The Anti Nuclear & Safe Energy Journal

SCRAM

4
5

NUCLEAR POWER? NO THANKS

60p

Contents

This magazine is produced for the Anti-Nuclear, Safe Energy and Disarmament movements by the Scottish Campaign to Resist the Atomic Menace.
SCRAM, 11 Forth Street, Edinburgh EH1 3LE.
Typesetting at Edinburgh Unemployed Workers Centre, 12a Picardy Place, Edinburgh EH1 3JT.
Send contributions for inclusion.
Deadline for next issue: 9th January 1984

Comment

1984 has seen SCRAM prosper. The journal has expanded from sixteen to twenty to twenty four pages, though the next issue will probably contain 20 pages.

We are still fighting Torness even though we have devoted more effort to the journal which we hope is now well established – a national rag. The intention is to provide accurate campaigning material, a forum for discussion within the movement and to probe the nuclear industry. Our successes this year have included the export of Magnox reactors, the USS Sam Rayburn, the SSEB funding of the bomb, a fire at Faslane, and in this issue, a very significant change in the waste policy of the generating boards.

A Two Year Group has been set up in Scotland to campaign on Windscale and more details are given below.

In the office we recognise the need for full-time paid staff, which we don't have. The journal and additional campaigning undertaken over the year have relied on enthusiasm which is a very fickle commodity. Please continue to support the campaign by sending us articles and news stories, criticisms when required and finally, money. Send a friend a SCRAM subscription for Christmas; you know we make sense. We are not quite down to the last Indian, but assistance is sought, especially for the wages fund.

On a happier note, the nuclear industry is 'advancing backwards' and the Commons Select Committee on Energy have produced a damning report on the allocation of research and development funding. Read it and campaign accordingly.

2 Year Group

A new action group has been formed to mobilise support in Scotland to combat the radioactive discharges from Windscale. The group is called the Two Year Group (2YG) and takes its name from the commitment to reduce the discharges to zero within two years.

George Foulkes, MP for Carrick Cumnock and Doon Valley, chaired the meeting and outlined the group's aims as:-

1 the complete suspension of radioactive discharges from BNFL's Windscale works within two years;
2 to press for a thorough investigation of the hazards to health from radioactive discharges;
3 to examine ways in which an independent Scottish monitoring unit can be stablished; and
4 to urge all Scottish local authorities to press the Government to support these goals.

Representatives from SCRAM, Friends of the Earth (Scotland), CORE (Cumbrians Opposed to a Radioactive Environment), the Dunters (Orkney), Ayr CND, the Medical Campaign Against Nuclear Weapons, the Ecology Party, and The Radioactive Pollution Survey for Wigtownshire (who intend to carry out a radioactive survey of the Wigtownshire coast) attended the public meeting in Glasgow on 16th November.

Councillor Iain Macdonald of Strathclyde Regional Council brought news to the meeting that the Regional Council supports the group and its aims. A mailing prior to the meeting prompted replies from 39 of the 72 Scottish MP's - at this early stage 20 MP's support the aims of the Group. Of the 5 Scottish MEP's that replied, 4 support the Group's aims. A second mailing has now been carried out.

A meeting for the interim steering group has been set for 8th December, again in Glasgow. The main tasks of the steering group are to set out a strategy for the campaign and to appoint someone to work on the campaign. Anybody interested should contact SCRAM or Friends of the Earth (Scotland), 53 George IV Bridge, Edinburgh.

The Silent Operators

Since the 1977 Windscale Inquiry, the reprocessing of AGR fuel has been considered national policy to which the generating boards have publicly adhered. However the activities and plans of the Boards have opened up another option, long term dry storage. The CEGB has prepared plans for dry storage facilities and is ready to proceed with construction. The SSEB states in its 1983/4 annual report *'In the case of Hunterston B...with the remainder of the fuel being stored in dry conditions.'* The SSEB asserts that though it is making financial provision for dry storage of AGR fuel, it has no such intention. Possibly the board is schizophrenic; maybe it is unwilling to admit to highly significant change in policy or is deliberately misleading the public. This leaves the poor reader of SSEB annual reports wondering which other claims, provisions, and plans are without foundation.

The emergence of dry storage signals the end of THORP. Its cancellation at an early stage in construction would not be expensive and the case made at the 1977 Windscale Public Inquiry has collapsed. Dry storage is preferable to reprocessing because the health hazard is reduced, it is cheaper, it reduces the need to transport spent fuel, it does not generate high level waste, it does not require sea discharges and reduces the dangers of proliferation, since no plutonium is separated. Reprocessing would allow the re-use of recovered fissile uranium, and would provide plutonium for the breeder reactor programme, but as uranium has declined in price and has become abundant, reprocessing to obtain it is uneconomic and superfluous. THORP would produce Pu, for which there is no civil requirement and in consequence it will require long-term storage. Dr Mess of the West German utility RWE said in ATOM (November 84) *'the storage of plutonium for use subsequently is very expensive and not advisable technologically.'* Finally the vitrification plant, for the high level waste produced in reprocessing, which on BNFL's assurance the Windscale report accepted *'will be successfully established'* seven years later has not appeared.

In 1984 the reprocessing agreement between BNFL and the generating boards is due for renegotiation and the Boards' interest in dry storage, with its lower costs, combined with the collapse of the rationale for THORP can be expected to lead to THORP's cancellation.

The SSEB's plans for dry storage arose at the Torness Railhead Inquiry when the SSEB, in the shape of Mr Watt, was asked if they had compared the costs of dry storage with those of reprocessing. Mr Watt emphatically denied any interest in dry storage and affirmed the SSEB's adherence to the national policy of reprocessing spent AGR fuel at Windscale. He was then asked to comment on:-*'In the case of Hunterston B the treatment of residual fuel is calculated on the basic of long term storage in dry conditions,'* he responded by asking for the source of the quote - the SSEB's 1983/4 annual report. Collapse of stout party. And a request to borrow SCRAM's copy. After a slight delay we were offered the novel argument that because the quote came from the section of the report covering accounting policy this did not mean that it was the SSEB's intention. Translated this means that although money is being put aside for dry storage, they aren't going to do it. This provokes the obvious rejoinder that if the Board has no plans for dry storage, why the charade? Mr Watt also added that the provision mentioned was only for residual fuel, the fuel remaining when the reactor is decommissioned, but was unable to indicate how this fuel differed from other AGR spent fuel. This SSEB position is untenable, as financial provision is also being made for fuel other than residual.

It is instructive to examine the evolution of the SSEB's plans for spent AGR fuel from Hunterston B. Annual reports up to and including that for 1981/82, under financial accounting policy, nuclear fuel, state *'The charge to the revenue account...also takes into account the net cost of reprocessing irradiated fuel...'*

The 1982/3 report contained *'the cost of dealing with irradiated fuel from Hunterston B is now based on a station life time average of the Board's contractual participation in the BNFL plant and the estimated cost of the use of a suitable store for the remainder of the fuel.'* Adding *'it has been assumed for costing purposes that all fuel...would be reprocessed in due course by the plant provided by BNFL. Detailed studies have established the feasibility and economic advantages of storing a proportion of discharged fuel for long term periods of time in dry conditions before treatment.'*

By 1983/84:- *'In the case of Hunterston, B fuel since no reprocessing yet takes place...the cost of dealing with irradiated fuel from this station is based on an assumption of 530 tonnes of uranium being reprocessed...with the remainder of the fuel being stored in dry conditions.'*

Originally the plans were for reprocessing, then changed to storing some fuel in dry conditions for a long period prior to reprocessing because the Board had established both the feasibility and economic advantage of the second option. It is hard to envisage how it can be cheaper to first store the fuel and later reprocess, than simply to reprocess. This, notwithstanding the final version has 530 tonnes reprocessed, and the rest stored in dry conditions, no mention being made of reprocessing this fuel.

It follows that when Mr Watt at the Railhead Inquiry denied that the SSEB had made cost comparisons between storage and reprocessing he misrepresented the Board.

A similar evolution appears under decommissioning. Up to 1981/2:- *'These costs which include the reprocessing and long term storage of the residual fuel...'*

In 1982/3 and 1983/4:- *'In the case of Hunterston B the treatment of residual fuel is calculated on the basis of long term storage in dry conditions.'*

Again a very significant alteration with the latest version making no mention of reprocessing. At the Torness Railhead Inquiry the SSEB still maintained that spent fuel would be reprocessed.

Meanwhile the CEGB maintains its intention to reprocess. *'Provision is made...for reprocessing and long term storage, treatment and eventual disposal of resulting waste products'* (p.50, 1983/84) However in para. 62 1982/83:- *'detailed design work is being carried out for possible construction of a dry store for irradiated AGR fuel.'* The CEGB does not give up its commitment to reprocessing, but sees dry storage as *'a potential alternative to early reprocessing...to provide a flexibility in management of later arisings of AGR fuel.'*

The plans for a dry store were developed *'in conjunction with the NNC (National Nuclear Corporation) an outline design and costing for a dry store was completed'*, para 63. And *'a decision to proceed with construction of a dry store need not be taken until before 1985'* para 64. In the October 1984 issue of Atom the NNC took a full page ad. *'The long term storage of irradiated fuel is a problem which can be solved. The NNC had designed a natural draught store, capable of being built in a central location or on an existing power plant site.'*

At present AGR fuel cannot be reprocessed. The original attempt between 1969 and 1973 ceased when, with only 100 tonnes processed, an accident closed building B204 at Windscale. The replacement THORP was given the go ahead in 1978 but BNFL does not expect it to be on stream until 1993, and then with only a ten year operating life.

The case for reprocessing, presented at the THORP inquiry, included the absence of other options, problems with long term (over ten years) storage of AGR fuel underwater and Pu for the breeder programme, and the need to recover fissile uranium and to reduce plutonium proliferation.

Dry storage is available and the specifications for the initial design prepared by the NNC include *'the storage of irradiated fuel from 14 AGR's (each of 625MW net output) located at six sites up to 700km apart and to store it for a period of 50 to 100 years...the total amount to be stored could lie in the range 6,000 to 8,000 tonnes of uranium.'* This appears to be the whole of the CEGB's AGR programme.

AGR fuel rods stored under water for prolonged periods are expected to corrode but dry storage in the conditions proposed by the NNC should leave the fuel *'in pristine condition throughout the period'* (50-100 years).

At the Windscale Inquiry it was accepted that the Magnox reprocessing would produce 55 tonnes of Pu which would be sufficient for a breeder programme with 8 stations of 1,250MW. The UK breeder programme now involves one 250MW Prototype Fast Reactor (PFR) with plans for a Commercial Demonstration Fast Reactor this century.

In 1978 reprocessing for fissile uranium was considered economic once the price of uranium reached $80 per lb. The price was then $40 and *'a doubling in price by the year 2000 can well be contemplated'* appeared. In 1984 the spot price is $17, a tiny fraction of the $80 mentioned in 1977 and a yet smaller fraction when inflation is included. The uranium market is glutted. In addition, fissile uranium recovered from Magnox reprocessing has never been re-used.

In 1977 it was suggested that THORP would increase proliferation because the Pu might be stolen. Also if the UK embarked on reprocessing it would set a precedent for other countries. BNFL countered that the reprocessing of foreign fuel by THORP would lessen the incentive for other countries to develop their own facilities and if Pu was returned in the form of fuel rods that had been briefly irradiated, this would eliminate the risks of theft and would require further reprocessing to recover weapons grade Pu which would in turn reduce proliferation. In retrospect the spread of reprocessing facilities has not abated, and if the example of Pu recovered from foreign Magnox fuel is followed, it will not be returned to the owners as irradiated fuel rods.

Overall the move towards dry storage by the generating boards is to be welcomed, but the SSEB has been less than candid about their changed plans for AGR fuel which can only call into question their repeated assertions that spent AGR fuel from Torness will be reprocessed. The plans prepared by the NNC encompass dry storage on the reactor site, which is also to be welcomed as it reduces the need for transport of spent fuel.

Jeremy Adler

Sources
SSEB and CEGB annual reports
Windscale (THORP) Inquiry Report 1978
Atom November 1984, p.3
NNC brochure 'Dry Storage for Irradiated Fuel and Active Waste

Fuel Cycle News

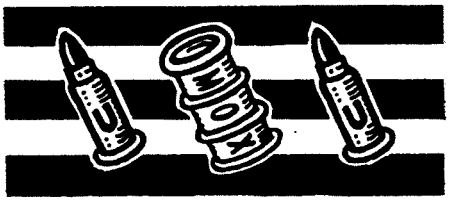
France is stepping up plans to produce MOX (mixed oxide; uranium and plutonium) fuel for light water reactors. Other interested countries include Switzerland, West Germany, Japan, Belgium and the UK.

The commercial advantages of MOX are reported to be small. However, plutonium stockpiles are increasing and with the slow down of the breeder reactor programme the use of MOX reduces plutonium storage costs. The new fuel will probably use Pu for 25% of the usual enrichment.

MOX has been produced at Windscale for the experimental AGR and BNFL are 'actively considering' the commercial possibilities for both AGR and PWR reactors.

This raises many questions for the anti-nuclear movement:- proliferation, increased plutonium movements, reprocessing of MOX. There is no projected shortfall in uranium supplies, which have been bolstered by Australia's mining plans, and MOX is therefore superfluous. Conversely the use of MOX would burn plutonium, thereby reducing stockpiles which the anti-nuclear movement may find, on balance, to be advantageous.

Financial Times 8.11.84
2.11.84



Uranium is being used as ammunition in weapons designed for attacking armoured vehicles and personnel. Against hard targets the high density of depleted uranium makes a very efficient penetrator and as a bonus, flakes of uranium spontaneously ignite. In a new and secret development depleted uranium is being used by the Americans and French as ammunition for antipersonnel weapons. The big bonus, for the military, is that depleted uranium is soft and spreads out on entering the body, resulting in a small entry wound, but a massive exit hole.

This is functionally a dum dum bullet, which is banned by international convention. The ban refers to a method of bullet construction, not the resulting wound; thus depleted uranium is not covered by it, since its use was not conceived of.

Depleted uranium is a by product of uranium enrichment and reprocessing. It occurs as 99% of the natural ore, compared with 0.7% of fissile uranium 235. It has no value for the nuclear industry, except to be converted to plutonium in the planned breeder reactors. It is thus being made freely available; its stocks are building up progressively, the 6,500 tonnes used by the US military being only a tiny fraction of the 250,000 tonnes formed by the American Nuclear Industry.

The ingenuity of the military scientists is boundless in finding ways of destruction with the most unlikely and most valueless by-products.

Uranium Traffic Special Report
Uranium Bullets Uag.
August 1984

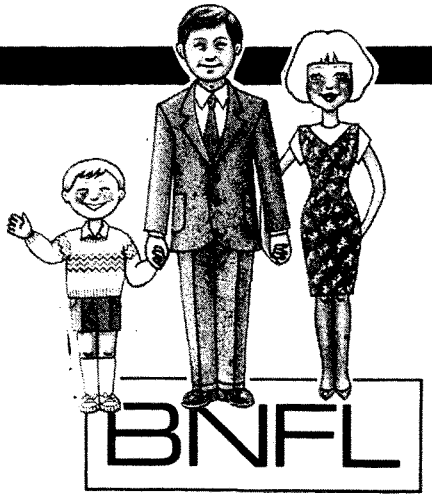
Fuel Cycle

The collapse of the nuclear industry worldwide has produced a massive surfeit of enrichment capacity. The West continues to be committed to using Soviet plant (as publicised by the Mont Louis incident) and the strong dollar is procuring American enrichment work for European utilities. Cogema and Urenco have recently obtained enrichment work from the States. Cogema, the state owned French utility, has obtained work from 3 US concerns and hopes for further work. This is aided by recent exchange fluctuations which have created a 20% gap between rates offered by Eurodif, in which Cogema has a 51.5% stake, and the US Department of Energy. Meanwhile Urenco has obtained an order from Boston Edison's Pilgrim 1 nuclear power station and is hoping for more.

BNFL is a one-third shareholder in Urenco. Along with West German and Dutch organisations, and on the basis of this small order, worth between ten and twenty million pounds over ten years, they 'will call for the provision of additional enrichment capacity at Capenhurst. In the last issue of SCRAM we reported that BNFL has established a PWR fuel assembly facility at Springfield.

BNFL will be expanding into a market super saturated with capacity. The US Department of Energy's plants are operating at only one third capacity, while Eurodif uses only one half of its plant. While it is pleasant to see the world's nuclear industries undermining each other, as all good capitalists should, the waste of resources is pitiful.

Financial Times 14.11.84
BNFL News Nov. 1984



BNFL have paid £25,000 to dependents of a former worker at Springfield, Lancashire, who died of leukaemia. Springfield houses BNFL's fuel fabrication plant.

Does this mean BNFL admit liability? or are they feeling magnanimous as Christmas approaches.

Scotsman 10.11.84.

Uranium

The prospects for the mammoth A$1600 million Roxby Downs uranium mine have dimmed. The rolling blockade and the collapse of the world uranium market demonstrate that the venture is neither socially acceptable nor economically viable.

The action started on August 19th and continues. Initially opposition came from 300 police, some mounted, and the creation of a 'buffer zone' extending 13km from the mine. The zone was brought into being by the South Australian State government at the request of Roxby Management Services (RMS) and barred all persons from the area, except with company permission. This even included the Kokatha people, Australian Aborigines, who are the traditional owners of the land. 281 arrests were made. The logistics of the blockade increase the respect we at SCRAM feel for the participants. Roxby Downs is over 350 miles from the nearest city, Adelaide, and 60 miles from drinkable water.

On aboriginal land rights Hawke's ruling Labour Party asserts that 'there will be no veto of mining or exploration.' The aborigines are therefore forced to negotiate and cannot exclude the mining giants.

Roxby Downs (also known as Oylmoc Dam) is owned by Western Mines (51%) and BP (40%), but the agreement provides that BP puts up almost all the money. To date A$150 million has been spent but the drop in the world price of uranium and copper, with which the mine is well endowed, has brought into question the future of the venture. Roxby contains sufficient uranium to power the world's nukes for a decade, but the spot price has dropped from $45 to $17 a pound over the last six years with no sign of an upturn. Copper is also in the doldrums, with the price dropping 30% over the last five years. The present price, 55 cents a pound, makes almost every copper mine in Australia a marginal economic proposition. The viability of Roxby depends on finding a market for the 3-4000 tonnes of uranium that are expected to be mined annually. The involvement of BP may indicate that the British government is interested in widening its uranium base. Historically, BP has operated as a supply arm for the government with foreign policy operation in its support. BP was founded before World War I by Churchill to secure oil for the fleet which was then switching away from coal.

The Australian government is expected to provide the infrastructure for the mine, roads, electricity, schools, water pipelines etc. at a cost of A$50 million. In return it will receive 2½% of the profits, but only if the mine operates at 84% capacity for 60 consecutive days, something an astute mine manager could easily avoid. The Fitzgerald Report, published in the mid seventies, demonstrated that when all taxes, subsidies and allowances were considered, there was a net transfer of funds from the Treasury to the mining companies.

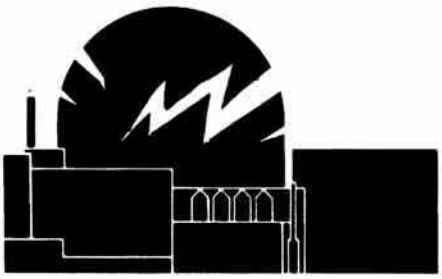
The present uranium price of $17 a pound is below the Australian government's floor price of $35 a pound. However, with the depressed world copper price Roxby Management Service, who operate the mine for the owners, would require $55 a pound to make the project viable. A feasibility survey is due for completion March 1985 and the cancellation of Roxby is expected.

Should Roxby be mothballed, then the licence to export uranium provided by the Australian Government will be up for grabs by other uranium projects.

Sources
Financial Times 19.11.84.
Backround to Roxby Downs, Coalition for Nuclear Free Australia
Background Briefing on Nuclear Issues No.4 June 1984, Anti Uranium Coalition

Three Mile Island in 1979 was 9 minutes from meltdown, much closer than previously believed. The new Department of Energy (US) study revealed that the core reached 4,800°F, only 350°F below meltdown and 1500°F higher than conceded at the official inquiry. This concluded that the core was 30-60 minutes from meltdown, but the new study shows this guesstimate was dangerously inaccurate. The core is now a 100 tonne mass of solidified uranium dioxide. Its removal will be highly dangerous.

Guardian 14.11.84.



Mistakes which contributed to the Three Mile Island accident were repeated at Heysham I in June. Bad layout of the control room, procedural inefficiency and human error combined as operators failed to notice the alarm when higher than normal temperatures appeared in reactor fuel channels. Half an hour later a computer scan noticed the abnormality and the reactor was shut down. Two plates had been left in the fuel channels. The reactor was closed down for nearly two months. The CEGB plans to 'urgently review' the situation.

Nucleonics Week 30.8.84
New Scientist 22.11.84.

Finland is to build two nuclear powered ice-breakers for the USSR. The reactor will be installed in the Soviet Union. In Japan the Mutsu, a nuclear powered cargo ship, is still not operational. This would require an additional £30 million on top of £175 million already lost and £20 million to build the ship a port. No port would accept the vessel.

Nature 16.8.84.
Financial Times 13.11.84.

The CEGB has cancelled its private insurance after a row with the London insurance market over premiums. A 'self insurance' fund of £25 million has been established. The Nuclear Installations Act (1969) makes the CEGB liable for personnel injury or damage and a claim could easily exceed the £25 million provided. It is not suprising that the City and CEGB disagree on insurance premiums. The CEGB has an irrational belief in its operations.

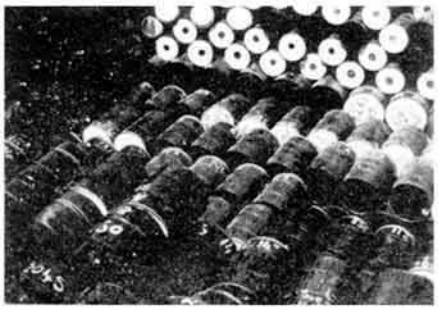
Financial Times

BNFL has denied ever carrying nuclear cargo on passenger ferries. Greenpeace accuses them of doing just that. Information leaked to the Guardian in the form of the manifest of SENLAC ferries owned by Sealink, showed that they did indeed carry these cargoes for BNFL. The manifest, which is the list of a ship's cargo, lists hexafluoride.

When pressed by Greenpeace, BNFL then said they had put out a further press release within hours of their first statement. Greenpeace rang all major newspapers and established that none had received it. They went back to BNFL, asking them to specify who had published the press release, and they named the Yorkshire Post. So Greenpeace contacted the Yorkshire Post, who denied ever receiving the Press Release.

BNFL do carry nuclear cargo on passenger ships. Sealink have said that they won't carry nuclear cargo again. However Greenpeace knows other ferry companies do carry it, namely North Sea Ferries and Townsend Thorensen, and would advise against using those companies.

The Swedish Government, following up the campaign waged by Greenpeace and the National Union of Seamen, has sent proposals to the International Maritime Organisation to tighten regulations on nuclear cargo, and to ban such transport on passenger carrying ships.



On the 22nd September twenty members of BAND (Billingham Against Nuclear Dumping) staged a protest in the National Railway Museum at York about a nuclear waste flask being included in the museum's collection. Accompanying the exhibit was a video of the discredited flask crash test and stacks of CEGB propaganda. The CEGB news sheet 'Power News' had been added to the 'Friends of the Museum' stand.

The protestors objected to 'this great museum being "used" by the nuclear industry', saying that 'this radioactive waste flask does not belong in this great museum.' At SCRAM we are impressed that the CEGB can afford the £450,000 for a flask used in a PR exercise.

Complaints to Dr J. Coyley, Keeper of the Museum, National Railway Museum, York.

As part of the country-wide actions against the transport of spent fuel, Essex CND mounted a mass leafletting of railway stations along the spent fuel route through Essex on 26th October. 8000 leaflets were handed out to commuters at all the stations during the morning rush-hour, and some also in the evening.

At some stations CND members were ordered away from BR property at the station entrances, and at one station a Station Master admitted that the transport of nuclear spent fuel was just a 'money spinning' commercial operation for BR. Despite verbal abuse from some railway workers, the group hopes to send speakers to railway union branch meetings in the future, with the aim of informing individual union members of the dangers of spent fuel transport.

Greenpeace's allegations that the CEGB fixed the train crash held earlier this year have certainly stirred up the industry! Greenpeace's press conference was swiftly followed by the CEGB's own version, rebutting all accusations of foul play. But George Pritchard of Greenpeace says that evidence which Greenpeace has in its possession shows the CEGB spent a lot of time and money (£4 million to be precise) in selecting the type of locomotive to be used - evidence also shows that the crash they staged was selected from a list headed 'Crashes likely to cause negligible damage', compiled by their own team of consultants. The CEGB have, of course, the right to take Greenpeace to court if they wish to challenge the evidence. Greenpeace believes that in the courts they will be able to establish how the rail crash was fixed and how the public were deceived by the crash and drop test done earlier. Greenpeace's evidence shows that, some time before the public tests, a drop test was done from a height of 36m onto granite, which resulted in the flask losing its lid. There are viaducts on the route from Hunterston to Windscale. One is 50m high.

An accident involving a flask falling from a height of 36m was shown in the CEGB's list as being one which would lead to the detaching of the lid. The CEGB chose to drop a flask from 9m in their public display because:-

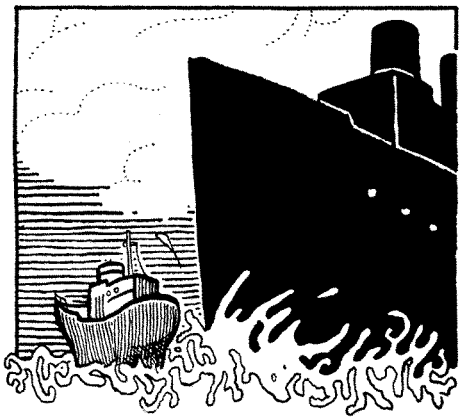
a) that was the height international standards lay down
b) they'd done it previously and knew that damage would only be superficial.

If they had dropped it from 12m, which was also tried previously, the flask would have failed international standards.

Louise Coe

BNFL, through the good offices of Lloyd's Ship Manager (a magazine), claim that the satellite communication systems installed on the ships of their subsidiary, Pacific Nuclear Transport Ltd, increase safety. Information supplied to CORE (Cumbrians Opposed to a Radioactive Environment) by a navigation officer indicates that this claim is highly misleading and that the satellite communication system actually reduces safety and increases the risk of collision.

Nuclear material arrives in the UK at Workington from Europe and Japan and plutonium makes the return journey to Japan. The cargoes are either spent fuel or plutonium, both highly dangerous. The Mont Louis, which sank recently, was carrying uranium hexafluoride, which carries less risk. Ships are con-



tinuously monitored from the ship management offices in Barrow, which is able to act as an emergency co-ordinating centre in case of 'a cargo related problem' (their words).

Operation of the equipment requires the simultaneous participation of the master and navigation officers who are responsible for the safe navigation of their ship. On other classes of ships communication is in the hands of a separate wireless operator, located away from the bridge. This avoids conflict of interest for the navigation officers. We are informed that on one occasion an officer distracted by telexing a long list to Barrow almost ran down a yacht.

Satellite communication is unreliable, and the International Transport Federation opposes its use 'for distress and urgency purposes'. The navigation of spent fuel transport also leaves much to be desired. In 1979 the Pacific Swan, on route to Cherbourg, cut across the two lane system operating in the Channel and failed to warn Cherbourg Hazard Centre of her approach.

Despite the installation of complex communication equipment, the ship's position and hazardous cargo are not widely broadcasted. Indeed policy requires secrecy about position, course, and cargo. This hardly lends itself to safe navigation.

(Information from CORE 0229 33851)

BNFL fell foul of the Advertising Standards Authority again.

A BNFL leaflet titled 'Talks Service' contained the following:- 'the Government organisation Nuclear Industry Radioactive Waste Executive (NIREX)...'. NIREX is not a government body, having been set up in 1982 by BNFL, CEGB, SSEB, and UKAEA to manage the disposal of most solid low and intermediate level radioactive waste.

The complaint was made by F Jones of Billingham Against Nuclear Dumping (BAND) and upheld by the ASA. BNFL offered the defence that the leaflet was not intended as an advertisement and therefore the ASA had no jurisdiction. It then follows that BNFL are free to peddle mistruths unless prohibited by a competent authority.

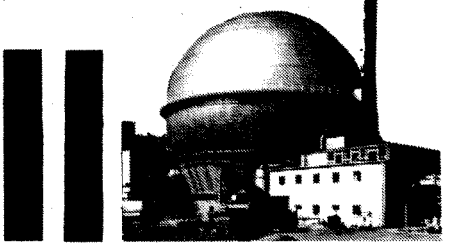
BNFL's previous failure with the ASA was over an ad displaying high level radioactive waste in paperweight form.

(From BAND, 152 Queensway, Billingham, Cleveland.)

Proposed alterations to the County Structure Plan for Bedfordshire County have been approved by the County Council.

The Council decided to add a policy (Policy 97) dealing with nuclear waste. The new Policy 97 reads:-*'The County Council will oppose any proposals for the location of nuclear waste disposal facilities within the County, including proposals for the exploration of any sites for the possible disposal of nuclear waste; furthermore, the County Council will oppose the transportation of nuclear waste within or through the County.'*

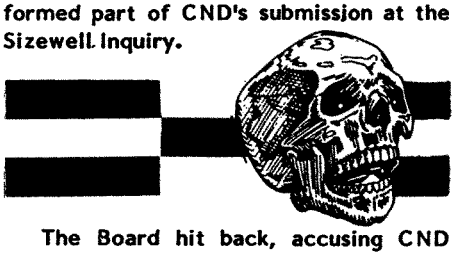
Windscale



Coastwatch, a group based in West Cumbria around the Sellafield complex, have produced a leaflet **Dose Limits** (A4 folded). Such questions as 'Is there a safe level of radiation?', 'Who sets the Dose Limits?' and 'What about luminous watches?' are answered. For a sample copy send sae. Coastwatch is also interesting in hearing from anyone with information and/or research about the International Commission for Radiological Protection.

Contact: Mike Harrington, Coastwatch, 21 Rose Hill, Harrington, Workington, Cumbria. 0946 831729

Lord Hinton, the former head of the CEGB, accused the CEGB of telling 'bloody lies' about the destination of plutonium produced in CEGB reactors. Dr Ross Hesketh, also a former CEGB scientist, added 'that the CEGB were and are in effect corporate liars.' This formed part of CND's submission at the Sizewell Inquiry.



The Board hit back, accusing CND of 'hypocrisy and humbug', but were unable to offer alternative figures for the production and disposal of plutonium, citing the Official Secrets Act. This leaves Sir Frank Layfield, the Inspector, in a very tricky position. The only set of figures on offer show that plutonium has been diverted from the nominally civil CEGB reactors to the States for warhead production. The opposing view, held by the CEGB, remains unsubstantiated.

If, as the Board claims, no plutonium has been diverted, then there is no need to invoke the Official Secrets Act since the State Security and the military are not involved. Further, if the reactors were operated by the CEGB are functionally civil, the publication of the relevant figures would give aid and comfort to the Board. Conversely, if CND's material is correct, the position adopted by the CEGB can only be maintained by sheltering under the Act.

Military

China will continue atmospheric nuclear tests (euphemism for explosions.) On a happier note, they have created a Bureau of Nuclear Safety to establish safeguards for their expanding nuclear industry. 10 GW are planned for this century.

Guardian 19.11.84
Financial Times 2.22.84

Prior to Mrs Gandhi's assassination, stories appeared advocating a pre-emptive strike against Pakistan's nuclear facilities. A strike by Indian aircraft against the traditional enemy's nuclear weapons capability would have been an electoral asset and is thought to be favoured by the Indian armed forces. The controversal enrichment facility at Kahuta is already protected by surface to air missiles, commandos, and airfields. Another potential aggressor is Israel to whom nipping the 'Islamic bomb' in the bud must seem attractive. The precedent was set with the Iraqi reactor.

Nucleonics Week 20.9.84.

India's Reactor Record— Appalling

India has the most ambitious nuclear programme of any underdeveloped nation. It proceeds in great secrecy, and is outside the normal democratic procedures in that country. The health and safety record of the industry is appalling, with many deaths from nuclear causes as well as ordinary accidents. Yet there is very little public criticism of the industry, mainly because the people who control it are highly influential and committed to proving that India can meet the promises of a self-sufficient nuclear industry. Also there is virtually no public awareness of radiation and its effects. India faces very grave problems if it continues with its declared programmes.

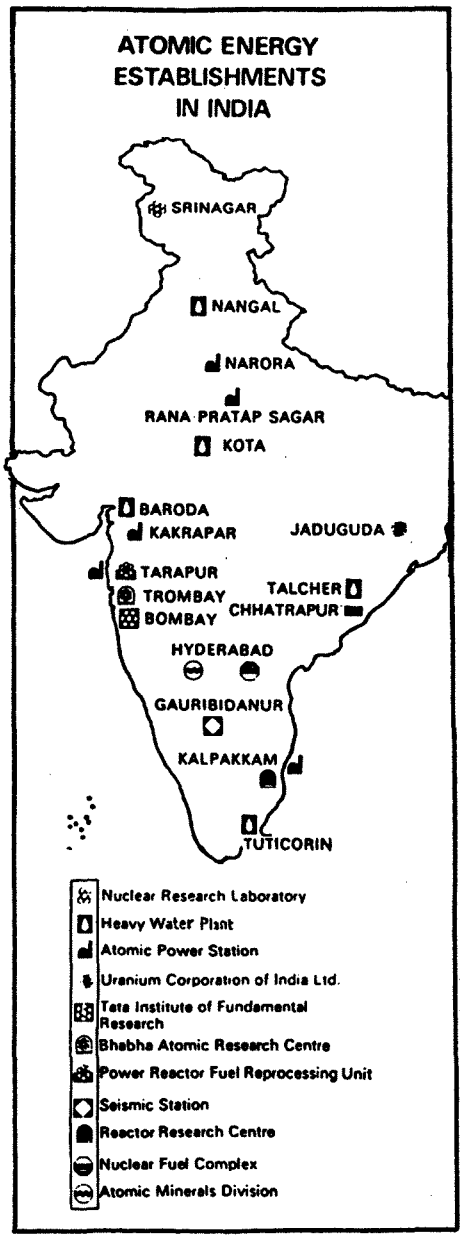
The Indian Atomic Energy Commission (AEC) was set up in 1948 and its chairman, Homi Bhabha, remained in the post until his death in 1966. In the intervening years Bhabha had virtually absolute control of all India's nuclear developments: he was Secretary of the Department of Atomic Energy (DAE) and Director of the Atomic Energy Research Establishment, and was responsible only, and directly, to the Prime Minister Jawaharlal Nehru (father of Indira Gandhi and grandfather of Rajiv Gandhi.)

The 1962 Atomic Energy Act, the most comprehensive of any country, gave the AEC absolute power in all nuclear matters. The DAE and the AEC were made free from all legal and economic restraints. The DAE is unique in India, in that its books are not even open to the Auditor General. All research and development on nuclear matters must receive the consent of the DAE, which compounds the control of the Act.

India has a nuclear power programme consisting of 5 reactors with 3 more under construction. The first 2 reactors went critical in 1969. They are enriched uranium Boiling Water Reactors built by General Electric of the USA. These 210MW reactors are at Tarapur near Bombay and have run at 54% and 40% capacity this year (up to September.) The remaining reactors are natural uranium Heavy Water Reactors (HWR) and are based on the Canadian CANDU design. The first two (RAPP 1 & 2), in Rajastan, are 220MW and went critical in 1973 and 1982 respectively, although RAPP 1 is now shut down and RAPP 2 achieved only 22% capacity in September. The 235MW Madras MAPP 1 reactor, of indigenous construction, achieved 75% capacity in 1984, although figures for September are not available. MAPP 2 is not yet complete.

The other two reactors under construction are to be at Narora in Uttar Pradesh (northern India) and are also 235MW HWR's. These reactors have received much criticism, not least from a committee set up to investigate sites for nuclear power stations. Its interim report in 1972 did not favour Narora. Its doubts centred upon Narora's location - only 56 miles away from the Moradabad fault, the site of a severe earthquake in 1956 - and on the banks of the Ganges. The interim report concluded that the risk and cost of developing a suitable reactor design to withstand the prevalent seismic conditions was too high. Foundations were drilled to 300m instead of the usual 100m without finding a solid rock bottom.

Even assuming that the NAPP reactors could be protected against earthquakes, the operating record of the other nuclear power stations in India leads critics to believe that routine discharges will contaminate the 1000km length of the Ganges to the Bay of Bengal. The Ganges feeds millions of citizens of Uttar Pradesh, Bihar and West Bengal.



FROM NO CLEAR REASON

Of the nuclear power stations which have so far operated in India, the TAPP reactors have been the worst from a safety point of view. Between 1970 and 1976 242 modifications were needed simply to keep the reactors generating. Most of the design changes were publicly denied by the DAE. There is a high turnover of workers at the power stations - the fortnightly permissible exposure can be received in minutes - and there is even a report of one visitor observing workers 'perched on high rafters on the reactor plant operating the radioactive wastes with long bamboo poles'. Radioactive water gushing from the core through a 15cm tube was dismissed by the DAE as a 'pinhole leak'.

Many people, both workers and members of the public, have died after being exposed to radiation. The DAE can get away with this because ignorant villagers are employed in clean-up operations and are paid relatively high wages. The villagers are later dismissed with a bonus after they have received large radiation doses. No medical records are kept; thus no subsequent deaths or illnesses can be traced to work at the plants. This situation is exacerbated by the complete lack of public information on radiation; one school book extols the virtues of nuclear power without a single sentence warning about radiation.

Yet, despite the appalling safety record, nuclear power is deemed to be too expensive because of high health and safety costs. Addressing a seminar at BARC (the Bhabha Atomic Research Centre - the Atomic Energy Research Establishment as was), Dr Raji Ramanna said, 'I would like to ask, "Are we not spending too much money on health and safety? Should we not have a look and find out whether the international standards of safety are indeed that necessary?"...I think we should have the courage to look at these standards especially where they are leading to runaway costs.'

Runaway costs indeed, but not because of safety standards. The budget of the DAE (R&D only) for the period 1980-85 is over 5 billion rupees (about $600m), compared to 70 million rupees for renewable energy R&D and 20 million for social welfare. In all 60% of the science budget is controlled by the DAE and the Department of Space. Yet less than 2½% of India's capacity for electricity generation is provided by nuclear power, and even less of actual generation.

India's nuclear programme is expected to expand. Installed commercial capacity is presently 1059MW, with a further 705MW under construction.

The government has claimed to be able to expand the capacity to 10,000MW by the year 2000. Dr Dhirendra Sharma, until last year an academic in the Centre for Studies of Science Policy at Jawaharlal Nehru University, and an outspoken critic of the nuclear programme, has shown that this is clearly unrealistic. In his book **India's Nuclear Estate**, published in 1983, Dr Sharma calculated the resources required for this programme. Assuming 60 tonnes of natural uranium per unit per year, and assuming a unit life of 30 years, 44 230MW units would require about 79,000 tonnes. However, according to the International Atomic Energy Agency's Working party on World Uranium Resources, India's reasonably assured reserves of uranium are only 15,000 tonnes. Attainable production is only 200 tonnes by 1990.

Then there is the heavy water. The HWR's the Indians have chosen require 200 tonnes of heavy water per unit for the initial charge, then 20 tonnes per year for replenishment. This means that nearly 900 tonnes of heavy water per year will be required, after the initial charge of nearly 9000 tonnes. The production of heavy water is unlikely to reach 1000 tonnes by the year 2000.

It was mentioned above that Dr Sharma was at the Centre for Studies of Science Policy. Since his book was published, and following articles in several leading Indian newspapers criticising nuclear power and the Narora project in particular, he was summarily dismissed from his post just days before his immediate superior was due to resign, whom he should have replaced. His transfer, to the School of Languages, shook the academic world and has been internationally condemned. Robert M Young, of the Science in Society Research Unit in London wrote, "We see the University's decision...as substantiating Dr Sharma's incisive argument about immense powers of patronage and punishment exercised by India's "Nuclear Estate". (It happens in this country too - see the account of Ross Hesketh's dismissal from the CEGB in SCRAM 37.)

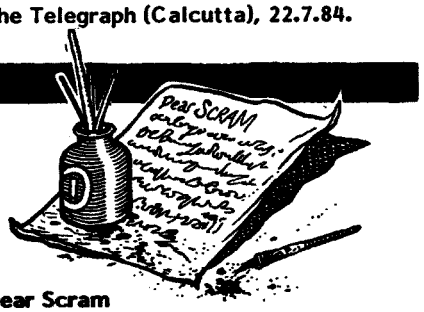
With the Indian General Elections this December, let's hope that the victor sees reason and abandons this expensive and totally inappropriate nuclear power programme.

Steve Martin

Sources.

India's Nuclear Nightmare (Nuclear Bulletin no 7), Health and Safety Group, Madhupur, India
Nuclear Barons, Pringle & Spingelman, Sphere.
No Clear Reason (Radical Science 14), Radical Science Collective, London
Nucleonics Week, 25.10.84
The Telegraph (Calcutta), 22.7.84.

Letters



Dear Scram

Having been a yearly subscriber to your rag, and then moving on to become a Life Member and supporter of SCRAM about two years ago, I am saddened by your almost total lack of any in-depth look at one of the biggest struggles for over 50 years by ordinary men and women throughout the country, namely the Miners' Strike.

The Miners are not just on strike for their jobs. Whole communities are at risk. Communities which could and can be run along 'environmental' lines. By excluding any articles on the Strike you are excluding yourself from a vast sea of people whose ideas are rapidly changing through struggle. These people are the miners on strike, their families and friends, and the people who actively support them.

The strike has posed the largest threat to government policies since the General Strike of 1926. The strike has the greatest potential for years to change people's ideas, not through propaganda of any type, but by personal experience. How many miners read SCRAM? How many SCRAM members have been on miners' picket lines, talked to miners? Does SCRAM support the miners?

If 140,000 striking miners plus thousands of other unionists and supporters can't change the NCB's plans, what hope have a few thousand Greens of changing the CEGB's or the SSEB's?

You are both fighting the same fight. NCB, CEGB, SSEB, = capitalism, big business the ruling class. The few rich at the top deciding what's best for the poor millions at the bottom. In fact, it's the rich making as much as they can out of the poor, by whatever means.

So I may be a Marxist, but I would like to see the kind of society described in SCRAM. It's a matter of how you achieve that goal.

Yours disgruntledly,
David McKay

SCRAM replies:-

We accept your criticism that we have not carried any major statement on the miners' strike. There was little we could add to what has been said at great length in other places. However, over the years we have regularly printed articles on nuclear power and the coal industry. Indeed SCRAM 36 gave its front cover over to an artist's impression of the funeral of the coal industry at the hands of nuclear power. Over many years we have warned of the implications for coal if nuclear power is pursued, a position not entirely accepted by the NUM.

We still remember a speech by the Scottish NUM President, Mick McGahey, at the September 1979 Torness rally in Edinburgh, when he called for a halt to Torness, but refused to come out against the other facets of nuclear power. (See SCRAM 14.) But this aside, SCRAM fully supports the miners in their fight to preserve the country's mining industy and deplores the destruction of civil liberties by this government. SCRAM workers have been to miners' picket lines and SCRAM has also donated cash to the Miners Strike Fund.

Dear Scram

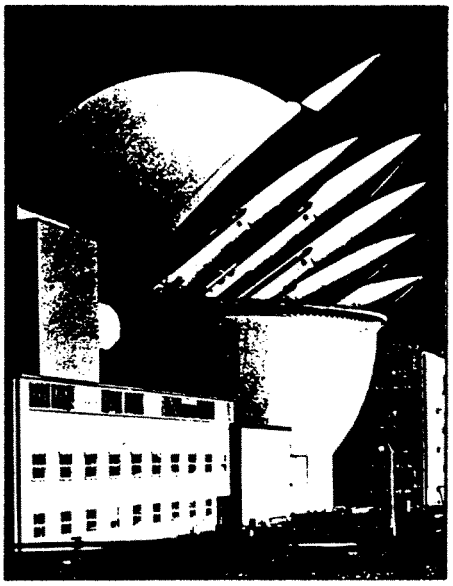
I wrote off to the London Electricity Consultative Council on June 10th 1984, asking them, amongst other things, what was their reaction to the judgment in the case of SWEB v. Brian John; i.e. if private citizens cannot take action to force the CEGB to abide by its own statutes, and since the CEGB cheerfully admit breach of their statutes, who can do anything about it? And also, what was the outcome of the press release by the LECC itself earlier in the year to the effect that they thought the proposed rise in electricity price was illegal? Two months later came a reply that the Secretary of the LECC was too busy to reply but would do so when he came back off holiday. At the end of September, still having heard nothing, I wrote to protest at this inability to reply to letters, and asked the LECC to comment on the legality/propriety of the announced increase in electricity prices due to the amount of expensive oil-burn during the miners' strike, given that from such figures of coal stocks as one has, at best half this substitution of oil for coal-burn has arguably been unnecessary. And the man still hasn't got it together to reply - so much for the wide-awakeness of our 'consumer watchdogs.'

Richard Moore
London

NPT ~ No Peace Tomorrow

With the 3rd Review Conference of the Non Proliferation Treaty less than one year off, SCRAM has commissioned this series to explain the importance of the Treaty and to analyse the issues likely to come up during review. In the first article Jos Gallacher gives the backround to the Treaty.

In September 1985, the Palais de Nations in Geneva will be the scene of the 3rd Review Conference of the Non Proliferation Treaty (NPT). Representatives of the 122 governments party to the treaty - or as many as can afford to send delegations - will spend four weeks examining the operation of the Treaty. The Conference will be a crisis point in the history of nuclear proliferation. Failure at the Conference could mean the collapse of the NPT followed by a sharp rise in the number of countries arming themselves with nuclear weapons.



PETER KENNARD

The NPT was negotiated in the optimistic 1960's when people believed that limited arms control measures could lead to disarmament. It followed the successful conclusion of the Partial Test Ban Treaty and the unilateral announcements made by the US, USSR, and UK of a cut-off in the production of fissile material. The NPT attempted to draw a line after the 5 nuclear armed states existing in 1968. This limit, it was argued, was necessary to allow the nuclear weapons states (NWS) to negotiate their own disarmament.

Two of the five countries allowed by the NPT to possess nuclear weapons, France and China, have refused to sign the treaty. Two of the seventeen countries on the Disarmament Committee which negotiated the NPT, India and Brazil, also refused to sign. Several other countries with significant nuclear technology also remain outside, in particular Argentina, Israel, Pakistan and South Africa. All of these countries offer strikingly similar criticism of the NPT.

They argue that it is unequal and discriminatory, imposing burdens on NNWS without reciprocal burdens on NWS. They claim it was discriminatory to permit some countries to possess weapons denied others. The treaty should prevent vertical as well as horizontal proliferation, and safeguards represented an intrusion into independent industrial development.

The NPT does impose obligations on NWS as well as NNWS, particularly under Article VI (on disarmament) and Article IV (on nuclear trade). The idea of Review Conferences was introduced as a means of verifying that the NWS have complied with the treaty. As a result past Review Conferences have been marked by acrimonious accusations that they have not.

In the years leading up to the first Review Conference in 1975, the superpowers had begun negotiations on nuclear disarmament. The SALT I agreement had set limits on the number of strategic missiles each possessed and the principles for SALT II had already been agreed. However this was not enough for the NNWS who complained of the slow pace of nuclear disarmament. Mexico led the attack proposing protocols which would have cut the SALT limits in half when the number of NPT signatories reached 100. (It was then 93).

Countries also complained that not enough nuclear development aid had been forthcoming. The Philippines moved a resolution calling for more aid to be directed to NPT parties. The conference would have collapsed had it not been for the action of the Swedish delegate chairing the conference. She prepared a bland final document which the conference could adopt. The consensus was artificial, but it saved the Review from complete failure.

In 1980 the Second Review Conference was even more acrimonious. Although the SALT II treaty had been signed, the USA had stopped its ratification. The Soviet Union was deploying SS 20 missiles, not controlled by SALT, and NATO had decided to respond by deploying Cruise and Pershing II missiles. NNWS were also unhappy about restrictions placed on nuclear trade. From 1975-78 the nuclear exporting states had held secret meetings to co-ordinate their non proliferation policies. Importing countries feared that an exporter's cartel had been formed. President Carter's opposition to reprocessing was also heavily criticised.

In 1980 no one was able to paper over the cracks and the Conference broke up in disarray.

These same issues are likely to dominate the 3rd Review Conference. The NWS are in no better position to defend themselves - especially on the question of nuclear disarmament. If the Conference fails, will the Treaty survive?

Jos Gallacher

The provisions of the Treaty are contained in its 11 Articles.

Article I
prohibits NWS from transferring nuclear weapons to anyone else.

Article II
prohibits non nuclear weapons states (NNWS) from acquiring nuclear weapons.

Article III
is the Treaty's verification clause. It imposes IAEA safeguards on the peaceful nuclear activities of NNWS. 'Safeguards' are measures which aim to detect removal of fissile material from peaceful use which would signal the violations of the Treaty.

Article IV
obliges states with advanced nuclear technology to promote the development of nuclear power in NNWS.

Article V
provides for the use of nuclear explosives for peaceful purposes.

Article VI
obliges NWS to negotiate in good faith towards an early end to the arms race, nuclear disarmament and ultimately general and complete disarmament.

Article VII
encourages states to form Nuclear Free Zones.

Article VIII
describes the mechanism by which the Treaty can be amended and provides for a Review Conference every 5 years.

Article IX
contains the technical details of how the Treaty can be signed, when it will come into force, etc.

Article X
permits countries to withdraw from the Treaty after giving 3 months notice. This article also sets the life-span of the Treaty at 25 years, after which a conference must decide whether to maintain the Treaty.

Article XI
is another technical measure about the languages in which the Treaty was written.

Demos; Chapelcross

November 2nd saw a small group of people from all parts of Britain gathering at the main gate of the BNFL facility at Chapelcross, Dumfriesshire.

Chapelcross, 3 miles from Annan and 20 from Carlisle, is where BNFL produces plutonium and tritium for Britain's bombs and their triggers. Electricity is produced as a by-product and sold to the SSEB at high prices. (See SCRAM 43.) Our peaceful vigil and leafletting of workers and police was repeated at BNFL plants up and down the country.

The Nuclear Fuel chain begins with the mining of uranium by exploited people in Canada, Australia and Namibia and ends up being reprocessed at Windscale, creating a nightmare of a waste disposal problem with its toxic by-products after use in nuclear reactors or ends up sitting in the warhead of the missiles in the submarines in the Clyde.

Chapelcross and Calder Hall were the 8 reactors set up to 'burn' natural uranium to create plutonium for Britain's A-bomb programme. This they have been doing for 25 years.

The Tritium plant at Chapelcross could become crucial when this country agrees to control its nuclear weapons. Tritium is used in the 'trigger' which starts the atomic explosion of a warhead. Tritium is radioactive and rapidly decays and so has to be replaced at intervals. If this is not done the weapon becomes unpredictable. Therefore disarmament would probably include monitoring tritium production. Without tritium and plutonium A-bombs could be made, but not easily.

To say that people are dying from nuclear weapons already is not empty rhetoric. November 2nd's demonstration was on behalf of the people in Namibia whose country is occuped illegally by South Africa, whose minerals (including uranium) are illegally removed by multinationals such as Rio Tinto Zinc and whose population provides the miners who are exposed to radon gas and other hazards.

So we stood at the gates of Chapelcross, cows grazed in the nearby field, steam rose from each of the 4 reactors' cooling towers. The sunflowers planted by the workers in the office block had withered and died. Somehow this place seemed more like the end of the line for Britain's nuclear programme than part of a cycle.

When Chapelcross reaches the end of its 'useful' life, the 4 reactors will sit here for ever in their pastoral surroundings. After all, what can you do with 4 used reactors, radioactive, and each weighing 22,000 tonnes?

Chapelcross is hazardous to people living nearby. A serious accident could cause the release of radioactivity. In May 1967 fuel elements melted at Chapelcross. A waste pipe from Chapelcross runs down an old railway to the Solway Firth. It passes through a housing scheme. Children play round it, It carries radioactive waste. Lorry-loads of reactor fuel and the dangerous waste travel to and from the plant inviting terrorist attacks.

Perhaps the next protest at this sinister plutonium factory will be bigger (and soon).

Malcolm Bruce

Greenham

It's easy to forget the existence of Greenham Common when you're living a cosy life in Edinburgh. It's easy, in a cold and rainy November, not to think about the women still camped there. And even the memory of having been there yourself fades in your mind - September seems a long time ago. The virtually non-existent media coverage of the 10 days suggests that a D-notice was issued, and this too makes them seem unreal. According to the RAF there were 15,000 women there on the 30th September, yet this was not mentioned in the press. Despite the large number of women, there was no organised mass action, although this would have been very difficult because of the huge police presence.

But the importance of going to Greenham for those days can't just be measured in numbers and actions, either by the women who stayed there permanently, or for those of us who visited. For those who live there, who must carry on through the muddy autumn facing what most of us only saw for a weekend, the women gathering at the base from all over the country, from all over the world (including a planeful of New Zealanders) were a sign of love and support. And visiting you realise or remember what it is that makes you so sad and angry. Facing the endless fence, the sinister buildings inside it and the aggressive military and police outside it, you are brought up against a reality that makes you want to turn emotions into actions. But always at Greenham there are the two sides, peace as well as war, and you are not only frightened and depressed, but also inspired and given hope.

Although nothing outwardly dramatic happened, going there in September was a jolt in your memory and your comfortable life that Greenham is still there, that the missiles are there, and that the women are there too. You bring back stories - good and terrible ones - photos, a plant, pictures in your mind, and Greenham becomes a part of your experience which you share with other people. So the web is spun outwards, and visiting, revisiting Greenham, you touch its strong silken centre.

Elizabeth Burns

An exhibition about Scottish women's experiences of Greenham Common is being planned. If you are interested in contributing or in helping to organise it, please get in touch with Liz (556 2618) or Joan (332 8924).

A Chocolate Orange ?

The rejection of the SSEB's application by East Lothian District Council for a rail spur and flask loading facility near Torness and adjacent to the main East Coast line precipitated the public inquiry held in Dunbar from October 23rd. The reporter, Mr Maycock, made it clear that the inquiry was limited to the environs of the railhead and would not be allowed to encompass spent fuel transport. However since the railhead's operations would include the movement of spent fuel in flasks, discussion of flask safety became a major feature of the inquiry.

The restrictions placed on the inquiry, while regrettable, were reasonable within the limits of planning legislation; the SSEB do not need permission from anyone to proceed with spent fuel transport from Torness to Windscale. The 1977 Windscale Inquiry into THORP, the facility needed if AGR fuel is to be reprocessed, is seen by the nuclear industry as the last word on transport, and with a pliant and supportive government, will remain the definitive statement of national policy. This, of course, did not prevent SCRAM, Greenpeace and East Lothian District Council (ELDC) from continually questioning the need for reprocessing.

To enliven what was expected to be a tedious inquiry, SCRAM's animal support group, the three wise gorillas, See no radiation, Hear no radiation, Taste no radiation, were given an outing. They were well received by the locals, including the staff of the local SSEB showroom, and, of course, by the media as they gambolled in the streets handing out leaflets and Stop Torness badges. The SSEB's team contrasted with the boisterous hirsute anti-nuclear activists, managing nothing more exuberant than a loud tie in the nine days of the inquiry.

At the inquiry the reporter, Mr Maycock, a man of military bearing, took command from a raised table which formed one side of an oblong of benches. To his sides the main protagonists formed up, the SSEB and ELDC, each in two ranks facing each other, arrayed around their counsels. The resemblance to chessmen was striking, especially as witnesses were manoeuvered, attacked, defended, and retired. The residue, us, were left the table opposite the reporter, with its harder chairs. The patriarchy held sway, with no women on either the ELDC or SSEB teams, though the latter had two secretaries hidden in a back room. A few women appeared among the objectors.

The first skirmish involved a submission by the Council for a 2 month adjournment to allow them adequate time to fully prepare their case. The SSEB countered by saying that it was necessary for construction to proceed rapidly. We threw in our pennyworth by saying that the SSEB, even assuming the planned commissioning dates for Torness, did not need the facility until 1989. The inquiry proceeded, but under cross examination the date of 1989 was eventually accepted by the SSEB.

The inquiry was played with a great display of manners, the knife slips hidden under a cloak of geniality. Each side offered witnesses in support of their position who, coached by their counsel, presented their part of the case. They were then open to cross examination by anyone who felt their own position had been prejudiced. This ruling prevented me from cross examining Peter Wilkinson from Greenpeace. The proponents, the SSEB, kicked off. This was the usual pattern, but the reporter took pains to permit presentations out of sequence by persons unable to wait for their allotted slot. This included John Hume Robertson (local MP), NUPE, Edinburgh District Council, Greenpeace, and some individuals.

Mr Blackman from the Department of Transport was pawn number one for the SSEB. His organisation certifies that flasks meet IAEA and UK standards which require punch, drop, thermal and inversion tests. The adequacy of the tests was a recurring theme of the inquiry. This discussion, papraphrased, became 'they are set by an internationally recognised body,' and 'so by whom? and so what, they're inadequate.' The CEGB's crash test at Old Dolby also kept intruding. Prior to the inquiry Greenpeace had released a leaked CEGB document which suggested the crash test had been arranged to ensure the flask remained intact, by choosing an unaggressive locomotive and loosening the engine's bolts. The crash test employed a Magnox fuel flask which is of very different strength to the AGR flask that would see service at Torness. The Magnox flask has mild steel walls 12" thick, while the AGR flask comprises a box of 3½" steel and an inner lead shield of 7" thick. Both flasks have a steel lid bolted on.

Blackman's best moment came when being questioned about the ability of the flask to survive a deliberate attempt to breach the walls in sabotage. He stated, 'It would be possible to design a sabotage-proof flask, but not to transport it (too heavy),' a very attractive feature from our standpoint. Sabotage/security, and the refusal of the reporter to allow them to be discussed provided brief moments of tension. A sort of compromise evolved. Security was accepted as the plans/attempts of the UKAEA police etc. to prevent sabotage and discussion of this was strictly verboten. Discussing the ease with which terrorists could breach a flask, having eluded the security forces, was grudgingly permitted.

Next on the stand was Mr Willis, the SSEB's civil engineer, who discussed engineering aspects of the railhead. It was generally tedious but grew livelier when it appeared that Mr Willis expected AGR fuel to be reprocessed at Windscale, blissfully unaware that the relevant plant, THORP, is not expected on stream until 1993. The SSEB plan their first movements for 1986. Mr Willis' submission covered other forms of flask transport, by road and sea, concluding that rail was the most attractive.

Mr Watt was originally to be the SSEB's final witness but under heavy pressure a representative of BR was produced. Mr Watt's performance, over four days, was much remarked upon, and resembled one of Mohammed Ali's later fights, taking a lot of punishment, moving slowly, but rarely showing any signs of going under. He gave ground grudgingly managed to parry pointed and persistent questioning with 'I don't think

MR. MAYCOCK

an answer to that question would be of any use to the inquiry' and 'commercial secrecy'. He was ably aided by both the Board's QC, who frequently intervened to succour his client's distressed minion, and by Mr Maycock, whose decisions to break for lunch or give the stenographer a rest tended to occur when the opposition were scoring heavily. Mr Maycock showed little interest in pressing the witness to answer the question. A common point of contention was the wish to see the original demonstration of flask tests, maintenance records, blueprints etc. and the SSEB's reluctant offer to supply sanitized versions.

Other questions dodged included a comparison between the contents of a flask and the radiological hazard attending the Hiroshima bomb, (a flask's contents have twice as much), cost comparisons between reprocessing and dry storage, and SSEB plans for dry storage (see page 3 in this issue.)

John Hume Robertson, the local MP, pitched in but blew his case early on by accepting that Torness will be completed and that rail transport from the site was then necessary. To his credit he made our favourite point that the generating capacity represented by Torness was not required to meet demand in Scotland and that the plant could be delayed while proper testing of flasks was undertaken. He also expressed the fears of locals about rail transport and mentioned the recent spate of accidents in Scotland with a special mention of high speed train crash at Morpeth, on the main East Coast line, that the flask will use.

Greenpeace, ably represented by Peter Wilkinson, mentioned the rigged Old Dolby test, the health hazards associated with Windscale, and made known Greenpeace's opposition to the movement of spent fuel. Interestingly the cross examination by the SSEB's QC was minimal. The SSEB submitted that the CEGB had refuted the allegations about the Old Dolby crash test but to suggest that a denial of the Greenpeace allegations is the same as a refutation is to misuse the language.

DR. ARNOTT

Under pressure the SSEB produced a witness from BR. BR's role is rather limited. They accept flasks from the SSEB without carrying out any radiological testing of their own. As to routes, BR are free to use any that suit their operational requirements or that still exist after continuing rail cuts. In practice, the likely routes are either north up the East Coast line and then cut across to the West Coast via Edinburgh and thence to Windscale or initially moving south via Newcastle and then to Windscale.

Dr Arnott, for the ELDC, compared the proposed facility with that used by flasks from Hunterston and found the Hunterston operation to be much safer. It is not adjacent to a main line and a substantial platform separates the urban line from the loading area. He pointed out that the speeds used on the main line were about those used in testing, and suggested that the rail spur be moved further from the main line or that a barrier be constructed to protect passengers from radiation and flasks from high speed trains.

The most stimulating evidence and subsequent cross examination came from Dr Charles Wackstein, an engineer with experience of the nuclear industry and accident prevention. He submitted that the flasks could be easily disassembled like 'a Terry's chocolate' (the best quote of the inquiry); that terrorists could easily breach the flask; that the resulting release of radioisotopes would, depending on location, wind conditions etc, kill 1000 people over a ten year period; and finally that the graphite cladding around the fuel elements could burn, generating sufficient heat to damage fuel rods. All in all, a pretty damaging submission. Naturally this led to a vigorous cross examination and second best quote of the inquiry when, after a prolonged exchange with the SSEB's QC about a small difference in calculations, the QC was repelled with 'smart arse quibbling.' Dr Wackstein's most effective parry was to ask what studies had been performed by the SSEB/CEGB to refute his assertions. This applied particularly to the suggestion that the graphite in the flask would burn at about 1,000°C and endanger the fuel rods. It appeared that no work on this scenario had been undertaken. This exchange encapsulated the inquiry. The opposition with minimal resources was able to call into doubt the Board's offerings and, accepting that the onus was on the Board to establish the safety case, we might expect a favourable outcome.(!)

Under pressure, the Board provided a list of incidents involving flasks 'between 1979 and 1984' and in addition, 10 withdrawals from service since September 1983. The sheet provided indicated that the list was up to date, but had actually omitted incidents earlier this year when teams were called out to flasks.

It emerged that the board's operations at Torness will differ from past practice. Plans exist to use more highly enriched fuel with a higher burn up of 24 GWd/TeU rather than 21, to load the flasks in air rather than under water, and possibly to introduce an entirely new model of flask. The proposed fuel will be enriched to 3½% (previously 3% was the maximum employed.) In a move to improve the operation of AGR's. (Further details in article on Hunterston B in this issue.) As a consequence the composition of the spent fuel will also change and as yet the present AGR flask has not been certified for this employ. Interestingly, Dr Wackstein, commenting on the quantity of lead employed in the flask, speculated that the degree of radiological protection was more consistent with the requirements of spent submarine PWR fuel where the radioactive content is very much higher.

Mr Watt admitted that new flask designs were under consideration but would not be presented to the inquiry. This raised the possibility that having won the inquiry with the present AGR flask, the Board is free to introduce a different design without requiring further debate. This inquiry is the first occasion on which the present AGR flask has been vetted despite its use for about ten years.

Loading in air rather than under water is novel. The original method, in use for all other AGR's, can result in contamination of the exterior of the flask and on occasion subsequent washing has left a radioactive residue. The operation is performed under water to allow dissipation of the decay heat produced by the fuel rods, and the fuel flask itself is designed to allow the dispersal of heat during transit. Decay heat declines once the fuel is removed from the reactor and for safe transport a period of 60 days must elapse before transport. It was admitted that on one occasion 'short cooled fuel', as it is known, was moved in from Olbury in 1981, though assurance was given that new measures will prevent that recurring. For our part we could easily ensure that short cooled fuel was never again moved.

On the solidity of flasks there was a prolonged exchange between Dr Wack-

continued on p.15

THE SSEB

All Gone Rong

To mark the official opening of Hunterston B on September 25th, 1980, the South of Scotland Electricity Board took two page advertising spreads in all the Scottish daily papers to ensure favourable publicity. In the soothing manner of such features 'a catastrophe we must not repeat' became, in the words of the then Chairman of the SSEB, 'an outstanding engineering achievement'. The true picture is somewhat different. The 1981/82 annual report referred to 'the experience gained in the operation and maintenance of the prototype reactors has been fed into the design of the new AGR at Torness'.

ATOM

Hunterston B (left) and A (right) part of the SSEB success story!

Originally conceived in 1967, Hunterston B was to be a further modification on the Hinkley design and would take its place alongside its Magnox predecessor on the Clyde coast. It was to take 5½ years to complete (it actually took 8), it would cost £97 million, produce electricity 14% cheaper than coal and would provide enough power for a city the size of Glasgow. The contract was awarded to the Nuclear Power Group in October 1967 and work began on site immediately. Later the contract was switched to the National Nuclear Corporation.

Work proceeded without hitch until 1971, when 80% of the work was complete. When work began on the reactor internals and the main technical components, it soon became clear that despite modification, the basic design was still not right and that a price was being paid for having moved forward too quickly without any operating experience on AGRs. This did not stop the SSEB stating that they had learned from experience with the Hinkley design and that they were building a reliable reactor that could be completed on time. The 1972/73 annual report commented:

"...progress has been seriously delayed and costs have been increased by difficulties with the thermal insulation...In addition to technical problems, which have led to extensive modifications in design and manufacture, progress of installation has been slow...to introduce extensive and costly modification in the boilers as a result of new data from a national programme of investigation into the corrosion of some steels in hot reactor coolant gas."

In 1974 the commissioning date was put back to 1975: during tests there were vibration problems which required that eight gas circulators be dismantled and rebuilt, and that the pressure vessel be modified, and fuel assemblies be altered. The SSEB refer to £16 million of extra expenditure for design changes. (First Report from the Select Committee on Energy, para 1058). For the Torness AGR, of very similar design, the insulation was estimated as 4% of the total cost. The total replacement of the insulation at Hunterston would therefore have only cost £5½ million, leaving £11 million unaccounted for. The final cost of Hunterston B was £143 million, which, the SSEB explained, came from rises in the retail price index plus 8-9% pa and the £16 million redesign costs. The initial fuel load cost a further £19.3 million.

The first reactor was not commissioned until February 1976, to be joined by the second reactor on March 31st 1977, just in time for the 1976/77 annual report to proclaim 'the stabilising effect of nuclear power on electricity prices.' This boast was curious because an earlier report had warned that the SSEB's reserves were too low in view of the prospect of a poor early performance from Hunterston, and ironic, because six months later the second reactor had its now famous 'sea water' outage. It was expected that repairs would keep it out of action until mid 1979 (actually Feb 1980). By good fortune the 4,000 gallons of sea-water did not harm the reactor internals. Repairs to the insulation and steel cladding around the reactor cost £15 million, with £43 million for replacement electricity. Further leaks occurred in 1983 and 1979.

Not all of Hunterston B's problems ended with commissioning. The station's operating record was to reflect the inherent design faults. Both reactors were de-rated from 660 to 500 MW to deal with unexpected corrosion problems. Today the reactors remain de-rated, although further modifications raised the ratings up to 520 MW. The 1982/3 annual report promised uprating to 615 MW and 1984 finds output pegged to 520 MW. Improved fuel is also cited in the quest for 660 MW though this can hardly have figured in the original plans.

Operating problems have included the conventional generating plant, detailed modification to reactor one, replacement of a generator motor, turbine bearing repairs, and a generation stator fault. The most spectacular outage involved an employee hitting the 'panic button' which shut the plant down for 16 hours. The culprit was sacked.

The one functioning reactor has shown a poor load-factor throughout most of its life, typically around 30% based on design rating and because of this the SSEB invented a new term - 'availability'. Defined however you like, 'availability' still only averaged 45% in its first five years. However, things have looked up in the last year and Hunterston B achieved a load-factor 66.6% based on design rating in 1983/84 - ten years after its projected commissioning date.

Originally, all the AGR'S were to be refuelled 'on-load', but this was only first achieved at Hunterston in August 1982, and only at 30% power.

The SSEB continue to quote generation costs in the old 'Historical Costs' accounting convention, discredited as 'misleading' by the 1982 Commons Select Committee on Energy because it ignores the fact that inflation will reduce the impact of the higher capital costs of nuclear plants. In an appendix to its annual report of 1980/81, the SSEB gives details of generation costs for Hunterston B and their coal-fired stations. Using those figures we have updated all the capital costs to March 1980 money values to give the following 'Current Costs':

	Hunterston B	Coal Stations	
Historical Costs	1.53	1.58	p/kWh
Current Costs	2.56	1.86	p/Kwh
Load Factor	65%	65%	

When the plant was still on the drawing board, the SSEB signed a 30 year deal with the Hydro-board and the British Aluminium Company to supply cheap electricity from Hunterston to the aluminium smelter at Invergordon. The electricity was to be supplied at a fixed price with the Government acting as a guarantor. The cheap electricity never materialised and the Scottish Office found themselves compensating the SSEB to the tune of £10 million a year. The bill mounted and the government finally pulled the plug on Hogmanay of 1980, by which time the bill had reached £150 million, with 900 jobs wasted.

Dungeness was the prototype commercial AGR. Hinkley was a modification of Dungeness. Hunterston was a modification of Hinkley, and is now referred to as the prototype for Torness. No doubt Torness would have become the prototype for further AGR's if the programme had not been axed.

Ian McKinnell
Jeremy Adler

(Next issue an article on Hinkley sees the end of our AGR series. These will be revised, collected and published in a booklet next year.)

A chocolate orange? continued from p.13

stein, Mr Watt and the two counsels about the size of hole that could be produced in a flask and that should, in consequence, be considered as a health hazard. The Board offered one inch while Dr Wackstein postulated 12" as an intermediate step to total disassembly. The Board, sticking to their line, had predictably not run computer models of larger holes on the grounds that they were impossible. The debate was repeated when possible losses of the radioactive content of the flasks were under consideration, the Board favouring 0.001 Ci (of 64,000 Ci), while the content the ELDC opted for was 10% of the total; the health hazards vary enormously.

SCRAM's submission mainly concerned the potential for terrorist attack, though we touched on the actual need for Torness, which will give the SSEB capacity 130% in excess of the simultaneous maximum demand and how the money spent on it could be invested in alternative energy technologies and insulation. On terrorism, we asserted that, even equipped with World War II infantry anti-tank weapons, a suitably-minded individual could readily breach a fuel flask. Modern weapons are more effective and have been manufactured in large numbers and must therefore be assumed to exist in terrorist arsenals. At the Sizewell Inquiry Professor Resnikoff submitted that a 1½lb conical shaped charge would breach a flask. As to desire and opportunity, we cited the Beirut bombing, the attempt on the life of the Prime Minister, attacks on nuclear facilities in the States, France, Iraq, Germany, Argentina, and the plan made by Gerald Tuite, an IRA bomber, to destroy flasks going to Windscale. In the USA it was revealed that between 1969 and 1975 there were 175 threats or acts of violence against nuclear facilities and 28 involving nuclear threats to cities; the investigator said, 'We wanted to find out if people with twisted minds are thinking nuclear and it appears that they are.' Opportunity there is in plenty. In 1979 a group with a bazooka approached a flask in Stratford Station without the intervention of the police or any like-minded groups. BR commented that it was not the job of their staff to stop people with bazookas, and provided they had valid tickets, it was all right with them. At Torness the railhead will be surrounded by a security fence though, as Mr Willis admitted, it would not stop anyone who wished to approach the site.

A representative of Edinburgh District Council made the administration's opposition to fuel transport apparent and served notice that EDC's health and safety representatives would take a keen interest in any movements in their area.

For ELDC, Councillor Pat O'Brien voiced its opposition to Torness and fuel transport. He was heavily cross examined by the Board's QC but held his ground admirably. Despite a debilitating lack of preparation time, ELDC put together a very good case and showed how effective a committed council can be, an example to the nuclear free councils who are content with giving themselves the title.

At the end of the evidence the counsels summed up. Mr Hardy, for ELDC, drew attention to the inadequacy of the Board's submission, claimed the continual citation of national policy 'emasculated the planning process'; suggested it was within the Secretary of State's power to reconsider national policy; pointed out that no full size tests had been undertaken with AGR flasks; and complained that no plans had been made to cope with a major release and that no consideration had been given to a total collapse of the flask. In his final statement he suggested that the railhead be rejected since the Board had plenty of time to resubmit their case before an operation requirement for the site arose. Finally he proposed that if permission be granted, a range of conditions should be attached, among which were reinstatement of land after transport had ceased, prior notification of the emergency services, radiological monitoring of the site, and the SSEB to be responsible for all costs attending an accident.

Mr McFadyen for the SSEB cited national policy, said that consideration for terrorism was outside the remit of the Secretary of State for Scotland, rubbished the conditions suggested by the ELDC, attacked Dr Wackstein, especially regarding one study commissioned from the NRPB which showed a health hazard even when the prevailing wind was blowing out to sea (a fair point) and affirmed the faith of SSEB in international regulation.

The inquiry lasted 9 days, twice as long as the original inquiry that gave permission for 8 reactors of any type at Torness. A large body of new material was prised out of the Board. The reporter, having read the 50 odd written statements, now writes his report, which is forwarded to the Secretary of State, who then makes his decision. Then the whole caboodle is published, the report, the decision (if it does not concur with the reporter's recommendations, reasons must be given) and finally the transcript. On the evidence, the Board should lose, but back in the real world permission to build is likely to be given, though with some attached conditions. Putting the whole inquiry into perspective, the local rag, the East Lothian Courier, hardly mentioned the 9 day wonder.

Jeremy Adler

Plutonium Graveyard ?

With the record-breaking Sizewell Public Inquiry nearing its end, (March 1985 is suggested), the focus of the nuclear debate looks set to move north, to the UK Atomic Energy Authority's fast reactor research centre at Dounreay on the shores of the stormy Pentland Firth.

Dounreay has been the centre of Britain's fast reactor programme for over 25 years and now houses the 250MW Prototype Fast Reactor (PFR) and an associated fast reactor reprocessing plant and fuel fabrication plant. Plutonium nitrate (PuN) is produced at the reprocessing plant and is shipped amid much secrecy by sea to Windscale. As the next phase of fast reactor development unfolds, the controversy associated with the PuN transport from Dounreay is likely to figure prominently in the nuclear debate.

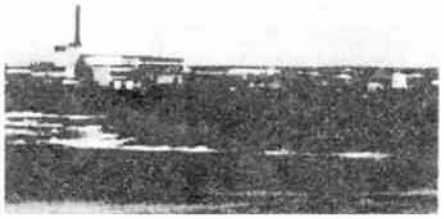
In the unlikely event that you were reassured by the CEGB's waste flask stunt, don't fall into the trap of believing that all shipments of nuclear materials are as 'safe' - they are not. The publicity associated with the CEGB test is in stark contrast to the secrecy surrounding the PuN shipments - the safety and security implications of PuN transport are alarming and ought to be more widely understood.

First, safety. If the container used in the shipments is punctured, PuN would be released in an aerosol form and could therefore be widely distributed. Bearing in mind that as little as a millionth of a gramme of plutonium can cause cancer when inhaled, sucn an incident would clearly be very serious.

The security implications are even more worrying. Plutonium can be used to make nuclear weapons, and its availability on the high seas in a pure form such as the nitrate makes it a particularly tempting terrorist target. The 1976 **Flowers Report** recognised this problem and concluded that 'we should not rely for energy supply on a process that produces such a hazardous substance as plutonium unless there is no reasonable alternative.'

Predictably, the nuclear industry's response is to hide the problems behind a wall of secrecy. A Nuclear Installations Inspectorate's safety assessment gave the shipments the all-clear. However, UKAEA and BNFL's safety reports are classified, and only a summary of one of these reports has been disclosed. Questions about plutonium quantities, isotopic mix, etc. are ignored by the UKAEA who, in a quaint turn of phrase, claim that the secrecy is for reasons of 'commercial confidentiality'. Clearly this is nonsense; the level of secrecy reflects the security risks. Nothing can more clearly demonstrate the military potential of the material used in the 'civil' nuclear power programme.

Now that Britain's military Magnox reactors are coming to the end of their productive lives, the military potential of the Dounreay fast reactor is becoming more widely recognised, and this is likely to have been a major factor in the government's decision to collaborate with other European countries in developing fast reactors (see SCRAM 43). The terrifying risks being taken with PuN shipments are therefore vital to the very future of the nuclear industry.



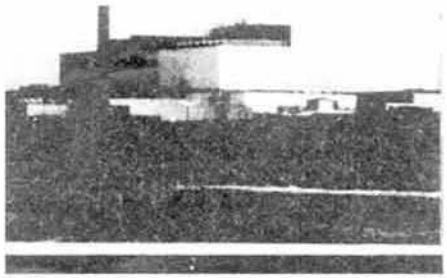
Indeed the government positively encourages the practice because the plutonium produced from FBR's is particularly suitable for bombs and because the amount of plutonium produced is not directly related to the amount of electricity generated - it is therefore easier to divert for military purposes. This unholy alliance is leading to a state where the most dangerous substance known becomes a major item of commerce - the Plutonium Economy. The shipments of PuN are the first steps on the path to the Plutonium Economy and it is vital they are stopped.

Another aspect of the European Collaboration will affect Dounreay and the local community a great deal. The Director of Dounreay, Clifford Blumfield, has outlined plans for a £200 million reprocessing plant capable of handling spent fuel from the first three European fast reactors. Given that this country has been promised a public inquiry before building a commercial fast reactor, this proposal is patently absurd. Mr Blumfield is proposing that we handle the dirty end of a technology which we may decide to take no part in. He is declaring the intention that we build another reprocessing plant to handle other countries' waste and increase the risk of spillages and routine radioactive pollution of our own sea shores.

The local community in Caithness is certainly the most pro-nuclear in the country, and this public attitude no doubt lies behind the government's nuclear plans for the area. Included in these plans may be nuclear waste disposal. Planning permission has already been granted to drill boreholes at Dounreay to assess its suitability for low level waste disposal, and there are plans for a £7 million plant to incorporate medium level waste into concrete. A report by the Institute of Geological Sciences has identified Dounreay as being one of the most suitable sites for disposal of all grades of nuclear waste. The thought of becoming Britain's nuclear dustbin will test the pro-nuclear loyalties of Caithness to the full.

The Highland Anti Nuclear Group (HANG) has relaunched its campaign to stop the PuN shipments and needs the support of other groups. The National Union of Seamen is known to be sympathetic and, following the wreck of the Mont Louis, joined with Greenpeace in calling for an international moratorium on the transport of nuclear materials by sea. So, with the spectre of a Commercial Demonstration Fast Reactor, the associated reprocessing plant and nuclear waste disposal looming up, on top of the PuN shipments, anti-nuclear groups, such as HANG and the Dunters in Orkney, are going to be very busy in the near future. Let us hope that other groups will be too.

Pete Mutton



At Dounreay a plant for converting medium activity liquid waste into concrete blocks is to be built at a cost £6.7 million. The waste arises from the reprocessing of fuel manufactured at Dounreay for use in Material Test Reactors. At present the waste is stored in stainless steel tanks within concrete vaults. This is the first step by the UKAEA to reduce its holdings of liquid waste.

It is unclear what the next step will be. The article in Atom talks about 'simple, safe, economic storage', but is remiss about details. **Atom October 1984.**

HOUSE OF COMMONS: ENERGY RESEARCH, DEVELOPMENT AND DEMONSTRATION IN THE UK - NINTH REPORT FROM ENERGY COMMITTEE

The report is a body blow to the approach undertaken in the field of energy by the government through the DoE, UKAEA and nationalised industries.

In 1982 less was spent on R&D than in 1975. The only IAEA country with a worse record is Belgium, and Japan has expanded her investment by a factor of 3 over the same period.

Expenditure is supply dominated, with only 4% of DoE expenditure devoted to efficient use. Half of the resources of the DoE's, £200 million of £245 million, goes on nuclear research and when the nationalised industries are included this becomes £260 million of £500 million. Worse, DoE money is mostly spent on electricity generation (89%) though electricity only accounts for 14% of final energy demand.

£2,400 has been spent on the breeder programme and a further £330 million is required for a commercial demonstration reactor (CDFR). Three larger countries are collaborating - France, Germany and the UK have entered a joint agreement to pursue breeder research, though three CDFR's will be built, one in each country. The report comments, *'There appears to be no obvious rationale for this decision.'*

The thermal reactor programme of research is also savaged. The report expresses surprise that this mature technology is still heavily funded by grant rather than by the electricity industry. *'We believe that this should be met by the Supply Industry, and not directly by the taxpayer.'* This is a hidden subsidy and allows nuclear generated power to appear cheaper.

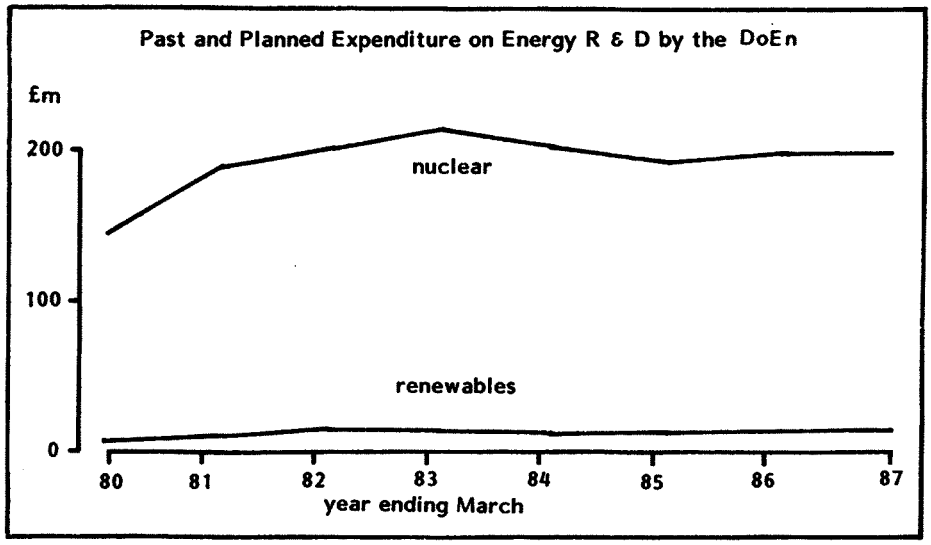
On fusion: *'We believe that at present the government places too much reliance on advice from those within the project...'* and *'we perceive it is being run on a very different basis from that adopted by the DoE in relation to smaller, non-nuclear projects, to which the attitude appears to be one of scepticism rather than faith', 'the programme appears to be based on the faith of the scientists and technologists and engineers concerned.'*

The disgraceful approach taken to wave energy is charted where the criteria for progression to a sea trial were progressively heightened despite the acceptance that the only way to proceed was with sea trials. The report notes *'the evidence on wave energy hardly inspires confidence in the Department's sponsorship of renewable energy R&D...'* and *'There is no evidence that the Department has ever assessed the much larger expenditure on the fast breeder and fusion research against a similarly stringent cost criteria - certainly not at such an early stage in their development.'* The Department of Industry were about to start funding wave energy with a view to export when the DoE pulled the plug.

Government support for alternative energy will remain token. A parliamentary answer given on the 25th of July by Mr Buchanan-Smith reveals a small cash rise, but conceals a real cash reduction, once inflation is included. Nuclear R & D is also pegged, though at a much higher baseline:- 200m rather than 14m.

Dr Challis, former chief scientist at the Department of Energy, addressing a meeting at the All Party Energy Studies Group, indicated that the present research phase of renewables was nearing completion and a successor programme aimed at commercialisation would need funding of between 100-200m pa.

Britain has the lowest non-military R & D budget of the major industrial powers. By scrimping on scientific and technical research and by leaving human resources idle, Mrs Thatcher is laying a corpse to rest, not the foundations for a supportable future.



In the conclusions are found:-

'we have received little evidence to show the scale and mix of energy R&D priorities, and hence expenditure trends, have responded in any significant way to either of the radical revisions of demand forecast over the last decade or to new perceptions of energy consumption patterns and market pressures.'

'When R&D priorities are assessed...they should be judged according to a set of criteria which are explicitly stated and consistently applied.'

'it is difficult to be satisfied that a sensible balance of priorities has been arrived at.'

'the absence of any forceful or effective lobby for energy efficiency R&D to counteract the powerful and largely supply oriented nationalised energy industries.'

'by the year 2,000 electricity will count for no more than one fifth of final energy demand. Despite this...the bulk of supply sided R&D is oriented to the production of electricity yet the main future supply requirements will be for alternatives to oil and gas for low-grade heat for industry, homes and offices; for transport fuels; and for chemical foodstocks.'

'decisions on the funding of energy R&D, energy conservation opportunities must be cost on the same basis as other energy resources.'

'recommend that serious consideration be given to the establishment of a new and stengthened technology management organisation...management of non-nuclear R&D.'

Structural changes within the DoE and UKAEA are recommended.

The report vindicates everything we have been saying for the last few years and builds on the previous report where the level of support for alternative energy was deemed 'grossly inadequate.' The DoE slammed *'certain complacency...towards the development of alternative energy sources' 'alternative energy sources should be pursued with urgency and determination.'*

The report is just the tonic the anti-nuclear alternative energy movement needs. The danger is that the report will go unread by those involved. **This is a report that all campaigners must read** despite the boring cover and depressingly sober language. The contents are all the more powerful for their sobriety.

Appropriate Technology

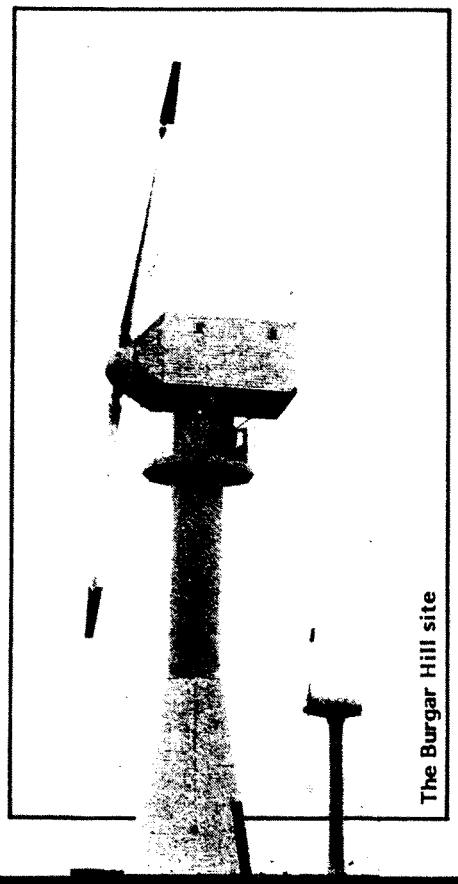
Plans to build Britain's biggest wind-energy turbine in the Orkneys have finally received official backing. The 3MW machine will be built by the Wind Energy group alongside two existing machines on Burgar Hill, at an estimated cost of £10.5 million, £4.5 million more than the original estimate, but worth every penny as a step in the right direction to renewable sources of energy.

The twin-bladed machine, 45 metres in diameter, will supply the island with 5-10% of its energy requirements by 1986. It will operate in wind speeds between 7 and 27 m/s, delivering a full 3MW output at 17 m/s and above.

David Hunt, junior energy minister responsible for renewable energy, announced the project and predicted, *'Wind-powered generation could make an effective and economic contribution to islands not connected to the grid, where it would compete with diesel plants. This is a market with a useful export potential for British companies. Its contribution to mainland supplies is less certain, but we need to assess the possibilities.'*

This machine is a landmark in wind energy's history in the UK, and future orders will no doubt depend on its success. However, the recent decision by the North of Scotland Hydro-electricity board to connect the Western Isles to the National Grid is a clear move away from small scale local energy production.

The £27 million project, announced at the beginning of November, is rushing headlong into confrontation with local people and conservationists. It will involve a line of 9 metre wooden poles (not metal pylons), 90 metres apart, running the full length of Skye, the cables running on the sea-bed to Rodel in South Harris, connecting Lewis and Harris, and one to South Uist, connecting the Southern Isles. This is to be ready and operating in four years. The poles will inevitably run through areas of great concern to conservationists. The Hydro-board, who do not require planning permission, write off the idea of running the cables underground due to costs.



The Burgar Hill site

The whole idea of connection to the National Grid is absurd, when you take into account the small-scale alternative technologies so suited to the islands. The board predicts a £2 million saving each year as a result of closing the diesel generating stations, taking 14 years to pay off. Wind, wave and solar heating could easily be developed in the area in less time, perhaps for more money, but what would the yearly savings be then?

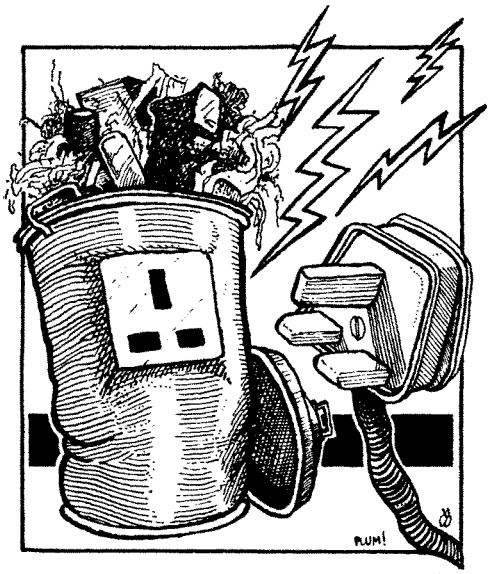
There are also millions of tonnes of peat on Lewis which could be utilized in the same way as in Finland and Eire. The possibilities are there for creating more jobs with clean, renewable sources of energy. All it needs is a change of attitude to decentralising the energy industry, and it's not going to happen in the boardroom of the North of Scotland Hydro-electricity board.

Electrical Review 12.10.84
West Highland Free Press 9.11.84
Glasgow Herald (Letters) 21.11.84

Rubbish

The Greater London Council has announced plans to expand its programme of waste-burning power stations. They wish to convert the Belvedere oil-burning station in South-east London to burn some of the vast quantities of combustible waste produced in London each year. This would produce electricity for the national grid as well as heat for part of a district heating scheme. The £50 million needed to be invested in the scheme would be partly recouped by saving the £6 million a year spent on dumping 300,000 tonnes of waste.

This addition to the GLC's existing refuse-burning station at Edmonton in North London would be a good opportunity to create a use for London's so-called waste, creating jobs, reducing pollution (see inset) and conserving oil and coal. However, the plans are jeopardized by various difficulties, not least of which are the government plans to abolish the GLC and make waste disposal the responsibility of borough councils, making it impossible to organise a city-wide burning scheme.



Belvedere is still used by the CEGB and no closure date has been announced as yet. Will they wait till after GLC is thrown on the scrap heap?

Fuel	Sulphur Dioxide	Nitrogen Dioxide
'Raw' refuse	0.2 - 0.5%	100 - 130 ppm
RDF	0.3%	120 ppm
Coal	1.5%	500 - 700 ppm
Oil	3.5%	150 - 300 ppm

[SO^2 and NO^2 are believed to be the main causes of acid rain].

CHP

The ever-nigh government decision to back a District Heating Scheme in one of the (few) proposed cities, has not yet been announced. (See SCRAM 44.)

Mr David Hunt, the junior energy minister, met Edinburgh MP's and councillors recently and hinted that we will all know 'within weeks'. Apparently Mr Hunt made it clear that the case for a CHP scheme in Edinburgh, operating from Cockenzie power station was 'technically very strong' and he was 'most impressed' by the proposals put forward by Edinburgh District Council and Lothian Regional Council, both of whom, along with private companies, are very keen to develop the project.

Mr Hunt is considering other proposals, such as a CHP scheme in Glasgow, although with support from a private consortium, not from the District Council.

If Edinburgh obtained the cash for further planning and proceeded with development, 3,780 jobs would be created over the next 12 to 20 years, saving millions of pounds in wasted energy at Cockenzie. It would also cast doubt over the future of the nuclear power station at Torness.

As pressure mounts on the British government to curb acid rain by cutting sulphur dioxide emissions, the time has come when we must examine and decide on the various new technologies open to us.

There are two basic systems. The **Pressurized Fluidized Bed Combustion** system (PFBC) removes the polluting sulphur by burning the coal in a bed of limestone. The **Flue-gas Desulphurization** method (FGD) cleans the flue-gases as they rise up the chimney stack. **PFBC** is at a relatively early stage of development, whereas **FGD** is an established technology, already in wide use throughout the world. There are many different designs, the two most efficient being the **Gypsum** and the **Wellman Lord** processes.

There are environmental problems associated with all the methods, but they vary enormously, and it is this factor on which the decision should be made. For instance, a PFBC unit installed in a 2,000MW station, using 2% sulphur coal, would consume between **1.09** and **1.28** million tonnes of limestone per year. This is an enormous quantity, and it would inevitably be mined from limestone deposits in the Peak District National Park, already a contentious issue.

Achieving the same removal of SO_2, a Gypsum FGD system in similar circumstances, would consume only **320,000** tonnes of limestone. Furthermore, the Wellman Lord method requires only **27,000** tonnes plus an additional **30,000** tonnes of caustic soda.

The waste end of the issue puts the nail in the coffin of present-day PFBC's, which would churn out over a million tonnes of unusable waste suitable only for dumping on land. The Gypsum FGD would create 500,000 tonnes of gypsum, recyclable as a building material, and 100,000 tonnes of calcium chloride solution which could be dumped at sea. The Wellman Lord process produces 94,000 tonnes of dumpable material and 300,000 tonnes of sulphuric acid and sulphur, recyclable as industrial materials.

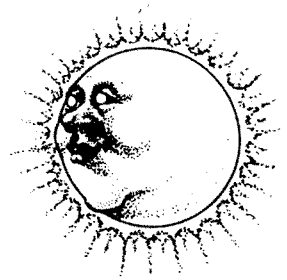
FGD systems will still cause environmental headaches, depending on whether the waste products can be readily sold, but it is clear from the figures above that PFBC, in its present state, is of no use whatsoever in combatting acid rain in the time scale directed by the EEC. (60% reduction of emissions by 1995.) If the limestone consumption was made more efficient and waste could be recycled, then it might be useful, but for the pressing issue of acid rain, a cleaner technology is required, namely the FGD. Which of the FGD's we go for is a matter of scientific and environmental analysis, but we must not drag our feet on this matter.

Earlier this year, when Lords and MP's were discussing the new technologies in parliamentary inquiries, they were completely misled and duped into believing the NCB/CEGB recommendations that Britain should back the PFBC system because **'the waste problems to which it gives rise are not as severe as those often incurred by flue-gas desulphurization.'** Mr Ian McGregor told the inquiries he was **'appalled** at the problems that there are in getting rid of the **adulterated calcium sulphate'** from FGD systems, claiming it is 'very difficult to dispose of' and that 'converting it to gypsum is an ambition which has **not** been attained.' (A total lie.)

We're used to this kind of commitment to the urgent measures needed to combat all environmental problems. The clear message is that they are not bothered really, but they'll do all they can to appear to be, and at the same time, delay any action against their own financial interests.

Further technical details can be obtained in the END's report October 1984, available from SCRAM. Send s.a.e.

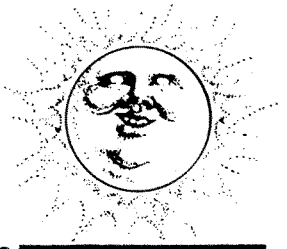
ENDS report October 1984
New Scientist 8.11.84



Solar

The development of solar power is proceeding in the States though not in the UK. Over the last ten years the price of photovoltaic cells has fallen from $100-150 per peak watt to only $6½-7 with $2 predicted by 1990. Efficiency, the ability to trap sunlight, has quadrupled to over 10%. In 1974 the use of solar panels was restricted to communications satellites but now uses include remote rural electrification, water pumping, and domestic and industrial use. Over 10,000 electrical systems are installed. In California over 10MW of solar power is attached to the grid, which is expected to rise to 50MW by 1987.

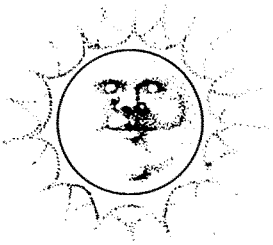
Financial Times 21.11.84.



Sun-line

Members of the Newport and Nevern Energy Group have built a prototype solar collector made out of empty plastic pop bottles. And it works! It has been labelled the 'Sunbottle' collector, and the Mark I version, complete with pipes, frame, 5 gallon plastic water tank and other fittings, has cost only about £8 to make. It has a distinctly Heath Robinson appearance, but it can be put together or dismantled in just a few minutes and it will fit into an average car boot. It is also light enough for a child to carry. Under sunny conditions it should produce 5 gallons of hot water for campers or caravanners - quite enough for washing and doing the dishes at the end of a summer's day.

The object of the exercise is to produce a portable solar collector made for the most part from scrap materials and costing no more than £10 to build. It should also be easy enough for an non-technical person to make over the course of a couple of evenings.



The Group isn't interested in making any money out of the invention. Copies of the plans for the Mark I 'Sunbottle' collector can be obtained for 50p each (to cover Xerox copying costs) from the Energy Project Office, c/o The National Parks Office, Long Street, Newport, Pembrokeshire, enclosing sae. Members of the Group hope that interested members of the public will build their own solar collectors and suggest design improvements which are cost-effective and which will improve performance. 'If lots of these collectors are built over the winter period by natural energy enthusiasts, the development process will probably proceed at a great pace next spring and summer,' said a spokesman for the Group. 'Solar energy is free, and we believe it should be used wherever possible to reduce our dependence on expensive fossil fuels. If our Sunbottle campaign goes well, and if we get enthusiastic participation from members of the public, we could have a really efficient D.I.Y. solar collector design by the end of next summer. Let's see what we can achieve by employing the full potential of community research and development.'

Newport & Nevern Energy Group

Three days of Acid Remarks

Despite an ambitious brief, the conference on Acid Rain held at the end of September in Edinburgh fell short of answering the most important question: why Britain persists in justifying its reputation as 'the dirty old man of Europe'. It did not provide, in the organisers' words 'an opportunity for everyone to have their questions answered on all aspects of the acid rain phenomenon.'

As you would expect, with the Scottish Wildlife Trust being the sponsor, most of the three days were devoted to the effects rather than the causes of acid rain. Still, the SWT should be congratulated for bringing together current research in the field and presenting it to a wide range (some 250 delegates) of interested scientists and laypeople.

All the presentations were made by male scientists with the exception of one Euro-MP. That in itself should convey the flavour of the event, low-key and unemotional. In fact the most moving contributions came from abroad:- Norway, West Germany and Canada. The horrific extent of tree devastation hidden behind the soothing term 'forest die-back', and the spectre of a whitened landscape as the Scandinavians desperately spread lime over their lake catchment areas ('we're only buying time,' said Dr Muniz grimly) are two striking images that illustrate the reality of acid rain. Dr Tom Brydges from Canada, whose survey of the Canadian experience clearly showed the direct link between SO_2 emissions and lake acidification, gave a perfect illustration apropos the 30% Club proposals: it's like, he said, someone saying well, I feed my family on 30% of the cyanide that I used to feed them, and I can't understand why they still get sick.

In comparison most of the British presentations were anaemic and cautious. The CEGB, of course, still smarting from their rough treatment at the hands of the Select Committee, had their say. They succeeded in confusing the issue to the extent that Paul Ekins of the Ecology Party finally accused them of deliberate obfuscation and uncooperativeness and of being against the spirit of the conference - an attack which the conference's chairman found acutely embarrassing, as he had throughout bent over backwards to be kind to the CEGB's representative, even at one point chiding him for being 'defensive'.

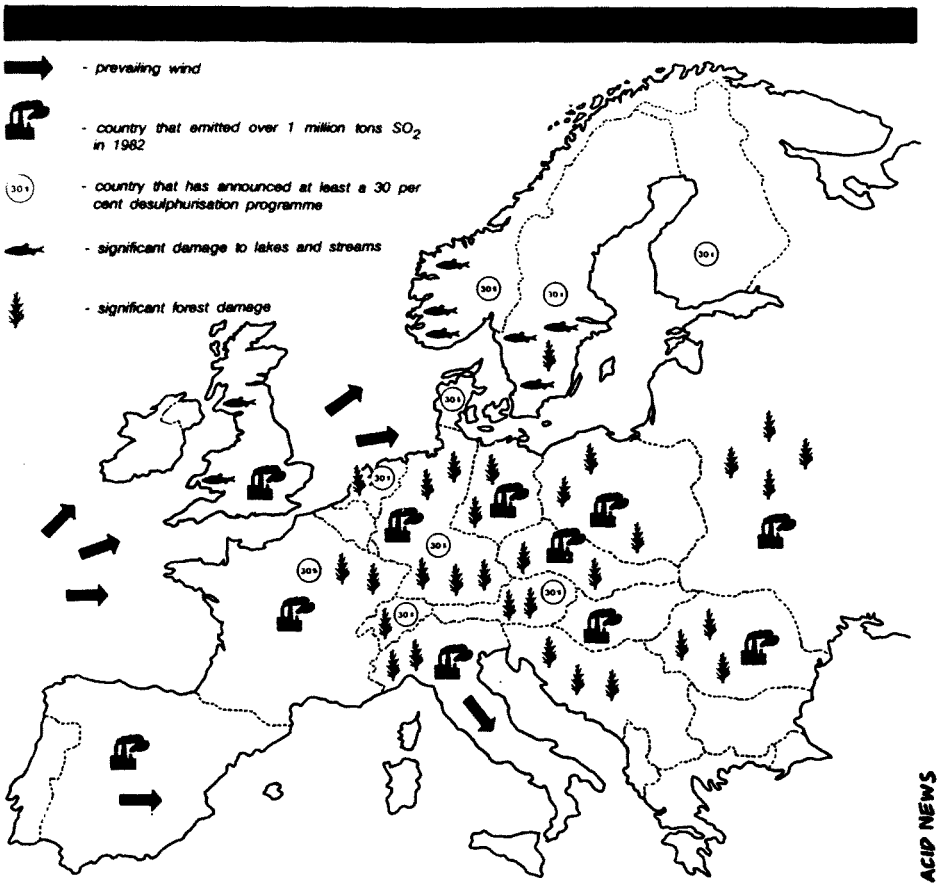
It is easy for organisations who want to muddy the waters to do so. Though it is established that SO_2 precipitation causes lake acidification, it is still possible to argue about the exact mechanisms of transport of SO_2 over long distancs. The CEGB can therefore say that the link between power station and emissions and SO_2 effects is still not proven. Including other pollutants such as nitrous oxides (also generated by power stations and by car exhausts) and ozone complicates the picture, especially because it is thought that these may be more relevant to the problem of forest damage. Strictly speaking, 'acid rain' refers only to wet deposition of SO_2, with other pollutants and mechanisms of fallout being equally important overall.

But, as one contributor said, it will never be possible to prove the connection 100%. The tragedy is that such differences of detail allow scientists to argue endlessly over causes and effects, while those responsible for cleaning up the mess can postpone the day when they have to install complicated and expensive control measures. A further tragedy is that it seems to be only economic consequences that stir people to action: depleted fish stocks in acidic lakes and dying trees in monoculture forest plantations. Only the Scottish Wildlife Trust's own speaker mentioned the threat to other wildlife. Until recently it seemed that Britain itself was not suffering much from its own pollution, but tree damage is now becoming widespread in Scotland and Cumbria, and acidity is rising in some Scottish lakes. This throws into sharp focus two of Tom Brydges' conclusions, drawn from experience in Canada vis-a-vis the United States:

> -control programmes are being implemented in countries which have achieved a high level of public understanding - as a result of damage becoming obvious and/or media reports on the problem
> -public awareness of damage within national boundaries has driven control actions, within emitting countries, to a greater degree of awareness of damage occurring in another country caused by the same emissions.

That message has to be acted on by everyone concerned with the European environment.

Tim Williams



From the map, it can be seen that the Eastern European countries will have to be involved in an European desulphurisation programme. In western Europe, five countries provide 75 per cent of the area's SO_2-emission. In terms of diplomatic initiatives, Spain and Italy are not prime targets because of their distance from Central Europe and because of direction of wind currents. Of the three major polluters, the UK is the only one that has not yet started a desulphurisation programme.

Directory for the Environment: Organisations in Britain and Ireland 1984-85 by Michael J. Barker. (Routledge & Kegan Paul, £8.95, 281pp)

Claud Cockburn, one of the founders of the Nature Council of Civil Liberties wrote in his autobiography "there are more organisations shouting 'Stop it, you brutes!' per square mile in the British Isles than anywhere else in the world.' So here's a directory for them - over a 1000 environmental organisations of all kinds - anti-nuclear, acupunctural, small groups like Men of the Stones (dedicated to the use of local building materials) as well as respectable bodies like the Nature Conservancy Council and Greenpeace, and dubious organisations like the SSEB. There are interesting anomalies - among the many animal organisations, several are devoted to cats (The Feline Advisory Bureau and the Cats Protection League) but only one to dogs, one to goats (British Goat Society - address Lion House) and none to hamsters or goldfish.

In spite of the temptation there is to make fun of the dottiness of some of the entries, this is a useful and encouraging book. There are more people in environmental groups in Britain than in political parties, and for the greening of Britain's grey unpleasant land, it would be excellent if they united. At least this book should enable them to know of each other's existence, with its subject index as well as its alphabetical listing. As it is a first edition, there are plenty of omissions and errors - Information Service on Energy, for instance, now has its address at 11 Forth Street, Edinburgh - many of these being due to groups not returning their questionnaires. Anyone, whether the Druids for Insulated Standing Stones, or The Militant Wing of the Carrier Pigeons Liberation League, should get in touch with the author and get themselves listed. It would also be good if groups gave the numbers of their members and active workers, though numbers would probably be distorted for the sake of public relations. The second edition of this book should be better value than the first, but it would be worthwhile consulting to see if you can get yourself included.

R M Bell

Warday and the Journey Onward by Whitley Strieber and James Kunetka (Hodder and Stoughton, £8.95, 380pp)
The Waste Remains by Judith Cook (Pluto, £2.50, 118pp)

Warday is in the post-Holocaust genre, with the actual causes of the war being left vague. It's a limited nuclear war since the USSR has exploded heavy megaton headed missiles at a high altitude and the electromagnetic pulse has knocked out the command control system. The best imaginative touch is an account from a naval commander (British), whose job it is to dismantle or explode nuclear submarines, which are still blindly roaming the seas. However, in their journey across limited-nuked America, the fictionalised journalists don't try and find out who's in charge of the 10,000 unexploded weapons, though they see plenty of other interesting sights - New York overrun with packs of human-eating dogs and California, with an abundant life and work camps for illegal immigrants. Between the travelogue and interviews with officials and citizens, are documents on radiation sickness, the economic state, agricultural productivity, and so on.

There's no doubt that this book is written as a cry against nuclear insanity. But there's always a danger in novels of the effects kind. Either they are fatalistic (like **On the Beach**), or they present a simplified society, one that is more easily encompassed by the mind than the present complicated set-up. The novelist can invent almost anything exciting - anarchical groups (here called Destructuralists), subsistence farmers, radio-active dust storms in the Mid West, and you can't help thinking that whatever the loss of their civilisation and thirty years off the normal life span, the survivors are having an interesting time of it. It creates a nostalgia for a more basic, heroic life, with immediate horrors to struggle against, which may be seen as more excitingly taxing than being, say, an administrator in a complicated and half-known world, with the horrors being in one's own ability to cope, or remote, in statistics and incomprehensible NATO speeches. A novel on the leading up to, or the actual conduct of a nuclear war would be much more difficult to write, requiring not just the thriller's description of technology and strategies, but the great Victorian realist's ability to make political and social and economic situations ring true.

As for **The Waste Remains**, whatever the ideological soundness of Pluto's new left-wing thrillers, none I've read have thrilled, and they've all been short on the other thriller virtues of atmosphere and plot and technical detail. **The Waste Remains** is worse than most. It's about some journalist whose body is found near a chemical warfare dump. There's a cover up, various dirty tricks by the Ministry of Defence, and an investigation by the local librarian - all very low-key, fair minded (sympathetic police inspector, nasty Special Branch man), and utterly dull.

R M Bell

Housmans Peace Diary 1985. £3.00

Ideological critics can interpret the change in the appearance of Housmans Peace Diary from last year's as part of the hard-line Left going gentler Green. Last year's had a lot of harsh graphics in stark black and photos of demonstrations; this year's has headings of snowflakes and corn-sheaves, depending on the month, and pictures in toner. Last year's cover was tough, this year's soft. But there are still the lists of peace organisations, dates of significant events, and also an extraordinarily timely and brilliant speech by Paul Goodman given in 1967 on and to the military-industrial complex (i.e. the National Security Industrial Association.) Housmans 1985, whatever its politico-ecological stance, is not as good value as last year's - it's smaller and more expensive, but it's still a reasonable buy, and it can be given to your unenlightened relations without frightening them off

R M Bell

The Choice: Nuclear Weapons versus Security. Ed. by Gwyn Prins. (Chatto & Windus, £6.95, 251pp)

Defended to Death was one of the outstanding anti-nuclear books of 1983, strong both on argument and information. Its editor, Gwyn Prins, has maintained the standard here in **The Choice.** Its tone is less radical, the nuclear problem being viewed from a broader Western rather than British perspective, with over half the contributions from the USA.

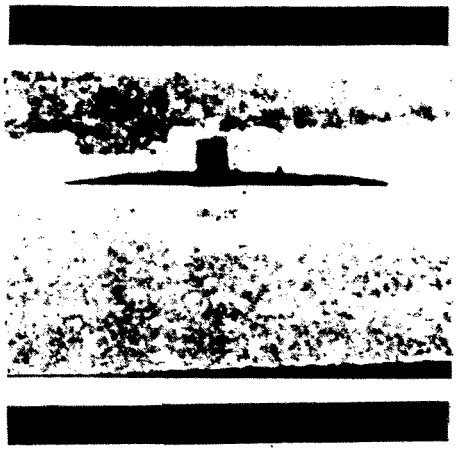
In particular it is accepted that the USA should retain some nuclear weapons - in the form of an invulnerable minimum deterrent - so long as other nations are nuclear armed. They believe that the effects of even a few nuclear weapons are so awesome that their mere existence is enough to help encourage caution in international affairs. However, although they believe in this "existential deterrence," they dismiss the notion that nuclear weapons can rationally be used for any specific military or political purposes. Three retired high-ranking US officers agree that it is folly to believe that nuclear weapons can serve any useful purpose in fighting war. To believe that they could is, as Admiral Gaylor says in the specific context of anti-submarine warfare, "soft-headed, deeply obnoxious - and militarily futile."

The possible political utility of nuclear weapons (or as it is crudely put, "nuclear blackmail") is considered by McGeorge Bundy, former US National Security Advisor. He discusses the Iran crisis of 1946, the Korean and Vietnam Wars, the US nuclear alert of 1973 and the recent Euromissile controversy. In Bundy's view: 'The more we learn about living with nuclear arsenals, the less we are able to find any good for them but one - the deterrence of nuclear aggression by others...What remains remarkable about the enormous arsenals of the superpowers is how little political advantage they have conferred.'

As to whether nuclear deterrence has kept the peace in Europe since World War II, Michael MccGwire points out the two dubious assumptions underlying this assertion. These are that the Soviet Union has a great desire to invade Western Europe, and that this being the case, whether a lesser threat (than nuclear devastation) would not have deterred them. Unfortunately Western defence has been based on extreme and highly abstract worst-case assumptions, with a Soviet leadership so ruthlessly expansionist that it will be tempted to exploit any theoretical deficiency in the West's defences. 'But', asks MccGwire, 'if the existence of such temptation is in doubt, are we just over-insuring, or can misplaced deterrence actually endanger us?' Since it is, in fact, more reasonable to assume that the Soviets would only invade Western Europe as a very last resort, if the security of the Soviet Union appeard to be gravely threatened, does not the deployment of American nuclear weapons which threaten their security actually make a Soviet invasion more rather than less likely?

Other essays are by Robert Neild on a non-nuclear defence policy, Malcolm Chalmers on how such a policy could be implemented and how much it would cost, with 'a net decrease in NATO defence spending' contrary to the widely held view (among some in the Labour Party) that non-nuclear defence would be expensive and other topics - space weapons, international law and nuclear weapons, the history of warfare, the military-industrial complex, and morality. They are all worth reading, though some are a little esoteric. A highly recommendable book, well-worth £6.95.

Graham Spinardi



Faslane - Diary of a Peace Camp (Polygon £3.95, 86pp)

'We are ordinary people experimenting with our everyday lives. A peace camp isn't the only place to do this, but it seems to accelerate the process...'

Faslane - Diary of a Peace Camp is written by 'ordinary' people about their 'everyday' lives at Faslane. It's a book about what it's like living with the nuclear threat always present, visibly as well as mentally, and about the helplessness and depression that it can make you feel; it's about the daily frustrations and the practical problems of living with a lot of people in cramped conditions at the edge of a nuclear base.

It's also a book about peace and how we can achieve it. The peace camp members explain how the camp was set up and survived and grew, with help from single visitors and huge demonstrations. They describe the actions and arrests, court cases and prison sentences they have gone through, and show the powerful effect the camp has had on workers at the base and on members of the local communities. They talk about the ways in which an individual does have the power to help change things:- 'I won't change the whole world...but I don't need to give in...there is no inevitability...anyone can join in the current of change.'

It's easy to read - it makes you feel you've just been chatting to the people at the peace camp - and it's a book that everyone should read. As the members of the camp realise, they represent all the people who support them, but who

aren't physically present:- 'We've got to remember that even if there is just one of us here in body, there are tens of thousands of people here in spirit...Although you may be by yourself here, you are never alone.' The peace campers, writing this book, strengthen the link between themselves and their supporters in Scotland and all over the world, who are, like them, just ordinary people working for peace. 'What we do seems very little at times, and I get filled with a feeling of hopelessness and despair and think I'm wasting my time - but I'm not, neither are you. There are millions of people, all of whom are doing a little. Together we can win. We have to.' The people who wrote this diary have shared what they are doing. 'Dare to be different,' they say, 'Dare to hope', and in giving us this book, they'll help everyone who reads it to dare a bit more.

Elizabeth Burns

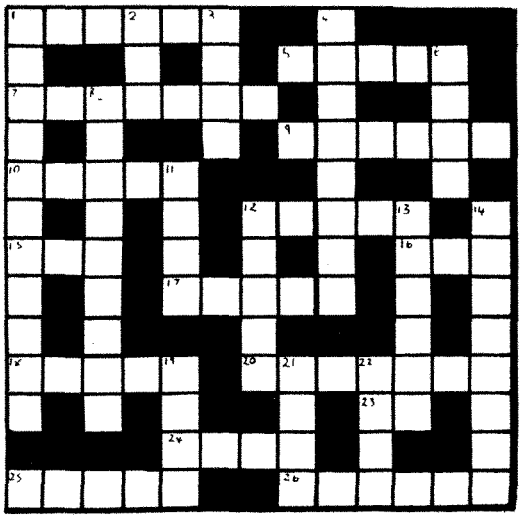
(At the book launching, campers had to nick their own copies because Polygon would not let them have any free.)

Weapons and Hope by Freeman Dyson. (Harper and Row, £10.95, 337pp)

The object of this book, Dyson says, is to explain the warriors to the victims, and vice versa. The warriors are the strategists and technicians, who live in a world of figures and abstractions; the victims are the rest of us, whose world is concrete and living. Dyson knows a good deal about the warriors' world. He's a physicist, a mathematician, and was once a defence consultant, and so he can explain things like non-nuclear defence systems (he's in favour of non-nuclear anti-ballistic missiles for instance) and can convey the excitement of the professional engaged in such work. On victims he is less coherent, more anecdotal, and really does not do them justice to the warriors. Warriors like to believe themselves cool and detached when they are irrational and hysterical and living in a fantasy world, and victims should be given credit for sense and intelligence as well as for having their hearts in the right place (after the Reagan election, in their boots.)

Dyson quotes extensively from poetry and prose to get over his whole view of the world. What he quotes is interesting, especially Herman Kahn's **On Thermonuclear War** which gives the ultimate black joke in deterrence - after five nukes over the USA, the whole world is blasted to pieces. So he's made a very readable, warm-hearted anthology, but when he's giving arguments against nuclear insanity, and ideas on lobotomising it, he's unsatisfactory.

R M Bell



X-Word

COMPILED BY GERBIL

ACROSS

1. This could be a Cafe if you've seen the film. (6)
5. BNFL call it a glass paperweight. (5)
7. A three pronged attack on Peace. (7)
9. There's 32 but not for long. (6)
10. 'X' marks the spot where they dump it. (5)
12. We're continually in their side. (5)
15. Led by a priest and a social worker. (abbrev.) (3)
16. Torness if it's not stopped. (abbrev.) (3)
17. Young campaigners. (5)
18. Not before 8. (5)
20. It won't produce any by-products?? (7)
23. Caesar and in French. (2)
24. Cumbrians in the centre of power. (4)
25. Madame measurement. (5)
26. Black on the back. (6)

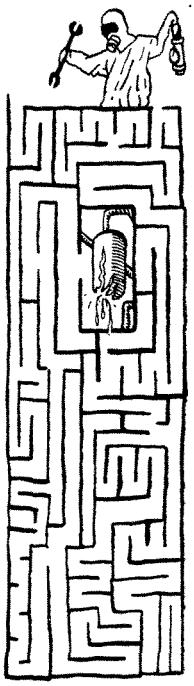
DOWN

1. It's not Uncle Solar. (4 + 7)
2. It's the initial insanity. (3)
3. Can you approve of Nukes? (4)
4. The end of the Clyde where the fish of death stay. (8)
6. Between North and South. (4)
8. To shed upon or into. (9)
11. A good use for radiation. (4)
12. Well hidden by the Nuclear Industry.
13. It means nothing. (6)
14. Number of guns. (8)
19. The arms that will destroy the humans. (4)
21. A ready battery. (4)
22. He was one and a contribution to the start of World War I. (4)

The Winner of this X-Word will get a nice Mystery Prize specially selected by SCRAM. 1st correct entry opened wins, so send yours NOW!!

MAZE.....

Help the nuclear safety expert find the leak before the nuke has a MELTDOWN!



Diary

December

1 Prisoners for Peace Day. Actions in support of imprisoned war resisters around the world. Contact:- War Resisters International, 55 Dawes Street, London SE17. Tel. 01 703 7189

2 Burtonwood USAF Base. Vigil outside base, 2-5 p.m. Contact:- Jem and Geoff, Warrington 33013

2 Alconbury USAF Base, 'Reclaim the Base' nonviolent action. Inc: decorating the fence, entering base and talking to soldiers etc.' We're not intimidated by conspiracy charges against the Alconbury 9.' Contact:- Action for future days - 021 643 4617. Peace Chariot. Barnsley 766310.

6 John Brown Memorial Lecture by Helen John, Greenham Campaigner. At Steps Theatre, Wellgate Centre, Dundee at 7.30 p.m. £1.

10 Demonstrations nationwide against Sea Launched Cruise missiles. Contact:- Jon Williams, END National Office or Alvin Barber 031 667 9550.

10 Namibia Women's Day. Contact:- 01 267 1941/2.

12 Discussion on Scottish Wildlife, conservation, pollution, the environment, in the Quill Bar, George IV Bridge, 7.30 p.m. All Friends of the Earth welcome. FOE 031 225 6906.

13 Stockbridge CND fundraising disco. Playhouse, below niteclub in Edinburgh. 9 p.m.

16 South Africa Heroes' Day.

20 NEED not GREED day. Actions on leafletting all over Edinburgh to remind people of exploitation, suffering and oppression throughout the world while everyone prepares for the Xmas money spinner. Where will you be today? Contact Little by Little, P.O. Box A, First of May, 43 Candlemaker Row, Edinburgh.

21-Jan 1 Midwinter gathering and celebration to mark the turning point for the struggle against Cruise at Molesworth Air Base, the site for 64 American missiles, for which construction starts next year. Stop it before it starts! Contact:- People's Peace Camp, outside Molesworth Air Base, Warren Lane, Fay Way, Clopton nr Kettering and Rainbow Village, Peace Corner, Old Weston Road, Brington nr Huntingdon.

January

1 Peace Camps Week. Week of action at military/nuclear installations.

15 History of Nuclear Energy Atomic Theory. What is radioactivity?

29 How Radiation affects us and the environment.

Teach-ins on Nuclear Power, Beckenham 01 650 1337

Over Xmas Period Vigils, carol singing, leafletting, meetings etc. Contact:- Peace and Justice Centre 031 556 0993

Every Thursday Collection for Miners 6-8 p.m. in Princes Street, Edinburgh. Cans can be uplifted at Trades Council office 5.30-6 p.m.

Every Saturday Food collection for the miners at Mound Pedestrian Precinct 10 a.m.-4 p.m. Also base for leafletting and donations.

Little Black Rabbit.

As the nights lengthen, Little Black Rabbit likes to put all four feet up and snuggle in her well-insulated burrow to peruse the post. Letters from the peace warren with news of the submersible stoat lair on the coast are her favourite. Anticipation is half the fun, but when an expected missive doesn't materialise LBR can get a little tetchy with the post pigeon.

Just the other day a registered letter from the peace warren sent to LBR's Edinburgh pad, containing a film of the stoat base, ended up returned to sender. Strangely the top was off the film. An attached note from the pigeon post bird said that LBR had not been at home when they attempted delivery. Now LBR is not an early riser, but usually when the pigeon post misses her, they leave a note and if this also fails they try again, dim but persistent. LBR can't remember seeing a note, and she has very good eyesight. Mulling it over in a favourite hostelry, LBR could only surmise that the pigeons had opened the film to look for another address, not appreciating the effect of light on the contents. As I said, dim. Another bunny who doesn't believe in Father Christmas suggested that perhaps the snooper eagle had ransacked the mail and opened the film looking for a tasty morsel. LBR has no truck with this cynical bunny, who also says the walls have ears. Though LBR's phone does make odd noises. Probably just eagles perching on their special branch.