

SAFE ENERGY

No.90

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**THORP –
still time to
stop it**

**The hundred
eyes of Argus**

**EC carbon
strategy
stifled**

**15 years on
– no time to
look back**

**Houses,
energy
and the
environment**

**Korean
proliferation
risk**

**15 years of SCRAM's journal
– a critical mass?**

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COMMENT

SOME may think that the nuclear industry and SCRAM have nothing in common. But we do. We are both hopelessly uneconomic.

At the end of this financial year SCRAM's bedraggled bank balance will show total reserves of £234, not even enough to cover one quarter's telephone bill. Unfortunately, unlike the nuclear industry we do not have access to the Government's autobank card. There is nothing hidden in our annual accounts, no fudging, just straightforward profit and loss – but without the profit.

As the nuclear debate accelerates towards the Government's Nuclear Review in 1994, towards the Nirex public inquiry and strains under the weight of British Nuclear Fuels' plans for two PWRs and the opening of the Thermal Oxide Reprocessing Plant; Nuclear Electric's plans for a twin-PWR; and Scottish Nuclear's plans for two of anything so long as they're nuclear, SCRAM's continued survival is more important than ever.

After 17 years of gathering and disseminating information, we play a vital role in what has become an information war.

HAVING scrapped the Department of Energy, the Government decided that their parliamentary scrutineers, the Energy Select Committee, should go too. The Tory-led Committee was often highly critical of Government policy – especially over the results of privatisation – and its demise looks like the messenger has been blamed for the message.

The Trade and Industry Select Committee, who inherit the energy brief, cannot hope to devote the time or acquire the knowledge which allowed their predecessors to be so effective.

While much of the energy industry is now in private hands, it remains a sector of vital importance to the nation as a whole. The public is entitled to see that the industry is properly regulated and efficiently run. The Energy Select Committee made a valuable contribution in bringing people to account. It will be deeply missed.

IT is a strange kind of logic which dictates that the answer to mounting stockpiles of plutonium is converting nuclear reactors to burn the stuff. This is exactly what the Japanese are now proposing.

The plan is to ship highly dangerous spent fuel halfway around the world to Sellafield for reprocessing. At Sellafield the fuel will be reprocessed at vast expense. Its volume will be increased by around 160 times. The local population will be subjected to radiation levels in breach of those recommended by the UK's National Radiological Protection Board. The Irish Sea will receive unacceptable discharges, to add to its already unacceptable radioactive burden. The Thermal Oxide Reprocessing Plant, built at vast expense for this very purpose, will become highly contaminated with radioactivity, making its decommissioning not only prohibitively expensive but extremely dangerous.

According to the logic, the products of the reprocessing, including plutonium, must then be sent back to Japan, the country of origin. It will once again be loaded onto a boat and travel halfway around the world, presenting a very tempting terrorist target.

Perhaps by comparison it seems idiotically naive to suggest that the first thing to do when you have too much of something is to stop making it.

SCRAM's *Safe Energy* journal is produced bi-monthly for the British Anti-nuclear and Safe Energy movements by the Scottish Campaign to Resist the Atomic Menace. Views expressed in articles appearing in this journal are not necessarily those of SCRAM.

scram, skram, v.
to shut-down a nuclear
reactor in an emergency.

CONTRIBUTIONS

We welcome contributions of articles, news, letters, graphics and photographs; which should be sent to SCRAM at the address below.

LETTERS

SCRAM reserves the right to edit letters to fit the available space. All letters for publication should be submitted by the news deadline below.

COPY DEADLINES

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ADVERTISING

Advertising rates are shown on page 26. Inserts can be mailed out with the journal – details on request.

BACK ISSUES

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SUBSCRIPTIONS

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FOR THE BLIND

The text of *Safe Energy* is now available on disk for people who are registered blind. This service is available at a charge of £3 above the appropriate subscription rate – this covers the cost of the disks and administration. Further information available on request.

PRODUCTION

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SAFE ENERGY

FEATURES

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Before British Nuclear Fuels can start operating their THORP reprocessing plant they require a new discharge authorisation. **Dr Patrick Green**, Friends of the Earth's radiation and rad waste campaigner, explains why the application should be refused.

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Named after the mythical Greek giant, the watcher with a hundred eyes, the Argus project has 20 radiation monitoring stations throughout Britain. **Dr Ross Couper** explains how the project operates.

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To achieve the improvements in energy efficiency necessary for environmental protection, a substantial tightening of the regulations will be needed, argues **Michael Harper**, Friends of the Earth's assistant energy campaigner.

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Renewed calls for an end to reprocessing at Sellafield and Cap de la Hague have followed the US announcement that they are to halt the production of weapons-grade plutonium and uranium. The Korean peninsula was highlighted by George Bush as an area of particular proliferation concern, **Shaun Burnie** and **Pete Roche** of Greenpeace take a look.

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Plus SCRAM's 1991/92 Annual Report

Power profit

BRTAIN'S state owned nuclear generating companies - Scottish Nuclear (SN) and Nuclear Electric (NE) - are gearing up for privatisation in the aftermath of the Government's 1994 nuclear review.

Both companies have published annual reports claiming they are on the verge of economic viability, even without the massive state handouts they both receive.

SN claim to have made their first profit ever. In the last financial year they show a £13.7 million profit compared to a loss of £32.5 million the previous year. However, little mention is made in their annual report of the £1.4 billion debt write-off received from the Government. Nor do the results take into account the £110 million in Government-underwritten provisions related to the closed Hunterston magnox reactor. SN have received £270 million from the Government so far for Magnox decommissioning.

SN make great play of the fact that they do "not enjoy the benefit" of a non-fossil fuel obligation (NFFO) like their counterpart south of the border. However, under the Government imposed contracts with

the two privatised electricity companies - ScottishPower and Hydro Electric - SN receive an average price of 3.62p per unit of electricity produced, "some 50% higher" than the average price paid to NE, according to NE's Financial Control Director, Stephen Ogle. These contracts will run for seven years longer than the NFFO.

Kerr MacGregor, the Scottish National Party's Energy Speaker, calculates that "Scottish electricity consumers are forced to pay a surcharge now approaching £100 per year for the average customer and almost twice the corresponding figure for England."

Privatisation

James Hann, SN's Chairman, said: "So far so good; but the company has a long way to go and many issues to resolve before we are satisfied with our financial performance." Cautiously heralding privatisation Hann commented: "I do believe that we are heading towards a position where under certain circumstances the company will be privatised."

He also issued a strong warning to the Government that a clear energy policy should be produced which was not solely based upon "market forces", calling for a "diverse and efficient mix of energy sources." He also claimed that because of

the long construction times new nuclear stations must be ordered by 1995 at the latest.

The UK's other nuclear generator, Nuclear Electric, also published their annual report in July. They made an operating profit of £482 million, an increase of 48% on last year's performance. However, after adjusting for the £1.26 billion subsidy they received from the NFFO that profit is soon translated into a loss of £700 million. NE are not dismayed by their financial status indeed they boast of their intention to become profitable, before taking into account the NFFO, by 1995.

NE's chairman, John Collier, believes that they will be able to bring the cost of nuclear generated electricity down from its current price of 3.9p a unit to below 2.8p by 1995. Collier attributes the company's increased 'profit' to an improvement in productivity particularly in the operation of NE's five AGRs whose output has increased by 22% since 1990, producing a total of 27.5TWh, some 13TWh short of their design output.

Further increases in productivity coupled with 3,000 job cuts will allow the company to reduce its operating costs by £400 million says Dr Bob Hawley, NE's recently appointed chief executive. □

G7 discuss reactor safety

LEADERS of the world's most powerful economies, the so-called G7 group of nations, failed to deal adequately with the problem of Eastern Europe's nuclear reactors when they met in Munich at the beginning of July.

While European leaders wanted a central fund to coordinate safety checks it is believed that both the US and Japan threw their weight behind bilateral agreements between individual countries. The result was a com-

promise, relying on bilateral agreements with a "supplementary" fund to fill any gaps.

The agreement has been greeted as a vote of no confidence in the terminally under-resourced International Atomic Energy Agency (IAEA) who have been given no role in administering the supplementary fund. Instead the fund will be run by the European Bank for Reconstruction and Development (EBRD) and the OECD.

David Kydd of the IAEA criticised the move arguing that the EBRD has no experience in nuclear issues. He believes "we need a clearing house to

make sure no plants are left out and to prevent duplication. The Russians have got so many visiting experts that they can't get anything done."

However, besides applying first aid to the ailing reactors the G7's main priority is to examine ways in which to replace them with alternative energy sources and energy efficiency. According to European Commission officials this could well explain why the IAEA has been frozen out. The IAEA's main purpose is to promote the use of nuclear power and it is not trusted to give fair consideration to other energy alternatives. □

EC energy budgets

A new 6 year deal costing over £500 million has been signed by the European Community (EC), the US, Japan and Russia to enter the second phase of an international effort to prove the viability of nuclear fusion as a power source.

The deal will involve the pooling of information and is intended to develop a test facility which would demonstrate the technical and scientific viability of fusion energy.

Engineering research and development work will be split among three sites: San Diego for integration work, Garching in Bavaria for in-vessel com-

ponents and Naka, Japan for out-of-vessel components.

US Energy Secretary, James Watkins, described the deal as "a milestone in the development of a safe, environmentally sound energy source for the next century." However, even if the feasibility study yields favourable results the timetable set for the international collaboration would not lead to the construction of a demonstration reactor until 2025, at an estimated cost of £2.5 billion. It would take at least another 15 years to construct a commercial plant.

■ Meanwhile, the EC is asking member states to significantly increase their contribution towards the Community research and development (R&D) budget.

Setting out its proposals for the next

five-year "framework programme", the EC is calling for a 28% increase in funding to Ecu7.3 billion.

If the 12 member states approve Brussels' request then expenditure on non-nuclear research (energy efficiency, renewables and biomass) will increase by 115% to Ecu337 million, while nuclear safety will receive a further 30%, bringing it up to Ecu259 million and nuclear fusion funding will jump 37% to Ecu 458 million.

EC Commissioner for Research Policy, Filippo Pandolfi, believes, "the next two years will be crucial for technological R&D in the Community. Without the necessary financial means, we cannot lay the foundations for competition in the international economy." □

Nirex postponement

NIREX look set to take another step backwards in their campaign to find a site to host a deep dump for the UK's low- and intermediate-level waste. It is widely believed that the company will shortly announce a second postponement in applying for planning permission for the repository.

They are now considering applying for permission to build a small rock laboratory at depth to explore the complex geology and movement of ground water at the Sellafield site. Only after analysing the results of such a project would Nirex decide whether to proceed with a full application to excavate the repository.

According to a report in the *Independent*, sources close to Nirex believe: "Most people see this as a necessary and realistic way forward."

An announcement is not expected until the end of October, because Nirex will have to consult with local authorities, government and the Radioactive Waste Management Advisory Committee. "One would not make a firm decision to go any

way until consultations and discussions have been completed because we don't want to bounce anyone into anything," says the *Independent's* source.

Originally Nirex envisaged only one inquiry being held into the plan, at which a full safety case would not be presented. Now, however, three inquiries are being discussed. The first for the rock laboratory would be non-nuclear. The second would discuss plans for the repository. Only after the construction of the repository will Nirex be in a position to make a full safety case, at that time a third inquiry could be held.

In July, at a parliamentary briefing held to mark the tenth anniversary of Nirex's formation, their managing director, Michael Folger, rebutted suggestions that Sellafield is Nirex's "preferred" site. Sellafield, he said, is "the site at which we have announced we are concentrating further geological investigations. Compared to the other site we're evaluating at this stage the distinguishing factor is that the bulk of the wastes arise at Sellafield, and in terms of transport and its costs Sellafield is preferred in that sense." □

IAE warn France

FRANCE is too dependent on nuclear power, and should increase its low electricity prices to be more in line with production costs warns the International Energy Agency (IEA) first report on the country.

In the report to mark France's entry to the organisation - an influential advisory and coordination committee which groups most members of the OECD - the IEA says the country should diversify away from nuclear power which accounts for 75-80% of electricity and 37% of total energy use.

This says the IEA is at the upper limit of acceptability. It suggests the government consider "clean and efficient gas and coal technology, co-generation, independent production and, in some areas, renewable energy sources."

The Agency also expresses its concern over France's massive nuclear electricity exports, which it argues is not a "solid policy" for importing countries. Britain was France's largest customer for nuclear electricity last year. □

German threat to THORP

PROPOSED changes in Germany's Federal Atomic Act could kill-off British Nuclear Fuel's (BNFL) Thermal Oxide Reprocessing Plant (THORP) at Sellafield.

However, much depends on whether the German Parliament can approve the changes before BNFL radioactively contaminate the new plant due to open early next year.

To meet their licensing requirements German utilities must reprocess their spent fuel. Under the proposed changes German power utilities will, for the first time, be allowed the option of direct disposal of their spent nuclear fuel. The revised Act has been approved by the cabinet and will now be debated in the German parliament.

In June, the SPD-led Upper House called for an end to reprocessing of German spent fuel in Britain and France and recycling of recovered plutonium in German reactors. The non-reprocessing option has also been requested by utility managers. A recent report by one of the 'Big Three' utilities, RWE-Energie, estimated that if nuclear power station operators could switch immediately to end storage of spent fuel they could save around DM6bn by 2005.

If a formal ban on reprocessing were to be agreed, reprocessing contracts for the second decade of operation at THORP (2003-2013) concluded in 1990, and worth £800m, would be nullified and, under force majeure clauses, at no expense to German industry. But under the Atomic Act revision currently proposed,



because it gives utilities the option of reprocessing or direct disposal, any utilities pulling out of reprocessing contracts would have to pay compensation to the reprocessors. The amount of compensation would not be very large, since the plant's capital costs have already been paid for, provided the plant has not already been contaminated, in which case they would have to pay a share of the high decommissioning costs. BNFL estimate that THORP's decommissioning bill will be around £460 million, but experience suggests that this figure will escalate.

The recent agreement with Nuclear Electric, based on fixed prices, was only made possible because of the price stability provided by the Germans. If the German utilities pull out of these contracts it is most unlikely that BNFL will find substitute customers. Reprocessing can only survive if the costs are spread between many customers, so it is extremely likely that without the German contracts for the second decade, THORP would have to close after operating for only 10 years. □

Dry store inquiry

AS expected a public inquiry is to be held into Scottish Nuclear's plans to build a dry store for spent fuel at Torness, near Dunbar (*Safe Energy* 89).

Announcing the inquiry, which is expected to be held in Dunbar later this year, Scottish Secretary Ian Lang said it would be chaired by Richard Hickman, deputy chief reporter.

Local MP John Home Robertson welcomed the fact that Lang had accepted the case for the inquiry. However, Home Robertson is concerned that the plan from a temporary dry store "could turn out to be permanent." Adding "I want the inquiry to establish what long-term measures should be taken for the permanent storage of this material."

Home Robertson is also "instinctively suspicious of anything nuclear. There are technical questions such as the corrosive effect of water on the Torness fuel elements and the risk of fuel elements being damaged if a tube is dropped."

Scottish Nuclear for their part have also welcomed the Scottish Secretary's decision. They stress that they "have absolutely no intention of leaving the fuel in the store indefinitely, although where it will go after a certain length of time is still not clear."

"We are anticipating that at some point in the future the government will be able to sort out its ideas on a national repository, or failing that we could decide to send it for reprocessing. That is what we are doing at the moment but we are paying through the nose for it." □

Missing U

AEA Technology and the UK Government "deliberately misled the public, and MPs, by laying false trails and encouraging the media to follow them" over Dounreay's loss of Uranium-235 last December, according to the Northern European Nuclear Information Group (NENIG).

While Dounreay management expressed surprise over the loss of 10kg of U-235 which they uncovered during routine stock taking in December last year, a European Community investigation reveals that they had been experiencing serious problems with the uranium recovery plant for at least a year.

Indeed, following a routine stock take in March 1991 Euratom safeguards inspectors "drew the attention of UKAEA Dounreay to shortcomings in the accountancy system and in particular unrecorded transfers." A report produced for the Eu-

ropean Parliament by the MEP for Northumbria, Gordon Adam, comments: "there had been on-going contracts between Euratom and Dounreay, and it became clear that procedures needed to be improved."

Because of this concern, in August 1991 Dounreay carried out modifications to the plant, which the management categorised as being too minor to bother notifying the Nuclear Installations Inspectorate. Despite this, according to the European Commission, "unrecorded transfers continued and were notified to the operator by Euratom safeguards inspectors who also drew the operator's attention to deficiencies in the records system." Adam added that Dounreay's "more commercially-based approach, reflecting the move towards privatisation" subjected the management to "commercial" and other pressures which added to the problem.

The management also tried to undermine the significance of the loss by arguing that 10kg is a small amount in comparison with the several tonnes of fuel

rods run through the uranium recovery plant between April and November of 1991. However, the European Parliament was informed that the throughput was a mere 135kg of U-235.

NENIG's report reveals a number of other deficiencies in Dounreay's operation which were highlighted by the European Parliament, including: disregard for safety allowing the plant to operate despite its faults; inadequate records of nuclear material; inadequate training for staff; the need to improve site licensing procedures; and inadequate monitoring of discharges into the sea.

Clearly the nuclear industry's much vaunted openness is no more than a publicity stunt, part of a desperate bid to persuade a disenchanted public that the industry which has run riot with public funds for the last 40 years can suddenly be trusted to operate in our best interest. A position highlighted by the Government's failure to make public the results of the UK's investigation into the loss. □

Fast breeder closure

Anuclear industry plan to keep the Dounreay Prototype Fast Breeder Reactor (PFR) open beyond the Government's 1994 cut-off date has been rejected by the Energy Minister, Tim Eggar.

The Nuclear Utilities Chairmen's Group, compromising the heads of Nuclear Electric, the Atomic Energy Authority, British Nuclear Fuels and Scottish Nuclear, wanted to use its own budget to continue operating PFR until 1997.

The Group claimed the reactor was needed to carry out work on instrumentation, core layout, fuel design and reliability of equipment for a future generation of fast breeders. They had hoped the work would culminate in the

commissioning of the first European fast reactor (EFR) early next century.

However, Eggar said: "I should like to pay tribute to the high quality of work that has been carried out on the PFR over many years. But in the present circumstances I cannot justify additional expenditure to keep the PFR open until 1997." Over the last 40 years the PFR has cost some £4 billion.

Colin Gregory, director of the fast reactor research programme at Dounreay, says that the date for an EFR has been considerably delayed by the decision: "We will have to build in more conservatism to the design, it will be harder to make the safety arguments and we won't be so certain on reliability."

The PFR has been shut down for over a year for repairs. Fuel received from the ill-fated German SIR-300 fast reactor, which was being stored at Dounreay

pending the Governments decision, will now have to be returned.

At the same time the French have closed their fast reactor, Super Phenix, following a shutdown of over 2 years. The plant has been plagued by design faults says the French Direction de la Surete des Installations Nucleaires (DSIN - Commission of Safety of Nuclear Installations). In their report they highlight the most serious failures suffered at Super Phenix: the discovery of tubing leaks in 1987, the entry of air into the reactor in 1990, and the collapse of the machine room roof in 1990 due to snow load.

All of these according to DSIN "have statistical significance for the future". They are due, say DSIN, "to difficult technical problems that have been insufficiently mastered, or failures in design ... it must be considered that the probability of new failures appearing is significant." □

Dounreay reprocessing

WITH the closure of the FBR, Dounreay must now turn their attention to fuel services and decommissioning. AEA Technology, the station's operators, have delivered an ultimatum to the world's research reactors saying that unless significant contractual interest is demonstrated by November the current batch of contracts will be the last.

In November, says David Thom, AEA Fuel Services product manager, the company will review the situation, if they have enough contracts coming in for reprocessing the plant will be kept open: "If not, it will close down. This will be a purely commercial decision."

Research reactor fuel in the West is accumulating in fuel storage ponds, cur-

rent estimates are that only about 4-500 elements are being added each year. However, taking the two together Dounreay believe there is potential Western reprocessing market for up to 1,200 elements annually for the next five to six years. Dounreay has a nominal capacity of around 1,000 elements a year.

"It would be nice if research reactor operators could get together and agree to support our reprocessing facility," says Thom, "but life isn't like that. The German research reactor operators are well organised, but they alone couldn't sustain the plant's operation."

Thom had hoped to be able to include the Iraqi spent research reactor spent fuel with the latest contracts, however that will now not be possible. While the consortium of French and British companies had submitted bids to the International Atomic Energy Authority to carry out the

work, they have been rejected, mainly because of difficulties over the return of the waste.

Dounreay are also examining the possibility of extending their mixed-oxide spent fuel reprocessing operation. While the Government has announced that it will not fund the plant - which was built to reprocess spent fuel from the FBR - beyond 1997, the company hopes to secure enough contracts to keep it going beyond 2000.

Dounreay have signed a number of deals for the mixed-oxide reprocessing plant in recent months. One with ENEA of Italy could lead to a multi-million pound deal involving the reprocessing of Light Water Reactor fuel pins. Another recent contract involves reprocessing some plutonium which has already been transported to Dounreay by Helicopter from Schneller-Brueter Kernkraftwerksgesellschaft mbH. □

Chapelcross study

BBRITISH Nuclear Fuels (BNFL) have been granted planning permission to sink test bores in the Forest of Ae as part of their £30 million feasibility study into building a PWR at Chapelcross in Dumfriesshire.

Dumfries and Galloway's planning Committee have agreed to ten test boreholes to be sunk to a depth of 80m and the excavation of 38 trial pits to a depth of five meters. The tests are necessary say BNFL to investigate the feasibility of building a reservoir within the Forest of Ae valley, to provide water for the station.

The company say no decision on whether to proceed with a new reactor

at either or both of Chapelcross and Calder Hall, at Sellafield, will be taken until 1994.

Meanwhile they "categorically" stated that "the new reactors we are considering for Chapelcross or for Sellafield or for both are to be commercial producers of electricity and they are not intended to produce any military products."

Chapelcross is the only source of Tritium which is vital in the UK's nuclear weapons programme. As Tritium has a half life of around 13 years it must be continually replaced in nuclear warheads. Chapelcross site superintendent, Peter Jenkins, said: "If the MoD asked us to design and build a plant to produce tritium then we would give that due consideration." □

Sizewell safety costs

NUCLEAR Electric (NE) have been asked to examine the possibility of extending the Sizewell B back-up safety system so it could carry out the same function as the much criticised computer controlled primary safety system.

Concern is mounting over the plant's primary system as computer software developed to control it has become so large that computer experts say it is impossible to prove that it will work in the event of an accident.

NE contend that the back-up system is already designed according to the same principles as those used at existing stations.

If the back-up has to be extended then the costs could well be considerable. A price increase NE can barely afford as the plant's costs have already jumped by over £300 million to £2 billion.

Extending the system could also delay the project by up to nine months. Any further price increase or delay would seriously jeopardise the industry's chances of coming through the Government's 1994 review intact. □

Magnox extension

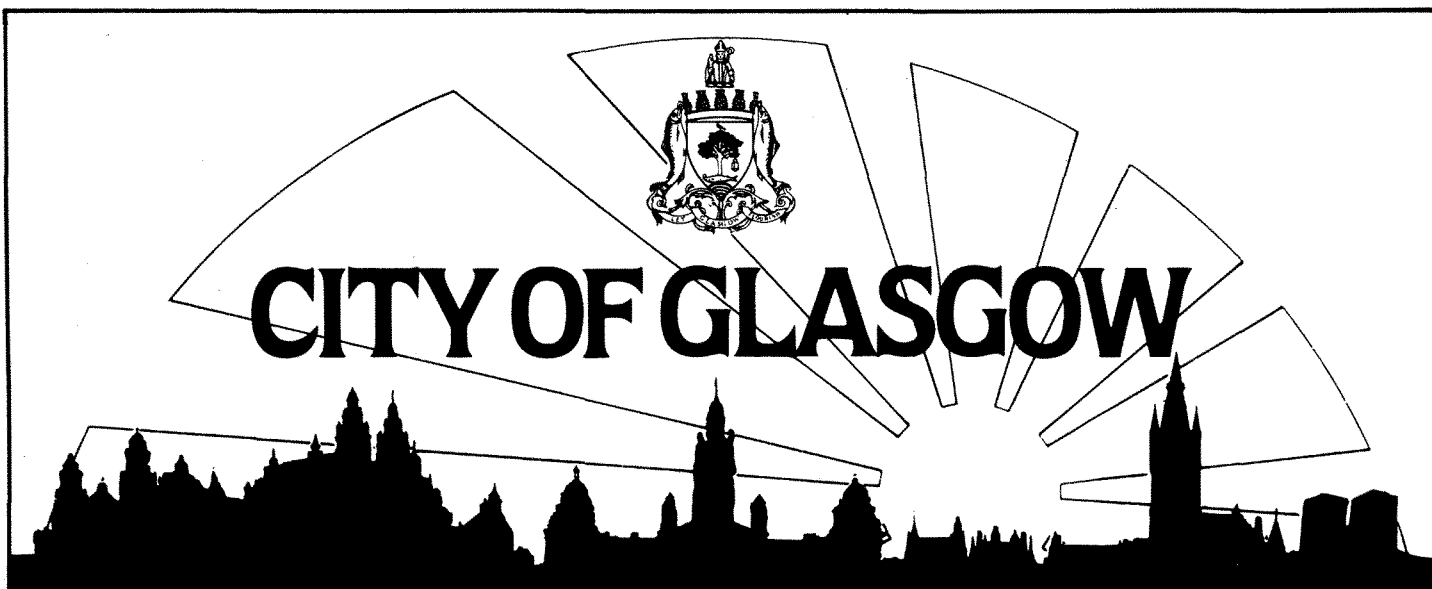
BRADWELL Magnox reactor 2 has been allowed to operate for a further two years by the Nuclear Installations Inspectorate (NII), until its next biennial inspection.

Nuclear Electric (NE), the plant's operators, had presented a case for the 30-year-old reactor continuing to operate for a further 10 years. However, they hope to keep it open until 1998 when they say its

economic life will have come to an end.

The move has been condemned by environmentalists who point out that radioactive emissions from the plant mean that the local population are subjected to doses higher than that recommended by the National Radiological Protection Board's new guidelines. NE have dismissed the criticisms, adding that they intend to reduce the emissions.

The company have another six Magnoxes, all of which they hope to keep operating beyond the 30-year mark. □



CONGRATULATES S.C.R.A.M.

ON FIFTEEN YEARS OF ITS MAGAZINE AND SUPPORTS ITS WORK ON ANTI-NUCLEAR ISSUES

The City of Glasgow declared itself a Nuclear Free Zone in May 1981 and has been at the forefront of campaigning locally, nationally and internationally against nuclear based defence systems and the use of nuclear power in the generation of electricity. The council has during that period chaired Nuclear Free Zones Scotland, co-hosted the successful 5th International Conference of Nuclear Free Zone Local Authorities, supported local peace groups, protested against the planned expansion of Dounreay and this year unveiled a Peace Garden near the city centre.

Much of this activity has been actively assisted by S.C.R.A.M. and that help is gratefully acknowledged.

By the end of this year, British Nuclear Fuels hopes to have been granted a new discharge authorisation that will enable the Thermal Oxide Reprocessing Plant to start operation. There remains one last chance to stop it, writes Dr PATRICK GREEN, Friends of the Earth's radiation & rad waste campaigner.

THORP – still time to stop it

B RITISH Nuclear Fuels (BNFL) applied for a revised site discharge authorisation in April this year. It will apply to all discharges from existing Magnox reprocessing, and from new plants such as EARP (The Enhanced Actinide Removal Plant) and THORP (Thermal Oxide Reprocessing Plant). BNFL's application will be considered by Her Majesty's Inspectorate of Pollution (HMIP) and the Ministry of Agriculture, Fisheries and Food (MAFF).

As part of the reauthorisation process BNFL has to demonstrate that it has complied with the Government's policy on radioactive waste management. The cornerstone of this policy is that any practice producing radioactive waste must be justified. This means that "the need for the practice must be established in terms of its overall benefit".

BNFL's justification for THORP assumes that there is value in the plutonium and uranium separated from the spent nuclear fuel and that reprocessing makes radioactive waste easier to handle. Neither claim is true.

Plutonium's purported economic value is based on its potential as Fast Breeder Reactor (FBR) fuel. Unfortunately for BNFL, there is no commercial fast breeder in the UK and the Government has now confirmed that the Dounreay FBR will close after 1994. Without a FBR, plutonium has no value or use apart from making nuclear weapons. Indeed, the argument that plutonium is a valuable product is challenged by others within the nuclear industry. John Collier, chairman of Nuclear Electric, has suggested that the fast breeder reactor should be modified to destroy plutonium. The Japanese, one of BNFL's main customers, are also considering modifying their fast breeder at Monju into a fast burner reactor.

However, BNFL also claims that plutonium has some value because it can be used in mixed oxide fuel (MOX) for PWRs. This claim is highly dubious given the enormous costs of reprocessing. Even if these costs are ignored, MOX fuel is much more expensive to make than normal uranium fuel and, for safety reasons, it

is only possible to use one third MOX fuel in a reactor. MOX fuel is also more expensive to manage after use than ordinary uranium fuel. It cannot be used in any of the UK's existing reactors apart from the Dounreay FBR.

Consequently, far from being an asset, plutonium is a liability. Even Christopher Harding, outgoing chairman of British Nuclear Fuels, has stated that there is "no justification for reprocessing if one's sole objective is to extract plutonium".

BNFL has also acknowledged that most of its customers regard the "recycled" uranium from reprocessing "as free issue of nil value".

BNFL also present reprocessing as a waste management technique that puts the waste in better form for storage and disposal. If this were the case, the economic costs of reprocessing might be worth paying but it is not. The Royal Commission on Environmental Pollution advised the Government in 1976 that "many of the most troublesome problems of radioactive waste management arise as a result of the reprocessing operation."

Waste

Sellafield is responsible for producing 50% of the UK's radioactive waste. Apart from considerably increasing the volume of waste that has to be managed, the waste stream from reprocessing is significantly more difficult to handle than intact spent fuel. The most hazardous product of reprocessing is liquid high-level waste that has to be returned to a solid form to make it more manageable. This vitrification process has only just started. High-level waste is currently stored in liquid form on the Sellafield site. The Nuclear Installations Inspectorate has commented that: "So long as waste remains in liquid form and therefore dispersible, it presents a hazard to those who work there, and potentially to the public or the environment".

RWMAC, the Government's main advisers on waste management, have also advised that "there are no compelling waste management reasons to reprocess oxide fuel early, or later, or at all."

If there is no value in the plutonium and no waste management advantage for reprocessing then why continue reprocessing? Reprocessing is an unnecessary practice. BNFL do not dispute this. Alan Johnson, chairman of BNFL's Reprocessing and Reactor Group, stated in November 1989; "Reprocessing is not necessary. In fact, one or two of our important customers would love to cancel their contracts. At the drop of a hat they'd cancel their contracts."

Reprocessing is not justified. Consequently, any level of additional radiation exposure from future discharges cannot be considered acceptable. HMIP should refuse to grant a new authorisation for the site.

Dose limit

Yet, even if the lack of justification is ignored it is clear that BNFL is going to have a difficult time in complying with the radiological requirements of Government policy. This states that radioactive discharges must not result in members of the public receiving a radiation dose above the legal limit. Secondly, BNFL must prove that, within those limits, any exposure is 'as low as reasonably achievable'.

Radioactive discharges are regulated by estimating the radiation dose received by the "critical group". This is the group of people who, because of their habits, are thought to receive the highest exposure.

Critical group dose estimates are based on measurements of contamination in the environment and on surveys of their habits in relation to this contamination. The actual dose received will vary depending on factors such as differences in their age, sex, size, metabolism and in their individual habits.

The critical group for liquid discharges is currently taken to be fish and shellfish consumers in the Sellafield area. It is assumed that there is a separate critical group for gaseous discharges.

The assessment of critical group exposures is not a precise science. The dose estimates only represent the average exposure received by the group. They do not represent actual doses received by any particular individual. Indeed, dose estimates from

BNFL, MAFF and the UKAEA for the local fishing community have differed by as much as 200 micro-sieverts (μSv) for some years, even when identical consumption rates and gut uptake factors are used (this is the estimate of how much of an ingested radionuclide, like plutonium, is absorbed across the human gut into the blood stream).

BNFL's application details the maximum doses that it believes will result from liquid discharges at the proposed authorised limit. It estimates that the critical group of fish consumers will receive a dose of $293\mu\text{Sv}$ ($386\mu\text{Sv}$ if the dose is calculated using the latest ICRP recommendations). BNFL point out that this is "considerably less" than the legal limit or the $500\mu\text{Sv}$ target "currently advised by NRPB".

BNFL does not mention the NRPB's new tolerable maximum of 300mSv in connection with its dose estimates. Instead it claims that the risk produced by this dose will be insignificant compared to background radiation. Background radiation is irrelevant. NRPB has said on more than one occasion that the existence of a background radiation dose does not justify the imposition of an artificial risk.

Critical group

However, BNFL claim that "discharges will be much lower" than allowed under the proposed authorised limits. This is not true. BNFL plan to discharge at around 75% of the proposed authorised limit. In this case, according to BNFL, doses would be around $177\mu\text{Sv}$ ($193\mu\text{Sv}$ using ICRP 60). The plan to discharge at 75% of the authorised limits must raise questions about whether the discharges are ALARA (as low as reasonably achievable).

The actual doses could also be higher than BNFL claims. They are dependent on the habits of the critical group and are calculated assuming that a an average member of the group annually consumes 36.5kg of fish, 6kg of crustaceans and 8.3kg of molluscs. These consumption rates are considerably lower than observed in the past. This particularly applies to molluscs. The consumption of this food fell by a factor of three following the 1983 beach contamination incident. If consumption rates rise again this will result in bigger doses. BNFL's application does not allow for this.

Furthermore, the dose estimates are only averages, not the dose received by the most exposed person. This means that some members of the group will receive higher doses than calculated by BNFL.

On top of this, the additional dose from gaseous discharges has to be considered. BNFL's application suggests that the maximum dose from gaseous discharges will be around $130\mu\text{Sv}$, but claims that the local fishing community will only receive $19\mu\text{Sv}$.

BNFL's application also fails to take into account the legacy of existing reprocessing. Over the past 40 years a total of $1,348\text{TBq}$ of alpha and $115,410\text{TBq}$ of beta emitters have been discharged into the environment. Extensive contamination has resulted. NRPB has stated that existing contamination must be taken into account "in setting an authorisation for discharge".

Contamination from Sellafield's historical discharges currently accounts for around 80% of the dose received by the critical group in any year. The proposed discharges will simply add to this dose. If the dose from preexisting environmental contamination is included, BNFL will have a very hard time complying with the dose limits.

For instance, MAFF have calculated that the local critical group received a dose of $160\mu\text{Sv}$ in 1990 ($110\mu\text{Sv}$ using ICRP 60). This dose is based on a gut uptake factor for plutonium and americium that is five times lower than recommended by the ICRP. If the ICRP's recommendations are followed the dose could be as high as $606\mu\text{Sv}$ ($367\mu\text{Sv}$). As explained, this estimate represents the average dose for the critical group. Some individuals would get a dose above this.

Intolerable

Of this, approximately 80%, ie $486\mu\text{Sv}$ ($294\mu\text{Sv}$), will be due to existing environmental contamination. Future discharges from the site will result in a dose in addition to this. Consequently, a total dose of around $779\mu\text{Sv}$ ($680\mu\text{Sv}$) could be received by an average member of the critical group. This will produce a risk of more than twice the NRPB's tolerable maximum. The dose is also very near the dose limit and leaves BNFL with very little room for manoeuvre.

Furthermore, the dose from existing environmental contamination would also increase if the local critical group were to increase its consumption of fish and shell fish. For instance, if the amount consumed increased to the levels observed amongst people obtaining fish from the Cumbrian commercial fisheries, the critical group would get a dose of between $340\mu\text{Sv}$ ($233\mu\text{Sv}$) and $1,340\mu\text{Sv}$ ($810\mu\text{Sv}$) depending on whether MAFF's or the ICRP's gut uptake factor is used. Future discharges would add to this dose.

Both MAFF and BNFL have stated that the dose from existing contamination

cannot be expected to fall significantly, despite the lower discharges in recent years. In fact, it is possible that the dose could go up due to remobilisation of seabed sediments.

Existing environmental contamination could also give rise to a dose above the legal limit before any additional dose from future discharges is considered. It should also be remembered that each year's discharge will become next year's existing contamination. On this basis, it can be seen why MAFF are arguing that the dose limit does not apply to doses from existing contamination.

Consequently, BNFL's calculations should be treated with considerable scepticism. Even if the figures are accepted, BNFL's projected doses will result in a risk that cannot be considered tolerable under NRPB criteria. Inclusion of the likely dose from preexisting environmental contamination could result in members of the critical group receiving a dose that either approaches or exceeds the legal limit. This should also be sufficient grounds for HMIP to refuse BNFL's application.

Act now

Before the new authorisation is granted, HMIP has to issue its proposals for an eight week period of public consultation. In the past, this has been little more than a rubber stamping exercise for the activities of the nuclear industry. This time, however, the outcome could be significantly different. If there is a large public response to the consultation exercise HMIP may have little choice but to refer BNFL's application to a public hearing/inquiry. Such a public hearing has never been held before. It could result in the application being refused or significantly amended. Whether this happens or not is dependent on you. Everyone has a right to respond to this consultation exercise and must respond. HMIP must be firmly told that there is no justification for reprocessing.

This is the last chance to stop THORP and the expansion of BNFL's reprocessing activities. The time to act is now. The consultation is expected to start in mid-September and will last two months. All comments must be sent to: HMIP Northern Division, Mitre House, Church Street, Lancaster LA1 1BG. □

Note:

Dose figures calculated using ICRP 26 methodology, ICRP 60 figures in brackets.

References:

"British Nuclear Fools - The Case Against Reprocessing" FoE, April 1992.

"Sellafield's Contaminated Legacy" FoE, September 1992.

The Argus project, conceived in the wake of the Chernobyl accident has established radiation monitoring stations up and down Britain. Dr ROSS COUPER* explains the running of the project, which derives its name from the mythical Greek giant – the watcher with a hundred eyes.

The hundred eyes of Argus

THE Argus project has established 20 monitoring stations throughout Great Britain (see map) which are, at this moment, continuously recording background radiation levels. The data produced, by these outstations, is available on an open access database at no charge to the user.

Following the Chernobyl accident, on April 26 1986, it became clear the British Government was not only ill prepared for a nuclear accident but in addition was addicted to secrecy.

In Gateshead, a group of people came together to try to provide up-to-date, accurate, and open information on radiation in the environment. This group originated the Argus Project. The Druridge Bay Campaign showed the way forward with their manual measurements of the accident, but continuity was a problem for them; it is extremely difficult to find dedicated people to carry out accurate manual measurements. The Argus Project adopted five guiding principles: the equipment should be as low a cost as possible; it should be as accurate as possible; it would be automatic; data collected should be openly available; and there would be no profit disposal from the systems and equipment produced.

Graham Denman, who has co-ordinated the project throughout, floated the idea at the 1986 Standing Conference on Radiation & Health, provoking a favourable response and considerable interest.

After much work and design, the first system was based on a BBC computer. (A much modified version of this is still operating as a safety system in a hospital radiation unit.) System testing established that a custom designed data logger was essential. This was designed from scratch, in a relatively short time, and a working prototype was demonstrated at the 1988 Stirling Conference (on Radiation and Health). Shortly after, in August, the first outstation started operation, although initially not as part of the network, as the database systems were under test. By the end of February 1989 this station was fully operational along with a second, both contributing to the database.

In May 1989 Reading Council started operating an Argus outstation. They are part of the Southern England Radiation Monitoring Group (SERMG) of councils and this proved to be the first of many outstations to be operated by councils in SERMG. With the success of this outstation the future of the growing network was assured.

Over the 6 years that the project has been operating about 20 people have voluntarily contributed time, effort and some money to the project. This has been a co-operative effort with various people designing, building and testing electronic hardware and software, whilst others have been involved with the legal and administrative parts of the system. Testing has been rigorous. It has to be, failure in any part of the system would be catastrophic and a large amount of time would be required to solve the problem, and worse the credibility of the system would have been seriously damaged.

What has Argus done?

Around the country are 20 Argus outstations taking measurements every 10 minutes. Each time an outstation contacts the database its clock is compared to the data base's master clock which is set using radio signals from an international standard atomic clock in Germany.

Each outstation operator has joined the network and in return for contributing to the open access database they receive a discount on the cost of the equipment. Each outstation sends data to the Argus Database on a daily basis. All the operators of the stations have access to all the data. In addition a summary of the data is publicly available.

This type of data handling network, where a number of remote units collect data which is then transferred to a central database, is quite common. Supermarkets use it for stock control, water authorities have automatic level measurement in reservoirs. But in these systems the central database has all the data gathering functions, they must be carefully designed and have limited expansion capabilities. By allowing the outstation to hold most of the intelligence of the network, Argus has ensured that the network is easily and

cheaply expandable. The database/data receiving end is kept simple and the system to handle data transmission expands as outstations are added.

At this moment 19 of the 20 outstations are collecting background radiation data only. The radiation sensor (gamma only) is a relatively simple sensor requiring only a stable power supply and an MC71 Geiger-Muller tube which must be protected from any trace of moisture. To provide flexibility the Argus sensing head, including the high voltage power supply and the geiger tube, can be sited up to 300m from the data logger.

The logger is designed to collect and securely hold data until it is automatically sent to the database, normally in the early hours of the morning to make use of the cheap rate phone calls. Only data not already sent is transmitted. If the unit fails to get through then another attempt is made the same day, then it will try the next day. Each outstation can hold up to 50 days' data.

The outstation will print the collected data using any dot matrix printer or transfer the data to a computer. To use the remote data transfer capability the outstation can be programmed to answer the phone at particular times of the day. It also has an emergency capability; if the emergency action level is set, readings exceeding this level will cause the outstation to ring a predetermined number and send (in printable format, ASCII) the reading causing the alarm and the outstation identity. The SERM Group has this capability in use on their outstations.

Argus has developed standards; for collection of data by using precision, highly stable instrumentation; and for data transfer by efficient data structures which include all the information required to ascertain the source of that data. If data is to be used it must be accurate, it also must be easy to use.

An automatic system produces masses of data. It is no real use on paper because of the quantity of data, it must be computer readable. It has to be efficiently packaged, to facilitate data transmission over the phone and storage on disc. Argus has established

what it believes to be a relatively simple but effective standard. Each separate computer file contains a month's data from a single sensing head at a single location, the file has a header - 128 bytes at the start of the file - which contains information defining the data within. This header includes; the sensor position in latitude, longitude and height above sea level; outstation number; sensor type, collection method and recording interval; the time of the first reading in the file; the range of the data collected and the units and exponent which the data refers to; and other information designed to make computer reading of the file as easy as possible.

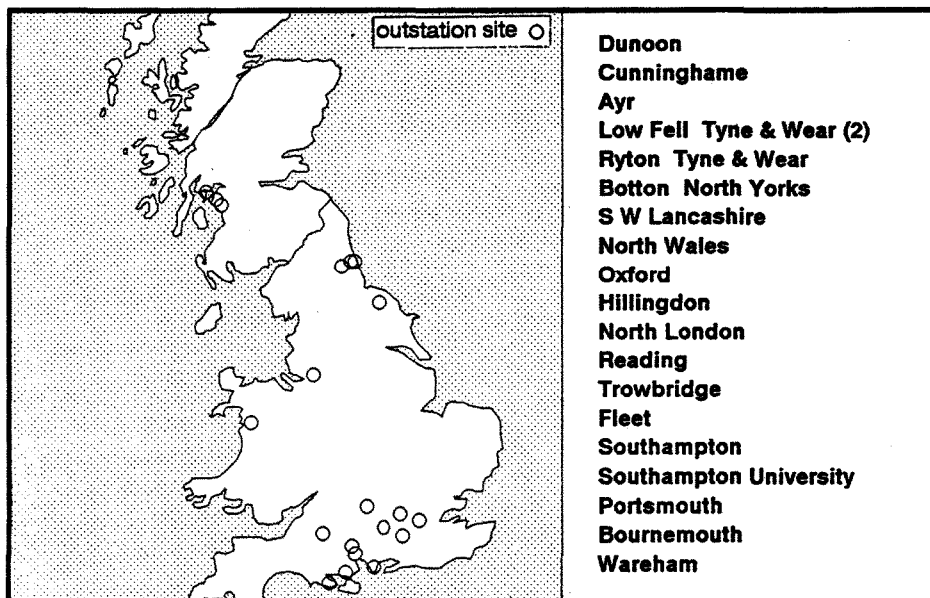
Argus would like this format to be widely used. The Argus Environmental Trust has been established to maintain an archive of all the raw data collected and to operate an open access database. The Argus Trust holds the data and facilitates its distribution but does not make comment on that data.

It is essential to keep all the data, to enable historical analysis. Because of the methods adopted by Argus there is no technical problem in keeping all the collected data, even if, in the future, the network expands enormously and incorporates dozens of sensors at each outstation.

The database is operated at no charge to the user (except for the cost of phone calls). Operating costs are low because the station operator bears the cost of phone calls. A small contribution from the cost of the station keeps the database operating. The computer used for the database is simply an old, IBM compatible PC (8086 based) with a 20MB hard disc attached to an incoming-only telephone line. This may need to be upgraded as the amount of data increases and will eventually require more than one phone-line. This can be done, at relatively low cost.

The Argus project has developed several computer programmes along with the operating systems for the network. It has produced a data viewing programme (DV), which displays the data as daily or monthly graphs or lists of numbers. Another programme produces (comma delimited ASCII) files to enable the data to be used in most commercial spreadsheets. A utility for printing the data is under development, as is a statistical analysis package, both are in use, under test, by members of the network.

Local groups are often concerned about a particular issue, such as the group at Dunoon, close to the former American Polaris base at Holy Loch, and Environet at Whitby in North Yorkshire, a possible site for nuclear waste disposal. The system is used to watch for incidents or



Argus gamma outstations, July 1992

to establish the existing environmental conditions. Four local groups are operating stations. Friends of the Earth have a station at their offices in London.

SERM has recommended the Argus system as the method for continuous background monitoring. At present nine SERM councils use the system. Two other councils, in South West Lancashire and in West Scotland, are also part of the network. The system provides a continuous reference for other monitoring eg. food and mobile monitoring of the environment.

Newcastle and Sunderland Polytechnics (now renamed the University of Northumbria at Newcastle, and Sunderland University) have used data from the Northern group of stations. Southampton University is operating a station. The two Polytechnics were using the data to examine processes occurring in the environment. Two of the concerned local groups have also started to do this.

What does it cost?

The cost of an outstation and sensor head is around £1500 depending on the location of the system. If remote collection of data by phone is required then an additional modem and an IBM compatible computer is required, at a cost of around £500.

Operating costs are around £40 per annum including the cost of phone calls and power, excluding phone rental. At the moment it costs around 80p (most expensive phone charge rate at 2400 baud) to retrieve a month's data from the 19 outstations.

A weather station measuring pressure, temperature, humidity, wind speed, wind direction, rainfall and sunlight

intensity has recently been installed. Two similar stations will be installed within the year, upgrading existing gamma stations.

Peaks in the Gamma background seem to coincide with periods of highly acidic rain at the North Yorkshire outstation. With the assistance of grants from the National Rivers Authority (Yorkshire Region) and the North Yorks Moors Park authority, Argus has developed a device which will measure the acidity of rain, as it falls. Environet is currently investigating this curious coincidence. The monitoring equipment is under test and will be operational later this year.

Using recently developed equipment, the existing Argus outstations can now be connected to almost any type of sensor with the data being handled in the same way as the gamma data. This data will be available on the database. Four years ago one outstation was operating, last year at this time there were 12, the network is rapidly expanding. Argus has had contacts with groups in Germany and in the USA which may lead to Argus networks in other countries.

In conclusion: the Argus Project has developed standards, for data collection and for data transfer. It has developed systems to aid the handling of the collected data using the technology available. The systems developed are used by concerned local groups, councils and scientific institutions. A primary concern of the project is that data is openly available. □

* Dr. Ross Couper operates an Argus outstation, he has been involved with the Argus project for 5 years. He is a lecturer at the University of Northumbria in the Department of Mechanical Engineering and Manufacturing Systems.

Political climatologists have detected a warming in the labyrinthine corridors of Brussels bureaucracy, as global warming has soared up the international agenda. Here ANDREW WARREN, Director of the Association for the Conservation of Energy (ACE), unravels the complex negotiation leading to a European Community carbon dioxide strategy, finding more mayhem than Maastricht.

EC carbon strategy stifled

THE European Community's strategy for stabilising carbon dioxide emissions is dead. Long live the European community's strategy for stabilising carbon dioxide (CO₂) emissions.

It has been a long hot summer in Brussels. And the heat has had as much to do with the pace of the negotiations on its energy conservation strategy – effectively synonymous with its CO₂ strategy – as with any attempt by the weather to demonstrate that the climate has already started changing. What has been happening? To appreciate the true piquancy of the developments, it is necessary to return to the Autumn of 1990. The first of the really big international conferences dealing with the greenhouse effect, the World Climate Conference in Geneva, was due. What was to be the European Community's public position?

The Council of Environment Ministers, drawn from the 12 Member States was (coincidentally?) meeting just a few days before. Many had with them studies showing how the minimum demands of climatologists could be met. These demands sought to ensure that emissions of the main gas held responsible for global warming, CO₂, should never be allowed to increase and (in fairly short order), start to decrease.

Economic

Fortunately, these studies also showed (for the most part) that stabilising emissions was not only technically possible, it was economically desirable. After all, Japan has consistently succeeded in upping its Gross Domestic Product whilst using less and less energy. Why shouldn't we Europeans?

And so in the heady surroundings of the old League of Nations in Geneva, the EC position was publicly enunciated. As a first step, the 12 nations would between them ensure that by the end of the decade there would be no more CO₂ produced than in 1990.

The bureaucrats in the European Commission duly got to work. By the following Summer, they had produced

a three-part strategy showing how the initial objective could be achieved. There would be a new tax on all energy consumption. EC programmes, intended to promote new energy technologies (THERMIE), tighten efficiency standards (SAVE), and promote renewable energy (ALTENER), would be strengthened. And there would be lots of "complementary" national programmes.

To progress through the Byzantine decision-making structure of Brussels, the strategy needed first of all to be unanimously approved by the 17 Commissioners.

When they met under the Presidency of Jacques Delors – the two British Commissioners are Sir Leon Brittan and Bruce Millan – it was the so-called carbon tax that caused the problems. A concerted lobby from European industry howled at the prospect, threatening to quit Europe for less environmentally-sensitive domains.

Eco-macho

Countering them were the pure economists in the Commission, who were convinced that only through upping fuel charges and setting "appropriate price signals" could the Community's targets be achieved. Gradually the tax became a kind of eco-macho symbol. Support it, and you are a true believer; question its effectiveness, and you are an environmental wimp.

Meanwhile, the other two parts of the strategy became forgotten. This despite the EC's own forecasts, which demonstrated that between them their own programmes – THERMIE, SAVE, ALTENER – could deliver just as much potential saving as the tax.

But the theoreticians won out. Officially. Just before the mammoth international conference, the Earth Summit of Rio, began the Commissioners endorsed the concept of a new energy/carbon tax. Never mind that it would only be introduced if all other developed countries introduced something similar. They had agreed to introduce a new tax. In principle. If everyone else did, but officially, the job was done.

In order to cobble this together, the EC programmes had come in for some nasty knocking. The renewables support programme ALTENER was heavily cut back from its originally projected size. The SAVE programme – intended to set a myriad number of technical standards, from the training of energy managers to the introduction of third party financing in the public sector – was watered down.

Seven proposed new directives became one. No specific targets or standards are to be set. Countries are now only being asked to sign up to say they agree that higher insulation levels or individual heat metering are Good Things.

Subsidiarity

Additionally, a new monitoring directive is due, ostensibly to check progress. But quite how that is to be measured for effectiveness is a moot point. Instead of setting specific qualifications for say, training of energy managers – both initially and mid-career, as in Japan – it is to be left to Member States to decide what to do. This is the principle of subsidiarity. Some may well do a lot. On present trends, few will. The one programme that has survived well is THERMIE. It is now being reorientated towards CO₂ saving, and a particular new drive on it is taking place in the UK. But even it has had financial hiccups.

In theory, the European Community can still make the famous 'stabilisation by 2000' target despite a 4% increase in emissions from 1990 to 1991. In theory, each of the 12 nations is going to take on much more of the delivery itself; again, the fashionable concept of subsidiarity. But to date only the Dutch have published full details of how they plan to achieve their targets. For the rest, it is mostly a question of business-as-usual accompanied by pious aspirations.

Officially, Europe still has a detailed strategy to promote energy efficiency, and thus deal with CO₂ emissions. But unless it swiftly develops real teeth with real rather than theoretical initiatives, the strategy is not going to be worth much more than the reams of paper squandered to compile it. □

Fifteen years of continuous publication is an admirable achievement for an anti-nuclear magazine, it is also a good opportunity to reflect on battles fought and battles won. However, with anti-nuclear campaigners facing an onslaught of public inquiries and Government reviews, MIKE TOWNSLEY believes nostalgia is a luxury we can ill-afford.

15 years on – no time to look back

THIRTEEN years ago Margaret Thatcher, flush with victory, informed the nation of her nuclear vision. She wanted 10 PWRs built. Yet no little thanks to the anti-nuclear movement not one of these stations has been opened, indeed only Sizewell B, has been built. Even it is unfinished and is in danger of falling massively behind schedule adding insult to the injury of being massively over budget.

The anti-nuclear movement, with a little help from their friends in the city – who refused to buy the industry – have forced the Government to reconsider their entire nuclear dream. In 1994, so we are told, the Nuclear Industry, after four decades of unquestioned financial support, will be tried for insolvency and technical incompetence, if found guilty their licence to run riot in the countryside will be revoked, and no more nuclear power stations will be ordered.

Despite a seemingly bleak future, the industry, never letting mere reality dampen their optimism, have announced plans for new stations.

Sizewell C

Nuclear Electric (NE) are considering lodging a planning request to build a twin Pressurised Water Reactor (PWR) at Sizewell: "We are keen to go for Sizewell C, it would be our first option for post-1994, if we get a favourable outcome." It has certain advantages over using Hinkley Point for which they already have planning permission. The company believes it can build the twin reactor for a total cost of about £3.5 billion because it can re-use some of the infrastructure for Sizewell B. While the new reactors would not be exact copies of the Sizewell PWR, NE are considering a modified design which they argue will deliver power at about 2.9p a unit.

A local planning inquiry should be sufficient for the new stations, argues Nuclear Electric, as they believe the safety and design as been exhaustively tested at both the Sizewell and Hinkley Point Inquiries. John Collier, NE's chairman, thinks the project should be funded jointly through private and public investment. An idea scorned by City Analysts who point out that private investors expect a higher rate of return than the 8% figure quoted by Collier.

Brian George, NE's executive director for construction, said the company would be taking a commercial risk if it decided to proceed with the planning application before the outcome of the review is known. Energy Minister, Tim Eggar, said it is a matter for NE whether or not to submit a planning application but warned this would not influence the outcome of the review.

Scottish Nuclear (SN) are sceptical about NE's plans. However, they too want to order new plant as soon as possible. SN are studying proposals from Mitsubishi of Japan for a new reactor design along with several other foreign designs. Approval for new reactors is unlikely to be granted unless private sector funding is available, to this end a deal with Mitsubishi is believed to involve attractive long-term financing arrangements covering Japanese-made components.

James Hann, SN's chairman, said: "If there is a licensed design acceptable to the nuclear inspectorate and the Government, and that can be sold, we will listen. But we must continue to consider other options." Hann is unconvinced by NE's economic arguments, saying, "We would be most interested to see the figures."

BNFL plans PWRs

PWRs also appear to be the preferred choice of the UK's other nuclear generator, British Nuclear Fuels. The company which operates two ageing military Magnox stations at Chapelcross and Calder Hall, now wants to enter the commercial market. They are spending about £30 million on feasibility studies.

The chairs of the generators along with their counterpart in the United Kingdom Atomic Energy Authority (UKAEA) have formed the Nuclear Utilities Chairmen's Group. The Group is drawing up a joint case for meeting the challenge of the 1994 review. A task not helped by their individual actions. While SN and NE are quibbling over what kind of reactor to go for; SN and BNFL are cutting into each other's business; BNFL are entering the generating market; and SN are rejecting the main stay of BNFL's business by opting for dry storage.

SN's dry store plans will also add to the burden of impending public inquiries. The question remains whether or not their proposals for a temporary store are acceptable when no final solution for the problem of the country's growing mountain of nuclear waste exists? And as yet no real proposals exist for dealing with high-level waste.

Nirex, the Government agency, presented with the unenviable task of solving the waste riddle, also plan to go to a public inquiry in the next few years.

How many inquiries and reviews can the environmental movement fight all at once? Now more than ever, with all our campaigning objectives coming to a head, the anti-nuclear movement must concentrate its resources and focus its attention for a final confrontation. Now is not the time to cut back campaigns.

'Safe and viable'

"Few people actually know anything about what goes on within a nuclear reactor, but our research last year showed that 54% of those polled in Scotland wanted to learn more and, by the time of the 1994 Review, we must prove to the public and the Government alike that nuclear energy really is safe and a viable option," argues James Hann. He believes that if the rest of the industry follows SN's lead all will be rosy in the garden: "At SN we are already showing signs of success in actively trying to 'demistify nuclear' through a series of popular communications programmes and our Annual Safety Report." But, issuing a warning to the rest of the industry, he thinks "the industry in general will continue to suffer from the consequences of sub-standard practices elsewhere."

After 15 years the central arguments are the same. The nuclear industry is hopelessly uneconomic, dangerous, a threat to world security, incapable of rising to the challenge of the world energy crisis and above all generates environmental pollution which cannot be remedied, it leaves a destructive legacy for which no solution exists.

What has changed is that the UK now has a Government which is not blind to the industry's failings, a Government which just might be willing to close the industry down. □

The time for revising building regulations is approaching, while a survey for Friends of the Earth shows that most building companies only just comply with the current regulations. MICHAEL HARPER, Assistant Energy Campaigner for Friends of the Earth, argues that only substantial tightening of the regulations will produce the improvements in energy efficiency necessary for environmental protection.

Houses, energy and the environment

THIRTY per cent of total national energy consumption (including transportation) is used in homes, corresponding to an annual energy bill of about £12.4 billion. This contributes about 170 million tonnes of carbon dioxide (CO₂) each year (at 1990 levels of emissions), 29% of the UK total; 67% of this energy is used for space heating.

The Building Research Establishment has estimated that the potential for savings in this area is considerable. In the domestic sector, about 30% of the energy used for space heating could be saved by insulating all external walls either with cavity wall insulation, where possible, or by adding insulation to the internal or external faces of the walls. This would give savings of around £1.4 billion a year and reduce CO₂ emissions by around 25 million tonnes a year. Though in practice insulation of solid walls is expensive, at least one half of the overall potential savings ought to be achievable cost-effectively through insulation of cavity walls (see table 1).

It is clear therefore that the design levels for thermal efficiency of houses can be critical for reducing UK CO₂ emissions over the long term.

Legislation consolidated in the Building Act 1984 empowers the Secretary of State for the Environment to make regulations for ensuring new buildings conform to certain minimum specifications, including levels of thermal efficiency. On 13 May, Environment Secretary Michael Howard announced that both he and the Scottish Secretary would start consultation this year on the strengthening and extension of building regulations. He said that this would be likely to cover "further improvements in standards of energy efficiency, the strengthening and extension of energy efficiency standards to renovation and conversions ... and the incorporation of home energy rating into the requirements of the regulations".

As a result of this announcement, Friends of the Earth began a survey of house building companies to establish the extent to which current regulations were a success. The survey, conducted during June 1992, looked at the percentage of houses built with roof and wall insulation levels equal to the current

regulations or better than the current regulations; the percentage of houses built with double-glazing and low-emissivity glass; the percentage of houses with electricity or gas central heating and finally a number of questions on methods of achieving high levels of insulation.

We sent letters with the questionnaires to the 50 largest construction companies involved in house-building in the UK and although not every company responded to the survey, responses were received from large, medium and small companies giving a representative spread of builders in the UK. In total, companies responding to the survey accounted for 141,500 homes or approximately one third of houses built since 1985. However, the survey did not cover houses built to external specifications, for example from local authorities or from housing associations, and so represents a survey of the designs and specifications used by the building companies themselves. It is considered that, in general, those that responded represented the more positive element within the building industry.

Roofs, walls and windows

Under the 1990 building regulations the adoption of double-glazing for windows can be used as a 'trade-off' with insulation levels in walls and roofs to achieve compliance with the regulations. The survey showed that approximately 50% of houses built sought to achieve compliance with the regulations through this method in

relation to walls and some 40% in relation to roofs. It is clear that there is scope for many companies to improve thermal efficiency considerably by improving insulation levels directly in both the fabric of the building and the window area rather than one or the other.

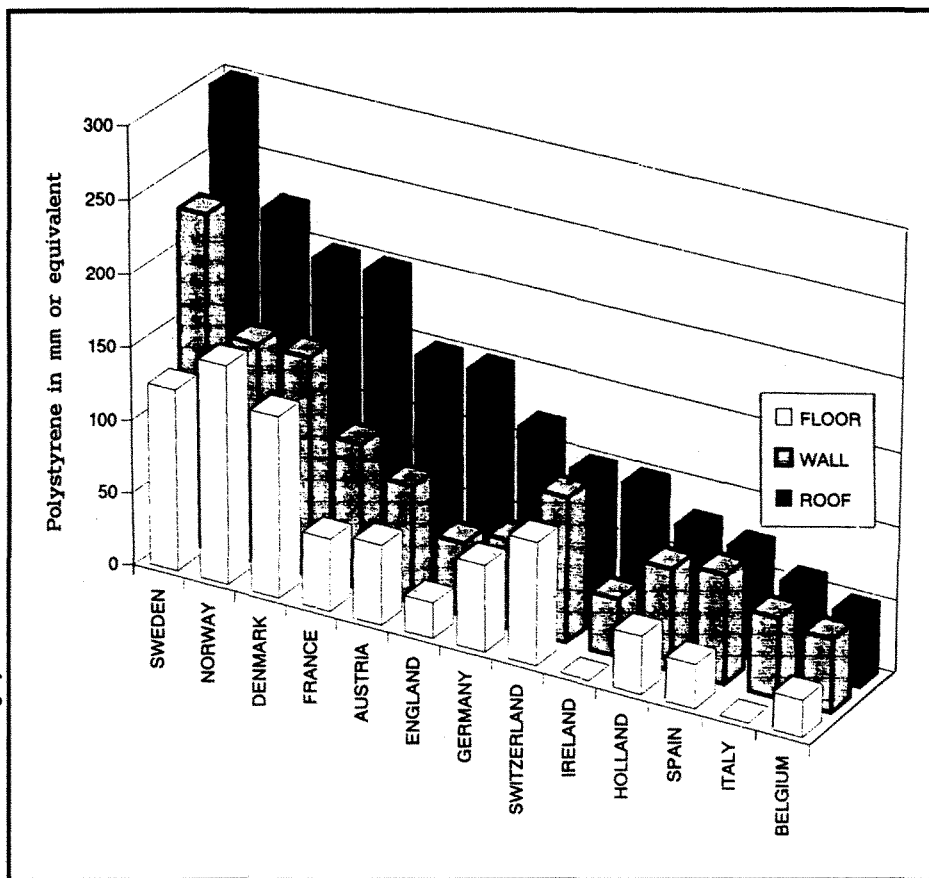
Additionally, only a fraction of the houses built used higher levels of wall and roof insulation than minimum compliance with the regulations demanded (24% and 4% respectively). This gives a clear indication that companies are moving only as fast as the regulations themselves are working and that relying on a voluntary approach to achieve higher levels of energy efficiency in new buildings is not working.

That companies are not voluntarily exceeding the regulations can also be seen from the exceedingly low up-take of low-emissivity glass which reduces levels of heat loss through windows.

The survey results demonstrate a disturbing number of houses (over 25%) still being built using electric heating systems. Research for FoE has indicated that this can contribute up to four times more carbon dioxide emissions for unit of heat output compared to the use of gas central heating in a similarly insulated building. In addition, research by the Government's Energy Technology Support Unit suggests that a modern gas condensing boiler of 80% end-use efficiency would produce four times less global warming impact than electricity generated from the current mix

	No. of Dwellings Deficient (million)	Average Cost per Dwelling (£)	Average Energy Cost Reduction (£/year)	Typical Payback Period (years)	Total CO ₂ Reduction (Mtonnes)
Draught Proofing	19.6	50	13	4	4.5
Condensing Boiler	11.7	150	34	4	5.4
Cavity Wall Insulation	9.0	300	72	4	11.9
Solid Wall Insulation	9.2	1,500	72	21	12.4
Double Glazing	16.5	500	24	21	7.3

Table 1: Energy saving measures – costs and benefits



1990 European insulation standards

of generating capacity existing in 1990⁽¹⁾.

Only 3% of all houses were built with gas condensing boilers despite the very high efficiencies achieved through such central heating systems and the consequent reduced energy bills for the householders. In addition, 95% of these houses were built by one company, all of whose houses have been built with gas condensing boilers since 1985.

Thermal bridging

Over 20% of companies do not recognise or incorporate 'thermal bridging' within the calculation of 'U-values' (a measurement of thermal transmission) despite the fact that failure to do this can have a significant effect on the levels of heat loss actually achieved following construction. Thermal bridges are part of the external envelope of a building through which the heat loss is significantly higher than through the surrounding areas, making the house harder to heat and leading to mould growth problems.

It is estimated by the Building Research Establishment that eliminating thermal bridges would save approximately 10% of the domestic energy used in the UK. Mortar joints, ceiling joists and metal lintels can be examples of thermal bridges which have a higher U-values than the surrounding insulation. That any companies should be ignoring the effects

of thermal bridging indicates that many houses may not in practice be complying with the regulations despite being deemed to have complied on paper.

Companies were asked to provide comment on the issue of upgrading the current building regulations. Though many respondents provided no comment, those that did covered a range of different attitudes. Though one company considered that the building regulations were adequate and needed no updating, most who answered considered that the regulations could be broadened to cover other aspects. For example, it was thought that the regulations should include:

- proper monitoring of post-construction building performance (A significant feature of the 1985 Building Regulations is that there are alternative systems of building control - one by local authorities, and the other a private system of certification which relies on 'approved inspectors' operating under a separate set of regulations called the Building (Approved Inspectors, etc) Regulations 1985 - the latter is effectively self-regulatory building control by the construction industry itself through a scheme of private certification);
- monitoring of compliance during construction;
- the extension of the regulations to renovation and conversion of existing properties;

- some method of upgrading existing housing stock which is not subject to renovation or conversion.

The survey confirmed that the introduction of the 1990 regulations has not significantly improved the standards of thermal insulation in new buildings. Few companies are voluntarily going beyond the regulations (none bar one exceeded the levels of insulation recommended for roofing) which points to the conclusion that to improve on levels of insulation, tight regulations are necessary.

In contrast to the disturbing number of houses built with electric central heating, pitifully few houses were built with gas condensing boilers despite the very high efficiencies achieved through such central heating systems and the consequent reduced energy bills for the householders. This substantiates the recommendation made by FoE to the House of Commons Energy Select Committee that electricity heating systems should be banned in new building developments where a suitable alternative system is available.

Overall, the results show an acute need for further consideration on setting tight building regulations. This is brought home when put in the context of international comparisons. As David Olivier demonstrated in his article in *Safe Energy 89* (*Greening our buildings*) a UK home conforming to the 1990 building regulations will have an annual space heating consumption of 113kWh/m² compared to a house conforming to the Dutch standards of 89kWh/m², German standards of 86kWh/m², Swiss standards of 58kWh/m², and Dutch low-energy designs of just 22kWh/m². Though not the worst in Europe as can be seen from the graph opposite, insulation standards in the UK can be significantly improved bringing benefits of improved comfort levels, reduced energy bills and most importantly reduced environmental pollution.

Friends of the Earth will be using the results of the survey to press for much tighter standards for walls and roofs, for removing the 'trade-off' system between walls, roofs and glazing, for greater clarity on how conformity with the regulations should be achieved, for a rigorous method of monitoring performance and for additional regulations restricting the use of electricity for heating when a suitable alternative exists. □

Notes:

(1) See *Cool Planet, Warm Homes* briefing by Friends of the Earth, 1990; *The Impact of UK Electricity, Gas and Oil Use on Global Warming*, N Eyre and L Michaelis, ETSU, September 1991.

George Bush's announcement that the US will halt the production of weapons-grade plutonium and uranium has led to renewed calls for an end to reprocessing at Sellafield, in Cumbria, and Cap de la Hague, in Normandy. SHAUN BURNIE and PETE ROCHE, of Greenpeace, focus on the Korean peninsula, highlighted in Bush's statement, as an area of particular proliferation concern.

Korean proliferation risk

REPROCESSING is recycling argues conventional nuclear industry wisdom. However, by 1990 the Sellafield nuclear complex had produced some 42.5 tonnes of plutonium from Magnox spent fuel, only five tonnes of which has been used. Now British Nuclear Fuels is aggressively marketing its reprocessing services worldwide. It is touting spare capacity in the thermal oxide reprocessing plant (THORP), due to open later this year. THORP will produce a flood of plutonium, which will be sent back to the country of origin.

If current reprocessing plans are realised, it is likely that by the end of the century there will be a world surplus of between 100 and 200 tonnes of separated plutonium from civilian spent fuel. Although plutonium produced by civilian power reactors has a different mix of isotopes than so-called weapons-grade plutonium, it can be used in weapons. This 'civil' surplus will be in addition to the 200 tonnes of plutonium expected to be recovered from dismantled warheads in the US and Russia. This increase in world stocks of separated plutonium will impose significant new burdens on nuclear safeguards and protection systems. William Dircks (not Dricks as in *Safe Energy* 89), the Deputy Director-General of the International Atomic Energy Agency has already expressed concern at this worldwide surplus of plutonium, describing it as "a major political and security problem".

Area of concern

Among the countries with which BNFL hopes to trade is South Korea, despite the fact that Bush specifically identified the Korean peninsula as a region of major proliferation concern.

In 1971/2 South Korea, deciding to act upon the recommendation of its Weapons Exploitation Committee, built its own nuclear arsenal. At the time there were an estimated 6-700 US nuclear weapons in the country. In 1972 negotiations began with the French for the purchase of a reprocessing plant. The deal became public knowledge in 1975 with Seoul claiming that the plant was necessary for energy security and

to match the Japanese reprocessing plant at Tokai Mura.

Following the Indian nuclear test in 1974, the US became concerned about the nuclear programmes of Non-Nuclear Weapons States. They were convinced that the Korean reprocessing plant was for military purposes, specifically to use the separated plutonium in nuclear devices. By March 1975 the US demanded that the military programme be abandoned. Economic pressure was brought to bear on South Korea with the US threatening to withhold funds for a new nuclear plant. Simultaneously they demanded that other states, France, Belgium and Canada, involved in the reprocessing deal end their involvement.

At the time, President Carter's policy was to withdraw US troops and nuclear weapons from the Korean peninsula, angering the Korean Military. If such a policy was carried out, they warned Carter, they would have no choice but to develop their own weapons programme. After all, US policy had demonstrated to Seoul the power of nuclear weapons; they had kept the peace on the peninsula since the partition. Carter ended his withdrawal programme in 1978.

Stockpile

Six years later South Korea again tried to buy a reprocessing plant, this time from Canada, but again the US 'persuaded' Canada to end co-operation with Seoul.

South Korea has nine nuclear power plants. US-supplied PWRs predominate but Korea also has a Canadian CANDU reactor. They have a total installed capacity of 6.3GWe, with a further 1.7GWe under construction or on order.

By 1991 South Korea would have been in a position to produce about 1.3 tonnes of fissile plutonium 239 annually, from spent fuel. Current stockpiles of unseparated plutonium already accumulated amount to about ten tonnes and could reach 24 tonnes by 2000 - sufficient plutonium to produce between 86 and 450 nuclear bombs depending on the level of sophistication.

By way of contrast North Korea has a projected nuclear capacity of 0.3 GWe in the year 2000, producing 70kg of plutonium per year - but details of the plutonium production facility at Yongban, 60 miles north of the capital, Pyongyang, are somewhat sketchy. North Korea has already confirmed that it has produced "a little bit of plutonium" for experimental use. South Korea, Japan and the US all suspect North Korea of trying to develop a nuclear bomb.

On 27 November 1991 BNFL signed a nuclear co-operation deal with South Korea to supply fuel cycle services. There is no specific reprocessing dimension to this agreement - it is only a preliminary arrangement to allow for future negotiations. However, BNFL's decision, announced earlier this year, to open office in Seoul, with the specific purpose of marketing a range of nuclear services to the South Korean state electricity company, Kepco, gives a clear indication of their desire for a reprocessing contract.

Sensitive

South Korea is among 33 countries branded by the Department of Trade and Industry (DTI) as sensitive destinations for nuclear exports because of "proliferation concerns and other criteria, including the risk of diversion and the lack of effective export controls". There are two guiding principles as to whether a country should be included on the list: whether they are signatories of the Non-Proliferation Treaty (NPT) and the Missile Technology Control Regime (MTCR). South Korea signed the former in 1975, but not the latter. However, the most likely reason for South Korea's inclusion on the DTI list is its questionable motives in seeking to acquire certain nuclear technology.

South Korea has also held discussions with Russia on nuclear co-operation. Moscow is keen to expand its indigenous reprocessing technology, and financial assistance from Seoul would be most welcome. A decision on whether to complete a reprocessing plant at the Krasnoyarsk nuclear complex in Siberia (formerly a secret Soviet plutonium production facility) is expected later this year. It is far more

likely that South Korea will obtain separated plutonium from Russia than from BNFL. The Russians will almost certainly dramatically undercut UK charges for storage and reprocessing. The role of the US will be crucial here. Whether they would permit a reprocessing deal with either Russia or the UK must be open to question.

Japan's dedication to the plutonium economy and energy security can be held partly responsible for South Korea's programme – or at least it will be one reason given by South Korea, who have expressed concern over Japanese military expansion.

The decline in US military influence in the region and the possible removal of the US nuclear umbrella could be another justification. Although it reflects only one opinion in South Korea it is worth quoting from an article which appeared in October 1991, in Yu-Yong-won, a Seoul newspaper. Under the headline "Korea must obtain nuclear armament capability", it said: "The dominant assertion is that at this point in time, Japan must be judged as our number one potential enemy ... the fact that Japan currently has the nuclear option is the primary impetus for us to have the nuclear option as well. Japan is able to produce nuclear weapons

whenever it wishes since it has the technology for enrichment and reprocessing facilities."

The South Korean military still have a very large presence in everyday politics, and the view expressed above appears to reflect their own.

The Korean peninsula remains one of the most sensitive regions on earth. Who can predict what the relationship between China, Japan and a unified Korea may be in a few decades from now.

Paranuclear

Aside from the acquisition of nuclear materials, other equipment would be needed, including delivery systems, before South Korea became a Nuclear Weapons State. But this should not prove to be a major obstacle for a technologically sophisticated country like South Korea. Early next century it could easily become a 'paranuclear' state ie. a country able to produce nuclear weapons in a matter of months, with the help of a reprocessing agreement with the UK or Russia.

The shipment of around one tonne of plutonium from France to Japan later this year, to be followed by shipments

from the UK, provides South Korea with further justification for developing a nuclear capability. Since the Gulf War, nuclear proliferation has become an area of grave concern amongst leading industrialised states.

At the G7 meeting in Munich in July, leaders called for tough moves to halt the spread of rogue nuclear weapons. The G7 declaration said "The world needs the most effective possible action to safeguard nuclear materials and to detect and prevent the transfer or the illicit or clandestine production of nuclear weapons".

If Major and Mitterand are prepared to aid Japan in stockpiling plutonium on the one hand, and yet criticise countries like the two Koreas on the other, it represents a staggering level of hypocrisy. If they are really serious about non-proliferation they will order a halt to reprocessing at Sellafield and Cap de la Hague immediately. □

Acknowledgements: The authors are indebted to the work of Peter Hayes of Nautilus Pacific Research, Australian National University, Canberra, and author of the Republic of Korea and the Nuclear Issue. For further details please contact Greenpeace, Canonbury Villas, London, N1 2PN.

Clydebank District Council

Clydebank District Council, as a Nuclear Free Zone Authority, supports any campaign that strives to prevent nuclear disasters, through its policy against both nuclear weapons and nuclear energy and the resultant waste generated. In particular the Council opposes nuclear waste being stored underground or on the sea bed.

The Council is pleased to support SCRAM on its fifteen years of publication, making people aware of nuclear power and its related risks.

Renewables response

IN responding to the Commons Energy Committee's final report*, on renewable energy (*Safe Energy 88*), the Government is broadly sympathetic. However, on specific questions of Government funding and action the stock response is that they are awaiting the outcome of current studies.

On the important issue of the renewables target of 1,000MW by 2000, which the Committee proposed should be expanded to 3-4,000MW, an updated estimate will be produced by the now revived Renewable Energy Advisory Committee as part of their review of renewables. A legislative framework within which renewables will be able to compete is being established but, the Government reports, it is impossible to predict when renewables technologies will become competitive or how quickly they will be introduced.

Scotland and Northern Ireland will, as the Committee proposed, receive some form of Renewables Order to match England and Wales, but precise details have yet to be announced - the results of a

consultation process being carried out in Scotland (*Safe Energy 89*) are awaited. An assessment of renewable energy potential in Northern Ireland is to be published, and a similar study for Scotland is being considered.

Extension of the NFFO for renewables schemes beyond the present 1998 cut-off, as proposed by the Committee, is the subject of discussions between the Government and the European Commission (see p20).

The response to the Committee's strong call for wave power to be given a higher priority with increased R&D funding is that the results of the Government's wave energy review - initially expected at the end of last year - are due out in a few months.

The Government agrees that onshore wind power is one of the most promising renewables, but on the Committee's specific call for a demonstration off-shore wind farm they can only offer the possibility of a feasibility study.

Future funding for photovoltaics - a demonstration project of 500-1,000 domestic and commercial buildings was proposed - will depend on the results of a £250,000 preliminary programme launched last year, argue the Government.

Studies on large, medium and small tidal barrages are all nearing completion.

The inclusion of external costs in energy prices was a key issue identified by the Committee, as it would "considerably strengthen" the economic case for renewables. The Government responds that a "great deal" of research, economic and scientific, is required to determine the costs of environmental damage, but a preliminary report, commissioned by the Department of Energy, will be published soon.

The link between the Energy Technology Support Unit (ETSU) and its paymaster and landlord the UK Atomic Energy Authority (UKAEA), caused the Committee much concern, but the Government was happy to announce that ETSU is now free of the security measures that apply to the UKAEA at the Harwell site - they've moved a section of barbed wire fencing. Further separation of the two organisations will be considered in the renewables review. □

* "Renewable Energy: Vol I" House of Commons Energy Committee. HMSO; April 1992.

Privatisation response

AFTER four months of consideration, the Government's response to the highly-critical Commons Energy Committee report on electricity privatisation (*Safe Energy 88*) has been complete rejection of the findings.

Agreeing to act on only one of 50 recommendations, the Government claims: "The committee has not given sufficient credit to what has already been achieved from electricity privatisation." Eight of nine recommendations addressed specifically to the Government have been dismissed, usually as being someone else's responsibility.

Only in agreeing to give "careful consideration" to the future of clean coal research "in the context of privatisation [of British Coal]," is there any meeting of minds between the Government and the Committee it has now disbanded.

■ A simultaneous, but more constructive response to the Energy Committee, came from Professor Stephen Littlechild, director general of electricity supply. He considered that since privatisation there had been "encouraging developments in competition and greater efficiency", but admitted to areas of concern.

Littlechild agreed with the Committee's recommendation that, by no later than 1995, he should decide whether to refer National Power and PowerGen to the Monopolies and Mergers Commission. But, he rejected calls to adjust the timing of the reviews of the price controls on the regional electricity companies. □

UK's THERMIE failure

BRTAIN is failing to take full advantage of European Commission grants for projects involving renewable energies and energy conservation, according to the Association for the Conservation of Energy (ACE).

Between 1975 and 1992, the UK received support of £218 million from the EC THERMIE programme and its predecessors. For hydrocarbons and solid fuel research Britain received easily its fair share. However, it has not "done so well for funds from energy saving, or for renewable energy. We have obtained only 12% and 10% respectively of the budget, although our just return should be closer to 18%," according to ACE Director Andrew Warren.

Over recent months, continues Warren,

many other schemes "designed by the EC to assist energy saving have been decimated" (see p12). However, THERMIE is moving into a new phase in 1993, it will increasingly focus on technologies designed to reduce emissions of carbon dioxide and sulphur dioxide, and the Commission has allocated about £250 million for THERMIE backed projects until the end of 1994. "It is vital that as large a portion of this as possible is spent on expediting energy saving and renewable technologies, both in and of use to Britain," says Warren.

Once projects have gone beyond the development stage, THERMIE helps to promote them by evaluating the market potential for energy technology, disseminating information, collaborating with national and regional organisations and cooperating with countries outside the Community. □

EC energy/carbon tax

SEVERAL significant changes to the proposed European Community carbon/energy (*Safe Energy 88*) are contained in the final version published in June.

Heavy energy sectors (including glass-making, steel and chemicals), which were to have been exempted from the tax automatically, will now have to argue their case. Only when a company can persuade their government that they will lose market share to importers not bearing the tax will the Commission consider exemption.

Another amendment to the proposals will allow firms spending more than 8% of their turnover on fuel to offset money spent on energy-saving measures against the tax.

It has been decided that the tax should be fiscally neutral, with countries cutting existing taxes by a corresponding amount.

The new law is to be considered by the European Parliament and then the Council of Ministers. The tax is officially dependent on the other OECD countries introducing similar measures, and although Japan is considering such a move, the planned 1993 start date for the EC scheme seems unlikely. □

Fuel cell progress

FUEL cell use in Britain could be set for a boost as the London Regeneration Consortium is looking at incorporating the technology in their planned development at King's Cross, London. LRC's articulated bus network could be powered by fuel cells, and they are also being considered for supplying some of the buildings' electricity.

The fuel cell (*SCRAM 76*) was invented in Britain 150 years ago, but the Japanese are now leading the field in this potentially clean technology. Like a battery, the cell produces electricity through chemical reaction. A supply of hydrogen and oxygen is combined to

produce electricity, heat and water with much lower emissions than conventional power stations. Where the hydrogen comes from 'reformed' natural gas, there are associated emissions of carbon dioxide (CO₂).

New research indicates that fuel cells can replace conventional power generation in 90% of cases, according to Peter Teagan of consultants Arthur D Little, reducing carbon dioxide emissions by 40 to 60% and noxious emissions by between 50 and 90%. Future use of fuel cells with renewable energy - where the hydrogen and oxygen are produced by electrolysis of water - offers the possibility of virtually pollution-free storage and supply of electricity.

The World Fuel Cell Council has accused Europe of neglecting this technology, leaving the market open to the Japanese. Given the high start-up costs, the WFCC are calling on governments to introduce subsidies such as tax credits to help kick start the technology. Britain's Department of Trade and Industry has a programme to accelerate the development of fuel cells, but say they have no plans to provide incentives for companies to install them.

Japan has set a national target of 2,250MW of installed capacity by 2000 and 8,300MW by 2010 and has the largest plant currently operating, an 11MW device supplying electricity for up to 5,000 homes in Tokyo. □

Thermo-electricity

A breakthrough in converting heat to electricity is claimed by two British researchers. Based on the phenomenon of thermo-electricity, their device operates with a claimed efficiency of 70% or more, compared with the previous limit of about 2%.

Practical applications for the device, if initial findings are correct, could include using waste heat from power stations and other industrial sources to generate electricity. The device could also be run in reverse as a heat pump for heating and cooling applications.

The prototype device was made up of alternate layers of metal and dielectric to produce a series-connected capacitor linked to a 500kHz oscillator. It is the introduction of the oscillator which the researchers believe has produced the increased efficiency over previous DC devices. The current is generated as a result of the temperature difference between two heat sinks - in the case of the prototype aluminium plates on the top and bottom of the layered stack.

The development began a few years ago when John Scott Strachan of the Pennwalt Corporation and Dr Harold Aspden of Southampton University's electrical engineering department, started looking at ways to boost the efficiency of thermo-electricity.

From their recent experiments, where a block of ice was placed on one plate to provide the temperature difference, a scaled up output measured in kW/m² is being predicted.

Although the device has now been granted a US patent, there is some scepticism over the pair's findings. Aspden admits that "the efficiency is too high to make sense to the engineer," but thinks it could be explained by a feedback phenomenon. □

Scottish wave

WAVE power pioneer, Professor Allan Wells plans to build a 2MW wave station off the coast of Scotland next year if he can attract Government backing to add to industrial money already promised.

Wells plans to place an Osprey (Ocean Swell Power Respiratory Energy) plant at a depth of 20m, which he says provides the "minimum cost of the structure in relation to the kilowatts it is capable of producing."

The plant will also be close enough to shore to allow its power to be brought in via overhead cables, thus avoiding the expensive problem of "seabed cable coming ashore on a rocky coast line."

The Osprey is an oscillating water column consisting of an upright cylinder which can harness wave energy from any direction. Wells estimates that the cost of power from his device "will be in the same range as oil or coal-burning stations."

Admitting to some disagreement over

the cost estimates with the Energy Technology Support Unit, Wells says the differences are mainly over how long the payback period should be. He is confident that Government funding will be forthcoming.

■ Meanwhile the long awaited Government review of wave energy has taken another small step towards completion.

Tom Sharpe who is in charge of the review has reached an agreement with the team developing the Bristol Cylinder over the predicted price of power from their device.

Now well over a year late, part of the delay is being blamed on the difficulty of agreeing power prices with the wave teams. However, the review steering group have insisted that the costings used in the report must be agreed with the teams in order to avoid a repetition of the 1982 wave review fiasco, in which a senior consultant working on the review claimed that estimated costs for the Salter's Duck wave power device were deliberately exaggerated. □

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Flood warning

SEVERE flooding will hit coastal areas with increasing frequency as a result of global warming, warns a new Friends of the Earth report*. A business-as-usual approach to environmental pollution could see current once-a-century flooding hit some parts of Britain as often as once every three years by 2030.

The reports authors, from the School of Environmental Sciences at the University of East Anglia, base their findings on an estimate of global temperature rise made by the Intergovernmental Panel on Climate Change (IPCC) in 1990. Although the IPCC have since revised their estimate of the global sea-level rise by 2100 from 110cm to 50cm, the authors stand by the main thrust of their report.

Climate change will cause a rise in sea-levels through thermal expansion of the oceans, the melting of mountain glaciers and the break-up of the ice sheets. The

main impact in Britain will be "increased frequency of flooding, coastal erosion and saline intrusion, caused by changes in the regime of waves, tides and surges."

Taking the estimate of sea-level rises together with projected movements in the earth's crust, the report calculated the increased frequency of flooding by 2030 and 2100 at 25 UK ports. Using a base of a 1-in-100 year flood, the frequency of such a flood increases by 2030 to between 1-in-40 years for Grangemouth and 1-in-3 years for Newhaven. By 2100 most of the ports would face this event more frequently than once a year, and even for Glasgow which fares best in the findings, the frequency increases to 1-in-8 years.

With 40% of Britain's industry located in coastal or estuarine areas - all 14 oil refineries, 13 coal-fired power stations and ten nuclear stations are located near the sea or lower estuaries - rising sea levels could have a serious impact. Nuclear stations on the south east coast such as Sizewell and Dungeness are particu-

larly vulnerable, Dungeness is built on a sand spit, a recently formed feature which may be prone to migration. The Hinkley site is in an area which experienced storm surges in 1910 and 1981. Virtually all the UK's nuclear reactors are potentially at risk from sea-level rise well before complete (stage 3) decommissioning can be achieved at the end of next century.

The cost of counter measures to protect the UK from a 1 metre rise in sea-levels by 2100 has been put at around £7 billion.

While calling for further research in a number of areas, the authors recommend that, on the precautionary principle, responses to sea-level rises - which may be preventative or adaptive - should be prepared now. The preferred solution is "to minimise future rises in sea-level by limiting emissions of carbon dioxide and other gases which are increasing the greenhouse effect". □

*"Sea-level rise and the UK" by JP Barkham, FAS MacGuire and SJ Jones.

Humberside renewables

HUMBERSIDE'S potential for renewable energy is to be studied in an eight month, £21,000 study. The study, which follows similar valuations in Cornwall and Dyfed, is to be carried out by Environmental Resources Ltd (ERL) for Humberside County Council. In assessing which renewable energy sources look most promising, practicality, cost and environmental impact will be considered.

Welcoming the initiative, which is part of a county-wide Environmental Action Programme, Councillor Margaret Crampton, Chair of the Environment Sub-Committee commented, "For a sustainable future we must break away from finite fossil fuel resources ... The development of renewable sources of energy makes sense environmentally and economically."

Humberside's potential for wind power has already been highlighted by the Countryside Commission; and the County Council issued a discussion paper on the issue last January. ERL Project Director, Ray Tomkins enthused "We think it will stir people's imaginations and we intend to produce a practical framework for the development of these renewable resources for which Humberside, by the very nature of its geography and climate, is well suited."

The final report, due to be launched in Spring 1993, will include a comparative assessment of the potential for each renewable source - both on and off shore, the time scales involved and practical next steps for initiating and implementing a renewables programme. □

Cumbria planning study

THE planning implications of renewable energy projects are being examined in Cumbria in order to draw up planning policy guidelines for Local Authorities.

A study, initiated by the Department of Energy in the autumn of 1991, is being carried out by Cumbria County and South Lakeland District Councils together with the government's Energy Technology Support Unit and the Lake District Special Planning Board. The working group have produced an interim report* which examines the potential resource of renewable and assesses their environmental impact.

While many environmental groups have called for improvements in the planning procedures, this report does little to advance renewable energy use. The total achievable resource "in the foreseeable future" is put at a maximum of 250MW.

It might be more than ironic that the Department of Energy should have chosen an area so tied to the nuclear industry to carry out such a study. The possible contribution of a range of renew-

ables is dismissed with ease.

Off-shore wave power is not possible because Cumbria is leeward of Ireland; shoreline wave power is not practical because of the large tidal range; tidal power is not economic, except possibly on the Duddon Estuary; large-scale hydro-electricity is not relevant in Cumbria; it is unlikely that geothermal would be suitable; the relatively low levels and scattered distribution of the population makes municipal waste incineration uneconomic, and anaerobic digestion is unlikely; and landfill gas potential will be reduced as waste incineration and anaerobic digestion increase.

When looking at the environmental impact of existing electricity generation, the report assesses "radiation releases by electricity generation fuel cycle" but the figures exclude nuclear reprocessing.

That the starting point for a planning assessment of renewable energy should be so negative about these sources potentials does not bode well. And it does nothing to enhance ETSU's reputation within the renewables community. □

* "Planning and renewable energy: a joint study in Cumbria and South Lakeland"; interim report, July 1992.

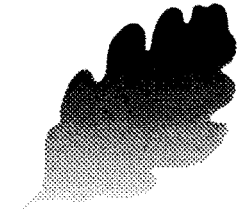
NFFO delay

THERE is growing concern that the Government's failure to announce a new English and Welsh Renewables Order for 1992 could seriously undermine projects planned for this year.

A survey by Friends of the Earth, who have accused the Government of delaying tactics, has identified 30 developers planning a total of over 620MW of installed capacity (350MW Declared Net Capacity) for the 1992 Order. If added to the capacity accepted under the 1990 and 1991 orders this would exceed the Government's target of 1,000MW for the year 2000.

The previous Orders were laid in December 1990 and November 1991, but the size of the Orders had been announced at the end of the preceeding year. An undertaking that developers would be given enough time to do their sums and put forward projects in time for the 1992 Order was made by the then Energy Minister Colin Moynihan to the Commons Energy Committee in January.

Any extension to the 1998 cut-off, which has been widely called for, would significantly alter the financing of projects. No announcement, on either the size of the Order or any extension to the renewables subsidy beyond the present 1998 cut-off, has been made by Tim Eggar, the new Energy Minister. □



Midlothian

**MIDLOTHIAN DISTRICT COUNCIL
congratulates the Scottish Campaign
to Resist the Atomic Menace on the
production of the 15th Anniversary issue
of the SAFE ENERGY JOURNAL**

As a member of Nuclear Free Local Authorities, the District Council is committed:

- to the preservation of a safe, pollution free environment;
- to conservation, and sustained research into the use of renewable energy;
- to the promotion of safe energy production policies;
- to the promotion of policies aimed at making the population of Midlothian more aware of the problems which exist.

REVIEWS

Energy efficiency: the policy agenda for the 1990s edited by Ian Christie & Neil Ritchie.

Policy Studies Institute; 1992, 118pp, £14.95.

Energy efficiency is more than just a "free lunch" – it is "a lunch you are paid to eat", according to former Friends of the Earth Director, David Gee. As he, and almost everyone else, points out energy saving not only saves money and the environment, but it creates employment and improves social conditions. Why then are governments, consumers and industry not "rushing to take advantage."

After all, "The European Commission and the British Energy and Environment Ministers all agree that energy efficiency is the quickest and the most cost-effective way to combat global warming ... The potential for energy saving is enormous. The Government's own figures suggest cost saving of around £10 billion from the national fuel bill of £50 billion, with technically possible savings of up to £25 billion. The cost-effective savings alone would reduce the UK's current CO₂ emissions by up to one fifth, as well as reducing fuel bills, creating jobs and increasing the warmth of British homes."

The figure of £10 billion in savings from the adoption of best available techniques for

energy efficiency and conservation is equivalent to the UK's annual income from North Sea oil.

This volume is a collection of key-note papers produced for a series of seminars held to mark the tenth anniversary of Neighbourhood Energy Action and to set "the policy agenda of the 1990s."

A number of factors were identified by the gathered experts and dignitaries to account for the surprisingly low take-up of energy efficiency. One of the prime reasons is the false security established by falling energy prices over the last decade, leading to low incentive for investment.

However, with the joint pressures of fossil fuels running out and concern about the possible consequences of global warming, energy price increases are inescapable. Yet if prices simply rise and force greater awareness of energy use and saving, this will do little to solve the problem of fuel poverty, where some seven million UK households languish in the cold of unaffordable warmth.

Little or no lead has been offered by Government over

the last decade. Gas and non-nuclear electricity industries have been privatised, energy efficiency grants to both business and households have been reduced. This market orientated approach has led to a preoccupation with sales in the energy sector, a problem hardly helped by the structure of the privatised utilities.

The weak position of the Energy Efficiency Office within Whitehall, the scant attention paid to least cost planning, insufficient energy efficiency standards for buildings and appliances, and the failure of public agencies to set a good example in making their own buildings energy efficient, were all identified as contributing factors to the low take-up.

On the basis of the papers and the seminar discussions, and in relation to recent policy developments in the UK and European Community, it seems clear that "a new agenda for energy efficiency is developing."

While no consensus exists on the most effective means of ensuring greater investment in energy efficiency, it seems certain that the following will become 'key elements' of energy policy in the coming years:

- improved information through energy labelling and audits, and incentives for insulation measures by householders;
- incentives for energy sup-

pliers to offer services in energy management and energy advice, and to invest in energy efficiency; including least cost planning;

- a higher profile for energy efficiency policy in Government;
- increased targeting of insulation measures for low-income households to mitigate fuel poverty and cut energy loss from the most poorly insulated homes.

This emerging agenda stresses a more strategic approach than has been fashionable for the last decade. The main thrust of the new policy agenda is environmental concern, and is "likely to be as much influenced by the European Community as by Whitehall, if not more so."

In all, the principal authors – Tim Jackson, John Cheshire, Brenda Boardman and Linda P Taylor – produce a detailed 'state of the art' picture of energy efficiency and its place in the contemporary energy and environment sector.

The arguments are convincing, and have been so for many years, let's hope this time that somebody in Government not only reads them but takes them on board. How many more people must suffer the indignity of fuel poverty, while the environment continues to suffer and at least £10 billion is squandered every single year.

MIKE TOWNSLEY

Emerging energy technologies: impacts and policy implications; Michael Grubb, John Walker et al.

The Royal Institute of International Affairs/
Dartmouth Publishing; 1992, 252pp, £29.50hb.

Though not the completion of a trilogy, this book is from the same stable as *Energy policies and the greenhouse effect* Volumes one and two (*Safe Energy* 84, 89), and links in well with these earlier works.

Through examples of both demand- and supply-side technologies, Grubb et al consider developing technologies, their possible future impacts,

and the effect of government policy options.

The diverse and complex nature of technology development has often meant that energy forecasts have been proved badly wrong having overlooked or misjudged the impact of technological change.

From energy labelling to investment in clean coal R&D, this book demonstrates

the pace of technology development in the energy sector and the crucial link with governmental (and inter-governmental) policy.

In considering R&D spending by government members of the International Energy Agency since 1977, three-fifths of which was on nuclear power, "there appears to be no discernible relationship between the allocation of government energy R&D expenditure over the past fifteen years and the technologies which now appear most likely to have a significant impact on energy supply and demand over the coming decades."

I do have one criticism: the

chapter on lighting proposes that higher electricity use should receive higher tariffs. It would "encourage the efficient use of electricity, and help low income households," say the authors. But low income households often have hard to heat homes and need to spend large amounts of their income on heating, while being the least able to make investments in energy efficiency.

This is, though, another excellent book from the Royal Institute of International Affairs' Energy and Environment Programme, and a valuable contribution to the energy debate.

GRAHAM STEIN

REVIEWS

The green economy: the environment, sustainable development and the politics of the future by Michael Jacobs.

Pluto Press; 1991, 304pp, £9.95pb, £29.95hb.

To many environmentalists economics are anathema; economists are seen as advocates of unlimited economic growth regardless of its effect on the environment. This view stems from a misunderstanding of the nature of economics.

The simplest definition of economics is 'the study of the allocation of scarce resources between competing ends'.

In an attempt to build models of the ways resources are used economists have had to quantify economic activities and so have tended to use the common measure; money. Professional economists fully understand the shortcomings of this approach but unfortunately politicians and others often do not. As a consequence monetary measures such as Gross National Product (GNP) and inflation rate are used as measures of the success of governments with little regard to non-monetary factors such as the state of the environment or the health of the population.

Michael Jacobs' book addresses this subject. He does not attempt to give an economist's answer to the environmental crisis but ably lays out an economist's approach to understanding it and proposes a new and comprehensive framework for the development of policies to address the situation.

He uses language that non-economists can understand but is nevertheless rigorous in his approach. He uses the

device of extensive footnotes to give details of his sources and to explore counter arguments and side issues. This leaves the main text as a clear exploration of the central issues.

In the initial section of the book he examines the relationships between the environment and human economic activities and analyses why conventional economics and political systems have led to the current crisis.

In capitalist economies what economists term as 'externalities' such as common resources, public goods and consideration of the legacy to be left to future generations, are ignored by the operation of the market and lead to depletion of resources and environmental pollution. This is because decisions are made by the individual in relation to his own short-term best interest in spite of the collective result of everyone's decisions being to the detriment of all in the long-term.

Centrally planned economies could have avoided this problem by having the environment as a major objective in their planning programmes. In practice the planned economies of Eastern Europe, USSR and China allowed their environment to deteriorate at least as much as that of capitalist economies.

The second section of the book develops the concept of sustainable development and rejects the concept of 'zero growth'. He points out that zero growth could, for

example, still see the rainforests being decimated at the present rate. What is needed is development that will both enhance the welfare of humans and preserve the environment for present and future generations. His analysis identifies four basic components of the environment and discusses measures likely to lead to a sustainable situation. The four are: renewable resources such as fish stocks; non-renewable and continuing resources such as minerals; environmental services which include the climate, flora and fauna etc. and; the assimilation of wastes.

He suggests that the development of the technology of non-polluting energy from renewable sources ranks amongst the greatest scientific challenges that mankind now faces. This is because many of the changes that would solve environmental problems are themselves energy consuming.

The third section of the book explores government

programmes that could be instituted on national and international scales to achieve sustainable development. He discusses the relative merits of voluntary mechanisms; regulation; government expenditure; and financial incentives, concluding that all have their place and indeed are interdependent. For example the revenue for a carbon tax can be used to finance environmental protection measures.

The final section considers the measurement of economic success, the difficulty of including sustainability parameters in cost-benefit analysis and the difference between the standard of living and the quality of life.

Jacobs' gives an excellent framework for an understanding of the issues that must be addressed urgently and is recommended wholeheartedly. It should be compulsory reading for our politicians and Green campaigners.

DAVID CATT

**Supporting
SCRAM
in campaigning for
safe energy production**



LOTHIAN
REGIONAL COUNCIL

**A member of the
Scottish
Nuclear-Free Zone
Movement**

*Lothian Regional Council - working towards
a Nuclear-Free Britain*

The advertising rates for Safe Energy are:

Full page (190mm x 265mm): £140

Half page (190mm x 130mm): £75

Quarter page (90mm x 130mm): £40

LITTLE BLACK RABBIT



Bad news

Reports in *Nuclear Forum* and *BNFL News* informed their readers that in a "historic turn-round" the Scottish NUM are now backing nuclear power. The stories claimed that a pro-nuclear motion from the Scottish miners' union had been passed at this year's Scottish TUC Annual Congress.

Nuclear Forum is the magazine of British Nuclear Forum, the group that takes out full-page adverts in our national press telling us to write to them for "the facts" on nuclear power.

The facts on the Scottish miners story are: the Scottish NUM do not support nuclear power; their motion to the STUC Annual Congress was not pro-nuclear; a proposed amendment from another Union, which was pro-nuclear, was withdrawn.

LBR has a suggested new title for BNF's organ - "Nuclear Fiction".



Gaia-a-gaga

James Lovelock, the person behind the Gaia theory of the earth as a living, breathing entity, has been talking to *Nuclear Forum* about his rather eccentric views on nuclear power. The problem with nuclear power "is only a perception problem," he declares. And the reason for many of the fears people have about

nuclear power - Russian disinformation.

Perhaps Lovelock's daftest notion is his desire to have a suitcaseful of high-level nuclear waste in his home - complete with concrete blocks and built-in safety system, he's not completely barmy - to heat his house.



Bear-faced cheek

The latest in the long line of bizarre sponsorship deals from the nuclear industry is BNFL Springfields support for Barnardos at the Preston Guild Famous Teddy Bear Exhibition. The nuclear industry may wish to create a cuddly image for themselves, but Barnardos pride themselves on refusing sponsorship from unsuitable companies. There acceptance of BNFL cash has not met with universal approval amongst their staff, some of whom don't consider the nuclear industry to be particularly children-friendly.



Sellafield is missing

LBR decided to take a trip to the BNFL visitors' centre at Sellafield, but having arrived in Cumbria, got lost. Not having a radiation detector, our roving rabbit took a look at a "Discover Western Lakeland" brochure, produced with help from the West Cumbria Development Agency. Not a mention of that lovely Sellafield. "Passport to Cumbria" tourist

guide was no help either. Finally LBR turned to the map in the Lake District Guardian produced by the National Park Authority - Sellafield was nowhere to be seen.

Perhaps Sellafield isn't as popular a place as they'd have us believe.



Mud packed

German Greenpeace has disclosed that samples of sand and mud taken from around the Sellafield reprocessing plant are so radioactive the whole area around the BNFL plant would be declared radioactive waste under German law. But LBR has discovered that the campaign, aimed at stopping German plans to send waste to the new THORP plant, has had its problems.

Attempts to get some barrels of the contaminated mud across the English Channel for delivery to the German environment minister, Klaus Toepfer, failed when two ferry companies refused to handle the barrels. Sealink turned them down in retaliation at Greenpeace efforts in early June to stop one of their ships carrying spent fuel from docking in Dover. P&O told them they had stopped carrying dangerous substances after Greenpeace campaigning in the past.

Definitely a case of being a victim of your own success.

Three ways to promote safe energy

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

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

- ☐ £15 (ordinary)
- ☐ £7 (concession)
- ☐ £25 (supporting)
- ☐ £100 (life)
- ☐ £35 (institutional)

Overseas (£ sterling please):
Europe add £2.50;
Outwith Europe add £4.50.

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

- ☐ £10
- ☐ £25
- ☐ £50
- ☐ £100
- other £ _____

3 I would like to help SCRAM with a regular monthly donation of:

- ☐ £1 ☐ £5 ☐ £10 other £ _____

To the Manager _____
(your Bank)

Address (your Bank) _____

Name _____

Address _____

Post code _____ Phone No. _____

To: SCRAM, 11 Forth Street, Edinburgh EH1 3LE

Please pay on _____ (date) the sum of _____ (amount) from my account number _____

to the Royal Bank of Scotland,
142/144 Princes Street, Edinburgh (83-51-00) for the credit of SCRAM No.2 Account 258597 and make similar payments monthly until further notice.

Signed _____ Date _____
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Scottish Campaign to Resist the Atomic Menace

ANNUAL REPORT 1991/92

HIGHLIGHTS OF THE YEAR

The Government's 1994 review of nuclear power provided the backdrop to domestic events in 1991/92, but overseas news dominated the start of the year. Our April/May journal reported on the near-meltdown at Mihama-2 reactor in Japan – an accident overshadowed by the Gulf War. And 26 April was the fifth anniversary of the Chernobyl accident.

Nirex announced in June that Sellafield was their preferred site for a low- and intermediate-level nuclear waste dump. Meanwhile, first reserve Dounreay stepped up its international search for storage/reprocessing contracts – a cause not helped by the announcement in December that 10kg of highly enriched uranium had gone AWOL.

June also brought the announcement from Scottish Nuclear of plans for on-site dry storage of their spent fuel, which was a serious blow to the still unopened THORP reprocessing plant at Sellafield.

With their decision in December to grant four decrepit Magnox stations a stay of execution, the Nuclear Installations Inspectorate did the public a grave disservice.

There was little good news for renewable energy in 1991/92, though in Colin Moynihan the Department of Energy seemed to have a Minister genuinely interested in the future of renewables. And signs appeared that wave power, after ten years in the doldrums, might be making a revival.

JOURNAL

The most obvious change in the journal was in the masthead, with "SCRAM" subtitled "the Safe Energy Journal" becoming "Safe Energy". We feel the new title is a clearer description of the content of the journal and hope that in the long term it will attract new readers, while continuing to appeal to our existing readership.

From the feedback we receive, readers seem generally satisfied with the contents of the journal, though we are always looking for ways to make improvements. We are aware that the layout and graphics could be better, but we are restricted by time, money, and facilities.

While the journal used almost always to be 28 pages, we now sometimes have 24 page issues. Because of the typesetting system we now use, it is possible to include as much information in 24 pages as we used to in 28. The shorter format saves on printing and postage costs.

Perhaps due to the recession, there has been a small reduction in the number of subscribers, though we hope to reverse this trend through increased advertising. Areas of expanding readership include eastern Europe and India.

REPORTS

The three main reports produced in the year were: *Renewable Energy: the Cinderella Option* by Mike Townsley, for Glasgow District Council (£3.50); *An analysis of the Dounreay reprocessing contracts* by Pete Roche and Mike Townsley, updating an earlier report (£2.00); and *Renewable Energy: Scotland's Future* by Dave Spence and Graham Stein, for Nuclear Free Zones Scotland (£5.00 A4, £3.00 A5). Copies of all three reports are available from SCRAM. (Please add 10% p&p.)

INFORMATION

SCRAM receives many requests for information from students, politicians, campaigners and the general public. While we welcome contributions towards the costs of this, we rely on grants and donations to meet the bulk of the expense.

With the nuclear industry spending millions of pounds of taxpayers money pumping literature into our schools – in lieu of text books the cash starved schools cannot afford – it is vital that the opposition case is also put.

We have not had the resources for a comprehensive update of our schools literature for years, but believe the content of the information we provide is still far superior to the glossily produced propaganda of the nuclear industry.

MEDIA

Providing information to the media is an important part of SCRAM's work. This includes informing journalists of stories, giving background information and analysis, and providing quotes.

It is important for the media to have reliable sources of information on energy matters, particularly on nuclear power where stories are often fast moving, involve complicated and confusing information and terminology, and are sometimes subject to misleading or incomplete information from the nuclear industry. SCRAM is regularly in contact with journalists on a range of newspapers and in television.

Even where nuclear and renewable energy stories do not mention SCRAM, we have often been involved in providing information.

The letters pages of the Scotsman newspaper have carried several exchanges between SCRAM and pro-nuclear correspondents on a range of issues from spent fuel transportation to the scope for renewable energy.

STAFF

SCRAM has for a number of years had three full-time staff, paid subsistence wages of around £45 per week, and a varying number of volunteers.

In April 1991, after a four year stint with SCRAM, Pete Roche - who helped set up SCRAM in 1975 and had also worked full-time for SCRAM in 1977/78 and 1981/82 - left us to take up a post with Greenpeace in London as a Civil Nuclear Campaigner.

Pete was replaced by Dave Spence who had previously been working with us as a volunteer. Dave left SCRAM in March '92, but for financial reasons it has not been possible to take on a replacement. The two full-time staff are Mike Townsley and Graham Stein.

Amongst those people who have helped SCRAM as volunteers, we would particularly like to thank Sebastian Klinke, Ken Benjamin and Douglas Raith.

STALL

In November '91 SCRAM started running a regular stall at a range of events, selling literature and merchandise. This has provided some income and more importantly has spread the anti-nuclear/pro-renewables message to a wider audience.

Many thanks are due to Linsay Stevenson for all her efforts in organising and running the stall and to those people who have helped Linsay staff the stall.

FINANCES

Since its beginnings in 1975, SCRAM has survived on a very modest budget. However, increasing costs particularly in running the office have not been matched by increasing income. This is due in part to the difficulties faced by Local Authorities, and through our policy of keeping subscription rates - particularly the concession rate - as low as possible. The result, as shown in the financial statement below, has been an erosion of our limited cash reserves. Clearly the year ahead will be crucial to SCRAM's survival.

We have widened our annual financial appeal to include Local Authorities in England and Wales, having previously confined this to Scottish Authorities. It will also be necessary for us to considerably increase our donation income from individuals if we are to avoid the projected deficit for the year which would leave us seriously short of funds. Standing orders, which provide us with a regular income, are particularly useful.

The cost of journal printing and distribution is covered by journal income but office expenses, wages and the costs of providing information have to be met by donations and grants. We continue to look at ways of reducing expenditure, but we have little room for manoeuvre if we are to maintain the range and quality of our information provision.

Given the current financial climate, hopes of increasing SCRAM wages above the present £45 per week will have to remain a long-term aim.

Accounts for 1991/92

BALANCE SHEET

	1992/93 (budget)	1991/92	1990/91	1989/90
Current assets start of year	6334	11893.18	13870.61	13104.68
Profit for the year	-6100	-5558.52	-1977.43	+765.93
Current assets end of year	234	6334.66	11893.18	13870.61

INCOME AND EXPENDITURE 1991/92 AND 1992/93 BUDGET

	1992/93 (budget)	1991/92	1990/91	1989/90
	£	£	£	£
INCOME				
Journal subscriptions	6000	5990.34	6518.79	6610.11
Photocopying	500	528.22	1171.70	2637.70
Donations	6000	11848.20 ⁽¹⁾	12732.38 ⁽²⁾	6757.10
Sales	500	387.87	400.33	644.93
Stall	500	671.66	—	—
Projects/Contracts	4000	800.00	250.00	1680.00
Miscellaneous	500	395.92	35.00	302.80
Press cuttings service	1200	1270.00	1010.00	650.00
Bank interest	100	418.33	1079.02	785.59
TOTAL INCOME	19300	22310.54	23197.22	20068.23
EXPENDITURE				
Journal	4000	3870.35	3961.57	3181.54
Rent/Rates/Insurance	2500	2475.36	1877.68	1374.30
Heating/Lighting	250	223.06	380.71	306.63
Telephone/Fax	1200	1434.78	1308.97	760.31
Photocopier	5500	4977.00	4447.09	4080.87
Postage	600	597.80	746.00	729.00
Expenses	2000	3708.84	2117.68	1670.10
Projects/Contracts	—	—	—	520.00
Petty cash	300	270.80	254.27	239.20
Bank charges/Tax	300	218.68	293.54	164.97
Office equipment/supplies	2000	874.99	2877.55	512.32
Stall	500	796.98	—	—
Library	1000	916.10	859.22	761.38
Miscellaneous	500	685.92	231.47	554.48
Wages ⁽³⁾	4750	6818.40	5818.90	4447.20
TOTAL EXPENDITURE	25400	27869.06	25174.65	19302.30
BALANCE FOR YEAR	-6100	-5558.52	-1977.43	+765.93

(1) Includes a single donation of £4,000 from a trust fund.

(2) Includes a single donation of £6,000 from a trust fund.

(3) Wage bill covers 2 or 3 full-time staff on subsistence wages of £45.50 per week, with other work being carried out by volunteers when available.

FINANCIAL APPEAL

Facing a nuclear industry that spends millions of pounds of taxpayers money every year on propaganda, SCRAM – in its seventeenth year – continues to survive on just a few thousand pounds a year from Local Authorities and the support of individuals.

The next two years, leading up to the Government review of nuclear power in 1994 will be crucial.

The good news is that on such a modest budget, SCRAM's financial problems could be relatively easy to solve. Individual contributions really do help.

If you are able, we hope you will send us a donation. £20, £50 or even £100 may seem a lot now, but it's a tiny price to pay for a safer future.

Photo: Mike Lave

Jonathon Porritt supports SCRAM and the *Safe Energy* journal.

"SCRAM plays a vital role in campaigning for an environmentally sustainable energy policy. *Safe Energy* provides invaluable coverage of nuclear power and renewable energy issues."

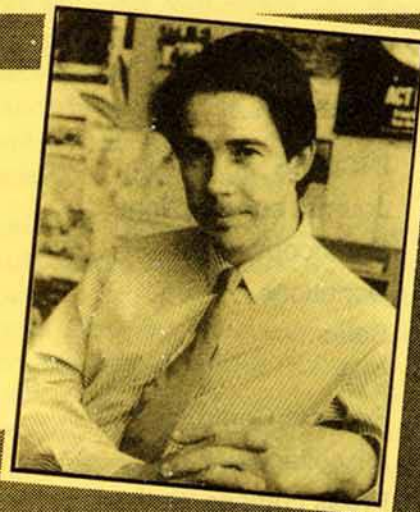


Photo: Phillip Carr



As a *Safe Energy* subscriber, former Python **Terry Jones** says:

"SCRAM is a voice of sanity in the crazy world of nuclear politics."

I enclose a donation to SCRAM of:

☐ £10; ☐ £20; ☐ £50; ☐ £100; ☐ other £ _____

You do not have to give us your name and address, but standing order donors should print their name clearly.

Name _____

Address _____

Post code _____

Phone number _____

I would like to make a regular monthly donation to SCRAM of:

☐ £1; ☐ £5; ☐ £10; ☐ £20; ☐ other £ _____

To the Manager _____ (your bank)

Address (your bank) _____

Please pay on _____ (date) the sum of £ _____

from my account number _____

to the Royal Bank of Scotland, 142/144 Princes Street, Edinburgh (83-51-00) for the credit of SCRAM No.2 Account 258597 and make similar payments monthly until further notice.

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Signed _____ Date _____

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