alleviate this problem both ends of the antenna can be grounded in highly resistive rock, forcing the signal to travel many miles underground to the other terminal. This method has been used by the US Navy for their ELF transmitter in Wisconsin and Michigan - the most recent example being 84 miles long and costing an estimated $230 million.

The other problem is that ELF signals, by virtue of the law which states that the amount of information which can be carried on a signal decreases with its wavelength, take several minutes to transmit even a single character. This low 'data rate' must seriously limit the operational usefulness of ELF, although in applications such as 'one-way' alerting messages to SSBN's, this may not be a particular drawback.

The military requirement for the ELF system is to enable submarines to operate at greater depths yet still be in communication with their bases. The best system presently in use (VLF - Very Low Frequency) only allows the boats to patrol up to 30 feet deep whilst still being in touch. ELF has been demonstrated as being capable of communicating with a submarine travelling at 16 knots, 400 feet down in the Mediterranean. This would force the USSR to spend 'billions of dollars' to regain their current detection rate against US SSBN's, the Deputy Under-Secretary of Defence, Donald Latham, said in justification to Congress in 1981.

No Operational Need

However, all is not as military planners would have us believe. A number of important arguments have been made against the ELF proposals:-

*Present communications allow SSBN's to be in contact for 99.9% of the time, as required by the US Navy.

*Despite being able to transmit to an SSBN travelling at speed and at depth, the maximum depth from which these missiles can be launched is unlikely to exceed 150 feet, and the subs spend their time travelling at slow speeds and relatively shallow depths whilst on alert in order to remain as quiet as possible.

*It has been stated that at least 19,000 different encrypted three letter messages can be transmitted, making the system something more than just a 'bell-ringer' to order subs closer to the surface, which coupled with ELF's inability to survive a nuclear attack, brings the West a step nearer to first strike capability.

*It is intended to use the ELF system to extend the operational capacity of the US Navy's SSN's (nuclear-powered attack submarines) which are now equipped with nuclear-armed Tomahawk cruise missiles for use in 'strategic reserve role'. These subs make more use of speed and depth and are involved in special missions such as intelligence gathering.

Western Isles MP Donald Stewart raised the matter of ELF in Parliament in December last year and received the reply, 'There is a naval requirement for such a site in Scotland. Several mainland areas are under consideration, although no firm decision has yet been taken.'

The performance of the ELF antenna depends on its location. The antenna array must be located in an area which has bedrock of a very low conductivity (granite is particularly suitable); the outcrop must be large enough to accomodate an aerial of at least 28 miles in diameter (as in the case of the Michigan facility); the rock must be relatively fault-free to ensure the area is of uniformly low conductivity; the topography must be moderately level to ease construction; and surface conditions must be relatively dry to prevent leakage of the signal into the wet soil. The site must also have a low population density.

Opposition Grows

The 'several mainland sites' have been narrowed down to three and informed sources indicate that Mullwarchar is likely to be the favourite, with Altnabreac in Caithness as a close second. This is because both areas have been extensively surveyed for the waste disposal programme; Altnabreac is the only area where test drilling was performed without public opposition.

It is likely there will be fierce opposition at Mullwarchar whereas the Caithness site may be an easier option because of the way the nuclear industry was accepted into the area with open arms. However, there are a number of active CND groups in Caithness (including workers at Dounreay) so it may not be as easy as the MoD believes.

There is one other problem associated with ELF transmissions: health hazards. The low frequency radiation from the communications base is similar to that given off from high voltage pylons. Health effects include headaches, blackouts, depression - even cancer has been suggested. Any facility must therefore be isolated from the public, besides any military considerations, and, in an area under the control of the military, nuclear waste dumping could go ahead without planning permission.

Steve Martin

Decommissioning

With the debate on nuclear waste disposal gathering more momentum recently another aspect of the nuclear power programme is receiving less attention in the public domain:- decommissioning. At the end of their operating life all machines, nuclear power stations included, become less efficient, technically obsolete and often dangerous. The machine then has to be dismantled. It is not so simple with nuclear power stations. The following article has been extracted from a paper prepared in early 1984 by Robert Bullock for the Washington-based Environmental Action Forum. The paper deals with the decommissioning debate in the United States of Pressurised Water Reactors. Although they have a significantly different design to the gas-cooled reactors in this country, the paper provides some interesting general information on the subject.

Decommissioning involves safely removing a nuclear plant from service and preventing its accumulated radioactivity from endangering living things. The fission process produces unstable 'activation products', which have long half lives and are permanently embedded in the reactor structures. This long-lived radioactivity makes decommissioning inevitable. Despite this inevitablity, decommissioning has historically received little attention, but scientific studies, governmental interest and citizen activism have prompted its examination. The nuclear industry's financial and technical problems and the several plants currently demanding decommissioning make it a problem now.

Previously ignored activation products were discovered in the mid 70's which opened up a new dimension to the decommissioning problem:- Nickel-59 (half life of 80,000 years), Niobium-94 (20,000 years) and Carbon-14 (5,700 years). This meant that the premise of Cobalt-60, with a half life of only 5.3 years, being the controlling factor in a reactor's radioactive decay was seriously challenged. It also challenged assumptions of the length of time a decommissioned reactor was deemed to be a health hazard. These discoveries prompted government interest in decommissioning.

In 1977 the General Accounting Office (GAO) attacked the Nuclear Regulatory Commission (NRC), the body responsible for regulating the safety aspects of nuclear power stations, for its poor regulations on decommissioning:

> *The NRC has not paid much attention to one of the biggest problems that may confront the public in the future - that is, who will pay the cost of decommissioning nuclear power reactors.*

Meanwhile, some states have been tightening their own regulations, while others have elected to await forthcoming NRC regulations on decommissioning.

Decommissioning Options

According to the NRC Regulatory Guide, there are three acceptable methods for decommissioning:- entombment, mothballing and dismantling. Before any of these operations can be performed the plant must first undergo certain preparations: all non-contaminated systems must be drained of fluids and selected radioactive components must be decontaminated; the waste produced, along with radioactive liquids, spent fuel and other irradiated, non-fixed components within the reactor housing must then be transported to permanent waste storage sites.

Entombment: *the complete isolation of radioactivity from the environment by means of massive concrete and metal barriers until the radioactivity has decayed to levels which permit unrestricted release of the facility* (NRC definition).

Since the discovery of the new activation products, this option is no longer considered to be permanent.

Mothballing: *those activities required to place...and maintain...a radioactive facility in such a condition that the risk to safety is within acceptable bounds and that the facility can be safely stored for as long a time as desired* (NRC)

The facility is left intact, the doors are locked, security guards are posted and periodic maintenance and radiological surveys are performed. As above this method is not satisfactory. Indeed one would expect a mothballed plant to lose its ability to contain radioactivity sooner than one covered in concrete, and there are also additional security problems.

Dismantling: *all...materials having activities accepted unrestricted activity levels...should be removed from the site. If the facility owner so desires, the remainder of the reactor facility may be dismantled and all vestiges removed and disposed of* (NRC).

In contrast to the other options, there is little relevant experience in dismantling.

Dismantling is a permanent option, but whether it should be done immediately after plant shutdown or after a delay provokes debate that remains unresolved. The reduced waste volumes and occuptional exposures, the desire to let technology develop and experience accumulate, and utilities' political concerns argue for delayed dismantling. On the other hand, concern over holding utilities responsible for decommissioning, the desire to release nuclear sites for other use, the health and safety hazards of delay, and its potentially cheaper costs support immediate dismantling. But since each plant's characterisitics vary greatly, whether delay is justified should be determined on a plant-by-plant basis.

Decommissioning Costs

The estimated costs of decommissioning commercial nuclear power plants have ranged from a few million dollars to figures equalling a nuclear plant's construction and vary by as much as 250%. Numerous variables render costs unpredictable, including: regulatory change, uncertainties in waste disposal and transport, the circumstances of a plant's operations, and uncertainties in decommissioning technology. There is no experience in decommissioning large nuclear plants to serve as a basis for cost estimates, but related experience at Elk River, Dresden 1 and Three Mile Island suggest that costs will be very great.

On-going research into health hazards, new technical problems, and increased public concern will ensure that there will need to be changes in regulations. Of particular interest is the modification and addition of equipment in the reactors, for example new standards to protect the Long Island Lighting Company's Shoreham plant against earthquakes meant cramming masses of new equipment into the undersized pressure vessel. Such a stuffed reactor could make operating and manoeuvering the remotely controlled cutting equipment very difficult and expensive. Utilities often fail to record these modifications which prompted the ex-head of the NRC's Decommissioning Task Force to state, 'One of the major problems is that nobody knows what the plant is like anymore.'

Future cost increases in disposing of the radioactive wastes are certain to play an important part in the overall decommissioning costs. Those parts of the plant contaminated with the activation products should be classed as high level waste and hence should require deep geological storage. The transportation of radioactive wastes will also bring increased costs particularly when considering the logistical problems of trans-

porting the huge volumes of material which will be produced.

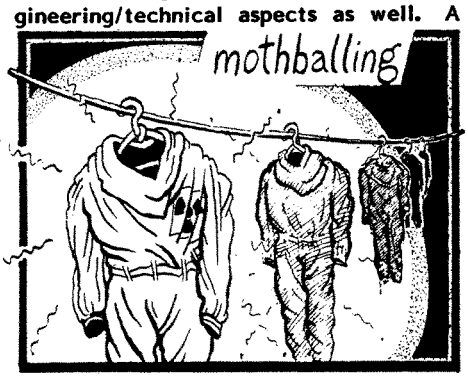
Finally, decommissioning demands special financial planning. Its substantial costs, the importance of equity among consumers and the uncertain future health of nuclear utilities make responsible planning necessary. Financing mechanisms must be judged on the basis of assurance of necessary funds, flexibility, equity and cost.

Conclusions

A number of closing observations spring forth from the foregoing:-

First, the most overwhelming characteristic of decommissioning is its uncertainty. While it certainly promises to be a major future concern, we know little about it. Decommissioning a large nuclear power plant would greatly help to combat this uncertainty, and there exist a number of candidate plants: Indian Point 1, Humboldt Bay and Dresden 1. One of these plants ought to be decommissioned to alleviate the uncertainty underlying decommissioning.

Second, uncertainties concerning decommissioning exist outside of the engineering/technical aspects as well. A



hazy jurisdictional overlap of a number of federal and state entities creates numerous grey spots which are likely to continue for years while the issues are worked out in court.

Third, regarding decommissioning financing, there seems to be an area of stockholder responsibility that has been largely overlooked. Instead of expecting consumers to bear the costs of these contingency options, it seems reasonable to argue that the owners of a nuclear plant should bear responsibility for contingencies in decommissioning. Investment, particularly in the nuclear industry, is inherently risky. The risks created by the uncertainties should not simply be thrust upon the consumer; affixed with such a financial safety valve, nuclear power is made to appear less risky than it really is. It follows that the shareholders - certainly in plants being planned or in early stages of construction - ought to cover the costs of contingencies in decommissioning.

Perhaps the plant owners themselves ought to cover the costs of an insurance option when it becomes available, since the coverage represents in part the risks of contingencies in decommissioning. Alternatively, utilities themselves should bear decommissioning costs in relation to the amount of their plant's originally expected operating lives which have not been realised (i.e., the earlier a plant shuts down, the greater should be the plant owner's share of decommissioning costs.)

Fourth, and perhaps most broadly reaching, decommissioning will have a significant effect on the economics of nuclear power. Nuclear-generated electricity has typically been chosen over other forms of electrical generation on the basis of a demonstrated 3 to 5 per cent economic advantage. These comparisons, however, generally have not considered the costs of decommissioning (nor of waste disposal, government subsidies and other 'hidden costs'). With the costs of decommissioning now being recognised as significant and potentially overwhelming, nuclear economics could very well become self-condemning. With investors as wary of nuclear power as they are today, one more added cost could have tremendous impact, particularly on the 50-odd plants now under construction.

The British Experience

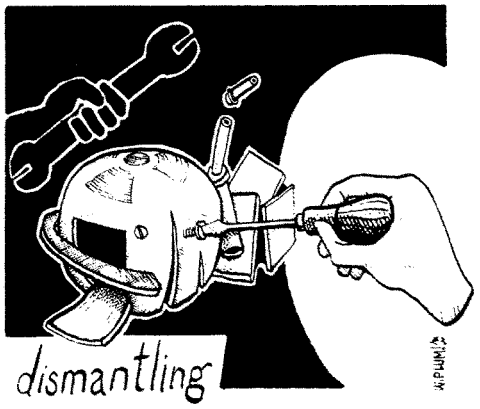
Information relating to decommissioning in this country is, like in the US, a little thin on the ground, although A R Gregory's 'Proof of Evidence' to the Sizewell Inquiry (CEGB P24) and Dr Lawton's 'Decommissioning of the Windscale AGR (WAGR)' (*Atom*, November 1982) demonstrate how the subject has been approached.

To date only small experimental reactors have been completely dismantled. The DRAGON reactor at Winfrith and the materials test reactor at Dounreay have been taken to the first stage of decommissioning. According to a Parliamentary Answer in March 1983, 'No commercial scale nuclear power stations have yet reached the end of their useful lives', so the information in the papers is educated guesswork.

The CEGB policy is to clear a site of nuclear plant after the end of its useful life, although it is their intention to retain the site as a centre of electricity generation for long after the present stations have been closed down. Therefore obsolete reactors may remain on sites still in operational use.

An engineering study is currently being formulated for dealing with a typical Magnox station and the UKAEA has prepared a detailed step-by-step programme for the WAGR decommissioning project, the main aim of which is to 'get information and *not* to recover usable space' (*Atom*). The UKAEA is developing the necessary equipment and industrial firms will be invited to co-operate in the project.

There are no statutory regulations in the UK specifically covering decommissioning. The Nuclear Installations Act (1969) states that a site licence may be revoked at any time, so it is assumed that the site licence would remain in force until the Health and Safety Executive agrees that no danger from ionising radiation exists on the site or any site thereof. The transport and disposal of the wastes arising from decommissioning are regulated by the Department of the Environment, the Ministry of Agriculture, Fisheries and Food, and the International Atomic Energy Agency.



The process of decommissioning is expected to comprise three stages: defuelling the reactor, transferring the spent fuel to cooling ponds and transporting the said spent fuel to 'a reprocessing plant or other storage facility' (P24); dismantling the radioactive and non-radioactive plant and buildings external to the reactor biological shield and transporting the waste off-site; and dismantling and removal of the pressure vessel (with its internal structures and biological shield) and the building itself, then removing them off-site.

Stage 1 is expected to take about 5 years, stage 2 a further 5 years and stage 3 another 5 years after that. However there may have to be considerable delays between the stages due to the activity of the plant. A delay of several decades between stages 2 and 3 would bring appreciable radiological benefits, although any longer than 100 years would produce insignficant benefits. The costs of decommissioning a Magnox station similar to Sizewell A have been estimated at between £150m and £270m (1982 prices) depending on timing, according to a study carried out by the CEGB between 1979 and 1982.

However, as Dr Lawton pointed out in his summary, 'Much of the work [on the WAGR] is of a development nature and its successful execution should help plan subsequent similar operations as they become desirable or necessary in the 21st century,' so they are no closer to finding the answer in this country than they are in the US. A chilling possibility appears in P24 - 'Depending on particular circumstances...[a reactor may be left] under CEGB supervision for a longer period of perhaps 100 years' - three times longer than the CEGB's history to date!

Steve Martin

They're no Comin' & They're no Dumpin'

A Prototype and a Demonstration Fast Reactor, an experimental PWR, reprocessing and dumping of nuclear waste, shipments of plutonium waste by sea - this is a list of activities brought to the North of Scotland by the U.K. Atomic Energy Authority (UKAEA) and the Ministry of Defence in the last thirty years. In 1977 the SSEB arrived in Orkney to mine uranium. There followed a two year fight to stop them doing so, and this ended with an ambiguous shelving of their plan by Mr Younger. Frances McKie of the Dunters, the Orkney environmental group, here outlines the next plans of the nuclear industry for this part of the country.

At Christmas 1983, Alex Copson of ENSEC Ltd announced he had plans to store nuclear waste in the sea-bed. The site he had chosen was Stormy Bank, 15 miles west of Orkney. Newspaper reports carried illustrations of his plans which involved a redundant oil rig and a concrete walled shaft 3,000 ft deep into the sea-bed. Mr Copson claimed to have great expertise in the oil business which he would apply to what he thinks is relatively harmless nuclear waste. ENSEC turned out to be a very new company closely related to Cluff Oil. Sir Algy Cluff is better known for his financial activities in the City of London than for any technical expertise in the oil industry. In any case, private enterprise was now launching itself into the business of nuclear waste disposal.

Throughout 1984, the media carried various interviews with Mr Copson in which he frequently compared nuclear waste disposal to the oil industry. He mentioned the prospect of extra jobs and investment for Orkney, and referred to how the islands had adapted to the oil industry, and would likewise accept nuclear waste. Although he constantly promised to come north to explain his plans, he has yet to arrive. This probably explains his ignorance of these islands and the fundamental errors he has made.

Past Experiences

The SSEB taught Orcadians all they needed to know about the nuclear industry. Throughout all the proposals, denials, assertions and withdrawals between 1977 and 1980, the catch-phrase within the community was, 'They're no' comin' and they're no' diggin'.' That phrase has been re-adopted forthwith on the grounds that a flat 'No', backed with a promise of action, if necessary, worked once before, and will probably work again, along with the same Silent Protest Marches.

The Stormy Bank Group was set up at the beginning of February. Within the group are representatives of all the major Orkney industries, dominated by tourism, farming, fishing and the new investors - shellfish farmers.

Others have jumped on the bandwagon, however, and even bigger interests think that profits can be made out of ENSEC's idea. NIREX has commissioned a feasibility study and we await the outcome with great interest.

Future Plans

Meanwhile the Director of Dounreay, Mr Blumfield, has been hinting that the commercial Fast Reactor which Britain is to build as part of the European Fast Reactor Programme, will not come to Dounreay. He seems to be preparing his workforce and the community for the prospect of another Windscale instead. Since it makes no sense to have a major generating station hundreds of miles from major consumers, Dounreay looks like getting what no-one else could possibly want - a new Windscale to reprocess plutonium from all three commercial Fast Reactors.

Needless to say the prospect of more plutonium nitrate shipments plying in and out of the notorious Pentland Firth and mingling with cumbersome oil tankers is viewed with great concern. The plant itself would flout the recommendations of a Convention of Nuclear Scientists in Germany, which claimed the technology did not exist to reprocess plutonium with safety. In any case, Windscale and La Hague are enough for most people.

Economic Blackmail

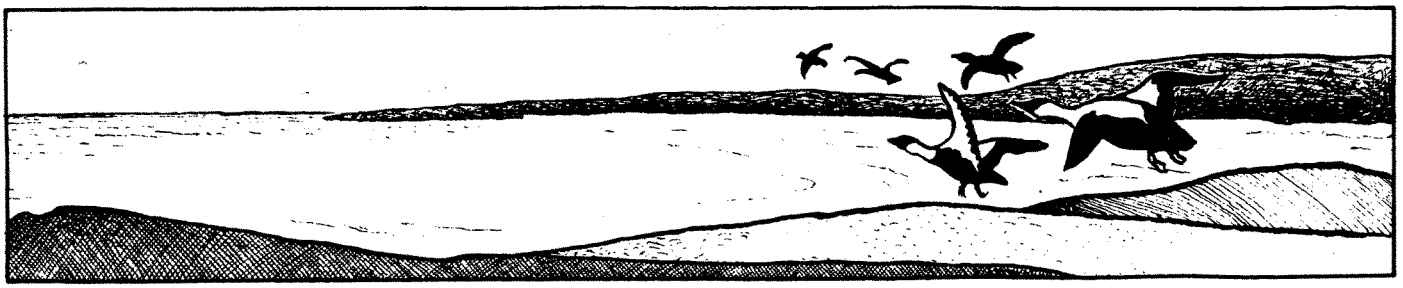
But Caithness is in a terrible position. In the middle of an economic recession, how can you ask such a vulnerable community to abandon its one major employer? When it hosted the first dangerous experiment in the fifties, economic blackmail was paramount, and the same applies today. However, this time there is hope. Orkney and Shetland are planning right now for the end of the oil industry's contribution to their economies. Coincidentally, this is projected for roughly the same time that present activities at Dounreay will run down. On that basis, it was decided to cross the Firth to ask the Caithnessians to join Orkney and Shetland in planning for 15 years hence - independent of oil, and the nuclear industry.

Confrontation Meeting

A meeting was held in Thurso on 18th February this year. To break the ice for us, Michael Burke came up to introduce his film *Windscale Nuclear Laundry*. With him came Pete Wilkinson from Greenpeace and Jean Emery from C.O.R.E. (Cumbrians Opposed to a Radioactive Environment). They faced a very noisy but interesting audience. Over 100 turned up and some had to be turned away. Five or six scientific officers, including Assistant Director Pugh and Mr G. Tyler, heckled loudly and aggressively. At one point the meeting was interrupted by the spectacular entrance of the Dounreay Medical Officer, Dr Ted Smith, who immediately poured scorn on the Black Report, commissioned as a result of the film. Throughout the heckling, Mike, Pete and Jean presented clear unassailable facts about the damage the nuclear industry has done, how the rest of the world is more alert to the dangers, and how alternatives exist. Pete in particular emphasised how Caithness and Orkney seemed to be attracting numerous undesirable schemes from a beleagured nuclear industry. Perhaps a repeat of the Highland Clearances is the objective?

Once the meeting was over and the hecklers left, other members of the audience talked to us. Those that did, gave a clear indication that they are very worried about the booby prize Mr Blumfield has planned for them.

The Dunters have promised Caithness that they will go back regularly from now on to help them voice their concern and perhaps plan a much safer future.



Radwaste – The Need for Debate

At present it is impossible to write a round-up of the nuclear waste scene which will not be out of date by the time it is printed. Important material pours in as never before. So I have asked SCRAM to let me have a Waste Column for the next three issues at least, in which I will do my best to update our movement, concentrating on scientific issues which underlie campaigning rather than on the campaigns themselves. Heaven knows, there are enough of them which demand attention: the ICSU Report with which I start; ENSEC; Canonsburg: new material produced by NERC on geomicrobiology; and much else. I shall try to look at all of it and hope that the results will stay up to date as source material for some time.

It is important to state the reason for this approach at the outset. It is that the only systematic sound thinking, both social and scientific, has been done, not by the Government, but by the pressure-groups. Their approach is the only one which could ultimately lead to socially acceptable solutions. Despite being clean-bowled over High Level Waste (HLW) in Galloway, Cheviots and Wales; held up to international abuse by Greenpeace over Windscale; and thrashed at Billingham the Government realises nothing of the above. But it is much more important that *we* realise it. Our success, and the mounting public support which we have, is founded in an unremitting attention to scientific and social facts down the years of our campaigning. If we keep up that sound approach there is nothing in the nuclear waste field which we cannot win. Acceptable solutions to the backlog problem; an end to waste transportation, to reprocessing and eventually to Windscale itself – we can win them all if we go on as we have: peg away at the data; found public support on sound policies – and don't get tired!

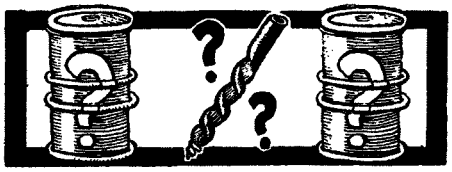
Evidence of how right we were over the HLW borehole proposal, how right we should be to combat any attempted recurrence, comes from a standing committee of the International Council of Scientific Unions (ICSU). Since 1978, the ICSU has studied the geology of HLW disposal in deep rock formations on land and at sea. Reviews of the report are to be found in the *Guardian* (6.9.84), in *Nature* (Vol 310 p537) and in the UKAEA house journal *Atom* (December 1984 p4). One or both of the last two should be read by serious campaigners. The following summary cannot be a substitute.

More Research Required

The ICSU committee included representatives from Canada, France, Czechoslovakia, USA, Japan, South Africa and Britain. Its main conclusions were as follows:

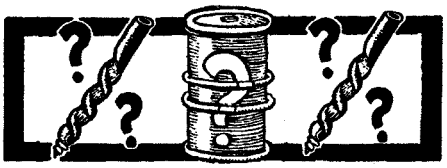
1 Century-long storage of HLW is essential.

2 That although the Committee (by implication rather than outright statement) does not exclude as an ultimate possibility that geological disposal might be acceptable, it points out, repeatedly and in almost every relevant technical mattter, that existing knowledge is sadly inadequate and that far more intensive and long-term research would be needed before any such decision could be justified. (Which broadly is what we all said. Think back to Heseltine in 1979: a decade of research, a demonstration repository in the 90's – and thank God for the pressure groups.)



3 The Committee does not try to dodge the Achilles' Heel of the whole concept. Since HLW wastes are dangerous for thousands of years, all demonstrations of adequacy 'must rely on indirect scientific arguments and predictions.' That too we said, or rather, Professor Ivan Tolstoy did. Geology is not a predictive science. There is an implication in the Report that it could become sufficiently predictive – but only given much more fundamental work covering far longer timescales than so far envisaged. They point out, indeed, that never before have scientists had to find answers to disposal problems covering so vast a timescale.

They say, of course, that there are heavy metal poisons with infinite lifetimes – but it is fair comment to point out that the analogy is faulty. The poisonous hazard of mercury, for instance, is totally confined to where it happens to be, whereas thermal heat and radiation from HLW can have corrosive effects which penetrate outside on containment and on backfill; and in both instances with effects exacerbated by moisture.



4 As a consequence of this view the Report asserts that too much time has been spent on laboratory and desk studies and far too little on field studies.

5 They conclude that insufficient attention has been given to deposition below the sea-bed. I shall not deal here with this section of the Report since it fits in more readily with discussion of the ENSEC proposal which I shall come to next time.

'Take Time' More Responsible

Now for some details, for which quotations are useful. These have been taken from the *Atom* report referred to partly because of its relative accessibility and partly because the quotations are referenced at the end of that article.

On interim storage the figure of 100 years is clearly regarded as a minimum.

> *. . . after emplacement of waste, thermal stresses may build up for a long period of time. . . .Such problems are not yet well quantified. It is certain that these effects would be reduced if interim storage was lengthened, while any influence of radiation on containers and backfill as well as danger to workers would all be reduced. . . .The ICSU group considered that interim storage should be for the longest acceptable period because technology for final disposal, whether terrestial or on the seabed, is not yet established. The 'take-time' or 'waiting' option might be more responsible than a bestguess quick alternative.*

Directly observable, and monitored, long-term interim storage (over 100 years) was the Committee's conclusion.

Well, *Pandora's* solution was to store until the short-lived heat-generating component had gone; that is, for 5-600 years. There seems no reason to revise it; it should give time for lots of research. The following are further points in the Committee's *Atom* paper.

* There is no doubt that there is no single ideal host for radwaste disposal . . .rocks formed at high temperatures may tend to suffer the greatest change in properties by the motion of low temperature fluids. (Granite might be the worst choice.)

* Appropriate mining technology for depths up to 4km exists, and the 500 to 1000 metre depths commonly considered adequate require careful justification.

It comes to this: that, during the very period when we were campaigning the ICSU Committee, with more time and resources and greater expertise, was reaching pretty much the same conclusions as we did. That ought to kill stone-dead any idea of depositing HLW in geological formations anywhere during our lifetimes. But we must recall the unhappy Tom King, scuttling out from under in December 1981 and telling us that the Government considered the idea established in principle – with virtually no field research at all. So they could try again. Maybe it would be fun if they did!

Don Arnott

Nucleaire ~ Non Merci

With the Sizewell Inquiry finally over, and the Inspector now having to wade through two years worth of evidence, we must wait to discover the future of Britain's nuclear power programme. The following article may give Sir Frank Layfield some food for thought. It describes the economic disaster which is the French nuclear programme. Miriam Boyle and Mike Robinson clearly show that the state-controlled nuclear industry is having a serious effect on the economy of the country when it was supposed to bring about economic independence. The depression of the private US nuclear industry should have shown our Government the folly of nuclear expansion. Perhaps the French industry, more akin to our own, will eventually make them see the light...perhaps.

Investment decisions made since the 70's oil crises have been excessively overambitious and the French now have an embarrassing surplus of electricity generating capacity. Rather than sustaining the French economy, nuclear power is becoming a burden, hindering industrial progress by absorbing so much investment and adversely affecting the country's balance of payments.

Despite the all-pervading secrecy in all things nuclear, recent independent analyses have all presented a gloomy picture. Technical problems and the introduction of new safety systems have increased costs; investment costs will escalate as future sites will require expensive adaptations; and Framatome will be increasing costs due to the reduction of orders from the six plants per year capacity to only one or two per year from the late 1980's which will seriously affect their 'economies of scale.' The bankruptcy of the parent company, Creusot-Loire, will put further financial strain on Framatome, although the most likely buyers are the state-owned companies Compagnie Generale Electromechanique (CGE) and Alsthom-Atlantique, which will lead to further state control.

Planned Expansion

By 1990 French generating capacity is projected to include 34 PWR's of 900 Mw, 18 PWR's of 1300Mw and the 1200Mw prototype commercial fast reactor, as well as five older gas-cooled reactors. This will mean that 70% of French electricity and 30% of total energy output will be provided by nuclear power. (In 1984 these figures were 48% and 17%.) Although official figures claim that nuclear electricity costs half that from coal and a third that from oil, they rarely mention that electricity is much more expensive than the direct use of coal, gas or oil. In 1983 French industry was charged twice as much for electricty as for coal and gas, and half as much again as for oil. Frustrated by industry's reluctance to buy electricity, EdF has been promoting electricity for industry with some vigour, spending 400mF in 1983 and a huge 1000mF in 1984. Even so, industrial demand is static at best and probably in slight decline.

EdF has also been deliberately promoting electricity in the domestic market - France is the only country in Europe still to actively promote electric central heating - which contributed to a 51% rise in electricity consumption between 1973 and 1981. This is because France has decided to go beyond 'nuclear substitution' (replacing coal or oil with nuclear power) to encouraging 'nuclear electrification' - replacing other fuels with nuclear electricity. This aggressive policy has been responsible for a big increase in the ownership of electrical appliances, with a 133% rise in domestic electricity usage since 1973 and a domestic price increase of between 27% and 40% over 1983.

Enormous Debts

As a result of the unrealistic assumption that electricity consumption would double every ten years there is now a large excess of installed generating capacity which can only get larger, thereby reducing efficiency and increasing costs. The premature shutdown of 2,800Mw of conventional capacity is one way of reducing the overcapacity, exporting surplus electricity is another. Contracts signed or under negotiation with several European grids will increase these exports from the 1983 level of 13.5 billion Kwh to 20 billion Kwh in the near future.

These factors have had a serious effect on EdF's finances. The company is the most important borrower on the US money market and the third in international markets. This has become worse with the US dollar's strength. EdF's debts were expected to reach 210bnF by the end of 1984, an increase of 110% since 1980. More than half of the utility's borrowing is for the nuclear programme and it recently raised $300m on the international bond market to refinance its 70bnF foreign debt. Therefore the strategic goal of economic independence has not been achieved because savings on imported oil and coal have been cancelled out by the cost of expensive foreign currency. The implications for the national economy remain the same whether the country is buying overseas oil or overseas currency.

Carrots and Sticks

Despite the financial problems the nuclear industry is able to continue more or less unchallenged, partly reflecting the demoralised anti-nuclear movement's failure to exert significant influence on decision making. However, it also reflects the success of EdF's campaign to offer attractive inducements to host communities:- cheaper electricity, improvements in local business and employment opportunities, and substantial contributions to local revenues through special taxes.

Another factor in the nuclear programme's unchallenged expansion is the virtual absence of consultation procedures. Proposals are made available, giving the public six weeks in which to register objections which are noted by the Government in assessing compensation claims. EdF is able to continue its preparations throughout, confident of a favourable decision. Not surprisingly, frustration has led local populations to violent dissent, as in the notable case of Plogoff in 1980.

Beyond this, there are institutional and political reasons for the unrelenting expansion. All major parties support the industry because of military considerations; state loans have become grants; accounting systems have disguised losses; and the similar educational background of industrial management and senior civil servants ensures a unified decision-making apparatus.

The nuclear industry symbolises the greatness of France, its patriotism and its political, economic and military independence and security. However, the unhindered expansion threatens other less prestigious energy sectors and casts a long shadow over the French economy as a whole.

Sources

'Le Nucleaire Pervers' by D. Chemiot (1984) *Alternatives Economiques* March 22-3
Electricity Costs in France by H Damveld (1984) W.I.S.E. Amsterdam
'Creusot-Loire et le Mal Francais', *L'Express* 41-4 by Y Guihannec and A Rebattet (1984)
'10 Ans de Programme Nucleaire: EDF devient un fardeau pour la France' by Y Lenoir and J P Orfeuil,(1984) *Science et Vie* 194, 24-33 and 164-170
'A Study of Nuclear Power in France' by Colin Sweet (1981) *Energy Paper 2*, Dept of Social Sciences, Polytechnic of the South Bank, London

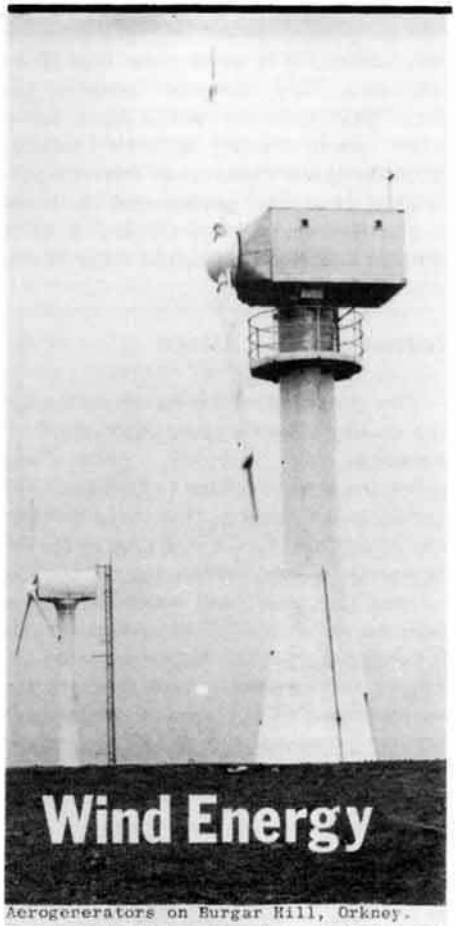
The 1980's have seen the large scale use of wind energy advance dramatically in some countries, but in the UK activity has been slower and less spectacular. This is in spite of our very good wind climate, some enthusiasm from the Department of Energy and the theoretically encouraging legislation of the 1983 Energy Act. Nevertheless, there have been some very interesting developments, and next year should see the really big machine operating in Orkney. In the following article Jamie Taylor gives a brief resume of the story so far, both in this country and overseas.

Electricity generation for the National Grid, or for remote communities, has received the most interest. The aerogenerators or WECS (Wind Energy Conversion Systems) are specialised refinements of the old corn grinding windmills. At present the majority of aerogenerators have slender two or three blade rotors, coupled through a gearbox to a generator, mounted on top of a steel tower. There are brakes and a 'yawing' mechanism to ensure the apparatus always faces into the wind.

The designers' biggest problem is to ensure that the apparatus can survive the worst anticipated wind forces, whilst maximising power extraction across a wide and fluctuating range of wind speeds. Most machines incorporate a microprocessor to control start-up and electrical synchronisation with the Grid, as well as disconnecting the system and applying the brakes when wind speeds get too high. This kind of technology costs around £1000 per kilowatt of capacity and can be bought 'off the peg' from several dozen manufacturers, some in the UK. However, the electrical power produced will on average be considerably less than the rated capacity - the load factor is often less than 20%, although on some Scottish sites it has exceeded 40%.

Foreign Wind Policy

The Danes are probably the most experienced WECS manufacturers, largely because of government policy - they still feel the bite of the 1970's oil crisis and take seriously the idea of privately operated electricity generation which does not pollute. If an aerogenerator meets the approved standards potential buyers qualify for a 30% subsidy towards the capital cost. The machine is connected in parallel to the public supply so the owner can sell excess output to the electricity board, as well as buying-in when there isn't enough wind. (The 1983 Energy Act made such connections legal in the UK.) This government encouragement resulted in a market-led development battle between manufacturers, particularly in the range up to 75Kw - around 500 of these are now installed, accumulating operating experience and subsequent design improvements. The



Aerogenerators on Burgar Hill, Orkney. Foreground: Wind Energy Group's 250kW and Background: Howden's 300kW machine.

first of the new generation of large machines, the 2Mw 'Tvindmill' was completed in 1977 - a remarkable achievement by staff and students at a state high school which included pioneering work in the use of glass fibre reinforced plastic for the 54 metre diameter rotor.

Starting in 1981, the extraordinary growth of 'wind farms' in California has benefitted Danish exporters. It is widely believed that wind farms would benefit their investors even if no electricity was generated, because they take advantage of generous federal and state tax credits currently available to high-rate tax payers - 'these aren't wind farms, they're tax farms' - observed one cynical US politician. On average the utilities also pay much higher rates than in Europe for wind-generated electricity. More than 500 machines of average size 80Kw have been credited with keeping about 2000 tonnes of pollutants out of the atmosphere in 1984. The unique wind topography of the Altamont and Techapi areas and the perfectly matched air conditioning load make wind farms an ideal generation option in California. Most interest is in the Danish machines, although James Howden and Co. Ltd. of Glasgow have at least 11 of their 330Kw machines operating there.

Wind Research on Orkney

By contrast, little is happening in the UK. Less than 20 WECS are connected to the Grid and most of the current development money goes to the 3Mw prototype being built by the Wind Energy Group (WEG - a British Aerospace, GEC and Taylor Woodrow consortium.) It will join the WEG's earlier 250kw and Howden's 300Kw machines (both of which came on line in 1983) on Burgar Hill in Orkney when it begins operating in 1986.

Howden pioneered the use of epoxy-impregnated wood laminate construction for the rotor blades because of the fatigue resistance of wood (this technique improves the structural predictability and weather resistance). The machine has won design and conservation awards and is credited with a more continuous performance than the WEG machine.

The £10 million cost of the 3Mw machine has attracted criticism from the 'Small is Better' school of thought, as well as the anti-wind lobby. The smaller machines, by virtue of the higher volume production, presently offer lower costs, but as production of the larger machines increases, and greater experience is gained, costs should fall in future. (The WEG claim that production models of their machine will sell for £4m.) The North of Scotland Hydro Electric Board, the operators, are happy with the performance of their Burgar Hill machines, although now that Orkney is connected to the Grid by undersea cable, the savings over diesel generation will not be realised. However, Shetland is beyond the range of present day cable technology, so wind energy developments there should be likely in the future.

Smaller-scale systems

Of the smaller scale aerogenerator projects, Fair Isle is of particular note. A modified Danish 55Kw machine, installed with money from the EEC and the Highlands and Islands Development Board, is the centre of the system and a diesel generator provides back-up. Each house has a special unit installed which automatically regulates heating load to make maximum use of the wind electricity and to minimise reliance on diesel. Lundy has had a similar system installed.

A number of farms in the UK have installed small aerogenerators and the South of Scotland Electricity Board is planning to try out Howden's prototype 60Kw machine on a farm near Edinburgh. It is rumoured that a similar model is soon to be tested at the National Test Facility for Small Wind Turbines at Myers Hill near Glasgow. WEG recently commissioned a 200Kw prototype at Ilfracombe in Devon, and were so encouraged that they invited the Under Secretary of Energy to visit it. Local residents were less impressed, however, and complained about noise and television interference - both problems can usually be alleviated.

The long-awaited decision on government funding for combined heat and power (CHP) schemes in three cities has finally been made. (Just as we were going to print with the last journal.)

Edinburgh, Belfast and Leicester will each receive £250,000 to spend on preparing a feasibility study over the next three years. The three were chosen by Energy Minister Peter Walker out of the original nine 'lead cities' proposed. It's a pity that the government hasn't got the foresight to continue the study in all nine cities. Nevertheless, some of the projects not funded may go ahead regardless.

One city was chosen from Northern Ireland, Scotland and England. Belfast has no competition or cheap gas supplies, so it was a certainty. Edinburgh seemed more likely than Glasgow because the Council, backed by a private consortia, was committed to the scheme, whereas Glasgow District Council refused to take part because the government demanded private investment as a condition. However, a stink has been raised by the decision to choose Leicester when cities like Sheffield and Newcastle-upon-Tyne have excellent cases for and positive commitment to CHP.

Political move?

George Gill, Chairperson of the Tyneside authority CHP group has attacked the government for 'political opportunism', adding, 'It is quite clear that if we had more Tory marginal seats in the North-East then we would have benefitted from Peter Walker's money.' Leicester is the cheapest of the nine possibilities and the government will not be giving £250,000 to a Local Authority which is due to be abolished under forthcoming legislation!

Refuse complications

The proposed abolition of metropolitan county councils could put many CHP initiatives in jeopardy, particularly where the use of refuse to fuel the CHP station is considered. This could drastically affect the GLC's existing waste incineration plants, which raised £4m in revenue last year, and could cut future plans to develop CHP on a wider scale in London Boroughs. Anger has been expressed in Tyneside, where they are going ahead with CHP without government funding, because the break-up of the council into districts will seriously complicate the efficient co-ordination of collecting and burning the waste.

Despite all the government restrictions, Sheffield has plans to develop CHP on its own, using a £300,000 grant from the EEC to help their new-technology approach of using a power station where coal is gasified and burnt with both a conventional and a gas turbine.

Electrical Review 15.2.85
New Technology 11.2.85

The Third World is benefitting from a new design of wind-pump which recently won an award for its high performance and structural design.

The pump provides water for irrigation, cattle or village supplies and apparently lasts five times as long as a diesel pump. Even with substantial research on stress and aerodynamics with new materials, the machine will cost less than half that of a diesel machine, and is already being used in many African and Asian countries.

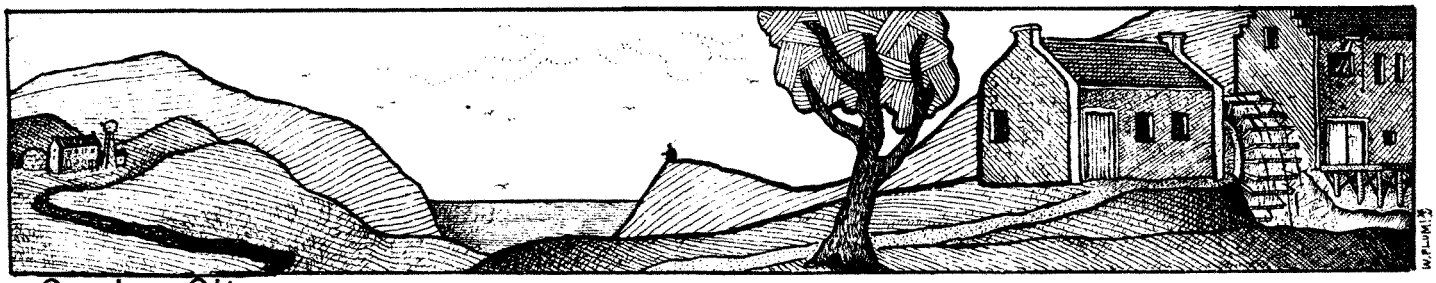
New Scientist 7.2.85

Speedy Spin

ERA-Technology, a research organisation, is trying to speed up the testing process for wind machines. Power performance curves are gathered over a period of a few months, studying the power output relative to changes in wind speed and direction. This shows how effective it will be on a particular site.

Currently samples are taken of 10 minutes under various conditions. ERA say they can cut this to 1 minute tests without losing accuracy, thereby cutting the testing process to a matter of weeks.

Electrical Review 8.2.85



Garden City

A new garden city in Milton Keynes based on community ownership, embodying many principles of the green and AT movement, looks set to go ahead.

The 'Greentown Group' who have planned the development in consultation with the Milton Keynes Development corporation (MKDC), the Borough Council, the County council and public utilities aim to ensure that the residents plan the village themselves and that all decisions affecting the community be made democratically. All contributions or ideas on the design of the village are taken seriously and discussed.

Greentown will be designed and run on ecologically sound lines, and aims to be appropriate to a future of changing technology combined with diminishing natural resources. The buildings will be very well insulated and weather-proof, hopefully to the standards of Scandinavian houses which stay warm and comfortable largely on internal gains from body heat, plus solar gains from well designed windows. Eventually, the village aims to treat its own sewage (with methane as a product) and generate most of its energy from renewable sources, such as solar, wind and biomass. A community re-use and recycling system is planned for domestic use.

EEC Help

The EEC has recently granted up to £214,000 to cover 40% of the cost of a solar/wind electricity system for the first cluster of houses to be built. However, more money is needed before the project can go ahead.

Unfortunately, a shadow now hangs over the whole development with regards to planning permission. The section 7 (1) of the New Towns Act may be amended because the Greentown group and the Borough council are concerned at the MKDC's increasing vagueness over its commitment to the project. Five years ago the MKDC saw the application as unique but now they treat them like 'any other developer'. This may not affect the project as a whole, but it may be delayed for up to a year or more.

By around 1990, if planning permission is given, Greentown village will be complete. 500 people, their homes, public buildings, children's playpens, workshops, public open space, woodland, gardens and orchards will occupy the 15 hectare site.

Look out for more info and article in next Journal.

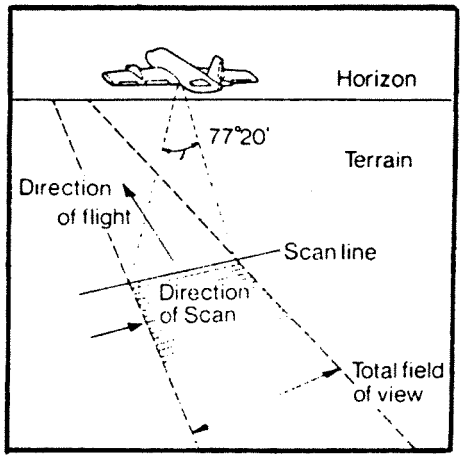
Airborn Solar A.T.

The Scottish Development Agency (SDA) has launched a campaign to increase Scotland's energy efficiency, monitoring heat loss from industrial, commercial and domestic buildings by taking infra-red photographs from an aeroplane.

Thermography is not new, but this survey, covering all population and industrial concentration in Central Scotland from Ayr to Dundee, exceeds by far anything ever attempted before.

At an estimated cost of £100,000, the plane will fly for 14 nights at an average height of 1,500 feet, resulting in 50 square metres of black and white photographs. White patches on the photos indicate heat loss, with an accuracy of 0.2°C differences to small areas to $0.8m^2$. The plane is now in the air, but only just. Half the funding was scraped together from private companies and local authorities before the project could start. £250 will be the cheapest photograph available (of 2.5 acres) going to the thousands for large areas. These sums, although not too much for companies, certainly won't strike an enthusiastic chord in local authority budgets or local insulation schemes, which would be benefitted most. It's pathetic that initiatives like this one are put under such financial pressure, especially when you consider that the Scottish Energy bill in 1982 was £2.5 billion, of which £850 million was for industrial use and £650 million for domestic use.

David Baker, the SDA's project officer said, 'There can be no doubt that a lot of energy and therefore money is being wasted at present through heat loss from buildings. Savings of up to 20% are within the reach of most people who are prepared to do something about the problem.'



Start of a campaign

The survey is apparently the start of a general campaign by the SDA to combat energy bills. Let's hope they mean it and try to widen their scope by taking their results and ideas into action in local communities, perhaps by exhibitions, talks, advertising, etc., or will so-called economic considerations choke them too, as they do with most alternatives to the uneconomic but politically agreeable nuclear programme.

The Department of Trade and Industry has cut its funding for the Solar Energy Information Office at Cardiff University, forcing its closure. This is yet another example of government commitment to renewables. The college cannot afford the £30,000 needed to keep the office open. The brief of the office, set up in 1976, was to persuade companies and organisations (anyone who enquired about it) to use solar energy equipment and to encourage British industry to enter the international market for solar energy supplies.

H & V News 2.2.85

Coal

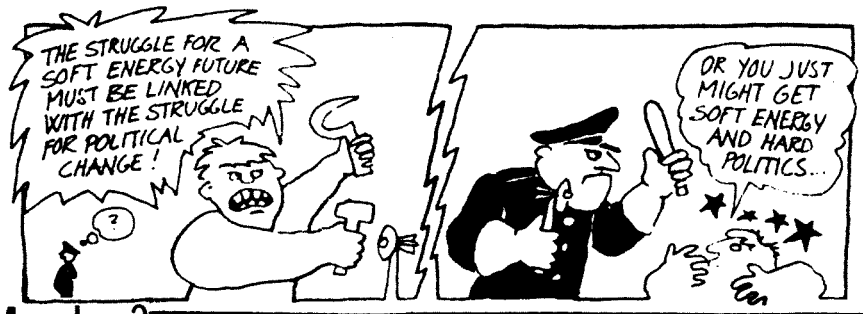
ICI is doing its bit for the coal industry. The chemical giant proposed a project to convert two of the five boilers at their Wilton site power station on Teeside. Now the strike is over the conversion will go ahead at a cost of £43m of which the government coal-conversion grant will cover £4m and the regional aid grant another £7m. The conversion will raise ICI's coal burn to one million tonnes per year.

(ICI owns the anhydrite mine which NIREX was considering using for the Billingham nuclear waste dump. Following mass local opposition the company refused to play ball with NIREX!).

New Technology 18. 3. 85

Saving

David Hunt, the Energy efficiency Minister addressing Yorkshire business people recently said, 'One extraordinary fact we have discovered by careful research is that industry could invest £300m in a range of energy saving schemes, where the return in energy savings would be more than £300m a year. There are not many investments available today with a 100% return and the return guaranteed.'

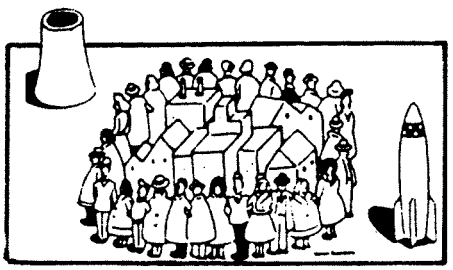


Murder ?

It is outrageous that with the current concern over the growing number of deaths in Scotland from hypothermia and cold-related diseases, the Government should cut £700,000 from the Home Insulation Scheme for 1985/86.

Grants are available for insulation of 90% up to £95 for the elderly and disabled. Everyone else receives 66% up to £69. The cuts will mean less money available, although the government justifies it on the grounds that the allocation was underspent every year. They seem happy with the low uptake of available grants because it's saving them money, instead of trying to expand public awareness of energy efficiency. What about funding local insulation schemes or making the grants 100%? People's lives are at risk!

In the 'Scottish Commentary on the Public expenditure Paper 1986/87' the Government claim that the introduction of a top-up grant in 1984 will increase the take-up of the Homes Insulation Scheme. Top-up grants provide for pre 1976 dwellings which have inadequate loft insulation. This is a good measure as far as it goes, but it is due to the efforts of insulation projects, draughtproofing schemes and groups such as Neighbourhood Energy Action that the uptake of grants is gradually rising.



No help for the poor

As usual, the poor are hit the hardest. The imposition of VAT on insulation materials and difficulty in finding the necessary capital makes insulation a luxury many cannot afford. When old and less well off members of our society are dying and ill through inadequate insulation, the government should have no choice but to retract this measure and not only increase grants but make them available for all energy efficiency measures.

Contact: Scottish Fuel Poverty Action Group, 18/19 Claremont Crescent, Edinburgh EH7 4QD.

The British Nuclear Deterrent by Peter Malone (Croom Helm, £16.95, 200pp), Trident. Britain's Independent Arms Race by Malcolm Chalmers (CND £1.95, 88pp)

These two books, covering roughly the same ground, highlight the subjective nature of the nuclear weapons debate. Both deal primarily with the matter of Polaris replacement, though they differ considerably in style and scope. Chalmers' book, written for CND, is most obviously a campaigning tool for those who oppose the British decision to purchase Trident, and provides a fairly exhaustive compendium of all Trident's demerits. Malone's book has a more academic style (and a price which should restrict it mainly to libraries), and gives much more attention to the historical development of the British nuclear deterrent up to and including Trident. Nevertheless, his academic neutrality is coloured by his 'personal view that the case for operationally independent British forces has never been stronger than it is today.'

The two books arrive at such opposite conclusions - one very much for, the other totally against Trident - using basically the same information sources. This is because objective 'facts' and certainties are hard to come by in the world of strategic nuclear deterrence. Also, neither author is quite comprehensive in his coverage of the issues, and so can avoid awkward arguments.

In particular, Malone concentrates on the need (in his view) to pose an unacceptable threat of destruction to the Soviet Union in a technologically convincing manner. He does not, however, confront the question of when it could ever be advantageous for Britain to engage in nuclear war with the Soviet Union. Instead, he tends occasionally to rely on the kind of nuclear strategy gibberish which has resulted from 'thinking about the unthinkable.' For example, Malone argues that Trident's multiple warheads (MIRVs) would allow 'low-cost counterforce targetting options' and so 'enhance the credibility of Britain's implied threat to respond to selective Soviet strikes with strategic forces.' Quite, but Malone does not explain how a small, densely-populated nation like Britain could benefit from such a course of action against the immense nuclear arsenal of the Soviet Union. As Chalmers notes, these kinds of arguments 'are dangerous madness. They assume that a nuclear war can be kept limited even when dozens, perhaps hundreds of nuclear weapons are landing on Soviet territory. They assume that leaders who had demonstrated themselves foolhardy enough to start a nuclear war would then have the sense to cease fighting after millions had been killed (as even a 'limited' war would imply).' Chalmers roundly, and rightly, dismisses the notion that it could ever be advantageous for Britain to launch its nuclear weapons against the Soviet Union, either in retaliation or in an attempt to avert conventional defeat.

Fair enough, but many (including the Government) might argue that Britain's strategic nuclear force is a deterrent whose very existence is intended to prevent such unhappy circumstances. If it ever has to be used then it has failed. Simply to demonstrate, as Chalmers adequately does, the futility of *using* the deterrent does not totally invalidate the proposition that it may serve some useful purpose in deterring aggression during peacetime. Although the threatened use of nuclear weapons by Britain against the Soviet Union is clearly incredible, it is still an awful possibility which the Soviet Union cannot totally ignore. As such, the possession of nuclear weapons by Britain might, in some circumstances, be an inhibiting factor on another nation's behaviour.

Nevertheless, the argument for Britain retaining its own nuclear weapons, and for updating with Trident, are not

On the Perimeter by Caroline Blackwood (Heinemann £5.95 Flamingo £1.95 112pp)

Caroline Blackwood, a respectable lady and respected novelist, was asked last year to write an article for a magazine on the defeat of the British women's Peace Movement. So she went - sceptical, afraid and prepared with prejudices - to Greenham Common. This book is her account; it's also a tribute to the Greenham women who, she came to realise, have not been and cannot be defeated.

It's written in a rather simplistic, pseudo-intrepid-reporter style, which can be irritating and patronizing to the women, though this is balanced by her obvious respect for what they're doing. She's more at ease describing the Newbury residents, maybe because she's a novelist and these incredible people are like characters from a book. Dickens might have invented the odious Mr Learoy of RAGE (Ratepayers Against Greenham Encampment) who, if his lovely daughters misbehave, threatens to send them off to the peace camp; or the appropriately named Mrs Scull, looking out of her bedroom window at the missile base and lamenting how pretty her view had been before the women set up camp there. Being far removed from the Greenham woman stereotype, Caroline Blackwood was able to mingle innocently with the Newbury residents in the local hotel, and presents us with snippets of her conversations with them. Her attempts at impartiality fail though, because merely by setting down the views of the 'other side' - for example that the Greenham women are responsible for contaminating the swimmimg pool or frightening rare birds away from the base - she exposes the ridiculousness of their arguments and the sad pettiness of their lives, beside which the courage and honesty and love of the peace women stand out. As one Newbury man realises, 'we are all bloody jealous of them. In our hearts we know we haven't got the guts to do what the women are doing.'

To women who've been at the camp this book may seem superficial,even naive. Yet it's an important, useful book which needed to be written. It's a book about Greenham for people who've never been there, for the people who say, 'Well, I see what they're trying to do, but...' or who half believe all the media stories about sex-starved Russian spies and maltreated children. It goes beyond the stereotypes and explains to anyone who wants to know what Greenham Common is about. Hopefully the combination of well-known novelist and mainstream publisher will help to make this book as widely read as it should be. It's a book to give to your mum or your next door neighbour, a book which will maybe make them curious and interested enough to go and see for themselves.

Elizabeth Burns

very convincing. Although British nuclear forces might, by their very existence, inhibit potential aggressors' behaviour, there are no plausible circumstances in which this would add to the level of deterrence already created by the superpowers' arsenals. Clearly, if the Soviet leaders were so desperate as to risk aggression in the face of the American nuclear forces, they would hardly then be put off by the relatively small British force.

In summary, Malone's book sets out a concise and well-written argument for the establishment view that the deterrent should be updated with Trident. His logic is consistent and would probably be convincing if one believed that nuclear war-fighting was a sensible option for Britain. Chalmers argues that it is not, but he could have looked more deeply at the question of what nuclear deterrence is, if anything. Anyone who wishes to obtain a reasonably complete understanding of the Trident debate should read both books, although no-one could recommend actually buying Malone's at its present price of £16.95 for only 200 pages.

Graham Spinardi

The Warning by Mike Gray and Ira Rosen (Norton, £14.95, 287pp)

'I love that plant,' said Jack Lemmon in *The China Syndrome*, and the audience scoffed and sniggered. But it was a true and appropriate line - as true as the lying Public Relations man and the checks on design which had been skimped to save money. *The Warning* shows the men who worked at Three Mile Island as not loving the plant, but certainly conscientiously attending to it in the confusion of flashing lights in the poorly designed control room with the computer sending out data an hour old and then rows of question marks. Some risked their lives in checking out radiation levels; no-one deserted thirty minutes from meltdown.

The Warning tells of these events in the style of a thriller, with the suspense and action you expect from the genre, and with no soap opera distractions which are often put in to popularise stories about political and technological happenings (e.g. in *The Day After*.) A thriller may be the best way to deal with such an event, for thrillers deal with technology, with big business, with the hidden worlds of high finance and administrative politics - the bits that the literary novel misses out, yet which may affect your life as much as personal relations and humankind's place in the universe. *The Warning* had me taken up by a subject which blocks my mind as a rule - the workings of a Pressurised Water Reactor, both normally and in a disaster. Reactors built by the same company differ quite markedly from site to site. Babcock & Wilcox, in this case, supplied the reactor, but its structures, control room, turbines and generators came from somewhere else. Another contract, the architect-engineer, puts it together. So Unit One, Three Mile Island has a good record. 'But the operators who work both plants all agree that Unit Two is a dog.' A dog that barked in the night, the authors conclude, but which has been ignored.

Whittled down from 50,000 pages of evidence from the inquiry after the accident, and from tapes, engineering data and interviews, this book was published in 1982. I had not heard of it before, but one of our readers asked us to review it, since it has received little notice in this country. It certainly deserves sales, though the price is a bit daunting. Perhaps your library could order it. But for what department? It is as scrupulously factual as a Court report, but reads like a thriller, and is much more scarey, since it actually happened.

R M Bell

The Making of the Atomic Age by Alwyn Mckay (Oxford University Press, £3.95, 153pp)

No-one who reads about the atomic age can miss feeling the excitement of those early physicists in the twenties and thirties when discovery followed on discovery. This was the new heaven, and then the old earth reasserted itself. An abstruse science studied by 100 clever brains was taken over by industry and the military for the giant Manhattan Project. This in itself was a great achievement, an enormous enterprise based on an idea. Plutonium had not yet been isolated, nor had uranium been brought to critical mass. A time schedule was fixed for those processes, and uranium enrichment and all the steps necessary for a bomb. This time schedule was often bettered. So Dr McKay says about Compton, who was put in charge of the entire plutonium programme, 'He described the task as "a heroic act of faith." Faith was something he understood from his deeply Christian family background.'

Such dedication and excitement was captured by Robert Jungk in *Brighter than a 1000 Suns*. Someone I lent that book to said it was good, but that there should have been an account of the actual discoveries of the scientists and the techniques used. This book fills in that gap, using clear and simple language, making a good introduction to a hard subject. But Dr McKay is a physicist, and physicists, through dealing most closely with matter, are the least materialist of scientists. (Just as ecologists, in dealing with the material effects of industry and technology on the earth and human beings are accused of being the most mystical of politicos.) So he says at the end of the book, when the writer's true self tends to emerge, 'The extraction of energy from uranium seems indeed to have become possible just in time, when a new source is needed. To some, including the author, this is evidence of God's provision for humanity.' And if God hadn't wanted bombs with megaton heads, he wouldn't have created hydrogen. Nuclear physics, however, does fall into that kind of language. It's an epic subject, the progress from the new universe to leukaemia on Windscale's beaches, a thing unachieved yet in prose and rhyme.

R M Bell

Diary

April

1 Annual Vigil by Peace Tax Campaign. To mark the start of the new tax year. Contact: PTC, 26 Thurlow Rd, Leicester, LE2 IYE (tel: 0533-702687).

1-4 'War, Violence and Social Change' Conference of the British Sociological Association. Contact BSA, 10 Portugal St, London.

6 Demo against proposed Trident submarine base at Coulport on the Roseneath Peninsula near Faslane. Scottish CND Motorcade converging from main towns and cities of Scotland. Contact: SCND, 420 Sauchiehall St, Glasgow G2 (tel:041 331 2878).

5-8 CND National Demo against Cruise at Molesworth, Cambridgeshire. Contact: Your local group or national CND. See you there!

8 A Walk will be leaving Sizewell on Harrisburg Day (28 March) to arrive at Molesworth on Easter Day. The Walk will be pointing to the links between Nuclear Power and Nuclear War. Contact: Ann and John Stringer, 1 Fell Rd, Birdbrook, Halstead, Essex, CO9 4BG (stamp please) tel: Ridgewell 440.

15 Video: 'Atomic Cafe' 8pm, Southfield Centre, Duns, Berwickshire. Berwickshire Anti-Nuclear Campaign. Info: Lenora Godwin, 4 Hurkur Cres. Eyemouth, Berwickshire.

15 - 21 International Acid Rain Week Info: your local Friends of the Earth Group.

17 April Rosalie Bertell to give a talk in Edinburgh on the health effects of low level radiation. Venue to be arranged.

26 Cycle Ride for Life Converging on Moleworth Cruise Base from all over. Info: Tony Fletcher tel: Swansea 49825 (home) or Swansea 468500 (work).

26 - 29 Windpower Course with practical sessions, at the Centre for Alternative Technology, Machynlleth, Wales. Tel: 0654 2400

27 - 29 Conference by CANUC (Campaign Against Namimbian Uranium Contracts) to Educate and Plan Activities. Contact CANUC's London office (01 267 1941/2). Venue to be in Manchester or Sheffield

27 - 6 May Enviroment Week 1985 The work of the Civic Trust. Info: Civic Trust, 17 Carlton House Terr, London SW1Y 5AW. Send large SAE.

27 World Day for Laboratory Animals Demos globally. British Union Against Vivisection (BUAV) are organising actions at Hazleton Labs, Harrogate; Toxical Labs, Herefordshire; Wickham Research Labs, Hampshire. Info: BUAV 01 607 1545 or 01 607 1892.

29 When the Wind Blows Stage play of book by Raymond Briggs at Kings Theatre, Glasgow.

May

7 1979 Torness Occupation

10 Reclaiming the Earth 10.30pm 1 hr Channel 4 documentary on enviroment and development. Can be copied off-air: for adult education tel: 01 482 2847, for schools & colleges tel: 0733 63122. Free viewers' notes: send SAE to PO Box 4000, Glasgow G12 9JQ or London W3 6XJ. Publicity leaflet: tel. 01 482 2847.

11 Mountbatten Day Ex-Services CND plan meetings in 4 cities on the 6th anniversary of his Strasbourg speech on the madness of nuclear 'defence'. London, Cardiff, Edinburgh or Glasgow and York or Leeds. Info: John Hurst 01 892 8912 (home) or 01 245 5065 (work).

11-12 Women's Peace Conference Malvern Hills College, Malvern, Worcs. £2 - £10 + food. Creche & access. Please book early.

12 - 27 The Great Peace Initiative A Swedish idea for all countries. UK contact is Gloria Frankel 01 980 1030

20 -23 'The Fourth Assembly' Theme - Community Empowerment. ('The "Fourth World" is the world of Human Scale.') The Ghandi Peace Foundation, 221 Deendayal, Upadhyaya Marg, N.Delhi 110002, India.

June

1 YCND Anti-Trident Demo, Glasgow. Assemble George Sq. 12.30, encircle the new MOD building. March starts 1pm, finishes at rally in Kelvin Hall.

12 Scottish CND Peace Festival Kelvin Hall, Glasgow. SCND: 041 331 2878

5 British Nuclear Fuels to appear in Carlisle Crown Court to answer charges arising from a leak in November 1983 when some Greenpeace divers were contaminated.

15 - 16 Severnside Campaign Against Radiation conference, with the aim of forming an information pool. Contact is Sue Haverley, Hillside Cottage, Liney Wodside, Lydney, Glos. Tel: Blakney 445

15-16 Celebration of Creativity at Laurieston Hall Community. Info. on this and other activities from Laurieston Hall, Castle Douglas, S.W. Scotland. Tel: 0644 275.

21-23 CND Festival at Glastonbury, over Midsummer.

Little Black Rabbit.

From Little Black Rabbit's Galloway retreat interesting developments in BNFL's Chapelcross plant have been noticed. A long fence has been erected around land adjacent to the four Magnox reactor nuclear power station and tritium factory which produces an essential ingredient of thermonuclear weapons.

Despite numerous requests, BNFL will not explain why they have erected the fence. However, Little Black Rabbit has made some educated guesses. The land could be for a new power station to replace the Magnox reactors when they are removed from service to continue plutonium production. Alternatively, an expanded tritium plant could be envisaged. Because of its relatively short half life (12.3 years) tritium needs to be continually produced to ensure effective weapons. Trident may require additional facilities.

The third thought Little Black Rabbit had was protection of the public! The discharge pipeline into the Solway is rumoured to be corroding and high levels of radioactivity have been recorded around it. The fenced-in area could be contaminated with this radioactivity.

Until BNFL admit why they erected a fence such speculation will grow. Come on BNFL, give us the answer.