



THE SAFE ENERGY JOURNAL

SCRAM

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safeguards**

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lost opportunity**

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COMMENT

THE Government's decision to postpone the privatisation of the electricity industry by six months is yet another indication of the chaos which now surrounds the whole exercise. Unlike earlier privatisations, the City will be faced with the prospect of investing in an industry both artificially and arbitrarily dismembered in a way which magnifies risks for investors.

On top of that is the inbuilt uncertainty of nuclear power. Despite rumours to the contrary, it has now been decided that "the AGR and the new PWR stations will still accompany the National Power Company and Scottish Power into the private sector."

This announcement will have been greeted with dismay by many in the City. The English AGRs are the most unreliable set of commercial reactors in the Western World; they are being offered for sale along with a reprocessing contract with BNFL - another big headache for investors.

ENGLAND'S AGRs were described by Sir Arthur Hawkins, Chairman of the CEBG in 1983, as "a catastrophe we must not repeat". Dungeness B was ordered in 1965 and Hartlepool and Heysham A in 1968. Yet by 1989, none of them was fully commissioned. Their average load factor for the year ending May 1989 was just over 30% - they generated less than a third as much power as they were designed to.

The CEBG had already admitted that PWRs were more expensive than coal. Now they have told the Hinkley C inquiry that the cost of Sizewell B has risen by 10%, and this will probably mean a rise of 3 to 4% in the cost of Hinkley C. So despite all the promises about the dawning of a new era, we are already seeing the old familiar pattern of cost escalation and time over-runs.

Contractual arrangements announced by John Wakeham, the Energy Secretary, mean that competition will now only be phased in over eight years, rather than straight away as many big consumers eager to enter bulk purchasing contracts had hoped.

TONY BLAIR, Shadow Energy Spokesperson, says the delay "confirmed the chaos to which Government plans have reduced this service." He called it "a humiliating climbdown" which "demonstrates the monumental shambles of a privatisation born out of dogma."

Opinion polls show that more than a third of investors could be scared off by nuclear power. We now learn that the European Commission intends to investigate sections of the Electricity Act, such as the 20% non-fossil fuel requirement; the fossil fuel levy and the £2.5 billion fund for decommissioning expenses. This will undoubtedly increase the uncertainty for investors.

Anybody who had been considering investing in the electricity industry would do better to invest in Euro Disney in France rather than a 'Mickey Mouse' outfit here in the UK.

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CONTRIBUTIONS

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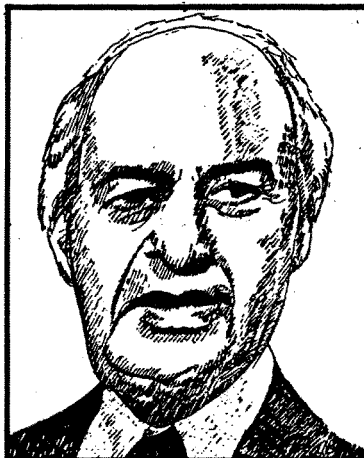
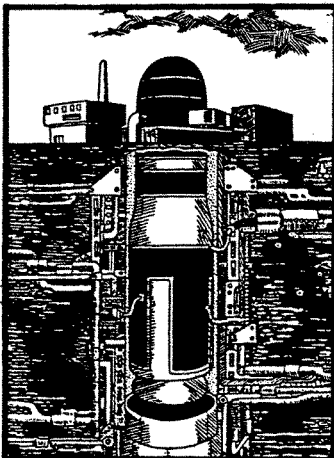
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Dreadnought dilemma

Workers at Rosyth Naval Dockyard have lifted their seven year ban on the decommissioned nuclear submarine, HMS Dreadnought.

Unions at the dockyard have been refusing to work on the Dreadnought since it arrived in 1982, because of fears that they would encourage the Ministry of Defence (MOD) to bring more decommissioned nuclear submarines to the yard.

The way has now been cleared for an internal structural examination of the submarine, to gauge its suitability for dry docking. Tom Adamson, industrial unions chairman at the yard, said "There was an overwhelming vote in favour of carrying out the survey. We will make the ship safe if it needs to be made safe and then reimpose the blacking."

The MOD, it is believed, want to dry dock the submarine early next year to carry out a more thorough inspection of the hull and look inside the ballast tanks. Some reports suggest that the Navy have been pumping air into the ballast tanks to keep it afloat. This inspection will assess the Dreadnought's suitability for being moved.

The MOD were criticised in July by the House of Commons Defence Committee for their failure to make up their minds about how to dispose of decommissioned nuclear submarines (SCRAM 72).

Dounreay may well be the Dreadnought's destination for dismantling. Both the UKAEA and Rolls Royce, who operate the submarine reactor prototype, HMS Vulcan, next door to Dounreay, told the Defence Committee they were capable of decommissioning submarines.

It would be technically possible to dispose of an intact submarine reactor compartment in Nirex's proposed deep repository, but the plans would have to be modified to include the excavation of a much larger shaft.

Nirex don't think "the difficulties and costs that would be involved . . . seem worthwhile." It is more likely, that if the deep disposal route is chosen, that the reactor compartments will be cut up and stored in suitable containers. This would inevitably lead to a degree of radiation exposure for the workforce.

Rosyth's new Trident re-fitting facility could be adapted for cutting up reactor compartments. The MOD estimate that, for the Dreadnought, this would result in a dosage to the workforce about the same as that received during a nuclear submarine refit at Rosyth.

Alternatively, the Dreadnought could be towed to Devonport dockyard, in Plymouth. Fears that this route may have been chosen were fuelled by the fact that a concrete nuclear waste store planned for Plymouth will have walls three times as thick as a similar store

planned for Rosyth.

It is clear that the Government and Navy's preferred disposal option is filling the submarines with concrete and sinking them at sea. The Irish Government will try to convince the London Dumping Convention, which organised the present moratorium on the disposal of radioactive waste at sea, to foreclose this option, at their next meeting in October. It is, however, not certain that the Government will feel bound by decisions made at the Convention.

Meanwhile Dunfermline District Council has finally been given permission to conduct radiation monitoring inside the main basin at Rosyth. The Council had made repeated requests for its radiation consultant, Dr Bob Wheaton, to be allowed access, but were previously told that radiation figures measured there were classified.

Swansea's mobile Chernobyls

Almost 5,000 people responded to a poll run by the South Wales Evening Post on whether or not nuclear-powered submarines should be allowed to dock in Swansea. 67% of respondents voted against the proposal.

Swansea District Council and West Glamorgan County Council were both in the middle of fighting the proposed Hinkley Point C nuclear power station, when they discovered that the MOD is "without any consultation, imposing a mobile nuclear reactor at the centre of our community" according to Alan Williams, Labour MP for Swansea West.

The Nuclear-Powered Warships Safety Committee (NPWSC) has recommended that the port at Swansea be designated a Z-berth (used for occasional operational or recreational visits). The Committee, whose members are drawn from the MOD, UKAEA, MAFF, NII, NRPB, the Department of Health and Her

Majesty's Inspectorate of Pollution (HMIP), has aroused considerable local opposition.

Archie Hamilton, Minister of State for the Armed Forces, told Parliament that a special safety scheme will now be drawn up in consultation with the local authorities and emergency services.

A safety zone with a radius of 550m, according to Hamilton, is the area in "which automatic counter-measures should take place in the event of a submarine nuclear reactor accident". He has refused to give the technical information upon which the zone is based, because "it would enable conclusions to be drawn about classified aspects of the design of submarine nuclear reactors".

Alan Williams is sceptical: "When Welsh sheep have been irradiated by the Chernobyl incident, it is very difficult for us to convince our constituents that the military radiation risk is limited to 550 metres."

Nirex knocked

Scotland Against Nuclear Dumping (SAND) in their latest briefing (*) say that even from "Nirex's own computer predictions, a waste dump at Dounreay could not, in the long term, meet Nirex's own design target."

The briefing is a response to a limited circulation report from Nirex called "Preliminary Environmental & Radiological Assessment and Preliminary Safety Report" (PERA/PSR).

The choice of Dounreay and Sellafield, the report makes clear, has been based on political expediency rather than safety. Basement Under

Sedimentary Cover (BUSC) is the geological environment identified by Nirex "as providing the best overall performance of the land-based concepts with respect to radiological safety." This geological environment is only found in the south-east of England.

The section on Site Selection in the PERA/PSR report includes a map (Figure 6.3) which purports to show 'reduced areas of search on land'. There is one area on this map which does not appear on the earlier map of geological regions considered to have potential for a repository (Figure 6.2). This new area stretches along the Moray Firth coast from just east of Inver-

ness to Buckie.

Nirex whittled nearly 500 sites down to 12 options, before plumping for Dounreay and Sellafield. Nirex are keeping the other 10 sites in reserve in case Dounreay and Sellafield prove unsuitable. SAND believe that the Moray Firth Coast is one of the sites on this secret reserve list.

PERA/PSR gives a clue to the real reason why Nirex oppose an "extended storage strategy." They say it could result in "increased opposition to the development of new nuclear facilities."

* SAND briefing on PERA/PSR; £1 incl p&p, available from SCRAM.

Secret consultation

Over the past several years Friends of the Earth has consistently criticised the 1960 Radioactive Substances Act, which governs discharges of radioactivity from non-nuclear sites (See SCRAM 65). It seems the Government has finally recognised that the current level of regulation is grossly inadequate and has proposed major amendments to the Act. The details of which are contained in a little known Department of Environment* consultation document published in May.

The DoE claim that the paper was widely circulated to industry, universities, hospitals and local authorities. FoE say no-one they have spoken to in the industry has actually heard of the paper and point out that the document has received no publicity, and that FoE was not on the circulation list. FoE's radiation consultant, Patrick Green, says "while the document is a vindication of the FoE campaign to force amendment of the Act,

one is entitled to ask whether the failure to publicise the document was because the Government wishes to give industry a chance to water down the proposals. It is significant to note that at a recent local authority conference, attended by over 120 environmental health officers and other authority staff, in the South West, not a single person had heard of the document. The way this document has come to light is extremely worrying."

The consultation document makes a number of proposals, the most important of which are:

1. Removal of Crown immunity under the Act, except for the MOD.
2. Local Authorities to set up a public register of certificates issued under the Act.
3. Regulatory departments and Local Authorities to have powers to disclose details of contaminated land.
4. Operators to be required to retain records, even after an authorisation has been cancelled.

5. Inspectors to have powers to enter sites where authorisations have been cancelled.
6. Inspectors to have powers to issue enforcement and prohibition notices.
7. Operators to be made liable for costs of administering the Act.
8. Inspectors to be allowed to conduct prosecutions in Magistrates courts.

The consultation document had a reply deadline in July. However, FoE recommend that people write to the DoE requesting a copy of the paper and reply to it. FoE can supply further details of the 1960 Act, its shortcomings and details of how it should be amended.

● Write to Patrick Green at FoE (26-28 Underwood St. London N1 7JQ), who will also discuss this issue more fully in the SCRAM 74.

* Control of Radioactive Substances Proposals for Amendment of the Radioactive Substances Act 1960 and for a Cost Recovery Charging Scheme: A Consultation Paper; May 1989, DOE.

Radioactive Solway

Parts of the North Solway coast are heavily contaminated with radioactivity from Sellafield according to a report* on the transfer of radionuclides.

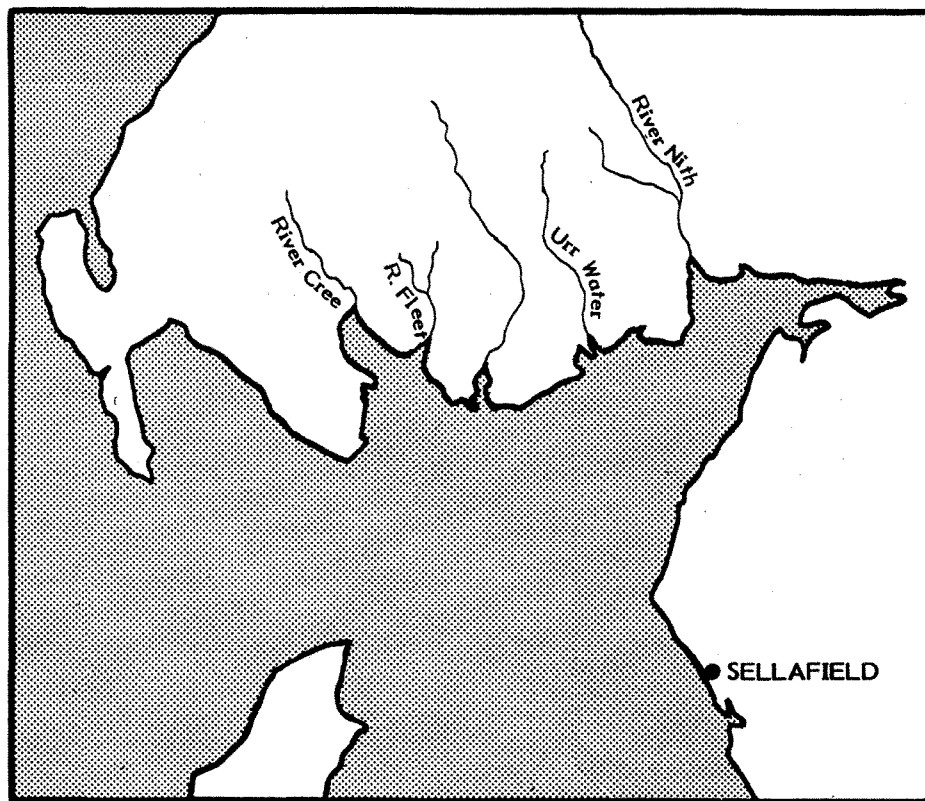
When announcing its publication, the Scottish Office said, the research had established "that the radiological impact on the inhabitants is well within the internationally accepted limit."

However, the study carried out by the Scottish Universities Research and Reactor Centre and commissioned by the Department of Environment, shows that levels of Caesium (Cs) 137 in two samples of soil taken from the banks of the Rivers Cree and Fleet exceed the official safety limits.

These Generalised Derived Limits (GDLs) are based on maximum public exposure levels of 1mSv/yr. If this is reduced to 0.5mSv/yr, as has been recommended by the NRPB, then the samples taken from around the River Nith and Urr Water would breach the limit as well.

The research provides evidence that radionuclides migrate from Sellafield in the marine environment to the Solway Firth, but sea-to-land transfer by aerial resuspension is usually limited to 500m inland. However, tidal inundation upriver is a much more effective mechanism of transferring radionuclides from sea to land. Radionuclides can be detected up to 17.5km upriver, although they are restricted to an area only a few metres on either side of the river course.

Besides the high Cs 137 levels,



the Cree, Fleet and Urr river systems produced samples with Plutonium (Pu) and Americium (Am) 241 activities above or close to 25% of the GDL. This implies, according to the report, "the need to review critical group doses particularly in the vicinity of the Cree and Urr rivers where riverbank areas are readily accessible to grazing sheep and cattle."

The report concludes that whilst the radiological situation in the area is "generally one of negligible

Sellafield influence", there are some localised radioactive deposits which are "significant fractions of the most relevant GDLs".

The Scottish Office have said that a new research project is being established in response to the report's recommendations, aiming to report within two years.

* An assessment of Artificial Radionuclide Transfer from Sellafield to South West Scotland: Scottish Universities Research and Reactor Centre Report. Reference: DOE/RW/89/127.

Wylfa B? Na!

Gwynedd County Council and Ynys Mon (Anglesey) Borough Council have both voted to reject National Power's application to build a Pressurised Water Reactor, Wylfa B, on Anglesey.

Between them the two councils have received about 30,000 objections to the power station (compared with 4,000 objections to Sizewell B and 21,000 to Hinkley C).

Gwynedd County Council have set aside £200,000 to fight the application, but they will be looking for financial help from other councils in Britain and Ireland. Lord Hooson Q.C. will be briefed to lead the council's case at an inquiry.

Gwynedd councillors voted against the proposal, on 7 September almost unanimously with only one abstention. The following day, neighbouring Clwyd County Council voted unanimously to oppose the development.

If the inquiry held into Wylfa B lasts for anything like as long as the Hinkley C inquiry it will be in sharp contrast to the five-day inquiries held before the building of the Welsh Magnox reactors at Wylfa A and Trawsfynydd.

People Against Wylfa B (PAWB) are asking people to continue sending their objections to Gwynedd County Council, Caernarfon, LL55 1LH. More objection postcards can be obtained from PAWB, PO Box 2, Porthaethwy, Ynys Mon, Gwynedd.

Sizewell C? No thanks

Meanwhile, as we go to Press, the Department of Energy had received a staggering 78,000 objections to Sizewell C.

Suffolk Coastal District Council will decide on 7 November, and Suffolk County Council on 23 November, whether or not to oppose the C station. Neither objected in principle to the B plant, and hopes that the Tory controlled councils will call for a full public inquiry are wearing a bit thin. They are expected to dodge the issue and call for an inquiry into local environmental issues and the new access roads.

However, the huge number of individual objections, along with Ipswich Borough, Norwich City, Norfolk County Council and the Association of London Authorities added to any number of local parish and town councils, means there will be a great deal of pressure on Energy Secretary, John Wakeham to call a full public inquiry.

Contact: Together Against Sizewell C, Tudor House, St James St, Dunwich, Saxmundham, Suffolk IP17 3DU

PWR costs escalate

The capital cost of Sizewell B has risen by about 10%, from £1.69 billion to £1.86 billion, according to the Director of the PWR programme at the CEBG. Brian George disclosed this information in a paper to the Hinkley Inquiry (CEGB 7 Add 7).

This increase in costs has been caused by additional payments to contractors to keep the project on schedule (even so it is 5 weeks behind) design changes to the steam system to make inspection easier, and additional costs for the control

systems.

The detailed cost estimate for Hinkley Point C will now have to be reviewed. Although all of the additional Sizewell B costs are not expected to carry over to Hinkley, it is expected that the original £1.47 bn cost will increase by about 3-4%.

The Hinkley Inquiry was due to close on 27 September, but instead was adjourned until 7 November to give objectors the chance to consider this last minute evidence from the CEBG.

Henney on Hinkley

It is critical to know "whether it is possible to construct a contract for the output of Hinkley C that will be acceptable to both ... National Power and the Area Distribution Companies" says Alex Henney, author of the Centre for Policy Studies pamphlet 'Privatise Power' (SCRAM 60).

In a briefing note for the Consortium of Local Authorities (COLA 17 Add 6) submitted to the Hinkley Inquiry just before it adjourned, Henney says that constructing long-term contracts for large power stations is complex at the best of times, but when the stations have yet to be built the contracts have to cover the additional risks of unknown construction time and uncertain operating performance. In the US agreeing such contracts usually takes between one and two years when negotiated between experienced parties.

By "the beginning of September", according to Henney despite "extensive and unresolved debates about risk and principles, there is no serious draft contract on the table for the AGRs and Sizewell B let alone for Hinkley C." In March

this year the CEBG withdrew its application for Fawley B, coal-fired power station, because the Area Boards decided it was not possible to contract for the plants output.

The financial uncertainties of Hinkley C are numerous. The Labour Party have made it quite clear that they will not be bound by open ended guarantees of public subsidy to the private sector. Even if it is built on time and operates with a reasonable availability Henney estimates that electricity from Hinkley C will cost 5p/kWh compared with 3p/kWh for coal-fired electricity. Such a price difference can only be sustained while the nuclear ring fence is in operation.

Given the Labour Party's views there is no guarantee that the nuclear ring fence can last for the minimum period necessary "to provide a secure contract for the 7 year construction period ... followed by 20-25 years of operation. Nuclear power hangs by the thread of one political life - that of Mrs Thatcher. And that is not an adequate basis for comfort in committing a long-term development costing £2.5bn."

Letter: a mass campaign of direct action

Dear SCRAM

Whilst we agree with the substance of your June/July editorial, we cannot agree with the conclusion. The Windscale, Sizewell B and now Hinkley C inquiries all tell us, as you say, that "rational argument counts for nought" when it comes to the Government and the nuclear industry. In fact the Government has been committed to building a substantial PWR programme in Britain ever since 1979. The public inquiry is merely a sham to divert public opposition into harmless (to the Government) and exhausting (to the anti-nuclear movement) channels.

We agree that the anti-nuclear

movement needs "to make sure the political costs of continuing with nuclear power are too high for any Government." However, rather than sending a postcard asking for yet another fruitless inquiry, we suggest that anti-nuclear activists start to build a mass campaign based on direct action against the nuclear industry.

If any of your readers are interested in building such a campaign then we hope they can come along to the next Anti-Nuclear Network conference. Details can be obtained from us in Brighton.

British Anti-Nuclear Network
c/o The Peace Centre
28 Trafalgar Street, Brighton.

US waste chaos

The US Government and nuclear industry have been accused of gross mismanagement, in a new study* on the development of structurally sound nuclear waste disposal facilities by Washington based consumer group, Public Citizen.

The Waste Isolation Pilot Plant, in New Mexico, and the proposed high-level waste repository near Yucca Mountain, Nevada, may never open because of problems with structural integrity and water seepage leaving them well below Federal environmental standards. Efforts to construct 12 commercial "low-level" waste dumps and develop a safe system for transporting nuclear waste are also running into difficulty. Public opposition to the dump sites is strong and growing.

No comprehensive review of the scale of the nuclear waste problem has been carried out by the US Government. So, Public Citizen undertook this year long study to examine the source and volume of radioactive waste, the health risks posed, and present storage and transportation technologies.

Waste is accumulating at an ac-

celerating rate - much of it is being stored indefinitely at "temporary" and poorly designed facilities.

Possibly in anticipation of the failure of the facilities it is now building, the Government is now hoping to deregulate the disposal of at least some of the waste - forcing it into state and community garbage disposal systems.

This would mean that, from the early 1990s, up to one-third of what is now classified as "low-level" waste would be treated like ordinary garbage - completely unregulated and unmonitored for radioactivity. The Nuclear Regulatory Commission calculates that this would result in an annual fatal cancer risk of 1 in 100,000 - at least 2,500 extra cancer deaths in the US every year.

Besides the problem of brine seeping into the WIPP repository (SCRAM 72), Public Citizen calculate that even if fully deployed it could only accommodate 33% of the retrievable and buried transuranic waste expected to exist by 2013.

There are more than 30 active geological faults near Yucca Mountain, and several volcanic cones. Underground nuclear blasts at the nearby Nevada Test Site may have fractured the underground strata at Yucca Mountain. Percolation of water from the surface into the site may be far more rapid than the Department of Energy has acknowledged - possibly taking only months to move from the surface to the storage chamber.

Recent studies suggest that the water table could rise and flood the repository, resulting in the expulsion

of waste at ground level. Moreover, the chemical composition of the area's groundwater is likely to facilitate the transport of radionuclides.

The current 2 million shipments each year of radioactive materials (waste as well as other materials) already expose people living near transport routes to 30,000 - 100,000 person mSv per year - enough to give 120,000 - 400,000 people the maximum annual dose permitted in the US (0.25mSv).

If all irradiated fuel is sent by truck to the Yucca Mountain repository, there will be between 3,800 and 6,405 truck shipments per year. Based on past accident statistics, this suggests there will be 19 accidents every year, with a crash severe enough to release some of the casks' radioactive contents occurring every 8.7 years.

* Nuclear Legacy: An Overview of the Places, Problems, and Politics of Radioactive Waste in the United States. Full report \$20; Summary \$3 from Public Citizen 215 Pennsylvania Ave, S.E. Washington DC 20003.



European plutonium trade

If the demand for Mixed Oxide Fuels (MOX) grows, as is currently anticipated, a British MOX plant could be brought into operation in the late 1990s.

MOX is a mixture of plutonium and uranium oxides containing about 5% plutonium, thus reducing the need for enriched uranium.

According to a recent OECD study, at least 40 commercial nuclear plants are planning to burn MOX fuel, which makes use of the plutonium recovered from spent nuclear fuels by reprocessing.

By using the plutonium quickly after reprocessing, storage costs are minimised, as is the loss of fissile material through radioactive decay and its gradual contamination with americium 241, which results in increased gamma doses to personnel.

With the nuclear industry becoming more and more pessimistic about future prospects for Fast Breeder technology, there is more interest in recycling plutonium as

MOX fuel. In Europe Belgium, France and West Germany have all made and tested plutonium fuels, and British Nuclear Fuels hope to enter the market.

BNFL, Belgonucleaire and Cogema have reached an agreement which involves a joint research and development programme on MOX fuels, and allows BNFL access to the COMMOX manufacturing capability. BNFL will act as an agent for MOX fuel to be supplied from current and planned COMMOX plants.

Meanwhile, the German company, Siemens, have asked the Hesse Environment Minister for a licence to increase the amount of plutonium handled at its fuel fabrication plant at Hanau, from 460kg per year to 2.5 tonnes per year. This would enable them to increase their production of MOX fuel to between 100 and 120 tonnes per year - enough for all West German nuclear plants.

Plutonium by air

New United States regulations on the safe transport of plutonium will virtually rule out BNFL's proposal to fly up to 45 tonnes of plutonium from Sellafield to Japan via Prestwick Airport in Ayrshire.

However, standards governing the transport of plutonium within Europe are controlled by the International Atomic Energy Agency (IAEA). The IAEA has recently formulated a new set of proposed standards which are far less demanding than the US standards. Prestwick Airport could still be used to transport plutonium back to BNFL's European customers.

It appears that BNFL have, so far, been unable to design a flask to meet current US regulations, let alone the new rules which are more than twice as stringent. Sharon Tanzer of the, independent, US Nuclear Control Institute is 'sceptical' that a flask capable of meeting the new regulations could be developed.

DAVID LOWRY of the European Proliferation Information Centre (EPIC) reports on the conference of a little known group - the European Safeguards Research and Development Association - and their efforts to prevent the diversion of nuclear materials to military uses.

Safeguard sleuths

DESPITE its twenty years existence the European Safeguards Research and Development Association (ESARDA) remains a purposefully quiet organisation, not wishing to be too public in its activities. For its 20th anniversary symposium - where over 230 experts, nuclear and computer scientists, chemists and engineers gathered - it did not invite any journalists, despite popular interest in the nuclear proliferation issue.

Given the security-sensitive background of some of its members, such as the UKAEA and BNFL in Britain, the Commissariat à l'Energie Atomique (CEA) in France and the EEC's nuclear watchdog EURATOM, it is not surprising that ESARDA is coy about publicity. Nonetheless, many things said at the Symposium are of considerable wider interest.

ESARDA's nuclear experts are trying to design systems and technologies to monitor nuclear materials to ensure that covert diversion to military uses does not take place at civil installations. Also, they train new scientists with the skills the 'safeguard sleuth' needs most: insatiable curiosity and scepticism over official figures.

Haunted

The most controversial presentation was made by Jim Lovett - who first worked for the old US Atomic Energy Commission, then the private US nuclear industry, before a 17-year career with the International Atomic Energy Authority (IAEA) safeguards section in Vienna. He explored a scenario which had "haunted him all the years he had worked on reprocessing at the IAEA."

The key question posed was "How do you ensure the absence of transfers of nuclear materials which bypass the input measurement at the reprocessing plant when the reprocessing regime begins?" He pointed out that a reprocessing plant is a maze of piping. To those who designed it, or supervised its construction, or even to chemical engineers with experience of reprocessing operations, the maze may be understandable, "but to suggest

it should be understandable to an inspector with limited knowledge of reprocessing is unrealistic." A EURATOM safeguards official ruefully reinforced Lovett's concern: "if the operator really wants to baffle the inspector he probably can."

The pessimism expressed by safeguards inspectors was countered by Andre Petit, former Ambassador at large for the CEA, who suggested that all the main problems in implementing safeguards at large reprocessing plants had been resolved. He thinks Lovett's concerns were looking at "artificial" problems. The bypass evasion proposition was false because it over looked verification checks before and after the input measurement. Taken collectively, Petit contended, measures would suffice. No safeguards procedure purely relies on accountancy he said. Surveillance is central to the safeguards scenario, he stressed.

Verification technology

The important interface between safeguards bureaucrats and technological innovators was the theme of the keynote paper by John Jennekens, the IAEA's Canadian deputy director, with specific responsibility for safeguards. "Political decisions on non-proliferation and safeguarding can only be implemented if the verification technology is developed and in place." Adding that, the problem of linguistics, reporting complex matters in a language other than the inspector's own, is all too often overlooked in the reporting of safeguards.

In an interview Jennekens made it clear that there were still serious unresolved matters. He said, it was recognised in the early years of nuclear power that in a processing plant, even if politicians sought to have very precise nuclear materials measurement, it was accuracy that mattered most.

"The difference between precise and accurate is important: for instance you can have numbers stating either you weigh 82.5382kg, or 82kg, although in actual fact you weigh 84kg. So neither number is accurate but the first number is very precise." He recalled that there

was a realisation that you couldn't have sufficient accuracy to be able to predict the actual density, composition or isotopic number density (purity) of nuclear materials. This is why the material unaccounted for (MUF) concept was brought in. "For most people MUF seems to mean nuclear material is 'lost' - but some of it is probably in waste streams, some of it in the so-called leached hulls. So from a safeguards standpoint our responsibility is to confirm non-diversion."

The history of safeguards development is important, Jennekens stressed: "When the [IAEA] safeguards committee wrote its first report (INFCIRC/153) there was heavy emphasis on protection to prevent diversion. The US was concerned about the Japanese, the Soviets about the (West) Germans and pressure was to have a tight nuclear material accountability. They should have realised that there was some limitation on this," (Jennekens was a Canadian delegate to this drafting.)

"For the reprocessing plants such as WAK in West Germany or Tokai in Japan we can't really rely on nuclear materials accountancy. We have to have people there: human inspectors, containment and surveillance systems. It is the totality of the information that you get that is necessary." He agrees with Lovett in that you "can't do a design verification on a plant and say that there isn't a bypass tube installed." But added, if you have internationalised your inspectorate, with intelligent people not under pressure for results from their own governments...then safeguards created considerable confidence."

Because of the complexity of safeguards, he was at pains to point out that, the motion of non-attainment safeguard goals had to be considered very carefully. "In Canada we did not attain safeguards objectives in one instance although we were working like the devil to improve our goal attainment. Because of deficiencies in equipment called fuel bundle counters, we had problems. In the course of a year you may count something like 3,000 bundles for a CANDU reactor. You may end up counting 3,042 or only 2,097." Is that significant from a

safeguard standpoint? "You need to assess how much plutonium is in the irradiated fuel, per kg of uranium."

"In one case surveillance was lost in a spent fuel bay because of a station power outage. We needed to go back therefore to re-verify the core. But in the spent fuel bay there are tens of thousands of spent fuel bundles each 50cm long. It is practically impossible to re-verify with such numbers. But the IAEA needed to judge if the Canadians diverted any of this fuel. We don't think so. In Canada, all stations have resident inspectors not from a safeguards standpoint, but for safety reasons. So the oversight there is good."

Jennekens admitted that unexplained power outages at potentially sensitive plants always "raised the eyebrows" of the IAEA's safeguards division. When there was "loss of illumination" in spent fuel facilities in Argentina, Canada and Pakistan the IAEA treated each with the same degree of seriousness because this surveillance break was "simply not acceptable." However, "interest is a little higher in Argentina and Pakistan, simply because of the policies of those governments."

Harwell

The sometimes disarming straight forwardness of Jennekens contrasted with the guarded approach of some British officials. Dr Brian Hooten, director of the UKAEA's Nuclear Materials Control Office, however, admitted that Harwell handles nuclear materials "outside of safeguards" and therefore controls its operations in a different manner from a purely civil site. Nuclear materials are only "very seldom taken out of safeguards" at Harwell because "the Department of Energy (DoEn) don't like it." He stressed that "substitution across the safeguards boundary" were not allowed.

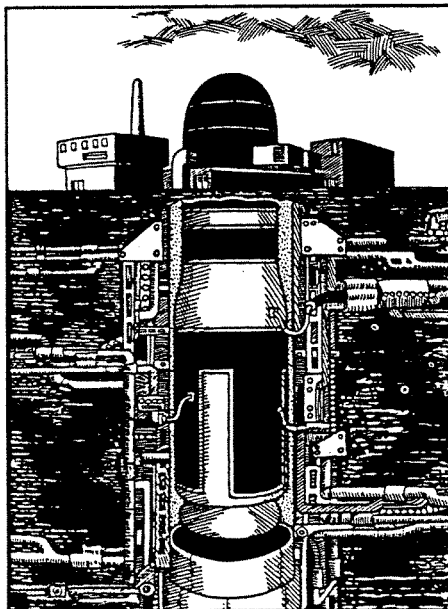
This contradicts statements made by the UK DoEn to the Electrical Power Engineers Association four years ago. In an internal memorandum by the EPEA research officer, dated 15 April 1985, it states that the DoEn officials had said that some fuel from Dounreay's inventory is "temporarily allocated to the military inventory." Fuel from the civil side at Dounreay can be used in a military reactor at Harwell for certain experiments.

During the experiment it is classified as military material and not subject to safeguards. Apparently in such instances the IAEA safeguards inspectors may be offered some additional material as "hostage" until it can be demonstrated that safe-

guarded material has not been diverted.

The same operational practice was also said to operate at Sellafield, where EURATOM inspectors had been barred from entry for 13 years (1973-86) until 4 June 1986 when a framework Sellafield safeguards was announced. This came only one week before the European Parliament's Energy Research and Technology Committee was about to initiate unprecedented proceedings against the UK and European Commission for ignoring mandatory safeguard promises from the 1957 EURATOM treaty.

The delay over the implementation of the safeguards was put down to EURATOM's commitment to establishing non-proliferation treaty safeguards in the EEC's non-weapons states in collaboration with



the IAEA, before problems with the UK and France were addressed, where a total of 19 mixed military-civil nuclear facilities exist.

The CEBG contended recently at the Hinkley C inquiry that none of the plutonium created in their reactors had been put to military use. When this claim was made at the Sizewell inquiry, it was described as "bloody lies" by Lord Hilton, the CEBG's first chairman (1957-64).

This time the claim was dismissed by the Luxembourg safeguards expert, who has personal knowledge of the British programme. He said that when spent nuclear fuel from military and civil reactors was 'co-processed' at Sellafield it was "physically impossible" to keep atoms separate, because the fuel is in a liquid state. 'In a fluidised-bed facility for fuel fabrication the nuclear material becomes "ultimately mixed and can never be one or the other thereafter." This makes a nonsense of the commitments to safeguards agreement

to keep to peaceful end-use obligations on imported uranium, he emphasised. Commitments made by Australian and Canadian energy ministers to their parliaments that none of their uranium had contributed to nuclear weapons programmes in nuclear weapons states in Europe were unsustainable.

He criticised the routine of "flag-swapping" and substituting civil uranium for military uranium for convenience, a practice promoted by the EURATOM nuclear supply agency acting independently from its safeguards agency, because it makes the implementation of proper safeguards far more complex. In this context the French 'safeguards' agreement with the IAEA was described as "hogwash", because it specifically allowed for substitutions, and the IAEA does not want to "waste its limited safeguards manpower in the weapons states."

'Flagswapping' had been central to the so-called Transnuclear scandal in West Germany and Belgium subject of a special all-party European Parliament (EP) report. It dealt with the failure of the nuclear watchdog to properly monitor nuclear materials transport across Europe. Yet, ESARDA failed to mention the issue at all.

Backtracking

EEC Energy Commissioner Nic Mosar, now retired, told the EP last year, that due to widespread concern "the European commission would draw up an annual report on the operation of safeguards and their results" serving "to disseminate more detailed information, to help strengthen public confidence in EURATOM supervision."

It appears that EURATOM is backtracking on this commitment to openness. The German director of EURATOM safeguards, Wilhelm Gmelin, who refused a full interview, pleading he required clearance from the Commission in Brussels, said the section of the annual report of the European Communities had increased its safeguards coverage to 2½ pages, but the full report promised was still under consideration. Gmelin thought that the EP would like to come back to the issue.

With 518 newly elected MEPs, there would seem no better issue to test their increased powers than to immediately summon new Energy Commissioner Cardoso e Cunha and director Gmelin to explain why they are reneging on a promise made to the EP. Unless such accountability is enforced, the EP will deserve no better reputation than an expensive talking shop. □

Energy efficiency - a lost opportunity

The Local Government and Housing Bill, which is currently going through Parliament, contains new arrangements for home improvement grants. It is viewed by Neighbourhood Energy Action (NEA) as "a missed opportunity to make a significant impact on energy efficiency standards in British housing."

The Bill does not make home improvement grants mandatory; makes no specific allocations of funding; has not been extended to give grant aid to public sector tenants and; fails to provide energy efficiency standards for houses.

NEIL RITCHIE, NEAs Senior Information Officer, outlines how the proposed system for home improvement grants would operate and the impact it will have on low income households.

ENERGY efficiency is back in the news, riding on the back of fears about global warming. Not since the oil crisis of the mid 70s has it commanded such attention. Leading authorities point out that energy efficiency measures offer the most cost effective method of reducing CO₂ emissions and thereby combating global warming. Whilst some of the new "green consumers", with money to spare, may be motivated to consider making their homes more energy efficient: what are the prospects for people on low incomes?

Ironically, if predictably, these are the very people who need the most help. People on low incomes tend to live in the poorest housing conditions. They lack the means to make any significant capital investment to



improve or repair the homes they live in. Many of them are in a 'fuel poverty' trap - burdened with poorly insulated homes and inefficient and expensive heating systems. Anyone who endures the misery of living in cold damp conditions for seven months of the year has a different perspective on energy efficiency. For them it's likely to mean getting more heat for their money, rather than a way of combating the Greenhouse Effect. Yet, under proposed legislation, to be introduced in April 1990, they face the prospect of losing their entitlement to existing grants for even the most basic insulation measures.

Housing Bill

Currently, the Homes Insulation Scheme and the Energy Grant provide money for people on low incomes to help meet 90% of the cost of loft insulation, fitting a hot water tank jacket and draughtproofing doors and windows. £27.5 million is available to people who receive income support, housing benefit or family credit. The Local

Government and Housing Bill, currently on its way through Parliament, threatens to remove this specific allocation of money for energy efficiency measures and require local authorities to fund such improvements from their already overstretched Housing Investment Programme resources.

Theoretically the new Home Improvement Grant should be good news for people on low incomes. After all, the intention is to target the grants on the people most in need, rather than on the property, as before. 100% grants will be available, and a wider range of improvements can be undertaken which can also be tailored to the requirements of individual households. Under the new system it's even possible that bigger and better energy saving measures could be grant aided: including cavity wall insulation and double glazing.

Possible - but unlikely. Most grants will be discretionary. Although the local authorities who will administer the new scheme will be able to make grants available, they won't be required to. They will also make decisions concerning what kinds of improvements can be grant aided. No-one will tell them how much money should be allocated, to making homes warmer or free from condensation. Given all the competing priorities, how will energy efficiency measures fare?

Bad news

A local authority's own tenants are further disadvantaged by the fact that they won't be eligible for grants at all. Any improvements to their houses will have to be funded as part of a council repair or improvement programme. This is particularly bad news for the network



of energy projects co-ordinated by Neighbourhood Energy Action (NEA). These projects provide draughtproofing and loft insulation, almost exclusively for people on low incomes. 75% of their work is for council tenants, only 15% for owner occupiers. The evidence suggests that local authorities do not generally draughtproof their housing stock,

except as part of a major improvement programme. If the money currently allocated to the Energy Grant (£17 million) which pays for draughtproofing for low income households is re-routed to general improvements, it seems more likely to be spent on repairing leaking roofs rather than on energy efficiency measures.

No-one would dispute the value of repairing leaking roofs or replacing rotten windows. However, when NEA lobbied to secure a replacement for single payments for draughtproofing back in 1988, it did so on the basis that the funds would be made available for better insulation.

Dampness and condensation

Keeping houses, and the people who live in them, warm and dry, makes economic sense. Houses don't deteriorate so rapidly, and their occupants avoid the illnesses associated with cold and damp. Improvements which make homes more energy efficient are not a luxury or an extra, and they should not be an after-thought. If evidence is needed to confirm that people want to live



in houses which they can afford to heat, surveys of tenants of Newark and Sherwood District Council and Wandsworth Borough Council gave this as their highest priority. The 250,000 people living in 84,500 houses in Glasgow affected by condensation and dampness (29% of the authority's stock) will have been pleased to learn that the Glasgow Action for Warm Homes campaign will see a major investment over the next five years in energy efficiency measures. Announcing a £362 million programme Glasgow's Director of Housing, David Comley said: "We believe the curses of dampness and condensation result from fuel poverty and are therefore committed to examining these problems and providing as much as we can of the necessary investment to eradicate them. That is what Glasgow Action for Warm Homes is all about.

"Our findings scotch the fallacy that condensation is, primarily the tenants' fault. They also reinforce

the council's long held argument that a major part of the solution to dampness and condensation is large scale investment in energy efficiency measures and repair work."

Massive problem

Nonetheless the scale of the problem remains monumental. Estimates suggest that 2.25 million council properties in England alone need improved heating systems, over 1.5 million need better insulation and over 600,000 need condensation treatment at a combined cost of over £4 billion. In the private sector, a further 4 million houses are in need of similar improvements at an average cost of £3,200 per dwelling.

Given the extent of the problem, and growing public concern about green issues, the revisions to the improvement grant system offered an ideal opportunity to significantly raise the energy efficiency performance of the British housing stock - already considered the lowest in Northern Europe. The current proposals fail to meet the challenge.

It is not just that council tenants will not be eligible for these grants, or that energy efficiency improvements will be discretionary rather than mandatory, the legislation also fails to set any specific standards or targets. Improvements to homes which are unfit for human habitation - the only area where grants are mandatory - will be required to have "adequate provision for heating". By this criteria, a 13 amp socket for an electric fire would be adequate. There is no requirement for any thermal insulation, and most of the heat which this electric fire will produce could end up disappearing fairly rapidly through an uninsulated roof or walls, or vanishing via the gaps around the windows and doors.

No precision

In the case of discretionary grants the picture looks a little brighter. The need 'to provide facilities for space heating' could again be satisfied by an electric socket but at least there is a clause indicating that grants can be made 'to provide adequate thermal insulation'. However, whereas Building Regulations specify precisely the standard of insulation which a new house must have, there will be no such precision when it comes to improving older properties. The Department of the Environment will restrict themselves to providing general guidance only on the kinds of work which local housing authorities can provide grants for.

Whilst this may include loft insulation, draughtproofing, cavity wall insulation, floor insulation, and double and secondary glazing, if a housing authority chooses to make grants for these purposes, how much of each there should be will be their decision.

In the case of minor works grants, insulation improvements can be funded but evidently improvements to heating systems cannot. Yet replacement of old and inefficient heating appliances and measures, such as fitting thermostatic radiator valves, can do much to make heating systems both more efficient and more affordable.

Lobbying continues

It is clear that a golden opportunity to tackle the low energy efficiency standards of the housing stock has been missed. A variety of organisations continue to lobby for amendments which will make grants for energy efficiency mandatory and available to council tenants, and amendments which will clearly indicate the standard for energy efficiency which should be achieved. NEA will be arguing that, without such changes, the Homes Insulation Scheme and the Energy Grant



should remain as separate programmes with separate budgets, so that at least low-cost basic improvements will continue to be available to those on low incomes.

With 1,800,000 low income households still without sufficient loft insulation, and 4,600,000 without adequate draughtproofing, there is still a great need for basic improvements which can significantly increase comfort levels and reduce fuel bills. If the proposed grant system is not amended all these people will have to hope that local housing authorities see warm, energy efficient homes as a top priority. Either that or hope that global warming introduces a sub-tropical climate before next winter. □

PAUL WATTS took the Friends of the Earth Radiation Monitoring Unit to North Wales; in an area which had high rainfall after Chernobyl he measured radiation levels which suggest contamination may have been higher than we are led to believe.

Welsh Chernobyl legacy

IN A post mortem examination of the Government's handling of the Chernobyl accident, the Agricultural Committee did not mince their words. They doubted whether the Ministry of Agriculture (MAFF) monitored all the worst affected areas, accusing them of negligence over the Skipton Moor incident, stating that, "in respect of North Yorkshire ... a clear case of negligence emerged", and concluding that "there was a clear failure in MAFF's information processing and assessment". The committee also concluded that "there were several routes by which lamb above the limit may have gone to slaughter and that it must therefore be highly probable that some did so."

The Committee were also critical of MAFF's failure to predict the length of time the lamb bans would last. The bans were introduced in June 1986 in those areas which had been worst affected by the Chernobyl contamination. It was anticipated that the restrictions on the sale and slaughter of lamb would last about 3 weeks, after which it was expected that the levels would have declined significantly. When the restrictions were first introduced in North Wales some 5,100 holdings with 2 million sheep were affected, Three years later around 416 holdings with some 300,000 sheep remain subject to restrictions.

FoE survey

In August of this year FoE carried out a radiation survey of North and Mid Wales. The purpose of this exercise was: to follow up the previous work FoE had carried out in North Wales in 1986 and 1987 and to compare the results; with data received from the Meteorological Office, to take measurements around Llangurig where there had been particularly high rain-fall over the critical weekend in May 1986, and where no lamb bans had ever been introduced; to compare measurements taken from restricted, de-restricted and un-restricted areas, and; to establish the need for an aerial survey over Wales similar to that carried out over Cumbria in the summer of 1988.

The equipment used was a Harwell

Caesium Threshold monitor (CTM), supplied by the UKAEA. In devising the survey strategy there were two options: (i) putting the emphasis on the accuracy of individual sample measurements (time constraints effectively reducing the number of samples which could be taken) or (ii) putting the emphasis on sample size - some reports having suggested that there can be as much as a factor of ten difference between activities of samples taken in close vicinity. It was because of this factor that the latter option was adopted. This effectively resulted in individual sample measurements being less accurate but allowed for the analysis of approximately 460 samples. Approximately sixty of these were re-analysed using a high resolution gamma ray spectrometer at the University of Surrey. Comparisons between the CTM and the gamma ray spectrometer results confirmed the reliability of the data.

THE RESULTS

Table 1 breaks down the results in terms of the five different sample types that were analysed and their area designation ie. whether they are from restricted (R), de-restricted (DR) or un-restricted

(UR) areas of Wales. All the samples from the UR areas have come from Llangurig, which received particularly high-rain fall at the beginning of May (see Figure 1).

There is clearly a definite trend in activities between different area designations, with higher mean activities in R areas than in DR and UR areas. However, as can be seen there is a wide range of contamination levels in all categories. In particular, some high readings were noted in parts of the unrestricted area.

For example, five of the grass samples from the UR area were above the mean of the samples from the DR areas. The highest UR grass sample was higher than 27 out of the 29 DR grass samples and higher than 16 out of 31 R samples. The highest rootmat sample from the UR area was higher than 17 out of 20 dJR samples and higher than 17 out of 35 R samples. Similar statistics exist for the soil, moss and lichen samples.

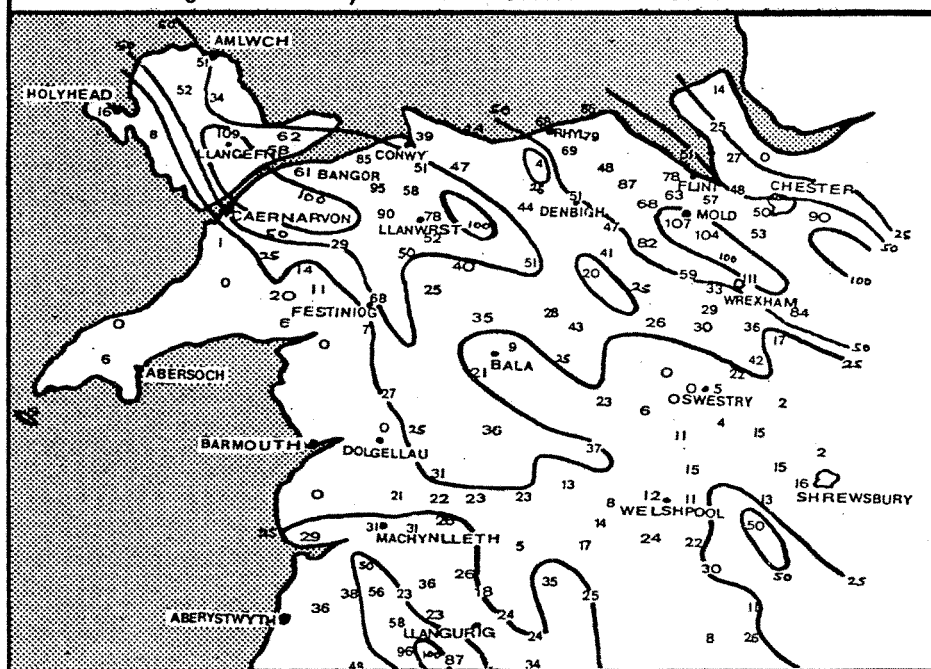
In all these cases only a few samples were found in the UR areas with higher readings. Given the wide distribution in contamination levels found, it is difficult to infer whether these are exceptional read-

TABLE 1: Summary of the results of monitoring 5 different sample types from differently designated areas

Sample type	Samples taken	Type	Mean (Bq/kg)	Range (Bq/kg)
Grass	23	UR	21	0 - 98
Grass	31	DR	52	0 - 482
Grass	31	R	122	0 - 429
Rootmat	22	UR	143	0 - 408
Rootmat	22	DR	371	110 - 1259
Rootmat	35	R	568	140 - 1423
Soil	20	UR	68	12 - 121
Soil	31	DR	142	13 - 553
Soil	49	R	162	2 - 645
Lichens	11	UR	287	42 - 757
Lichens	5	DR	589	254 - 1096
Lichens	9	R	2788	1373 - 4098
Moss	37	UR	104	0 - 531
Moss	25	DR	529	0 - 2000
Moss	41	R	1031	0 - 4303

UR - Un-restricted area, DR - De-restricted, R - Restricted

FIGURE 1: Rain-fall (tenths of mm) in N Wales in the period following the Chernobyl accident. Source - Met Office



ings, ie. chance findings or whether the high values are more widespread. We do not have sufficient samples to be able to answer this question.

However, these findings are sufficient to make some general statements. Clearly, the high values in the UR areas are not as high as the highest readings from the R areas. Therefore, it is unlikely that the UR area should be restricted. However, it is legitimate to ask whether higher contamination levels would have existed at some time in the three years since the accident. Unfortunately it does not appear that the official monitoring agencies have surveyed this area so it is not possible to comment with any certainty. However, it should be noted that the highest readings from UR areas, particularly of grass and rootmat are higher than 50% of the corresponding samples from the DR areas.

Unverifiable

MAFF and the Welsh Office should indicate whether they have monitored in this particular area in the past and if so they should state what contamination levels were found. Their published data for 1986/7 does not give specific locations for monitoring results. It is therefore impossible to verify official data.

One of the problems of making comparisons between the means of data sets taken over a large area, is that it does not highlight localised contamination. Accordingly, the data was broken down further into regions of Wales. This revealed an interesting feature when com-

parisons were made between the restricted area around Lake Vernwy and in the de-restricted area to the north of the lake. Because of the small sample size only very general points can be made. Table 2 shows the mean activities from the four different sample types monitored from the different areas.

In three out of the four sample types the mean contamination levels in the de-restricted area were higher than the mean in the restricted area. For grass, the highest reading was over one and a half times higher than the highest reading in the restricted area. For the rootmat the highest value in the de-restricted area was slightly higher than from the restricted area. Only the moss from the DR area had an average value lower than in the R area. However, the highest moss reading from the DR area was higher than 13 of the 18 samples from the R area.

While these results are only based upon a small sample size from the DR area, they suggest that the DR area to the north of Lake Vernwy is as contaminated, if not more so, than the R area. The samples from the DR area were taken from the road side. There is no information on contamination levels in the wider DR area away from the road. However, it is reasonable to suggest that similar contamination levels might exist. Clearly, these results show the need for a further investigation in the area.

The main area of importance is the relevance of our data to the sheep farming community in the area. It is important to note that no sheep have been monitored by FoE. Therefore it cannot be inferred what levels of contamination, if any, would be found in sheep grazing in the DR and the UR areas we monitored. The exact relationship between levels of caesium in soil, rootmat and grass, and the contamination levels of sheep is still unclear.

However, we note that the Ministry do not appear to publish monitoring data for sheep from DR and UR areas, for sheep in restricted areas they simply state how many were found to be above or below the 1000 Bq/kg limit. In their most recent press releases the Welsh Office have not stated how far below the limit sheep are when they are released from restrictions.

Whilst our results do not contain sufficient evidence to suggest that the areas highlighted have been incorrectly classified, or that another missed hot spot has been found, they do highlight the need for a comprehensive survey of contamination in North Wales. In terms of resource allocation, an aerial survey would provide an economic method of rapidly identifying where the problem areas are, enabling follow up ground work to be carried out. □

TABLE 2: Comparison between the restricted area around Lake Vernwy and the de-restricted area to the north of the Lake.

Sample type	Area	Samples taken	Mean (Bq/kg)	Range (Bq/kg)
Grass	R	14	137	0 - 390
Grass	DR	3	217	61 - 482
Rootmat	R	15	737	213 - 1218
Rootmat	DR	3	941	412 - 1259
Soil	R	16	149	48 - 305
Soil	DR	3	173	113 - 205
Moss	R	18	1327	10 - 4071
Moss	DR	3	870	217 - 2000

R - Restricted area, DR - De-restricted area

Lord Ezra with a long career in the energy world and more chairs than MFI - former Coal Board Chair, chair of NEA, chair of AGAS, chair of Associated Heat Services, and a prominent member of the Lords committee on energy - discusses recent events in the industry with MIKE TOWNSLEY.

Lord Ezra: championing CHP

You were a prime mover of the now infamous Lords Amendment to promote energy efficiency in the Electricity Bill. What was the objective of that amendment?

We wanted to introduce, into the new regulatory system, a way in which the regulator could ensure that the distribution companies positively stimulated energy efficiency. As a basis for the amendment we used the widespread practice from the United States, whereby the regulator does not agree to new investment in capacity by the utilities, in this case the 12 distribution companies, until they have assured him that they have done everything possible to stimulate efficient use, not only at the generating end but more particularly at the consumer end.

This is called Least Cost Planning in the US.

Yes. The Government objected to the amendment, they said it was too restrictive, they didn't like the wording. In the end they introduced an alternative, which, in my opinion is much weaker. It, simply, made it a duty of the regulator to stimulate energy efficiency and prepare a report on achievements.

Has the regulator been given powers to enforce efficiency standards?

No!

You are a known advocate of combined heat and power and district heating. What is your interest?

I have been involved in trying to stimulate CHP for 30 years or so. I was very active when I was in the coal industry and have remained active ever since. In fact Associated Heat Services, of which I am Chairman, is itself involved in promoting CHP and entering into schemes. I was the first president of the CHP Association, then the District Heating Association.

You proposed an amendment to the Electricity Bill that would have promoted CHP.

Again, I wanted to get the Government to commit themselves to promoting CHP, but, they wouldn't.

They argued that it constituted interference with the free market.

That's right. Even though it is clearly of great environmental im-

portance. With CHP you don't have environmental problems of any sort, all you do is distribute hot water through under ground pipes. You have the initial disturbance of putting the pipes there, but once that is done there are no conceivable environmental difficulties.

What I object to is, the Government interfered with the free market to support the nuclear industry. When it came to something which was indubitably of environmental benefit, much more so than nuclear, which has its own environmental problems, they wouldn't. I thought this was illogical and unreasonable.

The argument for CHP is an argument for efficiency.

It is an argument for efficiency, also these days a very strong environmental argument.

What you are doing with CHP is doubling the use of the effective heat from a power station, by using the waste heat for heating premises instead of just heating the atmosphere.

In that way it has a positive impact on the greenhouse effect by reducing the amount of additional energy which has to be consumed to provide heat.

What about the pollution from the heat source?

It is there already, generating electricity, you are not adding to it, you are making better use of it. That's the point!

How easy is it to retrofit fit CHP plant?

It is not difficult at all. Obviously you can't do it to every plant, it would be hopeless to retrofit a big 2000MW plant miles out in the country. You have nothing to heat. But there are plenty of medium and smaller plants, Leicester for example, which are near inhabited areas, city centres, those could easily be adapted.

The Government are very lukewarm about these things. The Sheffield scheme only went ahead because the city council had faith in it, and they found people from the private sector to co-operate. In fact it has paid off. It is a very viable scheme, it provides heat to large blocks of flats who used to get the heat from under floor electric heating, which was wildly expensive and

unsatisfactory, now they pay half the price for their heat and get double the comfort.

Baroness Hooper, then DoE Minister said, your amendment would not have strengthened the Bills existing support for CHP.

She argued two things, which were contradictory: on the one hand she said there was already a commitment, I don't believe it is sufficient. On the other, she said if they used the words that I had proposed - namely to "promote" - this would in some sense involve subsidisation. I said, the word promote did not mean subsidisation, it meant stimulate, encourage, which is what I wanted to happen. I subsequently looked it up and found I was absolutely right and sent her a cutting from the dictionary.

Did she respond?

Yes, I had a long letter from the ministry, saying that they still considered that my proposition would lead to a pressure for subsidisation. They did not think that this was right, and that they were doing a great deal to encourage CHP, but on the basis of the 'level playing field' - the same terms for everybody.

Was that not the purpose of the 1983 Energy Act?

Of course it was, and nothing came of it. It failed because of the pricing provisions. This time round will also fail because the legislation is not strong enough.

The problem with CHP is that it requires a great deal of up front capital investment, but it pays off later.

Is privatisation not supposed to strengthen the role of independents within the industry: providing diversity and security of supply?

Yes, it is, but I can't see many contracts being negotiated for a long time yet. There is so much confusion over the major contracts, between the distribution companies and the two big generating companies, until that is sorted out no one else can get a look in. When it is, I am not entirely sure how much additional capacity will be required. I think the CEBG greatly exaggerated the need for additional capacity, before the privatisation measures were introduced.

So they would have enough generating capacity to tie up the generating business and maintain their monopoly for the first few years?

Yes.

The Government denounce intervention in the free market for CHP yet have now taken Magnox nuclear power stations out of the industry's portfolio.

This is very odd. Their reaction to nuclear in particular is, to say the least, peculiar. In my opinion, and I supported amendments to this effect, which others proposed, to take nuclear as a whole out of the legislation. A separate company should have been formed, either wholly or partly owned by the Government, until all the nuclear problems had been sorted out. There are many problems: decommissioning and nuclear waste disposal being only two. Above all there is the fact that it is totally uneconomic in Britain, at the present - it has to be safeguarded by a nuclear levy.

The Government at the last minute decided just to take out Magnox, that's illogical. The AGR's are going to cost just as much to decommission.

The Lords proposed an amendment allowing the government in the event of an accident to take over the station in question

We pressed this very hard to emphasise that there is always a risk, however remote, of a nuclear accident. They may be few and far between but, when they occur they are devastating, therefore we felt, there should be some part of the legislation that provided for the government taking over the station and assuming full responsibility for a nuclear accident. The Government would not accept that.

Is their allegiance to nuclear power directly responsible for their disinterest in energy efficiency?

The two do go together. It is remarkable how strong they feel about nuclear power and how weak is their commitment for energy efficiency. They have cut the grant for the energy efficiency office in half and are going to cut it again next year. They have cut all advertising for energy efficiency...they appear to have lost interest in it.

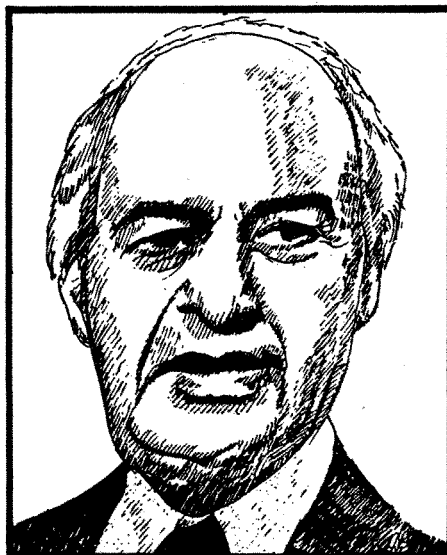
Although they have stopped advertising energy efficiency, they have started advertising for the flotation.

Indeed. I was among those peers who criticised this very strongly. The water and electricity industries, as now organised, are publicly owned. We do not believe they should be using public funds to promote the Government's plan to sell them to the private sector. If such expenditure is to be incurred then it should be the Government that meet it, and then we'd know

exactly where we stand. It is the Government that are doing the selling not the companies, they have no right under law to sell their assets.

They are actively advertising the industry for sale, however little or no money is spent on providing the consumer with consumption, or efficiency, data when they buy white goods. Should they be spending money on energy labelling?

Yes. The Government is obviously more interested in selling the industry to the private sector than in promoting energy efficiency. There were many recommendations made by the Select Committee of the House of Lords, of which I was a member, the most important of which was energy labelling. The Government have just been vapid about it, they said they would look at it. They really have not got an interest in energy efficiency. I don't quite know why that is because Mrs Thatcher keeps making big speeches about the greenhouse effect and the importance of the environment.



When it comes down to practical terms and particularly when it comes down to any expenditure of public money she's not interested. The only minister who has shown any interest in the subject was Peter Walker when he was at the Department of Energy. He led a major campaign on energy efficiency; as soon as he left his successor Mr Parkinson lost interest in this, his main interest was to get electricity privatisation under way, and having done that he left.

The City are now showing concern over privatisation of the industry

They are worried about it and so would I be if I were in the City. The whole question of National Power is fraught with the uncertainties of nuclear.

Energy efficiency is the most crucial thing to be done now, not only is it economically sound but it is socially desirable. There are very strong economic and social arguments. I think the Government are

quite wrong in not pressing that more. In fact they were lukewarm about anything to do with the environment, anything to do with energy efficiency.

What can be done now to make the Government see sense about energy efficiency?

I am a great believer in democracy; you can only use the weapons available. I can say I am not only pressing for energy efficiency politically, I am doing it commercially. That is what Associated Heat Services does. Its whole aim is to operate energy systems and boiler plant more efficiently than they are at present, by every means possible.

What we have to do now is seize upon the limited amount of support in the Bill and try and build it up. Trying to make sure the regulator really does do what is written in the Bill regarding energy efficiency, it is all we can do.

It was suggested that energy efficiency could be built into the so-called 'green bill' to be presented in the next parliament.

The Government hinted at that when they wanted to stop us pushing our amendments too hard. They said why don't you wait for the 'green bill'.

Would it not be even more complicated, than the Government said the Lords amendment would be?

If you want to get efficiency and it has got to be contained in the electricity privatisation legislation, it is no good imposing it from afar, with some other bill, it makes it very complicated. You would get a clash of interests and as far as electricity is concerned they'd say we've got to stick to our Act, no matter what any other legislation might say.

In a speech you gave to the 1986 Clean Air Conference, you said energy efficiency is the most important thing in an energy policy. Do you think we have an energy policy?

No. We haven't got an energy policy. Of course the Government argue that there is one, because they believe in market forces, they say that is a policy.

No there is not an energy policy, but you can't have one which is immutable, it has to change with circumstances and what we should now do is look at the whole energy industry: its production, distribution and usage in the light of the new, much higher, environmental standards that everybody wants. See how you can reconcile meeting the basic energy needs on an economic basis but at the same time recognising these higher environmental standards. That is what I would be doing if I were at the DoEn to-day. □

Death of a reprocessing plant

BNFL have reached agreement with the West Germans to reprocess about half the nuclear fuel that would have gone to the abandoned reprocessing plant at Wackersdorf.

Scene of some of the largest anti-nuclear demonstrations ever seen in Europe, Wackersdorf will now produce solar cells instead of reprocessing nuclear fuel.

IAN LEVESON reports from Berlin on how the reprocessing plant has fallen out of favour with the German nuclear industry. This doesn't mean that they have abandoned the idea of extracting plutonium from their spent fuel - it means that Britain and France are to get their nuclear waste instead.

We, in Britain, have become "victims of the success of the West German environmental movement." This must surely demonstrate that the need for European unity in the anti-nuclear movement is now greater than ever.

WACKERSDORF, in Bavaria, until May the construction site for a huge reprocessing plant, now makes proponents of alternative energy rejoice. Instead of nuclear fuel reprocessing, solar cells, amongst other things, will be produced there. The politicians and the inhabitants of the area around the site also have reason to celebrate: 2,500 jobs will be created, over 1,000 more than were promised by the reprocessing plant.

The redevelopment of the site is being subsidised by the Government, the £300 million they are spending is in part compensation from the electricity companies covering lost job opportunities from the reprocessing plant.

Even the electricity companies are satisfied with the decision to stop WAA Wackersdorf. In April, the nuclear community was shocked by news that the largest shareholder and main future customer, VEBA, had withdrawn from the project. They had come to a provisional agreement with the French reprocessing company COGEMA to send between 400 and 600 tonnes of spent fuel, each year from 1999, for reprocessing at La Hague. In turn VEBA would take a 49% capital stake in the 'UP3' plant at La Hague (SCRAM 71).

Shortly after this announcement other German electricity companies said that they wanted to give up the WAA completely. The Federal government had tried until then to build the reprocessing plant at all costs. But, in May the Minister for the Environment had to call a halt to construction work.

Spiralling costs

VEBA's reasons for withdrawing from the project were in the main financial. Last winter the projects spiralling costs became public, 1985 projections of DM 5.4bn (£1.8bn), when construction work began, rocketed to DM 7.7bn (£2.6bn). It would have totalled, DM 14.3bn (£4.8bn) including the MOX fuel plant, a lot more than the electricity companies had allowed for, according to VEBA. The French option cuts their reprocessing costs by two thirds.

Unresolved technical problems were also a named factor. However, more important still, seems to have been

the unremitting, anti-WAA campaign. The Bavarian Secretary for the Environment said that the WAA would be "technically feasible, but can't be put through politically". He quoted the Prime Minister of Lower Saxony, who had come to the same conclusion about the now abandoned proposal for a reprocessing plant at Gorleben, Wackersdorf's predecessor.

Opposition began in 1981 when Wackersdorf was first considered as a site for the reprocessing plant. In 1984, over 50,000 objections were lodged against the building permit application. Occupations of the site with up to 100,000 people were often cleared by police using helicopters and nerve gas. Although the WAA has been abandoned, the anti-WAA movement is not retiring it will extend throughout Europe.

White elephant

Some parts of the electricity industry had long been aware of the high reprocessing costs and small advantages of a reprocessing plant at Wackersdorf. As the German fast breeder at Kalkar is shaping up as the white elephant of the decade the only use for a reprocessing plant would be to produce MOX - plutonium enriched thermal fuel. However, the price of natural Uranium has fallen to \$10/lb (Electricite de France estimate that the cost of MOX fuel rods is 5 times higher than that of Uranium fuel).

Despite this, the German electricity industry was effectively forced into reprocessing by the state. Building permits for reactors in Germany depend on proof that waste management is secured for at least 6 years in advance. In 1980, the government and the electricity utilities had agreed on guidelines, according to which the reactor operators are obliged to pursue reprocessing in West Germany. Reprocessing in La Hague was only seen as a stop-gap. Direct final storage was not considered a permissible alternative, regardless of whether the reprocessed fuel could actually be used.

The contract with COGEMA has freed the industry, thrusting the Government into nuclear reality. All that is required is a small change in the waste management guidelines. Reactor operation can no longer be



tied to the national concept of eventual German reprocessing.

After VEBA had come to its agreement with COGEMA, the other electricity companies who had been involved in Wackersdorf also searched for alternative reprocessing options.

Each year, from 2000, 250 tonnes of German nuclear waste could be reprocessed in the Thermal Oxide Reprocessing Plant (THORP) at Sellafield. This is about half the quantity of spent fuel they produce. As German utilities are supposed to take a capital share in UP3 at La Hague, it has been suggested that they invest in THORP. BNFL have Government approval to attract foreign investors in some of its operations.

MOX market

In a bid to break into the MOX fuel fabrication market BNFL undercut the French and offered to reprocess at Dm 1,260 (£420) per kg - Dm 240 (£80) less - on the condition that it would refabricate the reprocessed fuel into MOX. BNFL appear to be trying to secure its survival by moving into the MOX market, especial as existing stocks of plutonium could be used up in the process. They want to profit from the US efforts to force Japan to ship back plutonium from European reprocessing plants as MOX fuel. They would also find it convenient to supply UK PWR's with MOX, something which seems to have been unsuccessful during tests in an AGR. It is rumoured that Siemens is negotiating to build a MOX fabrication plant jointly with BNFL at Sellafield.

A formal agreement concerning closer nuclear cooperation between the UK and West Germany was signed by the then Energy

Secretary, Cecil Parkinson, and the German Minister for the environment. Its main aim being to safeguard the planned reprocessing of German waste at Sellafield. A similar agreement was struck between France and Germany in June. Both foresaw the transfer of German technology and laid the ground for French and British investment in German nuclear fuel plant.

Uneconomic

In order to achieve good conditions and low prices the Germans are playing France and the UK against each other. Both countries will have a reprocessing over-capacity which they need to sell - neither Electricite de France nor the CEEB are particularly keen on reprocessing. EDF has made it quite clear that it considers reprocessing both uneconomic and unnecessary.

(Reprocessing charges at THORP and UP3 are lower than they would have been at Wackersdorf because the capital costs will be paid off by the turn of the century.) However another factor is the poor safety regulations regarding earthquakes and plane crashes, the lack of a requirement to utilise the state of the art technology, and less restrictive rules about the containment of iodine, tritium, radioactive water and krypton.

Cumbrian victims

Meanwhile, there is increasing protest against Sellafield. The local pressure group Cumbrians Opposed to a Radioactive Environment (CORE) sees the Cumbrian population as "victims of the success of the West German environmental movement."

The mounting criticism of lax security measures and environmental

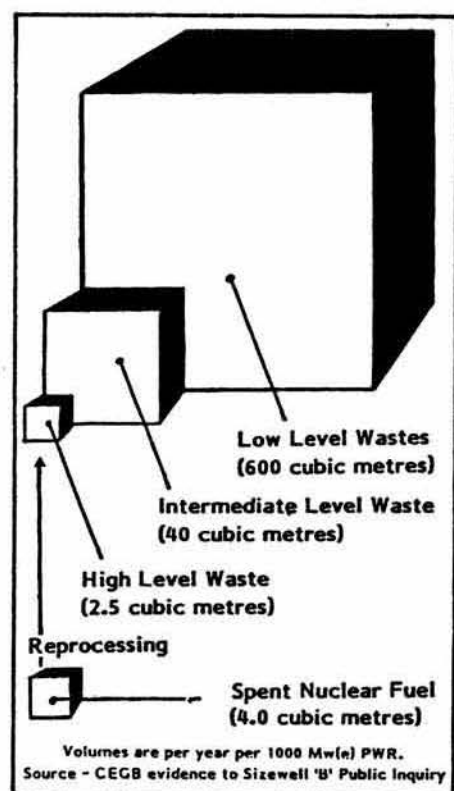
problems at both Sellafield and La Hague and the possibility of increased protest in Germany does not worry the German electricity industry. They would be only too happy if this brought an end to, in their opinion, uneconomic and unnecessary reprocessing.

The first tentative steps in this direction are being taken. The German nuclear industry are planning a pilot plant at Gorleben which will prepare spent fuel rods directly for final storage. Such a plant will be 40% cheaper than reprocessing plus final storage. It is hoped that it will be operational by the beginning of the next century.

Federal Environment Minister, Mr Toepfer is gradually moving away from the reprocessing dogma. The SPD governed German States said that they would not accept reprocessing abroad as proof of waste management.

Toepfer wants to change the nuclear waste management regulations. The new guidelines will probably demand proof that the reprocessed fuel is actually reused as MOX. However the industry might be free to choose another option: direct final storage.

Reprocessing is anything but economic. Is it grinding to a halt as the calculations of the electricity utilities imply? Or, will the reprocessing companies manage to install a revitalised plutonium economy based on MOX fuel? These questions should be answered, at least in part, by the new West German guidelines. □



Improving standards

The Free Market has fortunately failed to prevail with regard to Building Regulations.

As a result new Building Regulations will make a home built in 1990 at least 20% more efficient than one built this year.

The House Builders continue to whinge, but as ANDREW WARREN, Director of the Association for the Conservation of Energy reports, builders have been conforming to far tougher standards in Milton Keynes for years.

ONE of Nicholas Ridley's final acts as Environment Secretary was to lay before Parliament details of the 1990 Building Regulations. These make profound changes in the existing Regulations, last updated in 1985, across a wide variety of aspects of building practice: none more so than those concerning the conservation of fuel and power.

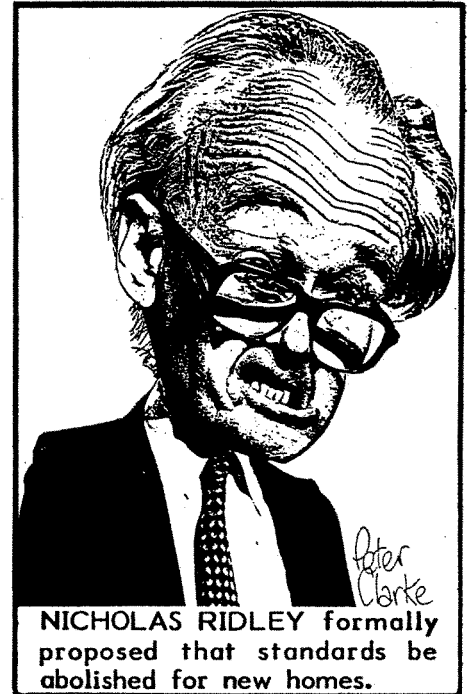
Ever since 1953, the Building Regulations have set minimum standards regarding the reduction of heat loss from the main fabric of new buildings. Latterly standards have been applied to both commercial buildings and factories, although the tendency has been for those to be less stringent than those applied to homes.

The balance will remain even from 1 April 1990 when the newest Regulations come into force. In practice, it was nearly negated altogether. In an earlier published consultation document, covering these very Regulations, it had been formally proposed that no standards whatsoever should apply to non-residential buildings concerning the conservation of fuel and power. This proposal met with such derision from key industrial bodies, like the CBI and the Chambers of Commerce, who pointed out that 70% of new factories were speculatively built, that it was subsequently quietly dropped.

Rearguard action

This drastic proposal to alter current energy saving policy was introduced upon the express command of Mr Ridley, who throughout his tenure of office at the Department of the Environment remained unconvinced of the need for any reference to energy conservation within the Building Regulations. Indeed it was only a rearguard action from the then Energy Secretary Peter Walker which stopped Mr Ridley formally proposing that standards should be abolished for new homes.

That argument certainly struck chords with the House Builders Federation, the trade association which in theory represents the interests of all new home builders, but in practice tends to have its policy formulation dominated by some of the medium-size and small builders, whose concern for wider



NICHOLAS RIDLEY formally proposed that standards be abolished for new homes.

issues of public interest has historically seldom been extensive.

From the time that the new changes to the Regulations were first mooted the House Builders Federation (HBF) maintained a barrage of criticisms, intended primarily to impede their progress. From month to month they vacillated between suggestions that higher insulation standards would be far too risky in construction terms to contemplate, to suggestions that the marketplace would never bear the additional cost, to a final desperate fling concerning the likely deleterious effects of increased energy saving standards upon the Greenhouse Effect.

Moratorium

Earlier this year HBF Director Roger Humber made a statement arguing for a further moratorium to change to the Regulations, lasting for at least 12 months while the consequences of the Greenhouse Effect and global warming were considered: "What is the point in bringing in building regulations to keep the heat in, when it is heating up outside anyway?" Instead of having regulations to require energy conservation measures in new homes, Mr Humber stated that he believed each building company should decide for itself whether any such devices were necessary. In other words, it should be up to builders to decide whether they

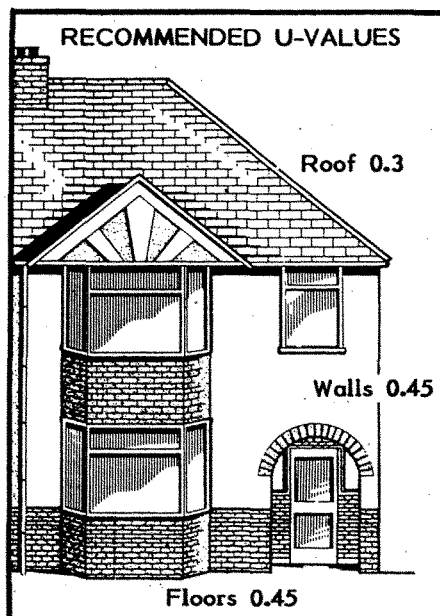
were prepared to spend a few hundred pounds more on installing energy saving items initially, to save future households thousands of pounds, and the atmosphere much extra pollution.

More efficient homes

Fortunately for those genuinely concerned to ameliorate the Greenhouse Effect, the Department of the Environment (and indeed the Scottish Office which has increasingly been acting in tandem on this issue), decided that it was worthwhile improving energy standards. As a result, a new 1990 home will be a minimum 20% more efficient than one built this year. Effectively, that means that an average 1990 home (3 bed semi-detached, gas central heating) will create just under 100 tonnes of the main Greenhouse gas, carbon dioxide, during its anticipated lifetime of 70 years.

Of course the number of new homes being built is only a very small proportion of that owned directly by local authorities. But Building Control Officers have now an increased responsibility to ensure that no corners are cut by the tiny minority of irresponsible builders, who might otherwise build overly-polluting

homes. It has to be said though that if all homes, not just new ones, were brought up to the standards of insulation required by the new Building Regulations, carbon dioxide emissions would fall by over 35 million tonnes each year, or 39% of current emissions from the domestic sector. These figures take account of an additional 1.85 million dwellings which are likely to be built in the UK by the year 2005. An excellent Designer Manual concerning the retrofitting of energy



conservation measures has been recently published by the Building Standards Institute.

Building Control Officers could have rather more difficulty than previously monitoring the installation of some of the trade-offs now permitted between the various energy conservation options. However, the chances are that most builders will opt for including the basic elements of insulation at the newly recommended improved levels - U values of 0.3 for roof, 0.45 for walls, and for the first time ever standards (of 0.45) for floors. There are a wide variety of products on the market which can achieve these levels with ease, each with a proven track record behind them.

The Development Corporation at Milton Keynes has for many years required that all builders in that city conform to far tougher standards of energy saving than even the 1990 Regulations propose. Practically every one of the major household names amongst builders has been happy to cooperate, and have built to these standards in Milton Keynes - to the satisfaction of householders and environmentalists alike. Building an energy efficient home is not a step into the blue beyond, it is now just plain common sense and good practice. □

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Leukaemia excesses near nuclear installations cannot be explained by official discharge figures and conventional risk estimates. TIM DEERE-JONES of the Irish Sea Project argues that current understanding of risk estimates and the marine environment is so flawed that significant exposure pathways and concentration mechanisms are "dismissed, missed and ignored".

Uncharted pathways

IRISH Sea Project (ISP) raised the topics of risk estimates, the marine environment, and sea-borne radiation during cross examinations at the Hinkley Inquiry. Its worst fears were confirmed by the CEBG, MAFF and the DoE.

ISP cross examined Dr Clarke of the National Radiological Protection Board (NRPB) on risk estimates, referring him to a paper indicating that the NRPB believed that the Nuclear industry currently operates at a risk level 30 times greater than the NRPB regards as the maximum acceptable risk for the public. Dr Clarke conceded the point. It also emerged that there was sufficient evidence to recommend a ten fold reduction in the legal dose limit to the public. The history of radiological protection has been a saga of steady reductions in "acceptable limits" and "acceptable risk estimates". Examining the marine environment it rapidly becomes apparent that site operators and Authorising Departments do not, and cannot, have sound data for the behavioural models of the environment, into which the liquid radioactivity from coastal nuclear installations is discharged.

Lack of data

The Ministry of Agriculture, Fisheries and Food (MAFF) admit that there are many areas of ignorance and doubt. They admit that information on the coastal environment near Sellafield outfalls "is still a matter for argument" because "the main overall weakness is the lack of systematic, long term data collection in almost all areas". This comes thirty years after the start of the largest and most complex cocktail of liquid discharges into UK, and European, water.

It also emerged at the Inquiry that, despite the decades old knowledge that plutonium and americium contaminated sea bed sediments are not stable and immobile, as the nuclear industry once believed, it is only now that MAFF have begun to construct an environmental model for sediment movement. Furthermore ISP was told by MAFF that they can't include in this model an

input for specific data relating to storm disturbance, but only an input for average effect. This will level out the peaks and troughs of the data and reduce its specific accuracy. The late decision to input sediment data demonstrates the fallibility of previous assumptions and predictions. It shouldn't be forgotten that the onset of Global Warming will have unquantifiable influences on the UK marine environment, adding more confusion to the already chaotic state of MAFF's models,

Accidental releases

Undoubtedly there are great weaknesses and outright failures in the compilation of discharge data from nuclear sites. For example, during the Inquiry ISP cross examined the CEBG on radioactive waste management and discovered that during the history of the site 13 incidents involving accidental releases of radioactivity from the A & B stations occurred.

In February 1979 contaminated debris originating from a cooling pond leak was dumped on a spoil heap outside the control area. Contamination was first observed in '79, it was not adequately dealt with - 8 years later further contamination from the same incident was discovered outside the control area, showing the weakness of CEBG incident follow up technique.

On 20 February 1979 a leak of radioactivity was discovered running over the foreshore outside the Hinkley site. It was thought to have begun in January. For reasons best known to the site operators, and never divulged to the Inquiry, this leak was allowed to continue until the beginning of June. It is estimated that as much as 185 million becquerels of radioactivity may have been released. This radioactivity may have been mainly caesium but could have been associated with the cooling pond leak and other nuclides may have been present. No clean up operations were conducted on the foreshore, natural washing action of the sea being considered sufficient.

At the conclusion of this cross ex-

amination the CEBG were forced to admit that these and other incidents resulted in radiation discharges that were outside authorisations and that they were caused by "breaches or lack of containment" of radioactive waste, "breaches of monitoring arrangements", breaches of the ALARA (As Low As Reasonably Achievable) principle, and breaches of discharge Authorisation. Given that the incident had gone on for a month or so before discovery, and that there is no regular daily monitoring of site discharge lines, it's fair to say that site operators do not and cannot have good, sound, discharge data. No one can have any faith in those site specific discharge data models so beloved of the nuclear industry, that purport to prove that there is no likelihood of observable health effects from their activities. How can we, when they manifestly don't know what they are discharging?

Environmental monitoring

Environmental monitoring in properly operated programmes would give information about the amount of radioactivity in the environment, its dispersal in the sea, its effect on the coastline and its impact on the natural and the human environments. This would involve analysing samples of silt, sand, vegetable and animal matter from specific sites. For a realistic view of the situation the sites studied must be chosen with the utmost care; estuaries will have the greatest concentration of radioactivity on any stretch of coastline. This fact, known for decades, has been ignored by MAFF and others responsible for marine and coastal monitoring.

In S W Scotland MAFF monitor a small relatively stony bottomed harbour at Garlieston, despite the fact that some miles up the coast there lies a very large estuarine system on the River Cree. RPSW (an independent group) have shown that MAFF's site fails to give a true picture of the area. When RPSW analysed silts from the Cree, they recorded maximum levels of americium 241 of 715Bq/Kg, whereas MAFF's Garlieston, site returned

levels of only 40.5Bq/Kg. A broadly similar pattern was observed for plutoniums and for caesium. It is plain that MAFF are monitoring sites that do not necessarily give the full picture of radiation dispersal. Worse still, despite RPSW's exercise, MAFF has not changed its sampling site.

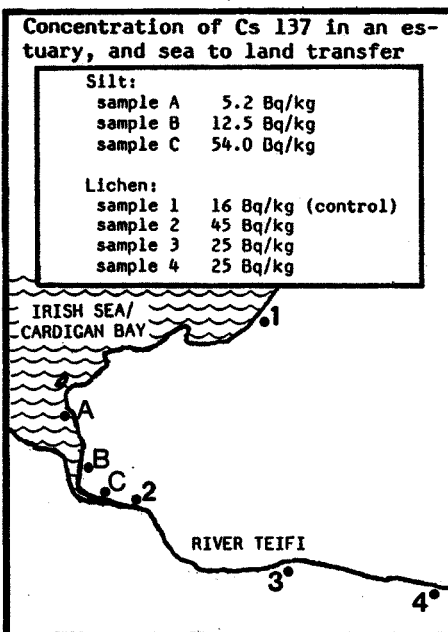
When cross examined by ISP both the CEEB and MAFF admitted that they do not monitor the Parrett estuary, a few km east of the Hinkley outfalls. The lack of such investigative work at sites well known as concentrators of marine radioactivity is typical of the complacency of site operators and Authorising bodies, or perhaps shows a deliberate policy of collecting data that won't result in high levels being entered into environmental models.

Sea to land transfer

Evidence, gathered by ISP and other independent groups, proves that estuarine sediments are a significant source of sea to land transfer of radioactivity. On ISP's own local estuary, the Teifi in S W Wales, a programme of analysis has shown radioactivity levels in silts increasing as samples approach the headwaters of the estuary. Lichen samples taken from river valley trees show decreasing levels of radioactivity with increasing distance from the estuary, pointing to the estuary as the source of the radiation in the lichen. Tritium represents a major proportion of liquid and gaseous discharges from Hinkley Point, estimates are that the sum of tritium discharges from the site is many times greater than the sum of all other nuclides discharged. Tritiated water behaves like other water, the human body absorbs 100% of the tritium in water through the skin and retains 100% of tritium in water inhaled. Tritium is associated with an increased level of lympho sarcomas in mice exposed to it, and a significant incorporation of tritium into DNA, RNA and proteins has been observed. The UKAEA has said that further work is required to understand the environmental behaviour of tritium, that further assessment and development is required for models of tritium in food pathways and that the long term toxicity of tritium in living tissue is largely unknown, particularly for mammal tissue. Despite these statements the CEEB maintain that they "do not think anybody believes there are very serious gaps in the knowledge of how to model the behaviour of Tritium in the environment". MAFF do not monitor silt, seaweed, soil, vegetation or human tissue for tritium. The CEEB have said they do not even try to monitor it in solid

substances, but claim that the vast amounts of tritium released are of no radiological significance.

Possibly the most important mechanism for the reconcentration of marine radioactivity is microlayering and the associated phenomenon of aerosoling. Microlayering is when the sea surface becomes enriched with sedimentary and clay mineral particles extracted from the marine water column. It occurs in the presence of naturally present oil films on the water surface. It has been demonstrated that a film less than 0.05um thick will allow microlayer formation. No work appears to have been done to quantify the effect of oil pollution on microlayer formation or to discover if a thicker oil film will support a thicker more enriched microlayer. Irish Sea microlayers have been observed to be particularly well enriched with radionuclides of americium, plutonium and polonium. The sources of these microlayer nuclides include disturbance of contaminated sea bed silts by storm activity,



trawling and dredging; direct contamination of the microlayer by convection of liquid discharge plumes; precipitation of radioactivity washed out of gaseous discharge plumes and; micro-organisms and marine algae which can concentrate actinides, like plutonium, by factors of several thousands.

Microlayering is the precursor of aerosoling, which covers the suspension from sea surface to air through bubble bursting, high wind speeds, evaporation and wave break in the open sea and on the coastal surf line. Aerosoling results in an enrichment factor (EF) of sea-borne radiation. Bubble burst for instance has been observed to give rise to an EF of up to 600 for americium and plutonium. ISP presented evidence to the Inquiry showing that bubble burst alone could contribute

5% of the International Commission for Radiological Protection dose rate limits for inhalation.

Site operators and Authorising bodies are only prepared to consider the input from one of those mechanisms, coastal surf line wave break. Despite being shown undisputed evidence by ISP that sea-borne radiation can be found impacting on crops at least ten miles inland, site operators and MAFF do not, and will not, put such information into their models for food contamination and subsequent radiation doses to the public. MAFF and the CEEB insist that the inhalation of sea spray is insignificant because of the small amounts inhaled; the average human inhalation rate is 21,600 litres a day and for those of us who live within the ten mile coastal strip of the UK, this represents a very significant potential intake of sea-borne radiation, particularly if aerosol EFs of 600 are taken into account, let alone the possibility that wind-blown micro-organisms and marine algae with EFs of up to 26,000 may also be present in that seaspray.

Reconcentration

What Comare and others are saying is that high incidence of childhood leukaemias can be observed near nuclear installations, but the figures they are being given suggest that discharges from these installations are too low to be responsible. ISP believe that conventional risk estimates are thirty times too high, and that dose rate estimates used by the people who give Comare et al the information are way out of kilter with the true facts. Man-made, marine radioactivity does not dilute and disperse as the nuclear industry wants us to believe. The fact that it reconcentrates and comes back to land renders the industry's dose rate estimates obsolete because they are drawn up on the basis of a national average without the input for sea to land transfer and re-concentration.

ISP have proved that the coastal strip of the UK and particularly the Irish Sea is getting a radiation dose from the marine environment that is affecting the human population through food pathways, inhalation and skin absorption. There is no model and there is no predicted dose rate for people thus affected. Until such models are constructed, based on all the available information about reconcentration mechanisms and sea to land transfer, the nuclear industry will be able to sit back and watch Comare and Regional Health Authorities running around wasting time and resources looking for a non-existent needle in a very large haystack. □

Clean coal

Work on producing a new generation of cleaner coal-fired power stations is now under way with the help of an £8 million Government grant.

The money will be added to funds already obtained from Ahlstrom (£5m) - a Finnish company - Powergen (£3/4m), an undisclosed Japanese company and British Coal, who are conducting the research.

The project to be run at the Coal Research Establishment, near Barnsley, is aimed at designing coal plant that will operate at a higher efficiency than conventional stations.

Secretary of State, John Wakeham, said, "This grant reflects the British Government's wish to see increasing effort to develop technologies which can make a significant reduction in the emissions of greenhouse gases."

By combining their own Pressurised Fluidised Bed Combustion (PFBC) technology with a new concept called a "topping cycle", BC believe it will be possible to reduce emissions of carbon dioxide (CO₂) by 20% per kilowatt of electricity produced.

It will not only mean significant reductions in CO₂ but will also meet the tough new standards for emissions of 'acid rain' gases - sulphur dioxide (SO₂) and nitrous oxides (NOx) - laid down by a 1988 European Community directive.

Sulphur retention

The PFBC process involves burning crushed coal under pressure, in a bed of its own ash kept in motion by an upward flow of air. By adding limestone, sulphur present in the coal can be retained in the bed and prevented from forming SO₂. Emission reductions in excess of 90% are said to be easily obtainable.

Although large quantities of limestone would be required for this process, BC believe that the dry mixture of ash and calcium sulphate produced could be used to offset the environmental effects of limestone mining. Limestone is currently used as a base for roads, a role which the ash/calcium sulphate mixture could easily perform. They argue that "if you convert all the power generation by coal in the UK to PFBC you would require 8 million tonnes of limestone. However, the mixture which comes out the other end when wetted becomes very hard and can be used as a construction material." 8 million tonnes of limestone would generate 20 million tonnes of ash, and "that could be used to displace more than the 8 million tonnes you have mined."

BC are also quick to point out that the process does not produce a

toxic slurry like other desulphurisation processes, such as the limestone/gypsum method (SCRAM 62). Although it uses over 1½ times the limestone, they believe that the quantity of limestone can be "reduced further."

Emissions of NOx are also very much lower - one third of the EC requirement - because PFBC operates at lower temperatures. NOx is formed at high temperature.

The technology has just come of age, with several commercial stations being built around the world. A PFBC combined heat and power station being built in the centre of Stockholm will heat 70% of the City's office and housing stock. It will have an overall efficiency of 80%, just over double that of a conventional coal-fired station. This will effectively half the CO₂ output per kW produced.

Gasifier

A "topping cycle", being developed by BC, allows overall efficiency to be increased even further by linking a pressurised coal gasifier with the PFBC. The heat generated by the PFBC is used in the normal way to raise steam and drive a turbine generator. However, with the topping cycle, the idea is to take the gases produced and boost their temperature by adding propane. The resultant hot gas, over 1,000°C, is then passed through one of the new generation of high temperature gas turbines. It is the addition of the booster gas that has led the process to be called a "topping cycle."

Although the system is currently limited in size to around 400MW, because commercial, off-the-shelf,

gas turbines are only 150MW. There is no theoretical reason precluding larger systems.

After fine tuning the design BC hope to build and operate a 50MW demonstration system at Grimethorpe in the mid 1990s.

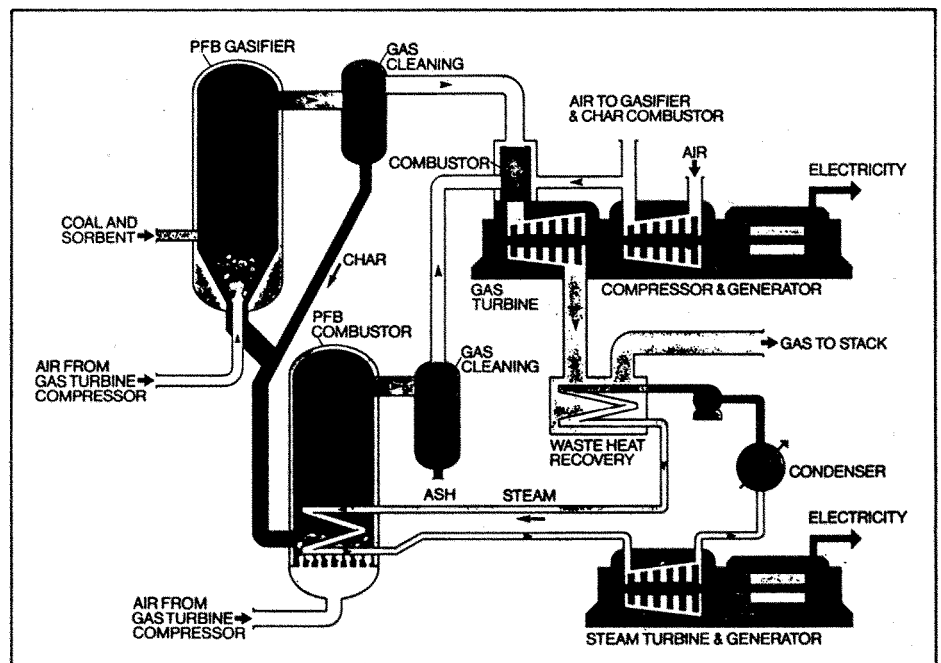
BC estimate that this system "should be up to 20% more efficient than pulverised fuel plant fitted with flue gas desulphurisation equipment."

"The privatisation of the UK power generation ... should open up opportunities for small independent power producers. The topping cycle should be ideally suited for small to medium size stations, with a potential for reducing capital costs compared with conventional stations by 6% and running costs by 20%," say BC.

Steve Dawes, BC Power Generation Research Manager, told SCRAM that they are pursuing this technology because "we are very interested in entering into the market, to be a producer of electricity is a way of upgrading the value of our coal. It is a way of keeping abreast of the economics of natural gas and other competitors. We have undertaken an enormous study with Bechtel and compared it with everything else around and it seems to come out very well. We are extremely optimistic." It is their hope that the system could be used in series of "pit head" stations, generating electricity on site thus cutting the need for expensive coal transport.

Given that over 75% of UK electricity is produced by coal-fired power stations, a figure which is unlikely to drop significantly, it is vital that projects like that of BC are funded by the Government.

THE TOPPING CYCLE BASED ON A PFBC



Acid rain

Plans to clean 'acid rain' gases from UK coal-fired power stations are in turmoil, as a result of the Government's plans to privatise the electricity industry.

The Government issued a consultation document, at the beginning of September, containing detailed proposals for cutting acid gases from coal-fired power stations by 60% of their 1980 level. However, the generating companies have told the Government that under the current proposals they may not be able to meet the target date of 2003.

Cuts in acid emissions are mandatory under a 1988 European Community directive. The cost of meeting which has is about £1.9 billion, it will involve retro-fitting 6 large coal-fired power stations with

desulphurisation equipment.

The problem, according to the generators, lies with the maximum duration of power contracts being cut from 15 to 5 years. This will not allow sufficient time to underwrite the high costs of fitting clean-up plant to existing stations.

They are also concerned that if the individual station has to bear the cost of the clean-up then it might lose out to an older plant.

Since everyone will benefit from the clean-up, they say, then everyone should pay. Spreading the cost throughout the electricity industry by adding it to the cost of using the transmission system is among the many methods suggested. It would seem fairer to oblige the distributors to buy power from the sulphur-free plant in the same way as they will have to buy from the

nuclear industry. That way non-polluting sources won't have to pay for pollution they do not create.

Increasing the maximum length of contracts from 5 to 10 years for all the coal-fired power stations which need to be modified to meet the clean-up targets is the preferred option of the generating companies.

The Government for its part says that the issue is still subject to negotiation and that no concrete decisions have been taken. They have also promised to make more information available to the public provided it is not "imposing an unreasonable burden on the industry."

Despite the chaos National Power are committed to cleaning up Drax A and B. Whilst PowerGen are expected to announce plans to retrofit the 2,000MW Ratcliffe station, plus one other large coal station.

Greenhouse morality

Nuclear power use, in developed countries, is necessary to make room "for a greater use of fossil energy in countries with a less suitable infrastructure," according to the Energy Secretary, John Wakeham.

Speaking to the World Energy Conference, in Montreal on 19 Sept, he outlined measures he believed necessary to help combat the Greenhouse Effect. Giving the nuclear industry "the fullest opportunity to prove itself under the new Electricity Act," was clearly top of his agenda.

Growth alone could generate the wealth to tackle environmental problems, says Wakeham, although that growth should be "green". Failure to do so, he warns, would damage not only industrialised countries but be likely to bear even more heavily on poorest nations now suffering the extremes of droughts and floods.

The polluter pays principle should be adopted and fuel subsidies should be eliminated, continued Wakeham: "We should continue to increase the efficiency with which energy is used. This is not just a question of saving energy for its own sake, but of industry and private citizens saving money in their own self interest."

He believes, we need to make greater use of natural gas, utilise renewable energy sources and step up viable research and development efforts.

He ended, warning of the "possibility that the world's energy economy cannot continue as it has done in the past ... and I suspect that a market approach which mobilises economic self-interest may point a more effective way forward than massive bureaucratic intervention."

Greenpeace Greenhouse propaganda

A Greenpeace advert stating that "nuclear Power is irrelevant in the prevention of global warming" has "distressed" the UKAEA chair.

John Collier, the head of the Authority, has written to the 40 prominent British scientists who lent their names to the advertising campaign expressing his concern over their support for "Greenpeace propaganda about the irrelevance of nuclear power in mitigating the Greenhouse Effect."

"The simple fact is that fossil fuel fired power stations produce CO₂ which contributes to the Greenhouse Effect, and that is one good reason for replacing them by nuclear power stations which do not produce CO₂", he argues. France, the nuclear industry's Mecca, "have done this." They have annual CO₂ emission of only 1.6 billion tonnes, lower than the UK, USA, East and West Germany. French emissions dropped by 3% in 1987 whilst UK emissions rose by 2%. "It is therefore clear that nuclear power can make a significant difference to reducing the effect," thus proving the lie to the advert.

The actual cost of France's 2% reduction is not given. The advert simply says that £ for £ energy efficiency offers more scope for reducing the demand for fossil fuels. Would Electricite de France be billions in debt had the money been invested in energy efficiency?

Dr John Mortimer, in evidence presented to the Hinkley "C" Inquiry, for FoE (FoE 9), showed that although nuclear power stations and their related nuclear fuel cycle release an order of magnitude (a factor of 10) less greenhouse gases, than coal plant, that this is again one order of magnitude less than would be achieved through the use of alternative energy systems and

energy efficiency.

Mortimer continues, increased reliance on nuclear power will ultimately result in raising CO₂ levels, "due to greater demand for uranium." As premium uranium is used up the industry will be forced to use lower grade ores, which require proportionately larger quantities of fossil fuel during mining and processing operations. This could lead to a situation where the "quantity of CO₂ released in association with nuclear power will be similar to emissions from conventional fossil fuel-fired power stations."

The Greenpeace advert also addresses other nuclear issues: nuclear waste; proliferation and; decommissioning. Collier did not even attempt to address these problems in his letter.

● Meanwhile at the British Association for the Advancement of Science meeting, two methods for removing CO₂ emissions from coal fired power stations were unveiled by the CEBG.

Unfortunately neither system works. The first, according to the Board's Dr Andrew Crane, involves scrubbing the CO₂ from flue gases, in much the same way as SO₂ can be removed. However for a 90% removal efficiency the cost of electricity would double.

The second method is planting trees. However he noted, as with wind parks, the amounts of land required to do this are colossal. He estimates that to compensate for one of the CEBG's 2GW coal-fired stations would need 5 times the land for the equivalent wind generating capacity. Earlier he warned the conference that a wind park some 200 miles square would be required to replace Sizewell B.

Severn Barrage

There are no overriding technical or environmental barriers to building the Severn Barrage according to preliminary investigations.

After three years and £4.2 million the Government are expected to publish a report this month which says that only economics could stand in the way of exploiting the vast energy potential of the Severn estuary. It is now believed that Government Ministers may order yet another study into financing the project.

The Barrage proposal has a long history. The current project began in 1978 when the Energy Secretary set up the Severn Barrage Committee (SBC) who were to examine the idea. They reported back to the Government in 1981 recommending a £20 million study programme. However, only a limited programme of work was conducted. The newly formed Severn Tidal Power Group (STPG) examined the SBC preferred scheme (Cardiff to Weston-super-mare) and compared it with another in the vicinity of English Stones. STPG reported in 1986 that generating costs would be 3p/kWh, at 1984 prices, but concluded that the

public sector would be unwilling to bear the full risk of the project.

Following that report the Energy Secretary announced a further £4.2 million research programme to look into the feasibility of the Barrage. That report is complete. The figures

given are those also presented to the Hinkley inquiry. A 7,200MW barrage from Lavernock, S Glamorgan and Bram Head in Somerset, would cost £9 billion, about 6 times that of a PWR, according to the CEBG, and produce electricity at 3.79p/kWh.

It is now widely accepted that the costing given by the CEBG for its nuclear plant do not reflect the true costs, some objectors at the Hinkley Inquiry have put the unit price at over 5p/kWh.

Nowhere is the battle between renewables and nuclear more bloody than in Somerset. The real threat to the Severn Barrage is Hinkley "C", which, if given the go-ahead, would seriously damage the viability of the Barrage.



Another alternative gone

Another renewable energy company has fallen foul of the Government's privatisation proposals. After 10 years of trading, the Northumbrian Energy Workshop (NEW) has gone into receivership.

NEW was a small cooperative whose aim was "to promote the use of alternative energy sources to show that there are real alternatives to dangerous conventional power stations." Much of their work concentrated on customising renewable power systems for remote places around the world. Their projects included producing wind power systems for Mongolian Nomads and Scottish fish farms, wind dataloggers for Indian Ocean islands and photovoltaic power plant for scientific expeditions.

More recently they were involved in monitoring sites for people considering installing wind farms, they installed 3x150ft masts holding anemometers at Capel Cynon, the first of the CEBG's three wind farms.

At the height of their operations in 1984 there were 13 members of

the co-op, at which time they invested in new buildings at their Hexham base. Unfortunately, for them and the general development of alternatives, shortly afterwards the price of oil fell and many companies lost interest. Since then they battled against crippling interest payments and the "over capacity of the electricity supply industry, the unhelpful [1983] Energy Act and the subsidised price of electricity." (SCRAM 51)

Immediately before going into receivership they had nine co-op members. Windpower and other alternatives are now coming back into vogue with the prospect of equitable trading conditions post privatisation. However, because of the confusion

currently dominating the market over the placing of new contracts and subsequent lull in orders, NEW have joined many small companies who lack the capital base to see them through the quiet spell in going to the wall.

Wind power is particularly attractive to distribution companies who lack their own generating capacity because it can be up and running in a relatively short time.

It now seems likely that foreign companies, such as the many Danish companies who have built up considerable operating experience in their own countries, will be the ones to benefit from privatisation, and the Single European Market due to be introduced in 1992.

Letter: French alternatives

Dear SCRAM

Don Arnott says in his article on Richard Webb that the French are forced to believe in nuclear power "because they have no nationally-based alternative." Not so! Don is too pessimistic.

The French set out to build a tidal barrage across the bay of S. Michel which could generate 12,000MW. They built a small trial project across the estuary of La Rance, with a capacity of 240MW. It was a success. But they did not proceed to build the bigger barrage because the available money had all

been consigned to nuclear power.

They could also obtain 11,000MW from wave power in the Bay of Biscay.

These two sources could supply France's basic need. Added to that would be the development of solar, wind, hydro, geothermal and perhaps CHP, biomass, gas and other sources which make smoke but are less damaging to life than nuclear power.

Sincerely

David Ross,
London



L.A. environment law

"Local government has a good record on the Environment...But, even more could be achieved through a co-ordinated approach which recognises that the policies of every single department in every single council has an impact for good or bad on our environment," says a report published by the Association of Metropolitan Authorities (AMA).

Action for the Future: Priorities for the Environment is the AMA's contribution to the 'green bandwagon'. Its aim is to "set the environmental agenda for local government." That agenda covers every aspect of local government activities from air pollution to land management.

Energy is covered in full. The main thrust of their argument is anti-nuclear, based on the belief that energy efficiency and renewable energies would serve us better: "In the absence of a publicly acceptable disposal strategy, current technology should be phased out based on the major accident potential, health and safety considera-

tions, transportation concerns and proliferation."

The AMA wants the Government to establish local radiation monitoring programmes. They also call on the Government to establish public education and information campaigns to "help the public deal with the nuclear issue from a base of reliable information."

At the same time they recommend that local authorities establish their own information campaigns. Running both campaigns would probably leave members of the public more confused, given that each would be giving a different message.

Fossil fuels also have their drawbacks. The report argues that we should be examining the possibility of moving away from conventional large centralised plant, and looking to smaller, cleaner plant much closer to the point of use. By placing them closer to the point of use they are in effect made considerably more efficient because they will not suffer the same distribution losses.

Improving the efficiency of coal-fired power stations is vital, and

the AMA believe that fluidised bed combustion and combined heat and power are the two most promising ways to improve efficiency. Centrally funded grants, which would be administered by local authorities, promoting the use of more efficient generating plant and energy management systems are desirable.

Local Authorities must press the Government to increase research and development of renewable energy sources on a national level. On the local scale they can "take a lead in demonstrating the capabilities of alternative energy sources." They can promote "energy awareness" campaigns. Liaison with planners and architects could be used to "determine local energy use policies and establish policy guidelines in planning policy to encourage alternative energy research and development."

This is not a blueprint for local authority action on the environment, but it will serve as an excellent place to start. It is promoted as "the first local authority policy audit", let us hope it is not the last.

Government inefficiency

Government campaigns to make the UK the most energy efficient nation in Europe have failed according to the National Audit Office.

The Audit Office, parliament's financial watchdog, says that the target of cutting the national fuel bill by £7 billion will, however, be achieved by 1995.

In 1983 the objective was to make the UK the most energy efficient "within the lifetime of the Parliament." This was never realistic, and as the election grew closer the target was moved. The new rhetoric was "Number one by 1990."

Energy efficiency had only improved by about £2.3 billion by December 1987 according to John Bourn, the controller and Auditor General. Market forces account for £1.6 billion and only £700 million is attributed to Departmental campaigns.

Local Authorities and the National Health Service have made the most progress, whilst Property Services Agency run Whitehall has consistently shown an increase in energy consumption.

Energy analysts have cast considerable doubt upon the validity of the report - "a Whitehall whitewash." The figures on which the conclusions are based were supplied by the Department of Energy and are in some cases way out of date. The report comes up before the public accounts committee on 1 November and is guaranteed a stormy ride.

Danube revival

Proponents of the massive Nagymaros hydro electric project (SCRAM 71) have been given until 31 October to justify the project. The Hungarian government were to have reached a decision on the project on 31 July.

This new twist is leading to the opinion that the scheme will now go ahead. The Hungarian government, who previously appeared to be bowing to public opinion, are faltering under pressure from its partners in the project Austria and Czechoslovakia.

Hungarian environmentalists argued that the project was situated on a geological fault line and that an earthquake of sufficient magnitude would allow seepage from the reservoir, through the porous basin, into the Budapest water

supply. The Austrian contractor, however, contends, that the base - which has been reached in excavations for the dam foundations - is solid and that the pouring of concrete footing could proceed immediately.

Also, Czechoslovak biologists have issued a report saying the the dam would in fact raise the local water table - not lower as environmentalists had argued - which in their opinion is vital to the survival of the region's flora and fauna.

Czechoslovakia are arguing that the Hungarian government would be in breach of agreement if they did not complete their end of the scheme, and are threatening to sue for \$2 billion damages. Hungary is in neither the political nor financial situation to ignore this threat.

Charter for Renewable Energy

The Charter for Renewable Energy (SCRAM 59) and NATTA have run into financial trouble.

They tried to raise funds for the Charter, which is to be launched in February next year, by holding a benefit concert in London. However, despite an excellent concert, headlined by the Loose Tubes, the event lost £2,800.

NATTA are appealing for funds to help themselves and the Charter through the crisis.

The Charter is an umbrella group, under which groups campaigning for

an energy policy based on renewable energy can collect and present a united front.

To this end it has produced an excellent document which outlines the way in which the Government should proceed towards an energy strategy based on benign renewable energy sources.

● Please send donations to NATTA c/o Energy and Environment Research Unit, Faculty of Technology, The Open University, Walton Hall, Milton Keynes, Bucks.

Acid Earth: the Global Threat of Acid Pollution. New Enlarged Edition by John McCormick. Earthscan & WWF; 225pp, £6.95, 1989.

No longer just 'acid rain' it is now acid deposition; it occurs dry and wet, as it always has. The problem of acid deposition has not been solved, although it has been replaced in newspaper headlines by global warming. The problem is getting worse instead of better.

We are failing the air pollution 'acid test' is the message given

out by this book. It begs the question, what hope can there be that international agreement can stave off the threat of global warming when acidification is still on the increase? Recognised as far back as 1852, when Scottish scientist Robert Angus Smith coined the phrase "acid rain", McCormick describes it as "one of the quintessential global environmental issues." He argues that the issue illustrates how "confused, divisive and piecemeal" our political and economic systems are when considering environmental problems of this nature.

That failure is manifest in three key areas.

The scientific dimension - although scientists are beginning to agree on some of the mechanisms of acid deposition, the debate seems as fierce as ever.

Politics - governments are unwilling to upset the balance which brought them to power and keeps them there. Acid controls would hit the powerful industrial lobbies hard.

Economics - how much are we willing to pay for a clean environment? And, who will pay?

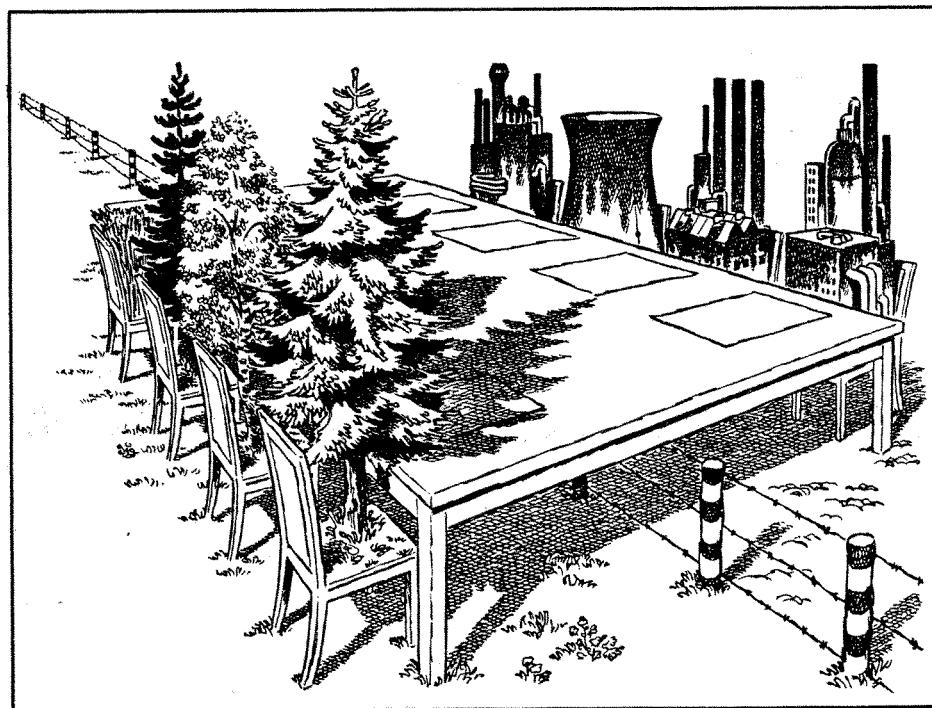
McCormick provides a useful summary of the current state of acid controls and emission in Europe and North America, Eastern Europe and the USSR. He explains the protocols and conventions and what hope there is that they will be met.

The developing world, or less developed countries (depending on which euphemism is in vogue) is where acid deposition will strike next, indeed it has already begun. There is little chance of it being stopped, McCormick observes "as night follows day, pollution is following industrial growth."

With each passing year a new book on acid rain is released and each year its story is less heartening, let's hope the next edition of "Acid Earth" has more stories of success.

An excellent book in which the author expects nothing of the reader and explains all.

MIKE TOWNSLEY



The Earth Report: Monitoring the Battle for Our Environment. Edward Goldsmith and Nicholas Hildyard (Eds). Mitchell Beazley; 1988, 240pp, £7.95.

Really two books in one. The first 90 pages are a sort of 'Ecologist Magazine' annual, with six 'major essays'. The most relevant to SCRAM readers is Peter Bunyard's essay on Nuclear Energy after Chernobyl. In the space of less than 20 pages Bunyard gives a global picture of the status of nuclear power after the world's worst nuclear accident. He concludes that government's can only proceed with nuclear programmes by creating an increasingly divided society.

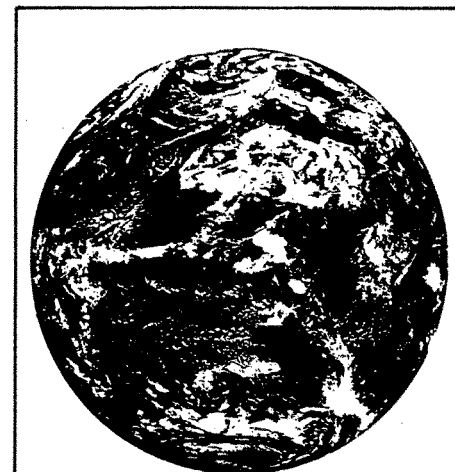
James Lovelock, the originator of the Gaia hypothesis, propounds his theory that the evolution of living organisms is so closely coupled with the evolution of their physical and chemical environment that together they constitute a single indivisible evolutionary process. Some people

find this too difficult to swallow, but to anyone, like myself, who has studied ecology it is rather obvious.

The second half of the book is an A to Z of environmental issues - a dictionary of terms, campaigns, pollutants and so on. From Acid Rain to Wackersdorf, Bhopal to Whales, Catalytic Converters to Tartrazine. Torness is missing and so is SCRAM from the list of organisations, which is irritating, but for people working on campaigns who tend to specialise, it is a valuable source of information on subjects they may not be so familiar with. The inclusion of source material and relevant organisations at the end of each entry would have been useful.

There is no mention of whether the Earth Report will be published annually. Like everything to do with environmental campaigns, the book will go out of date rapidly. An annual Earth Report would be handy.

PETE ROCHE



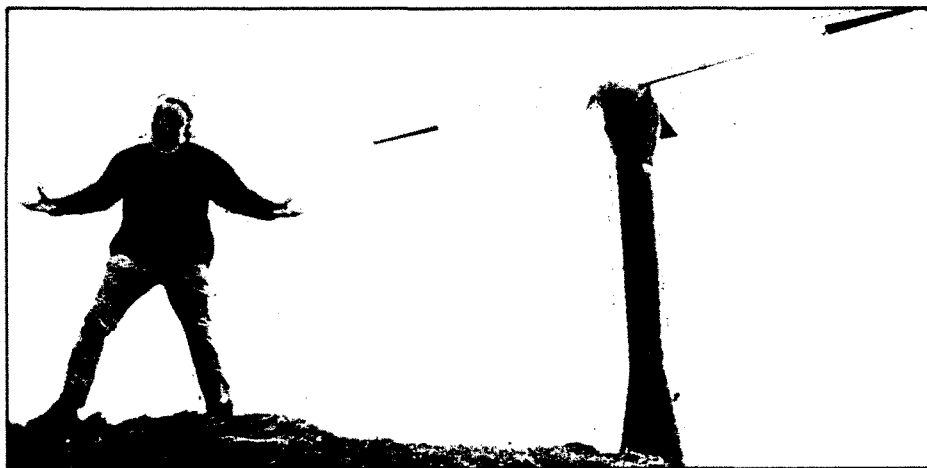
"The Gaia hypothesis sees the evolution of the species of living organisms so closely coupled with the evolution of their physical and chemical environment that together they constitute a single and indivisible evolutionary process"

Power from the Wind presented by David Bellamy. The CEGB Film and Video Library, Viscom Ltd, Park Hall Road Trading Estate, London SE21 8EL. Tel: 01-761 3035. Available on free loan. VHS/Beta/U-matic. 1989.

One wonders why the CEGB bothered to make this film: it neither serves to inform nor misinform.

I had expected to be subjected to the usual discussions of the environmental impact of wind turbines and the intermittancy of their power. Both were mentioned but not dwelt upon. They did, however, succumb to using film of the infamous Californian wind farms, where row upon row of turbines scar the landscape. (Incidentally, Bellamy referred to the one shown as Altamont Pass it was infact at San Geronio Pass.) Britain is more likely to have small farms of around 25 machines than the enormous arrays of hundreds of machines thrown up in California in order to catch a limited offer tax concession.

Environmentalist David Bellamy was a real coup for the Board. There can be few people who are more readily accepted for their good in-



tentions. Yet no amount of good intention and buffoonery can explain why he took part.

The film, lasting 20 minutes, begins on the Blue Arrow, Britain's challenger in the America's Cup, why? We are then expected to watch Bellamy swan around Barbados and listen to a commentary on how some 500 windmills were used on the island to grind sugar cane in the 17th century, on which the islands economy was based. Perhaps a more appropriate place to start would have been Denmark where wind currently provides over 1% of their power. Yet we get no more than a

glimpse of the Danish operation.

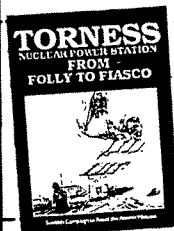
"If wind turbines are going to play a role they will have to be reliable," expounds Bellamy, who has obviously been studying hard for this film. Perhaps someone should let the government in on this before they order even more nuclear power stations.

I would have preferred the hatchet job I'd expected. It would at least have been entertaining. Get this on free loan and see if you can stay awake for the full 20 minutes.

MIKE TOWNSLEY

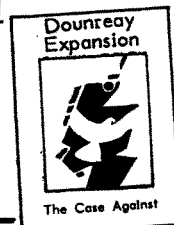
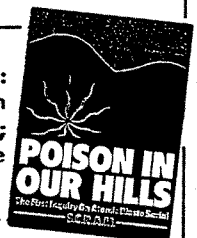
SCRAM PUBLICATIONS

Don't Take the A-Train: a critical examination of Nuclear Waste transport; 30pp, 1981, price 60p*.



Torness Nuclear Power Station: from folly to fiasco; 28pp, 1983, price 90p*.

Poison in Our Hills: the first inquiry on atomic waste burial; 69pp, 1980, price £1.80*.



Dounreay Expansion: the case against; 28pp, 1987, price 70p*.

* add 20% for p & p

SCRAM INFORMATION PACKS

(prices include p & p)

Nuclear waste dumping in Sweden and New Mexico; Aug '89, price £3.

Nuclear Waste Transport from Torness; Nov '87, £1; Mar '88, £1.

Hunterston Nuclear Power Station; May '88, £2.

Nuclear Waste: A briefing on the NIREX proposals and environmental approach; Jan '88, £2.

Recent NIREX Research Results: a critique; Jan '89, £2.

Nuclear Facilities and Emergency Planning in the UK: a summary of the Earth Resources Research Ltd report; Jan '89, £2.

Radiation and Health: SCRAM articles (nos. 57-70); Mar '89, £2.50.

Micro-organisms and Nuclear Waste: a neglected problem, by Don Arnott; Sept '88, £1.

Energy Conservation: the US experience; 1988, £1.

SCOTTISH ENERGY NEWS SERVICE

SCRAMs weekly press cuttings service - energy and related stories from a wide range of Scottish weekly and Sunday papers, from the John O'Groat Journal to the Observer Scottish supplement.

The cuttings are sent to you every week giving topical updates of the energy scene from a Scottish perspective. In depth coverage of subjects, from waste dumping at Dounreay to wave power on the Isle Islay.

Annual subscription - £100, further details from SCRAM at the address below.



SCRAM, 11 Forth Street, Edinburgh EH1 3LE

LITTLE BLACK RABBIT

Dear LBR

A friendly word of warning for your country cousins who may burrow under nuclear power station fences.

On a recent tour of Hartlepool station I noticed heaps of dead fish around the cooling water inlet filters. In other power stations the resident cats deal with this bounty so why not at Hartlepool? "We kill them", said my charming guide, "so they don't set off the alarms".

I don't suppose it makes much difference to the cat whether it is shot, poisoned or set upon by a dog; and the Green Party has other reasons for wanting to close down nuclear power stations but this deliberate slaughter of innocent moggies just underlines the callous selfishness of atomic energy.

Yours faithfully
Owen Dumbleton



LBRs favourite information officer, Douglas McRoberts, has left his job as Head of Information Services at Dounreay. McRoberts' 'information' sometimes proved to be highly inaccurate (see SCRAM 72, 71, ...) even to the point of being accused of "an outright lie" in the press. Given that McRoberts departure from Dounreay is because of his promotion to the post of chief press officer for the UKAEA in London, LBR can't help wondering what par-

ticular qualities the UKAEA hopes McRoberts will bring to his new job.



The launch of the CEGBs two successor generating companies (just a part of the electricity industry's £100m hype) has raised many eyebrows. LBR is not alone in being struck by the fascist imagery of the name and logo of 'National Power'.



A spokesperson for Wolff Olins, the agency responsible for the red white and blue logo, described it as "hard, tough and Thatcherite". LBR awaits details of NPs staff uniforms - brown shirts?



It doesn't seem to pay to be nuclear free in Australia, as has been discovered by Redbank, a suburb of the city of Ipswich, Queensland. The only Nuclear Free Zone (NFZ) in the whole state, Redbank has been chosen for the site of a nuclear waste dump!

Further antipodean news to reach LBR confirms the problems of being nuclear free in that part of the

world. Washington, in Nuclear-Free New Zealand, is due to host the world chess championships next year. This has been put in jeopardy by Soviet official Vitaly Sevastyanov, a former cosmonaut and double hero of the USSR, who claims the country is not suitable as "a hole in the ozone layer lets in dangerous radioactivity".

Sevastyanov's comments were at first thought to be a joke, but New Zealand's Department of Scientific and Industrial Research has now been called in to prepare a report on the Soviet's claims.



A story quite important to rabbits - the only safe fast breeders - comes from Quebec. Women delegates to the World Energy Conference in Montreal in September were asked whether or not they were pregnant, before being allowed to join a study tour to the nearest nuclear power station, Gentilly 2. The conference handbook "strongly advised" pregnant women to stay away, because of the threat of radiation to the unborn child.

LBR asked Sellafeld, which attracts more than 150,000 visitors a year, whether they asked similar personal questions. "There's no cause for concern," said a Sellafeld spokesperson, "Pregnant women visitors can pick up only insignificant doses of radioactivity." Phew!

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:

- | | |
|--|---|
| <input type="checkbox"/> £12.50 (ordinary) | <input type="checkbox"/> £5 (concession) |
| <input type="checkbox"/> £15 (overseas) | <input type="checkbox"/> £20 (supporting) |
| <input type="checkbox"/> £30 (institutional) | <input type="checkbox"/> £100 (life) |

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

£10 ☐ £50 ☐ £100 ☐ other £ _____

3. I would like to help pay SCRAM's wage bill with a regular monthly donation of:

£1 ☐ £5 ☐ £10 ☐ other £ _____

To the Manager:.....

.....(your Bank)

Address

.....

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

Please pay on (date) the sum of

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

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

142/144 Princess Street, Edinburgh (83-51-00) for the

credit of SCRAM no.2

similar payments monthly until further notice.

Signed

Name.....

Address

.....

Post Code

Phone No.

TO: SCRAM, 11 Forth Street, Edinburgh EH1 3LE.

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