SAFE ENERGY

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Nuclear review: the real thing?

The IAEA: mission impossible

UK risking climate convention

Banning nuclear power at sea

Thorp consultation out of date

COMMENT

"SEE no evil, hear no evil, speak no evil" seems to be the government's approach to the opening of the Thermal Oxide Reprocessing Plant (Thorp) at Sellafield.

It is difficult to understand how they can be "minded" to open the plant when a consultation process ordered by environment secretary, John Gummer, has barely got started, and despite this mindedness Gummer has also written to Friends of the Earth claiming he has not ruled out the possibility of holding a second public inquiry into Thorp.

Actions, however, speak louder than words. In the government documents accompanying the latest public consultation HM Inspectorate of Pollution concludes: "The provisions of the draft authorisation would effectively protect human health, the safety of the food chain and the environment generally."

For its part the Department of the Environment appears to have accepted without criticism BNFL's economic arguments, as produced by Touche Ross, arguing, "it is for BNFL to determine the commercial benefits of operating the Thorp plant ... the Government sees no reason to dissent from the essential conclusion in BNFL's document, namely that the operation of Thorp will bring substantial benefits to the company compared to abandoning the project." The public are expected to accept this statement without being given the chance to scrutinise the full report. All that has been released is a sanitised version of the Touche Ross report.

No consideration is being given to the alternatives to opening Thorp.

The government's latest decision, to allow BNFL to contaminate the plant with slightly depleted uranium, in carrying out pre-commissioning tests, gives little credence to their so-called commitment to democratic procedures.

However, if enough people protest and respond to the consultation it will be very difficult for the government to push Thorp through. A full public inquiry is the only way in which the full implications of Thorp can be aired and decided upon.

WIND power is finally making a small but significant contribution to Britain's electricity supply. But with this progress has come objections. Some of this is the understandable concern from residents near proposed developments, but there is more orchestrated opposition as well.

Articles in the press, science magazine editorials, comments from the heads of generating companies and even TV programmes on farming have raised the supposed evils of wind power: noise, visual intrusion, TV and radio interference, bird kills and stroboscopic effects.

Whatever the reasons for people's opposition, wind power companies should develop sites with sensitivity and care — it is in their own long-term interest as well as that of the rest of the nascent renewables industry and the environmental movement.

The message which needs to be put across is that it is never a choice of a wind farm or nothing, it is between a wind farm and the continuing emissions from fossil-fuel burning or the legacy of radioactivity from nuclear power.

When the full environmental choice is widely understood, the vested interests opposing renewable energy can be overcome.

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

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to shut-down a nuclear reactor in an emergency.

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Founded in 1957 as a result of US President Eisenhower's "Atoms for Peace" speech to the United Nations, the International Atomic Energy Agency (IAEA) was given the dual role of promoting nuclear technology and preventing the spread of nuclear weapons. **Mike Townsley** considers the IAEA's mission impossible and the need for genuine nuclear control.

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The UK government's refusal to accept a European Community-wide carbon/energy tax is threatening to unravel the international climate change convention agreed at Earth Summit held in Rio last year, explains **Andrew Warren,** director of the Association for the Conservation of Energy.

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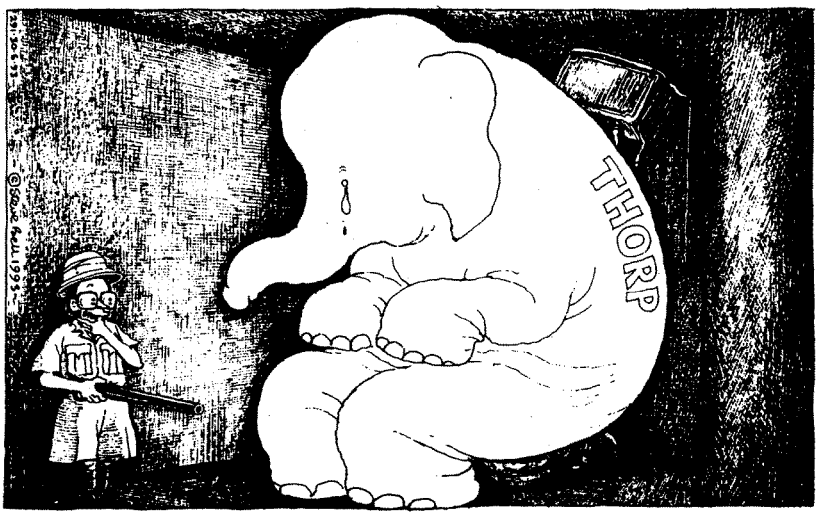
Despite the end of the Cold war, almost 300 nuclear-powered vessels still cruise the oceans, and the US, Russia, the UK and France plan to build more. **Josh Handler,** nuclear-free seas campaigner with Greenpeace International, argues that it is now time to call a halt to nuclear power at sea.



By Steve Bell, reproduced with permission

16 Thorp consultation out of date

The second Department of Environment (DoE) consultation on British Nuclear Fuel's Thermal Oxide Reprocessing Plant (Thorp) is now underway, but the government is already "minded" to allow the plant to open. **Simon Roberts** and **Dr Patrick Green** of Friends of the Earth believe the arguments used to justify Thorp are discredited and out of date, and that the DoE has failed to consider alternatives to opening the plant.

Sub disaster warning

SCOTTISH emergency planners have reacted with anger to revelations in *The Scotsman* newspaper that an accident on board a nuclear submarine could affect areas over a 100km radius and not just the 10km notified to them by the Ministry of Defence (MoD).

A nuclear submarine reactor accident in central Scotland could affect some 60% of the country's population, according to confidential MoD documents used in its training programme at the Royal Naval College, Greenwich. This "worst case" scenario, the possibility of which the Navy puts at about one in one million years of reactor operation, is far in excess of that previously notified to the country's emergency planning officers, who are expected to pick up the pieces following an accident.

John McVicar, Strathclyde Regional Council's emergency planning officer, said the "worst case" scenario "puts us into a totally unimaginable situation. It is a totally unacceptable hazard; there is no way we have the logistical ability to distribute potassium iodate tablets [to protect against thyroid cancers] out to that area ... We're talking in excess of 60% of the population of Scotland."

McVicar added: "It's not for the MoD to decide 'we won't give them that because it will upset them,' ... Whether we can plan for it is beside the point. The public have the right to know the true hazard." They "totally misled us," he said.

The MoD said the documents were for use in a training programme to give an awareness of a theoretical accident. It said planning officers were not told because they "are not expected to devise plans for accidents which are virtually impossible."

Despite this, the training manuals marked "restricted" and "UK restricted" argue that "it has to be borne in mind that worse accidents are possible though improbable, and contingency emergency planning must be sufficiently flexible to allow for them." Yet another of the documents comments: "the probability of requiring counter measures beyond 10km is so low as to negate any requirement for planning beyond this distance."

Only a few days prior to the *Scotsman*'s revelations, which apply equally to MoD stations in England, new emergency planning booklets to advise the public of what to do in the event of an accident where launched at a press conference. The booklet reassures people that there is no chance of an atomic bomb type explosion from one of the submarine reactors. Advice is given to residents who live within a 2km radius of the Devonport Dockyard which is to be the main refit yard for the UK's new Trident nuclear submarines. No mention is made of the "worst case scenario".

"Stay indoors"

Residents are told to stay indoors, switch off fans and ventilators and to put out open fires, and not to use the telephone. Further, parents are told not to collect their children from school but that teachers would look after them. Evacuation is extremely unlikely, says the MoD.

Capt David Hall, the Navy's chief staff officer for nuclear matters at Devonport, said there would be some warning before an accident: "A nuclear accident will take some time to develop, it won't happen just like that.

"It will give us time to see things develop and for us to take counter measures to prevent the release of radiation."

However, the classified documents warn of a less patient and considerate possibility: "It is conceivable that for some reason both primary and secondary containment fail, or are by-passed (eg penetration of the hull.) In this extremely unlikely event, it is possible the entire contents of the reactor compartment could be released in a very short time (minutes)."

The logistical difficulties which would be encountered during a worst case accident, warn the training manuals, would be compounded by the psychological effects of issuing a warning to the public.

People might panic after a warning — increasing their exposure to radiation or becoming involved in traffic accidents. Many naval officers and planners believe that the potential disaster caused by mass panic or evacuation would outweigh the benefits.

In responding to the *Scotsman* article the defence secretary, Malcolm Rifkind, said: "I'm not frankly very impressed, there was nothing secret about it [the documents]. It was handed to emergency planning officials as well as others ... It's purely a theoretical concept." He described allegations that planners had been misled as "silly, sensationalist and rather over the top."

However, Phil Harris, Lothian Region's emergency planning officer, said: "I had never been shown that document. What the minister seems to be suggesting is that there is some collusion to forget everything amongst local authorities. As far as I am concerned that is certainly not the case."

While admitting that the training documents are "meatier" than published advice, an MoD spokesman insisted that "all that we are doing is protecting people who don't fully understand what the situation is. It's no big secret." ❑

Thorp developments

WHILE the government has launched a further public consultation into the operation of the controversial Thermal Oxide Reprocessing Plant (Thorp) at Sellafield ("Thorp consultation out of date", p16), Sweden is considering taking back its spent fuel now stored at the site.

Citing increased leukaemia cases among children in the area around Sellafield and possible radioactive leakage into the Irish Sea, Swedish Environment & Natural Resources Minister Olaf Johansson said he wants to bring home 140 tons of spent fuel.

On behalf of other Nordic environment ministers he has also sent a letter to the government protesting against plans to open Thorp.

Admitting that contracts signed with Sellafield's operators British Nuclear Fuels (BNFL) "doesn't give us the right to take back the waste," Birger Almgren, head of the fuel division of OKG AB, argues "To do that, we would either have to break the agreement or in some way reach a voluntary agreement with the British."

Johansson said that Sweden should take responsibility for the spent fuel generated by its reactors. Sweden began sending spent fuel to England in 1969, but has since rejected reprocessing. It does, however, still have outstanding debts for reprocessing contracts.

■ Despite previously rejecting BNFL's proposals to commence pre-commissioning tests on Thorp by running slightly depleted uranium through the plant, the government has now given permission for the tests to go ahead.

Both the Ministry of Agriculture Fisheries and Food (MAFF) and HM Inspectorate of Pollution have decreed that the tests would not prejudice the outcome of the current public consultation into opening the plant. The Inspectorate and MAFF said BNFL had "indicated that it would be possible to decontaminate the plant [after testing] for the relatively small sum of £250,000 should permission for reprocessing not be given."

They said they would authorise the tests because "the radiological impact would be very small - less than 0.001% of the average dose to the UK population from natural background radiation."

Greenpeace plans to challenge the government's decision in the high court: "We are very confident we can win. We believe we have a very strong argument to stop this. It's a ridiculous situation. On one hand they say they are consulting the public and on the other they have given permission for the plant to start up."

■ Meanwhile, the environment secretary, John Gummer, has blocked expected planning authority approval for BNFL's application to build a £280 million commercial-scale mixed-oxide plant.

Gummer told Copeland Borough Council he wanted time to consider whether to call for an environmental impact assessment into the plant. ❑

NE's profit and loss

DESPITE making a massive loss of £619m, Nuclear Electric (NE) claims that an increase in its operating profit of 37% in its latest annual report puts it on target for being profitable without subsidy by 1995 and a suitable candidate for privatisation.

The company's 1992-93 annual report shows an increased market share of 3%, up to 21.6% and an increased income from electricity sales of 22% totalling about £1.4 billion. However, NE is still technically insolvent with liabilities for decommissioning and waste management of £10.4 billion.

Savings have been achieved in a number of ways: 1,297 jobs have been shed during the financial year with a further 2,000 predicted to go next year; station availability has increased as outages for maintenance have shortened, the overhaul of Wylfa's reactor number 2 was completed in just 33 days comparing "with the best of any utility in the world" says NE; and operating costs per unit are now down to 3.6p compared with 4.1p the previous year and 5.1p the year before that.

NE's chief executive, Bob Hawley, believes: "These results show we are well on the way to demonstrating that nuclear power in this country can be a real success — we are the only generator with all its commercial indicators going in the right direction and we do not expect to be 'Number 3' for much longer. I can see us overtaking PowerGen to become the second largest generator in the UK in 1996."

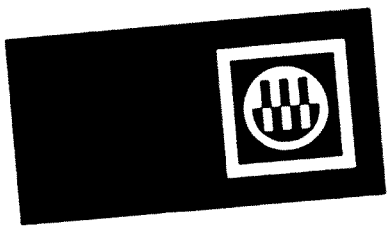
According to NE, it "should be privatisable in the next couple of years. And that ought to be an item on the agenda of the nuclear review."

As the final annual report before the government's review of the nuclear industry it will have an important bearing on the city's attitude towards nuclear power and therefore the prospects of raising private sector funds for new power stations as the Department of Trade and Industry wishes.

However, more important to prospective investors is the question of liabilities. With nuclear power the risks are many. In calculating decommissioning liabilities NE assumes final decommissioning can be postponed by 100 years, substantially reducing its annual provisions. Yet, any one of a number of reasons could lead to earlier decommissioning, when not all the required funds would be in place, who would pick up this bill? It is unlikely private capital would take the risk.

Reprocessing, or spent fuel management, represents over 35% of NE annual costs. NE contracts with British Nuclear Fuels are being re-negotiated, as the government refused to underwrite them, the costs of these contracts will have to rise as a result. And the question remains: who will underwrite the risks of cost escalation and catastrophe? Not the private sector.

Cheap accounting techniques establishing a false profit may look good on paper but it will not fool city investors. Without substantial government, and therefore taxpayer, assurances to underwrite the many risks associated with nuclear power there can be no future for the industry in this country. ❑



Nuclear Electric

Bulgarian nuclear fix

BILLED as the most dangerous reactors in the world, Bulgaria's Kozloduy reactors are to be overhauled using funds from the European Bank for Reconstruction and Development (EBRD) despite a confidential World Bank report indicating that other safer and cheaper options exist.

The EBRD plan involves spending about ECU 24 million over the next 18 months in order to keep the oldest of the station's six reactors running for a few more years. It will also spend money on bringing the two most modern reactors back on line by 1997. The deal involves the Bulgarians promising to close reactors 1 and 2 in the spring of 1997, and units 3 and 4 by the end of the following year.

This plan should allow time for two pumped storage hydro schemes to be brought on line along with another three power stations which will use waste heat from factories. This schedule, however, depends on Bulgaria attracting finance for the non-nuclear projects.

The reactors are all Soviet VVER-440/Model 230, which International Atomic Energy Agency scientists predicted ran a 25% risk of a core meltdown over a five year period.

The World Bank report, prepared for the Tokyo meeting of the G-7, found that it would cost some $18 billion to shut down the dangerous reactors by 1995, cancel other stations under construction, and build power plant using natural gas to make up the shortfall — all by the year 2000.

In contrast the Bank found that making the safety improvements and completing the reactors under construction would cost £24 billion.

When the plant's Soviet operators left in 1989 they were said to have taken the manuals with them and Western experts who have visited since have all expressed deep concern over the safety at the station. ❑

Trawsfynydd closes

TRAWSFYNYDD nuclear power station's closure, announced by Nuclear Electric (NE) in July, has brought new problems to the north Wales area from where its 490 strong workforce was drawn.

The 28-year-old Magnox station had not generated any electricity for over two and a half years and NE was finally forced to admit that the battle between safety and economic efficiency was lost. Many of the workforce now face unemployment as the area offers very few alternatives. Elfyn Llwyd, Plaid Cymru MP for Meirionnydd said: "The loss of 490 jobs here is similar to losing 12,000 jobs in the urban setting.

"It's pie in the sky to suggest that I am going to be able to bring a plant which is going to employ all these people."

The first 130 jobs could go by the end of the year, when the two-year defuelling process for the twin Magnox station begins. After that the staff will fall to 160. By 1997, says NE only "a few dozen" staff will be retained as the plant is sealed and left for over 100 years awaiting final decommissioning.

Llwyd has urged that decommissioning begin immediately, rather than mothballing the plant, to safeguard jobs. ❑

US waste return

THE US has finally overturned its 1988 moratorium on taking back spent highly enriched uranium (HEU) fuel it supplied to research reactors around the world ("US uranium return?", *Safe Energy 95*), a move which Dounreay claims will barely affect its plans to win contracts to reprocess the spent fuel.

According to Thomas Grumbly, the US Department of Energy's (DOE) Assistant Secretary for Environmental Restoration and Waste Management, the department is "committed to taking back the fuel, consistent with our obligations to foreign partners and within the requirements of environmental laws ... We recognise that we can't stand in the way now of solving a problem we created by sending the fuel abroad."

The DOE hopes to have gained the necessary clearance for the official go-ahead in June 1995. However, research reactors facing a "bona fide emergency" will be allowed to begin returning their spent fuel immediately using a Presidential waiver of environmental laws.

One of the main reasons for the US agreeing to take back the spent HEU is that it will allow it to encourage foreign research reactor operators to switch to low enriched uranium (LEU) which is not weapons grade. The US does not intend to reprocess the spent fuel but will store it pending eventual disposal in a deep geological repository. European research reactor operators will be expected to meet the full costs of storage and disposal, while the US will meet the costs for developing countries.

Although it is believed that the US option will be five times cheaper than having spent fuel reprocessed at Dounreay, which involves all waste generated being returned to the customer, some reactor operators are not happy with the US's attempts to force them to use LEU.

Two European research reactors — Grenoble in France and Petten in Holland — have turned to the Russians for fresh HEU, in a move which undermines US non-proliferation policies.

Dounreay has said that the loss of the US HEU market would not affect it because "our other three plants are completely unaffected by this decision."

A spokesman for the plant said that it could still play a role in the US strategy by reprocessing the spent fuel to recover the uranium on behalf of the Americans. The recovered uranium would be sent back to the US while the waste products would go to the reactor operator.

"Even if the US was able to take back all the fuel from around the world, it is our considered view that it would be much better to handle it here. We have not made that proposal but that is our considered view."

■ A pipeline costing £10 million of taxpayers' money and billed as an "article of faith" in Dounreay "doesn't work properly" according to the site's operator, AEA Technology.

The pipeline, designed to carry liquid radioactive waste from the site's prototype fast reactor and associated reprocessing plants into the Pentland Firth, was paid for by the Department of Energy (DoE).

When the funding was announced, Dounreay's director at that time, Gerry Jordan, greeted the news saying: "This is an article of faith in Dounreay by our sponsors, the Department of Energy, who are paying for this refurbishment. I regard the future of Dounreay with greater certainty as the days go by."

The ground-breaking renovation had been designed to prolong the life of the existing waste discharge system by over 100 years. It was intended that the work would overcome problems associated with corrosion of the diffusers at the end of the existing 600m discharge pipe.

The £10 million scheme involved intercepting the existing tunnel and pulling through an 800mm diameter outer protective polythene pipe with a bundle of smaller pipes inside. AEA Technology has admitted that the new pipe has become compressed, cutting flow rates by up to 50%, but insist that the system will work to full specifications. They are pursuing two solutions; increasing the pressure in the pipes, or using inbuilt spare capacity to achieve full flow.

A spokesman for HM Industrial Pollution Inspectorate (HMIPI) said that one condition of granting Dounreay a discharge authorisation was that the discharge system should be "fully maintained and kept in good repair." HMIPI has not been informed by Dounreay of any problems with the pipe but says: "If any rules or regulations have been broken then indeed we would be interested and would carry out an inspection." ❑

Euro parliament report

DOUNREAY is claiming a considerable victory over UK socialist MEP Llew Smith following a European Parliament (EP) debate and vote on a report produced by Smith which they say was "a clear attempt to choke the nuclear industry to death."

The report, which was two years in the making was aimed at tightening up controls over the transport of nuclear materials and the management of radioactive waste created at nuclear reprocessing plants, says Smith.

The EP wants all air shipments of plutonium to be banned within the Community and movements by sea to be forbidden unless special purpose-built vessels are used. The parliament also wants all future movements of plutonium to be placed within the scope of EC rules on prior notification — a request which has already been rejected by the EC Commission.

The idea of forbidding movements of plutonium by air has also been rejected by the Commission which believes such transports are already covered by International Atomic Energy Agency regulations.

The resolution also instructs the Commission to take "all the necessary steps to ensure that fully adequate emergency plans are adopted across the Community to handle any accident involving spent nuclear fuel or high-level radioactive waste" that is moved through Community ports. Further it calls for the development of a Community-wide emergency plan along the entire route of a transport involving radioactive material.

Derrick Milnes, a Dounreay staff member and activist in the National Campaign for the Nuclear Industry, says that: "In its original form, it would have had a devastating effect on our workforce and our communities. European workers' unity has been our strength. It's not easy for shop stewards to organise at this level, but we did it and we delivered."

Milnes was part of a pan-European nuclear trade union effort to lobby the Parliament. He said: "The Smith report, like so much anti-nuclear propaganda, posed as a demand for safety but its true aim was to make nuclear fuel transport impossible, and so strangle the industry. Faced with workers who have to know, and do know, far more about safety than Llew Smith or his Greenpeace backers, the EP's Socialist and Conservative groups both supported us."

The proposed ban on cross-border transportation of all radioactive materials, except in certain circumstances, was so diluted after successful amendments that its eventual recommendations pose no threat to the importation of spent fuel to Dounreay for reprocessing.

Another crucial amendment defined spent fuel as a substance quite different from radioactive waste, contrary to the original intention of the report, giving the pro-nuclear lobby what they wanted.

Smith is undeterred by the amendments to his resolution and will "monitor developments to ensure the European Commission carries out in full all the requirements set by the parliament in backing the recommendations."

However, the parliament has no legislative authority, it can merely make recommendations. ❑

Sizewell discharges

STATUTORY consultations into the proposed discharges from the Sizewell B PWR have been dismissed as a sham by environmental groups.

The plant, due to come on line next year, will routinely discharge radioactivity into the sea and air. While such discharges will be small compared to those from the existing Sizewell A plant, it will produce a large volume of waste over its lifetime.

Under government policy the production of radioactive waste must be justified. This means the practice must produce a positive net benefit which outweighs any risk created by the production of the waste.

Nuclear Electric argues that the need for Sizewell B was justified by the Sizewell Public Inquiry. The Inquiry Inspector concluded that the expected national economic benefit from the operation of the station was sufficient to justify any risk that would be incurred. However, this statement was made before the government's attempt to privatise the nuclear industry in 1989. The electricity generated by Sizewell B will be neither cheap nor competitive with other forms of generation.

HM Inspectorate of Pollution, which issues the authorisations, draws attention to the government's Coal Review which concluded that nuclear power offers "substantial benefits" and "contributed to the diversity and security of supply and helps the UK to meet its international obligations for curbing gaseous emissions which contribute to acid rain and the threat of global warming." However, there are other ways of achieving these aims which are cheaper and which carry less risk — namely energy efficiency and renewables.

Dr Patrick Green of Friends of the Earth dismissed the consultation, saying: "They are not going to pull the plug on Sizewell as a result of two months of consultation over the summer. The consultations have to go to the heart of the issue: is there a justification, in terms of some benefits, for the risk that is posed." ❑

Objections should be sent to HMIP, PO Box 143, Bedford, MK42 OPN.

Sellafield leak

DISCHARGES from the Sellafield reprocessing plant were deliberately kept high as part of an "organised and deliberate scientific experiment" according to a 1958 government memo leaked to the *Galloway Gazette*.

The memo, marked top secret, an extract from a memorandum from John Dunster, an Atomic Energy Authority scientist, and issued for the "personal use of RAB" — presumably Rab Butler, the Home Secretary at the time — states: "In general terms the intention has been to discharge fairly substantial amounts of radioactivity as part of an organised and deliberate experiment and the aims of this experiment would in fact have been defeated if the level of activity had been kept to a minimum.

"One of the principal and, I believe, the most effective methods of carrying out these investigations is indeed to use radioactivity and discharge it and find out what happens to it.

"This leads to information a great deal more sound than that which can be obtained by small-scale and laboratory experiments."

The contents of the memo were further explained by Dunster, now a member of the International Commission on Radiological Protection, in a speech to the Second Conference on the Peaceful Uses of Atomic Energy held in Geneva in 1958. Dunster told the conference: "By 1952 it was possible to make regular discharges from Windscale [Sellafield] and it was decided to combine these with a detailed monitoring programme to form a planned experiment.

"This experiment, whose aim was not only to show the safety of the discharges but also to establish the values for the maximum permissible discharges, was supported by the ministries responsible for issuing the authorisations for waste disposal.

"Since that time the discharges have been deliberately maintained at a level below the authorised rate but high enough to obtain detectable activity levels in samples of fish, seaweed and shore sand, and the experiment is still proceeding."

Following the leaking of the report several MPs and MEPs have taken up the issue and are calling for a full and independent inquiry into the experiment.

Irish MP, Eamonn Gilmour, said: "It is a belief that the emissions and releases had either been because of ignorance or accident.

"This adds a whole new dimension in that radioactivity had been released deliberately to satisfy an experiment.

"Only a full independent enquiry by the European Commission will establish the real truth." ❑

Scientist shortage

POOR public perception of nuclear power is leading to a shortage of qualified nuclear scientists in OECD countries, according the Nuclear Energy Agency (NEA).

In most of the countries studied, a large part of the existing nuclear industry's skilled workforce is approaching retirement age while at the same time universities and technical colleges are having increasing difficulty maintaining nuclear-related disciplines and attracting new students. Prominent among the nations feeling the shortage is the US which is having increasing difficulty in finding skilled candidates in such fields as health physics, nuclear engineering and radiochemistry.

Poor public perception of the industry bears the brunt of the blame, according to the agency. In Germany, for example, prior to Chernobyl there were 30 to 60 nuclear engineering students per technical high school (university) now there are only three to six such students.

Educational institutes are also facing severe difficulty as the average age of lecturers in nuclear engineering faculties is 10 years greater than in other disciplines, while the number of junior faculty members is declining steadily.

In several countries — Belgium, Germany, the Netherlands and the UK — the age structure in power plant operation and maintenance is top heavy in the 31-50 years category, with only about 10% of the work force younger than that. Switzerland, which has five nuclear reactors, appears to be in the worst shape of all: over 50% of its plant operation and maintenance experts are over 40, and almost 20% are over 50.

According to the NEA, demand and supply of qualified staff are "reasonably balanced in most countries," however, they report "concern and "anxiety" within the industry that the situation could rapidly degenerate.

While some countries are already trying to rectify this trend, the NEA warned: "Reliance by governments and industries on market forces to rectify imbalances in supply and demand may be inadequate since the timescale for responses to these forces may be too long and unpredictable to satisfy the needs of the nuclear industry."

A "sounder approach" aimed at anticipating the problems and taking "timely measures" has been suggested by the NEA. These include government funding of R&D programmes as well as university courses, support of educational activities of public research institutions, and "close co-operation" among nuclear utilities, research centres and universities.

The NEA also blames the catastrophic public perception of the nuclear industry for the skill shortage and suggests "more general actions at both national and international levels aimed at fostering a better informed public." Professional societies and associations should play an important role in "publicity" activities designed to correct the "inaccurate public image" of nuclear power. ❑

The Consortium of Opposing Local Authorities (Cola) coordinates objections to new nuclear power stations. FRED BARKER, Cola adviser, reports on the issues likely to be central to the government's nuclear review and how Cola will be responding.

Nuclear review: the real thing?

THE Consortium of Opposing Local Authorities (Cola) has been busy gearing up for the government review of nuclear power. Originally formed in 1987 to fight the Hinkley C Inquiry, Cola has remained in being to pursue its opposition through the nuclear review.

Over the coming months, Cola intends to mount a programme of action to convince the government and potential investors that no new nuclear power stations should be built in Britain.

The key issues

At the time of writing, the government has still not announced the terms of reference for the review. However, in late June, energy minister Tim Eggar set out some of the key issues that "the review will need to cover".[1]

Top of the list was the question: "would new nuclear power stations be commercially viable in the UK?" Crucially, Eggar added that the review would also examine "the prospects for securing private sector involvement in the financing of new capacity".

According to press reports last autumn, Nuclear Electric accepts that it has no hope of securing Treasury funding to build new nuclear power stations, and that it has to step up its search for private investment. Bob Hawley, Nuclear Electric's Chief Executive, was quoted as saying "we are starting to work on this with vigour".[2]

The issue of private investment raises some thorny issues for both the government and Nuclear Electric. As Green and Roberts argued in the last issue ("1993 Nuclear Review", *Safe Energy 95*), potential investors will want to know who will be responsible for covering the financial liabilities and risks associated with any new station.

The review will therefore have to confront the fundamental question of how the risk aversion of private capital can be overcome. In other words, what sort of market conditions need to be created before private capital will be made available to build new nuclear power stations?

The failed attempt to privatise nuclear power in the late 1980s holds some lessons here. Even with the Non-Fossil Fuel Obligation (NFFO), the Fossil Fuel Levy and government provision for up to £2.5 billion for decommissioning, spent fuel and radioactive waste liabilities (see box), the government was eventually forced to withdraw the Sizewell PWR and AGRs from the sale. The problem was that city institutions and other potential investors were still acutely concerned about the financial risks and uncertainties, and about the potential generating costs of PWRs under private sector financial conditions.

To meet these concerns, further unprecedented guarantees were sought from the government, which were rejected as politically unacceptable. So, in addition to considering whether estimates of future PWR generation costs are competitive with other sources, the impending nuclear review will have to consider whether a package of market conditions can be put in place which is both sufficient to attract private finance and politically acceptable. The difficulty of meeting both these requirements is likely to provide government strategists with a major headache.

Nuclear Electric's position

Nuclear Electric appears to take the view that it could attract private finance for new plant if two key conditions are fulfilled: first, if its inherited liabilities are off-loaded (reprocessing, radwaste and decommissioning liabilities of £9.3 billion had accrued by 1990); second, if some form of guaranteed market share can be secured beyond 1998 when the NFFO comes to an end.

These conditions came to the fore during the 'coal crisis' and resultant energy reviews. Nuclear Electric told the Trade and Industry Committee that it welcomed the proposal that it cease to be responsible for discharging inherited liabilities.[3] It also proposed a franchise system for guaranteeing its future market share. According to Nuclear Electric, such a system would permit the development of a long term contracts market "that is needed to support private investment".[4]

The company described the franchise system proposal as simply "one option" which deserved consideration. Although this specific option was opposed by both the Committee and the National Grid Company,[5] we can expect to see Nuclear Electric come forward with other market protection proposals during the nuclear review. As John Collier, Nuclear Electric's chairman, has argued, "without assurances of long term contracts or guaranteed markets, investors will not put money into new capital-intensive ... construction projects."[6]

Nuclear Electric is likely to try to justify such proposals by reference to the alleged strategic benefits of nuclear power. It will argue that nuclear power makes a major contribution to security of supply, primarily by providing security against fossil fuel supply interruptions and fossil fuel price increases. It will also argue that nuclear power has environmental advantages, notably in producing far less carbon dioxide emissions than its fossil fuel rivals. It may even try to quantify (ie put a financial value on) such strategic benefits.

Although the government is favourably disposed toward these arguments, it is not clear that it will consider them sufficient to justify market protection beyond 1998. It is clear, however, that the 'strategic benefits' of nuclear power will be an important factor weighed in the balance by the government when it considers the political acceptability of Nuclear Electric's proposals. Finally, Nuclear Electric is likely to make the surprising argument that is can achieve sufficient reductions in generation costs to make a new twin reactor PWR station competitive with Combined Cycle Gas Turbine plant at 2.9p/kWh.[7]

Cola's case

Cola's case to the review is likely to consist of four main arguments. First, financial: a combination of factors entails a risk of major construction cost increases (as demonstrated by the 40% cost increase in real terms for Sizewell B),[8] the risk that a station may turn out to be a poor performer (which may still be the case with Sizewell B), the risk of retrofitting or downrating arising from

the tightening of safety and environmental standards, and the risk of large increases in back-end fuel cycle and decommissioning costs. Added to these is the risk that a further serious reactor accident anywhere in the world could have onerous consequences for future plant, including expensive safety changes, power downrating or even closure. These financial risks are as real today as they were when they threatened to make National Power unsaleable with nuclear power in the late 1980s without unprecedented guarantees.

Second, that market protection beyond 1998 cannot be justified on security of supply or environmental grounds. In particular, substantially less weight should be accorded to strategic benefits than that judged to be appropriate by the Hinkley Inspector. The main reasons for this are: achieving security of supply can no longer be viewed primarily as a matter of introducing greater diversity to reduce the reliance on coal; the Inspector failed to take account of the insecurities of nuclear power, particularly relating to the possibility of major accidents with costly social, economic and political impacts; and research shows that it is neither necessary nor cost-effective to invest in new nuclear plant to achieve required reductions in carbon dioxide emissions.[9]

In addition, there are basic arguments on societal risk and radwaste which provide strong reasons for not extending market protection to a new generation of nuclear power stations. With regard to the former, a case can be made that the risk to society of a major accident at a new PWR exceeds the maximum tolerable level. With regard to the latter, it is not possible to be reasonably confident that a radioactive waste repository will be available early in the next century. This is because at best there will be significant delays in repository development at Sellafield, and at worst the long-term safety potential will be judged to be unacceptable and Nirex will have to start investigations at a new site.

Third, estimates of future PWR generation costs based on private sector financial criteria, and stripped of appraisal optimism, will show that new nuclear plant cannot be considered competitive with fossil fuel alternatives. In order to derive its 2.9p/kWh estimate of future PWR generation costs, Nuclear Electric will have made some controversial assumptions about the values to assign to the main determinants of generation costs: that is, the load factor (a measure of plant performance), the capital costs of construction,and the discount rate (a measure of the cost of money, based on the rate of return expected by an investor). More realistic assumptions for these key factors are likely to produce an estimate of PWR generation costs of at least 5p/kWh, compared to gas at 2-3p/kWh and coal at 3-4p/kWh.

Fourth, in a rigorous overall appraisal the disadvantages of new nuclear plant will be seen to substantially outweigh the benefits, so that the creation or maintenance of the market conditions which can overcome the risk aversion of private capital cannot be justified.

Use of the Fossil Fuel Levy?

There is a further option for the financing of new plant that needs to be considered. Although unlikely, it is not beyond the realms of possibility that the government could allow Nuclear Electric to invest more Fossil Fuel Levy (FFL) money in new plant.

Earlier this year, the Trade and Industry Committee established that the levy led Nuclear Electric to fund a large capital programme (chiefly Sizewell B) without incurring debt, and that a cash surplus of £5 billion is expected to have accumulated in the company's account with the National Loans Fund by 1998. The Committee was critical of the use of Levy money to pay for Nuclear Electric's investment programme, and recommended that the Levy income be taken away from Nuclear Electric to ensure that it is used only for discharging liabilities for reprocessing, waste management and decommissioning. As noted above, it also suggested that the company should cease to be responsible for discharging inherited liabilities.

The government is committed to considering the Committee's recommendations in the nuclear review.[10] COLA will argue that the FFL should be restructured to ensure, first, that Nuclear Electric's inherited liabilities are fully met, and second, that Levy money is not used for investment in new plant.

Cola initiatives

Cola will present most of the detailed arguments behind this outline case in a preliminary submission to the review. The preliminary submission will be finalised as soon as the terms of reference for the review are announced by the government. It will be published and widely distributed at the earliest opportunity. Copies of the preliminary submission will be available from the Cola secretariat at that stage.*

Cola is also commissioning expert evidence on two of the main determinants of estimates of future generation costs. This evidence will also be fed into the review, and will be published at an appropriate stage. Finally, Cola is particularly aware of the need to promote its case outside the review. It therefore intends to prepare and disseminate a series of briefings, with the aim of convincing MPs, potential investors, the media and others that no new nuclear plant should be built in Britain. ❑

THE NFFO and FFL

The NFFO is the statutory obligation on Regional Electricity Companies (RECs) in England and Wales to contract for specified amounts of non-fossil capacity (almost exclusively nuclear). It amounts to approximately 20% of the REC power requirement and lasts until 1998.

The FFL is the levy on electricity consumers in England and Wales which is used to reimburse the RECs for the additional costs that they incur by entering into contracts to satisfy the NFFO. The FFL effectively provides Nuclear Electric with a premium over the market price of electricity to cover the higher total costs of nuclear power.

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Created to both promote atomic power and prevent the spread of nuclear weapons, the International Atomic Energy Agency (IAEA) has a mission impossible. MIKE TOWNSLEY looks at the role of the IAEA and its failure to control nuclear proliferation.

The IAEA: mission impossible

"ATOMS for Peace" rallied US President Eisenhower in 1953, before the United Nations General Assembly: "... this greatest of destructive forces can be developed into a great boon for the benefit of all mankind." Born out of guilt over the bombing of Hiroshima and Nagasaki and the desire to change the atom's image, Eisenhower offered to share the benefits of nuclear technology with any nation willing to forgo a nuclear weapons programme.

However, his speech neatly sidetracked any mention of a 1946 US government report which warned that the "development of atomic energy for peaceful purposes and the development of atomic weapons are in much of their course interchangeable and interdependent. National governments could not be trusted with nuclear development since, at any time, a nation pursuing an ostensibly peaceful program might convert its fissionable materials to the making of bombs ... no system of international agreements and police-like inspections of nuclear facilities could prevent the military use of atomic technology."

The International Atomic Energy Agency (IAEA) was created as a direct result of Eisenhower's misleading speech. Backed by the General Assembly of the UN in 1954 it was founded in 1957. The IAEA was given a mission impossible, its aim was defined as: "... to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world. It shall ensure, so far as it is able, that assistance provided by it ... is not used in such a way as to further any military purpose." The IAEA is an anachronism, no other UN agency exist for the sole promotion of any other branch of industry.

"Ideology and statute of the IAEA has not changed since its creation, but the role of nuclear power has. Thirty-five years after its establishment it is time to eliminate the ideology of the 'Atomic Age' in the IAEA's work, aims and statute corresponding to the experience that nuclear power is not a benefit but a hazard," states the introduction of a new book* written by members of Gruppe Ökologie, Anti Atom International and the Ökologie Institut (Sponsored by the Austrian Ministry for Environment, Youth and Family). The book is part of a campaign for a reform of the Agency with the aim of turning it into a "purely nuclear control organization."

Established with the dual role of promoting nuclear technology and preventing the spread of nuclear weapons, the IAEA's nuclear safeguards regime forms the backbone of the Non-Proliferation Treaty (NPT).

The NPT was passed in 1968 by the UN General Assembly and signed by the three (at that time) atomic weapon countries – USA, USSR and the UK – along with forty more countries. It came into effect on 5 March 1970. There are now 147 countries party to the Treaty, including the five declared nuclear weapons states (including China and France). It has six main obligations: fixing the number of nuclear weapons states to five; undertaking to prevent non-nuclear weapons states from acquiring nuclear weapons; controlling the civilian use of atomic energy by IAEA safeguards; encouraging civilian atomic co-operation; undertaking to make available the benefits of so-called peaceful nuclear explosions; and promoting nuclear disarmament.

Limited safeguards

IAEA safeguards are very limited, with little scope for success. Indeed, the nuclear weapon states are under no obligation to accept IAEA safeguards on all their nuclear activities. It is often stressed that they voluntarily allow complete safeguards for their facilities. The US, for example, agreed to full safeguards for all of their civilian facilities in 1967, but it took until 1981 for them to decide upon which three sites should be open to inspection.

The IAEA is only authorised to ascertain the "diversion of nuclear energy from peaceful uses to nuclear weapons ..." (NPT Article III part 1), but not to verify whether the main obligation of the non-nuclear weapon member countries, "that is not to manufacture or otherwise acquire nuclear weapons" (Article II) is in fact fulfilled. The case of Iraq shows how limited this system is.

Huge amounts of the world's weapon-grade nuclear materials fall outside the safeguards regime: 54% of the world's plutonium which is bound within spent fuel and over 66% of the world's pure plutonium. Because only civilian material is safeguarded the IAEA has no jurisdiction over the 260 tons of military plutonium.

In addition, the world's inventory of highly enriched uranium is estimated to be about 1,300 tons of which a mere 11 tons is under the control of the IAEA.

As if this situation is not bad enough, it is set to worsen. By the end of the century an excess world inventory of 'civilian' separated plutonium, mainly through reprocessing, of some 200-300 tons is predicted.

In promoting reprocessing, the IAEA must shoulder a great deal of the blame for the dangerous world stockpiles of unsafeguarded nuclear materials. Indeed, at the 1992 annual conference of the Japan Atomic Industrial Forum, IAEA Deputy Director General William Dircks warned that the stockpiles "pose a major political and security problem world-wide." Dircks continued that it was time for the IAEA to make the necessary revision to its plutonium policy. However, so far nothing has changed.

When the NPT is due for re negotiation in 1995 many countries will express their concern over the IAEA's unwillingness to oppose any nation possessing nuclear weapons. India, which is suspected of possessing nuclear weapons, has already voiced this concern: "If the idea of the NPT is to free the world from the curse of nuclear weapons, then why is it that a few nations continue to claim the possession of nuclear weapons as their exclusive and legitimate right? And the IAEA does not contradict them."

Despite the obvious failings of the NPT, the volume's authors believe that it should be extended in 1995, as some control is better than no control at all. However, they also suggest that the IAEA should be reconstituted to allow control over both civil and military materials. The inclusion within the NPT of the promotion of peaceful applications for atomic energy should also be deleted along with the promotion of peaceful nuclear explosions and reprocessing.

As a UN agency, the IAEA issues recommendations on the transport of radioactive substances; international and

regional transport organisations, in addition to IAEA member states, adopt these recommendations. According to the IAEA: "Transport of radioactive materials is of vital importance for the full international development of peaceful uses of atomic energy." This belief and the duty to promote 'peaceful' nuclear technology are not consistent with its role as a regulatory body.

The Agency uses the ALARA (as low as reasonably achievable) principle in calculating radiation protection standards applied to transportation: this is governed by economics and not health.

The IAEA stipulates a number of safety standards for flasks containing nuclear materials. For example a type B flask which is used for transporting spent nuclear fuel must be able to withstand a drop of 9m onto an unyielding surface, survive being engulfed in a fire of 800°C for 30 minutes and be capable of withstanding immersion in water at as depth of 15m for 8 hours or 200m for one hour. These tests are pitifully inadequate. Many rail bridges exceed a height of 9m, and when a flask was dropped from 36m its lid popped off. For transport accidents US scientists found that 50% of all fires exceed 1000°C (10% over 1200°C), and that more than 10% take longer than 2 hours to put out. The logic of the immersion test is even more bewildering. Salvage of the package will invariably take longer than 8 hours at 15m, and even longer at 200m, yet the IAEA seems to believe the deeper the water the easier it will be to salvage a flask. Furthermore, the 200m test is not even recommended for transport packages containing plutonium.

Nor does the IAEA envisage a flask suffering cumulative stresses. The test are not performed on the same flask but on new ones each time.

The authors conclude that: "The consequences ... [are] that the application of the IAEA Regulations to the transport of radioactive material in type B packages does not justify the assumption that packages could withstand all the strains in possible accident situations."

Developing countries

According to the Agency Director General, Hans Blix: "... technical co-operation to help promote the use of nuclear techniques in developing countries forms one of the Agency's main activities."

These activities include the application of isotopes and radiation sources for industrial, medical, agricultural and other purposes as well as for the generation of electricity. According to the authors, one of the main reasons for this policy "has been and still is to give a positive image to a technology which from the very beginning is connected with death and devastation." Atoms for Peace has been split into a number of sub-divisions aimed at the developing world: Atoms for Health, Atoms for Pest Control ...

Yet in 1987 M Rosen, Director of the IAEA's Division of Nuclear Safety, commented: "The RAPAT experience so far unambiguously establishes that many developing countries simply lack the necessary infrastructure to implement a radiation protection policy based on international standards ...

"Nuclear techniques have been introduced almost randomly as they have become available. Even the least developed countries extensively use X-ray machines and radioisotope diagnostics along with radiotherapy units and industrial radiography sources, most located in private facilities and under the control of no one. They are neither licensed nor inspected."

RAPAT are the Agency's so-called Radiation Protection Advisory Teams. These teams were not established until 1984, some 27 years after the IAEA begun its mission to bring the benefits of the peaceful atom to the world.

Rosen's team, despite a lack of country-specific information, highlighted a frightening situation after surveying 23 developing countries:

- only 6 have any coherent radiation protection policy or long-term strategy;
- only 7 have a truly operational authority responsible for radiation protection;
- only 14 have on paper a sufficient set of regulations;
- only 7 have an adequate licensing and inspection capability;
- only about 40% had an adequate programme to monitor radiation in environmental and food samples;
- in one country about 3,000 X-ray machines were estimated to be in operation without licence or inspection; and
- in several countries sophisticated particle accelerators and neutron generators run without adequate operational procedures or monitoring.

In 1991 it was reported that in over half of the IAEA's member states "radiation safety control mechanisms are inadequate." By over half they meant 66%.

A German scientist, Dr Becker, who participated in a RAPAT mission to Zambia warned that the country had very inadequate protection standards urging that "a considerable improvement is ... imperative."

About 1500 workers are affected in Zambia where neither basic radiation protection legislation nor the rudiments of personal dose monitoring exist. The IAEA is going to give Zambia a present of two new radiation sources (a neutron generator and a cobalt gamma irradiator).

The Agency claims that: "in all cases, delivery of an irradiator has always been accompanied by training, consultant services and other means of support for technology transfer and the introduction of radiation processing activities that are both safe and profitable." Safe and profitable for whom?

Any activity to promote protection standards seems not to be geared towards improving safety: "The IAEA continues to play an active role in setting safety standards, but it is placing increased emphasis on promoting their use. The knowledge that standards have been developed and accepted on a world-wide basis will increase the acceptance of the nuclear power option."

Any nation thinking of accepting IAEA help in developing that option should beware. On nuclear waste management the IAEA say: "The Agency can only give advice and certain technical assistance to develop the expertise for the management of wastes; the countries themselves have to solve their problem."

In no field where the Agency is active does it allow anything to come between it and its mandate to promote the use of nuclear technologies: in eastern Europe it has not recommended the closure of a single reactor even given the perilous state of some of those reactors; it champions food irradiation even when in many cases this is more costly than alternatives and it promotes nuclear power in developing countries where the vast majority of the population is not connected to a grid.

As a UN Agency, it is time the UN faced up to its responsibilities and put a stop to the IAEA's dangerous promotional activities. The world is in dire need of genuine nuclear control.

The authors conclude: "Nuclear power is a hazard to the environment and people. Therefore it has to be stopped as soon as possible." Further "to accelerate the phasing out of nuclear power productions the UN should:

- promote the research and development and application of renewable energies, especially in small scale installation!
- take suitable action to cut down the waste of energy, especially in industrialised countries!" ❑

*** "35 Years' Promotion of Nuclear Energy: The International Atomic Energy Agency, A Critical Documentation of the Agency's Policy." Pub Gruppe Ökologie, Anti Atom International & Ökologie Institut; Vienna 1993; 278pp, Sch290. Available from Österreichesches Ökologie-Institut, 1070 Wien, Seidengasse 13, Vienna, Austria: Tel: 0222/93 61 05-0.**

UK government opposition to a carbon/energy tax could leave the European Community without a carbon dioxide reduction strategy, jeopardising the climate change convention agreed at the Rio Earth Summit last year, argues ANDREW WARREN, the director of the Association for the Conservation of Energy.

UK risking climate convention

THE bureaucrats in Brussels in charge of environment policy will not have had much of a summer break this year. Because, by early September, they are committed to producing a strategy which will solve the existing contretemps concerning their proposed 10 dollar per barrel carbon/energy tax. If they don't, the chances are that many of the more 'ecologically friendly' EC member states will simply refuse to ratify the Climate Change Convention signed last summer at Rio's Earth Summit. And if Europe won't ratify, it may well precipitate a wholesale unravelling of all the international initiatives to combat climate change.

What provides an added piquancy to this sorry scenario is that it was the twelve member states of the European Community which were effectively the first in the world to publicly set themselves a specific goal to mitigate the threat of climate change. That was three years ago, when the Council of Environment. Ministers met in Luxembourg on the eve of the 'political part' of the Second World Climate Conference in Geneva.

It was a heady atmosphere. For the previous few days, climatologists from all over the world had been gathering in Geneva. Their pronouncements about the impending horrors of global warming — concentrating particularly upon emissions of the main culpable gas, carbon dioxide — had been hitting headlines all over Europe. Their demands were that, within the decade, dramatic reductions in emissions (20% was the figure most quoted) would be required from all OECD countries.

The political part of the conference was due to involve a myriad of world leaders: it included French Premier Jacques Chirac, King Hussein of Jordan, the President of the south sea atoll, Kiribati — and even Margaret Thatcher, making what was to be her final platform speech as the UK's prime minister.

When their Council meeting in Luxembourg closed, all the environment ministers were due to travel to Geneva to join the Heads of State. There was therefore enormous pressure upon them to produce a document with commitments which matched the mood of the times.

It is a little ironic — given today's problems — how poorly received that commitment was at the time, coming as it did in the wake of the climatologists' urgent call for heavy cuts in emissions. But as a commitment, it was positively unambiguous.

It read that: "Member States are willing to take actions aimed at reaching stabilisation of the total CO_2 emissions by 2000 at 1990 levels in the Community as a whole". A couple of caveats were included. The first was an assumption that "other leading countries undertake commitments along these lines". The second was that those states with "relatively low levels of energy consumption" were entitled to "have targets and/or strategies corresponding to their economic and social development, while improving the energy efficiency of their economic activities".

Stumbling block

At that stage, it was felt that the first caveat — about other leading countries taking similar steps — would be the biggest stumbling block. In practice, most of those held out as potential problems at the time (the USA, Japan, even China) have all not just signed up, but more importantly ratified, the Rio Climate Change Convention, containing effectively the same commitment. It is the EC countries which have yet to do so.

Much more of a problem has been the difficulty of dealing with the "less developed" members of the European Community — the 'poor four', as they are colloquially known (Eire, Greece, Portugal, and Spain). Although per unit of Gross Domestic Product they already rank amongst the least energy efficient in the Community, on a per capita basis they are relatively small polluters — given their lower levels of affluence.

One of the key jobs facing the Commission staff is to develop a new solution incorporating these four, each of which has interpreted the 1990 commitment to include the concept of 'burden sharing'. This means that, within the overall umbrella of stabilisation, carbon emissions in the poor four rise whilst those in other, richer states fall proportionately more, to compensate.

Certainly, some compensation looks like being very necessary. Earlier this year, the Commission published a table which disregarded the overall target, but instead provided details of the individual commitments made by each of the Twelve on carbon reduction targets proposed within their own countries. It made very salutary reading.

Even based upon these targets (let alone whether proper programmes had been introduced to meet them), there was likely to be a shortfall of well over 100 million tonnes of CO_2 on the agreed stabilisation figure.

Even more pertinent was the question: have proper programmes been introduced to meet the targets? It is now two years since the Commission produced their recommended strategy for meeting the target. It had three parts to it: the national programmes; the SAVE programme for energy efficiency; and the 10 dollar a barrel carbon/energy tax.

Since that time, most of the steps taken seem to have been retrogressive. As reported in the April/May edition of *Safe Energy*, the SAVE programme has effectively been so neutered under the guise of subsidiarity as to become virtually valueless in carbon target terms. Such of its proposed measures as are ever enacted — and there are no effective means of ensuring this happens — will be subsumed within the decidedly suspect national programmes.

And the carbon/energy tax? This is the issue which has effectively become a macho symbol for the true believers. At the end of the last Environment Council of Ministers on June 28, Germany's long-standing environment minister, Klaus Toepfar was telling Reuters that his government will simply not ratify the UN Climate Change Convention, "unless it is made clear at the same time that the EC has agreed that an EC-wide tax on energy and carbon is crucial".

This view is overtly endorsed by the Danes and the Dutch — and more quietly by Luxembourg, Italy, and the current President of the Community, Belgium.

It is not that anyone has any illusions that such a tax will solve all the problems. The Commission itself has undertaken work which shows that relying upon price increases alone to stabilise emissions would require a tripling of fuel costs to be effective. The EC tax (even at 10 dollars a barrel) would not increase even the price of coal by anything like that much, probably by less than 60%. Less heavily carbon intense fuels — like heavy fuel oil — would rise by 45%, and natural gas for industry by 34%. In buildings, natural gas would rise by 14%, and heating oil by 16%. Overall electricity costs were forecast to rise by 16% by 2000 (in a British context, rather less than the imposition of VAT). Because of the heavy taxation duties already imposed, diesel would go up by 11% and petrol by just 6%. Whether an extra 7p on a gallon of petrol would be deterring anyone from driving a single mile less in the year 2000 was always debatable.

Agreement sought

But the difficulty for these six nations is that each of their national programmes is predicated upon one basic assumption. And that is that the European Community will introduce an energy/carbon tax in each member state. At one stage at last April's joint meeting between the Energy and Environment Councils of Ministers, the six had thought that they had managed to negotiate a general agreement in principle to proceed. They offered what was essentially a get-out clause to the poor four, with a restatement of the 1990 pledge, that "the fulfilment of these commitments in the Community as a whole depends inter alia on equitable burden sharing between Member States ... taking into account different levels of economic development and of CO_2 emissions."

By dint of doing that, the Danish Presidency was able to "note that the programmes submitted by several Member States indicate that the use of fiscal instruments makes a significant contribution to their planned reductions in CO_2 emissions"; and to "consider that the Community's overall strategy must take account of this situation".

Consequently, "a decision on such an instrument at Community level should be reached as soon as possible; and eleven" (note, not twelve) "delegations agree on the need for a positive decision".

The twelfth delegation — the one that did not agree upon the need for a positive decision — was that from the United Kingdom. The British position of opposition to the EC tax has been steadily hardening. Before the last Budget, it had been a position of studied agnosticism — quite reasonably pointing out the need for the Ad Hoc Working Group, appointed to finalise the tax's details to make progress.

But the Budget put Value Added Tax upon all domestic gas and electricity bills. In doing so, it merely brought the UK into line with taxation in all other EC countries. And, as the then Chancellor of the Exchequer announced, ended the "current anomaly" of placing VAT only on "goods like loft insulation, which improve energy efficiency, which makes a nonsense of any attempt to use the tax system to improve the environment". The subsequent political storm will not have endeared the concept of deliberately raising fuel prices to the UK Government. Expecting MPs to endorse a further price hike for their constituents would be, as one member of the Commons Environment Committee told me, "like expecting turkeys to vote for Christmas". Hence, the UK Treasury minister Sir John Cope's reassurances to the House of Commons that "the UK sees no need at this stage to consider new taxes on energy". Subsequently, he has been even more forthright: "This tax does not appear to be in the UK's interests". It is, however, manifestly in the UK's interests that sufficient numbers of countries ratify the Rio Climate Change Convention to activate its processes (a minimum 50 signatories are required, 27 have been obtained to date). After all, one of the co-authors of the Convention was Michael Howard. But Howard is no longer the UK's environment secretary, and thus the "pride of ownership" which the UK expressed about the Convention may be dissipating fast. Its government is confident that it can ratify the Convention without the need for an EC tax — although it has yet to state convincingly quite how. It argues that it will not hinder any other country from introducing its own tax unilaterally. However, it seems that few wish to do so because of potential competitiveness problems. A small levy, with the money recycled into energy conservation schemes, some, like the Dutch, are prepared to wear. But a 60% unilateral hike in coal prices is not something that, for instance, the German government is likely to be rushing to introduce.

Eleven countries want to see a positive decision. The Belgian Presidency is pledged to resolving the position before the deadline of the end of the year. Failure to deliver an EC-wide agreement before then could well mean that some environmentally sympathetic countries will not ratify the Rio convention. And, as I mentioned earlier, this could well precipitate the worldwide unravelling of the Earth Summit commitments. ❑

Nearly 300 nuclear-powered vessels roam the seas, many others await expensive decommissioning and some lie abandoned on the ocean floor. With the Cold war over, JOSH HANDLER, nuclear-free seas campaigner with Greenpeace International, proposes that it is time to ban nuclear power at sea.

Banning nuclear power at sea

THE oceans — our most vital resource — cover three-quarters of the world. Humanity lives by the seas, which provide food, trade, transportation and recreation. Yet the seas, historically, are also an area of conflict. During the past 40 years the US, Soviet, British, French and Chinese navies sailed hundreds of nuclear-powered ships and submarines on and below the seas in preparation for war. If the Cold war had flashed hot, the oceans would have become a nuclear battlefield littered with radioactive debris.

Now that the East-West conflict is over, nuclear-powered vessels should be retired. Nuclear-powered ships and submarines lack military missions, are expensive to build and operate, generate large amounts of long-lived deadly nuclear waste from their normal operations and when they are decommissioned, and are subject to accidents or deliberate attack which can result in the sinking of nuclear reactors and the release of radiation. With the costs of nuclear-powered vessels mounting, the time has come to ban nuclear power at sea.

Reactors roaming the seas

Since the first nuclear-powered vessel, the submarine USS Nautilus, was commissioned in 1954, almost 500 nuclear-powered ships and submarines, carrying more than 740 nuclear reactors, have been built by the Soviet Union and Russia, the US, the UK, France, China, Germany, and Japan. Today, nearly 300 of these vessels, carrying some 450 reactors — more than half of the world's nuclear reactors — are still at sea. And, more are under construction.

During the 1990s, the US, Russia, the UK, and France all plan to launch new nuclear-powered submarines and, in the case of the US and France, new nuclear-powered aircraft carriers. In addition, the US, Russia, and the UK have completely new types of nuclear submarines on their drawing boards. Nuclear submarines may also proliferate to new countries in the next decade. Brazil is preparing to build a nuclear-powered submarine, and the Indian Navy has also shown interest in acquiring nuclear-powered submarines.

Most nuclear-powered vessels are submarines, but there are over 20 Russian and US nuclear-powered surface warships, seven Russian nuclear-powered icebreakers and one Russian nuclear-powered merchant ship. The US also operates one nuclear-powered deep-sea research vessel.

All US, British and French nuclear-powered submarines have one reactor, while most Russian submarines have two. All military and civilian surface ships contain two nuclear reactors, except the American aircraft carrier USS Enterprise which has eight reactors on board.

These submarines and ships roam all the world's oceans, but are mainly to be found in the North Atlantic, North Pacific, and Arctic oceans, and the Mediterranean Sea. It is in these regions the nuclear-powered submarines and surface ships of the US, Russian, British and French navies operate and house their naval nuclear bases and facilities.

Lost at sea

Nuclear submarines are a relic of the Cold war. US, British and French submarines were built to hunt and destroy Soviet nuclear submarines or to attack the Soviet Union with nuclear weapons. Russia is no longer a military threat to the west and does not need to be deterred. Russian submarines, designed to attack US aircraft carrier battlegroups and deter the US from starting a nuclear war, are also outmoded. Nuclear submarines now cruise the oceans serving only to endanger submarine crews and the environment. New nuclear submarines in the US and Russia are not being constructed to meet any military threat but to preserve the 'defence industrial base'.

Nuclear-powered surface ships also face a troubled future. The US Navy is slowly retiring its nine nuclear-powered cruisers and has no plans to replace them. Three Russian Navy nuclear-powered cruisers are up for retirement. Only nuclear-powered aircraft carriers may survive, despite their extraordinary construction costs.

Nuclear-powered ships and submarines are enormously expensive. Nuclear vessels cost more to build, more to operate, more to maintain, and more to decommission than their conventional counterparts. Today, a single US Los Angeles class attack submarine costs almost $1 billion to purchase. The newest Seawolf attack submarine will cost $2 billion. A US ballistic missile submarine costs about $1.3 billion, and the next US nuclear aircraft carrier is expected to cost at least $4.6 billion. These expenses do not include the billions of dollars, roubles, pounds or francs, needed to construct a nuclear fuel fabrication industry, a nuclear shipyard infrastructure, nuclear waste facilities, and scrap retired nuclear-powered vessels.

Environmental damage

Naval nuclear reactors have contributed significantly to turning the oceans into a nuclear garbage dump. Nineteen naval nuclear reactors have deliberately been dumped at sea; one off the US Atlantic coast by the US Navy and the rest off the Russian Arctic and Pacific coasts by the Soviet Navy. The Russian Navy still routinely dumps nuclear waste at sea. Future dumping by other countries remains a possibility. The UK. would like to dump its retired nuclear submarines in the oceans.

Deliberate environmental pollution is just the tip of the iceberg. Nuclear-powered vessels have been involved in hundreds of peacetime accidents, routine and significant. Serious accidents have occurred regularly since nuclear-powered vessels went to sea. Five nuclear submarines have sunk — two American and three Russian — carrying seven nuclear reactors to the ocean floor. The Soviet nuclear submarine force was particularly disaster-prone even during the best of times, suffering numerous reactor explosions and meltdowns. Now in the worst of times, a major nuclear accident is a real possibility.

Collisions between nuclear-powered submarines, still engaged in cat-and-mouse games under the sea are another worry. At least nine such undersea collisions have occurred between Western and Soviet submarines since the 1960s, the last occurring in 1992 and 1993 despite the

end of the Cold war. Two other crashes involved surface ships. In 1970, when the USS Tautog collided with a Russian submarine in the depths of the Pacific ocean, the crash was so serious that both crews thought the other submarine had sunk.

Cold war's deadly legacy

A large number of nuclear-powered ships and submarines are now being retired. Approximately 180 decommissioned submarines carrying nearly 280 nuclear reactors need to be disposed of in the United States, Russia, the UK, and France. By the year 2000, another 100 nuclear-powered vessels with nearly 150 nuclear reactors will be removed from service, with more scheduled to follow in the next century. The magnitude of the problem is immense and unprecedented.

The US Navy has a program to decommission 100 nuclear-powered submarines and scrap about 85 by the year 2000 at a total cost of $2.7 billion, according to a 1992 General Accounting Office report. This amount does not include nuclear waste handling and storage costs. Most of the work is being done at the Puget Sound Naval Shipyard at Bremerton, Washington. The defuelled nuclear reactor compartments are cut out and shipped up the Columbia River for burial at the Department of Energy's Hanford nuclear reservation in Washington. So far, 30 reactor compartments had reached Hanford. The nuclear fuel is shipped to Idaho for storage at the Idaho National Engineering Laboratory.

Russia, by virtue of the many nuclear-powered submarines built by the Soviet Union, is facing an even greater problem. Some 100 old ex-Soviet nuclear-powered submarines are out of commission. The Russian Navy, due to an absence of preparation, lacks the support ships to offload the deadly nuclear fuel from most of these submarines, has inadequate scrapping facilities, and does not have land-based storage sites for the reactors. As a result, many of these submarines are rotting in harbours, posing an ecological threat. The UK, France and China also face similar problems with their smaller nuclear-powered fleets.

Radioactive pollution menaces the seas. From 1946 to 1982, 12 nations — the United States, the UK, France, Germany, Italy, Belgium, the Netherlands, Sweden, Switzerland, Japan, South Korea, and New Zealand — openly dumped over a million curies of radioactive waste in the Atlantic and the Pacific oceans. A thirteenth country, the Soviet Union, has secretly dumped nuclear waste from nuclear-powered vessels since the 1960s, and Russia may do so openly until the late 1990s.

Also, massive amounts of nuclear waste are discharged directly into the sea from land-based reprocessing plants at Sellafield and Dounreay in the UK, and La Hague in France. Radioactive waste from nuclear weapons plants inland — at Chelyabinsk and Krasnoyarsk in Russia and Hanford in the United States — has contaminated rivers flowing into the oceans.

A 10-year moratorium enacted in 1983 under the authority of the London Convention treaty — the global compact that deals with ocean dumping in the world's seas — has kept all nations but the Soviet Union from dumping waste at sea. The moratorium was adopted because a number of countries were planning to dramatically increase their dumping in the Atlantic and Pacific Oceans. The moratorium will be reviewed in November 1993. There is a risk it will not be turned into a permanent ban and once again the oceans will become a radioactive dustbin. Also, the UK— despite widespread opposition — plans to increase its radioactive discharges from Sellafield into the Irish Sea.

Oceans at risk

The oceans are at risk from multiple threats. Naval and other nuclear waste, chemical pollution from industries and farming, oil spills, municipal sewage discharges and sea-dumping of garbage, all combine to endanger the ocean environment.

Nuclear-powered submarines lack missions, and surface ships do not gain any additional fighting capability from nuclear-power. Billions of dollars are needed to build, maintain, and then dispose of decommissioned nuclear-powered ships and submarines. Naval reactors generate deadly radioactive waste which will have to be stored and guarded for hundreds or even thousands of years. There is always a chance that an accident may take a reactor to the bottom of the ocean or lead to the release of radiation during routine operations. A nuclear-powered warship seriously damaged in a conflict could lead to a major release of radiation affecting nearby countries and fisheries.

However, the number of nuclear-powered vessels is already on the decline. The high point of nuclear power at sea was in the late 1980s, when almost 400 nuclear ships and submarines were in commission. By the year 2000, there will still be nearly 200 nuclear-powered warships plying the world's oceans serving no purpose except to threaten the environment and generate nuclear waste.

It is time to ban nuclear power at sea. Construction of nuclear-powered ships and submarines needs to be stopped and nuclear shipyards need to be converted. Commissioned vessels should be phased out quickly and an orderly plan should be established to dispose of the retired vessels above ground. Nuclear submarines lost at sea and nuclear reactors deliberately dumped in the oceans must be dealt with, priority being given to retrieval and monitored storage on land. The dumping of naval and other radioactive waste in the oceans must be permanently banned. The nuclear arms race is over on land; it is time to end it at sea. ❑

The Department of Environment has now begun its second consultation on British Nuclear Fuels' Thermal Oxide Reprocessing Plant (Thorp), but has pre-empted this by stating that it is "minded" to allow the plant to open. The DoE has relied on discredited and out of date arguments to justify Thorp and has failed to considered alternatives to allowing the plant to open, argue SIMON ROBERTS and Dr PATRICK GREEN of Friends of the Earth.

Thorp consultation out of date

THE Department of Environment (DoE) has finally launched the long awaited second consultation on the justification for the Thermal Oxide Reprocessing Plant (Thorp). The consultation runs until 4 October 1993. The DoE stated that the government is now "minded" to grant British Nuclear Fuels (BNFL) an authorisation to operate Thorp. Such a statement demonstrates the farcical nature of the second consultation. If the Government has already made up its mind, why bother to hold a second consultation? However, to add to the confusion the Environment Secretary, John Gummner, has also written to FoE to state that the government has not yet ruled out holding a public inquiry after this second consultation. What happens next really depends on the scale of the public response to this consultation.

A large bundle of documents has been published by the DoE as part of the second consultation. The documents included Her Majesty's Inspectorate of Pollution's (HMIP) report on the first consultation and BNFL's economic case for opening the plant. The documents are available for public inspection at DoE offices in England, however, no mention has been made of where they can be viewed in Scotland or Wales.

The scale of response to the first consultation was unprecedented for a public consultation of this type. HMIP received a total of 83,731 letters, of which 64,514 objected to the opening of Thorp and 19,217 supported it. HMIP actually received a lot more than this, but found a number of ways to dismiss letters, although they did, in the end count the letters received before the formal start of the consultation and also any letters received up to March. Those ignored included "illegible names and addresses" (12,170); standard letters or "proformas" (of which there were 49,041) and petitions (28,780 names objecting and 18,467 names supporting).

Despite this, HMIP ignored all objections and concluded: "The provisions of the draft authorisation would effectively protect human health, the safety of the food chain and the environment generally." Its report, however, fails completely to support this claim.

The DoE also published BNFL's economic case for operation of Thorp. This is not the full Touche Ross report, only a summary document for public consumption. The DoE did not subject BNFL's case to independent scrutiny. Instead, it argued that, "it is for BNFL to determine the commercial benefits of operating the Thorp plant ... the Government sees no reason to dissent from the essential conclusion in BNFL's document, namely that operation of Thorp will bring substantial benefits to the company compared to abandoning the project."

FoE believes that BNFL's summary does not demonstrate that opening Thorp is the most economically or environmentally sound option for meeting the company's commitment to manage the spent nuclear fuel of its customers at home and abroad. There is another option which, according to a preliminary assessment by FoE,[1] would save BNFL and its customers money and greatly reduce the environmental burden of radioactive wastes and discharges.

With a cheaper and more environmentally sound alternative on offer, the radioactive discharges, proliferation risks and economic uncertainties of opening Thorp cannot be justified.

BNFL has argued, on the basis of its much-publicised but unpublished report by Touche Ross, that it will make a £500 million profit over the next 10 years if Thorp is opened, and that the UK would lose £900 million over the next 10 years if Thorp was not opened.[2] These estimates are extremely sensitive to changes in assumptions about costs. Yet, BNFL claims that these figures provide a justification (in terms of 'benefits') for the risks associated with nuclear waste production and contamination from Thorp.

However, according to sources who have seen the Touche Ross report, the calculations supporting the £900 million loss figure assume that BNFL would not be able to gain an income from whatever else it does instead of opening Thorp.

This outcome is highly questionable since the extent to which customers will be prepared to pay up on their contracts if BNFL does not reprocess their spent fuel will depend on what BNFL offers to do with their spent fuel instead. The option, assumed by BNFL for its Touche Ross report, of offering nothing and losing all further payments from customers is completely unrealistic.

A more realistic alternative would be to offer other spent fuel management services as a direct replacement for existing reprocessing contracts. BNFL could offer to construct dry storage facilities for its customers at Sellafield or abroad and transform Sellafield into an international centre of excellence in nuclear waste management and decommissioning technologies. It is likely, as the figures outlined below indicate, that customers would be most interested in switching their contracts, if only they were asked.

The alternative to Thorp

BNFL should provide specially designed storage facilities for the spent fuel currently contracted for reprocessing at Thorp.

Since our appearance at the 1977 Windscale public inquiry into Thorp, FoE has argued that BNFL should store rather than reprocess spent nuclear fuel. In June 1993, we wrote to the Prime Minister re-iterating this position and urging him to encourage BNFL to offer its customers the option of switching from reprocessing contracts to spent fuel storage contracts.

In financial terms, if BNFL followed this route it would have to meet the cost of construction and operation of dry storage facilities either at Sellafield or in the country of origin of the spent fuel (£1 billion over 50 years — undiscounted).[3] However, it would save the operating and decommissioning costs of Thorp (combined £3.2 billion in 1992 money — undiscounted).[4]

For their part, BNFL's customers would save the costs of storing plutonium (£30 million per year at least)[5] and high level nuclear waste (roughly £70 million — undiscounted)[6] and associated transportation costs.[7] The costs of disposing of intermediate and low-level waste associated with Thorp would also be saved (roughly £180 million — undiscounted).[8]

This balance of costs and benefits, as shown in Table 1, is such that it is unlikely that any foreign or home customer would seek to pull out of contracts. Indeed, it may well be that in negotiating these new arrangements, BNFL could expect to 'share' some of the resulting savings accruing to its foreign customers. Assuming that BNFL can secure an income for storing spent fuel instead of reprocessing it, the scale of possible savings for BNFL swamp the predicted profits of operating Thorp.

It should, of course, be noted that Scottish Nuclear is currently awaiting planning permission to construct a dry store for spent fuel at Torness. The company has stated that the "principal reason" for its decision to change from reprocessing to storage was economic. The company has estimated that the financial benefit to the company would amount to about £45 million per year.[9]

The costs of final disposal, assuming it can be achieved, for either spent fuel (following long term storage) or reprocessing wastes are extremely uncertain. For the purposes of this assessment it has been assumed that they are broadly comparable and therefore cancel each other out on the balance of costs and benefits.

In environmental terms it is now widely accepted that storing spent fuel is preferable to reprocessing it and dealing with the resulting waste stream. While neither option represents a final "solution" for spent fuel management, avoiding the production of the reprocessing waste stream significantly reduces both short and long term risks.

For example, the government's Radioactive Waste Management Advisory Committee (RWMAC) has stated: "Reprocessing, by releasing the wastes confined within the spent fuel elements, increases the volume of radioactive waste and the amounts of radioactive material released into the environment in effluent discharges."[10]

RWMAC concluded that "there are no compelling waste management reasons to reprocessing oxide fuel early, or later, or at all."

The only "practical alternative" waste management option to reprocessing is spent fuel storage.[9] Storage is now viewed by the nuclear industry as a "safe and environmentally acceptable way of dealing with spent fuel."[9] Indeed, at the recent Torness Public Inquiry into Scottish Nuclear's plan to construct dry storage for spent fuel, it was revealed that "BNFL is proposing to offer dry storage facilities in conjunction with the Costain construction group."

By comparison, storage produces far lower volumes of radioactive waste arisings than reprocessing. Discharges to the environment from spent fuel storages are insignificant when compared to those arising from reprocessing.[9]

At the Torness inquiry, officials for the Scottish Office Environment Department accepted that: "The reprocessing route did not appear to offer any immediate and significant advantages, from a waste management point of view."[9]

It should also be noted that the construction of dry storage facilities would provide construction jobs for the rest of this decade and then store operative jobs beyond that.

Cumbria County Council, in its submission to the first HMIP consultation, concluded: "A decision to abandon or postpone Thorp indefinitely would necessitate a review of waste management strategy. The review process and subsequent decisions, perhaps in the direction of surface spent fuel storage, could have significant job creation potential both at Sellafield and at UK nuclear power station sites. BNFL has not speculated on the job impacts of this scenario."[11]

Britain is already a world leader in the development of dry storage technology. Dry stores developed by GEC are in use at Nuclear Electric's Wylfa site and are being developed for use in the USA.

To justify the opening of its new Thorp reprocessing plant, BNFL and the government must demonstrate that it is the best course of action. They must show that nothing else could be done with the spent fuel to provide the same 'benefits' to customers but with less risk and the same or lower costs as Thorp. They have not done so.

Storing instead of reprocessing the spent fuel for its customers has lower environmental impact, minimal proliferation risks and saves BNFL and its customers money. The risks of Thorp cannot be justified if there is another, lower risk route to the same 'benefits'. The Government must act now to bring BNFL and its foreign customers to the negotiating table to examine the benefits of revising existing reprocessing contracts into storage contracts. ❑

Objections should be sent by 4 October to: The Department of the Environment, Sellafield Consultation, PO Box 5, Manchester M60 4DA.

Table 1: Undiscounted* costs and savings of not opening Thorp and storing spent fuel instead

	BNFL COSTS	BNFL SAVINGS	CUSTOMER SAVINGS
Dry store construction & 50 years operation	£1 billion		
Avoiding operating and decommissioning Thorp		£3.2 billion	
Avoiding 50 years of plutonium storage			£1.5 billion
Avoiding 50 years of high-level waste storage			£0.07 billion
Avoiding intermediate and low-level waste disposal			£0.18 billion

* The effects of discounting these costs and savings have yet to be fully calculated in this preliminary assessment. However, bearing in mind the time periods involved, it is likely that the difference between the net present value of store construction and operation and that of Thorp operation is even greater than for the undiscounted values.

Notes and References

1. Friends of the Earth will be publishing a more detailed assessment of this case as its submission to the second consultation on the justification for Thorp.

2. eg as quoted in 'Trouble in store for nuclear waste processor', Financial Times, 13 January 1993.

3. Sources: mid-range estimate from F Berkhout and W Walker (1990) Thorp and the economics of reprocessing, SPRU, Nov 1990, Table 9. Comparable with Touche Ross reported estimates of £15 million per year for storing the spent fuel already at Sellafield (quoted in ref 2).

4. Derived from figure (in 1989) prices of £2.9 billion for operation, financing charges, decommissioning and associated R&D quoted in BNFL News, November 1990, p1.

5. Figure taken from lower end of range of plutonium storage costs (£0.6 per g Pu per year) from F Berkhout et al (1992), 'Disposition of Separated Plutonium', Science and Global Security, 3, (3-4), 1992, p9.

6. Taken from F Berkhout (1993) Fuel reprocessing at Thorp: Profitability and Public Liabilities, Greenpeace, January 1993, p14.

7. We have yet to identify a published figure for transportation costs for plutonium or high-level waste.

8. Taken from various nuclear industry sources.

9. Reported in Hickman R.M, Electricity Act 1989 Application for Section 36 Consent, Unpublished Report of Public Local Inquiry into Objections to Proposed Spent Fuel Store at Torness Power Station, Dunbar, East Lothian, January 1993.

10. RWMAC, Eleventh Annual Report, November 1990, London: HMSO.

11. Cumbria County Council, Thorp and the Revised Sellafield Discharge Authorisation: Advice in Respect of the HMIP Consultation on the Proposed Revised Authorisation under the Radioactive Substances Act 1960, prepared by Environmental Resources Ltd, Dec 1992.

NFFO go-ahead

AFTER much delay, the third tranche renewables order for England and Wales was announced by energy minister Tim Eggar on 21 July. The order, originally due in 1992, is for 300-400MW declared net capacity (DNC) of renewable energy.

Unlike the first two orders made in 1990 and 1991, which totalled 559MW DNC, the third order will run for 15 to 20 years. This follows European Community approval for an extension of the Non-Fossil Fuel Obligation (NFFO) beyond the 1998 cut-off imposed on nuclear power.

For the first time, similar assistance is to be given for renewables in Scotland and Northern Ireland. In plans announced by Scottish secretary Ian Lang, ScottishPower and Scottish Hydro-Electric will between them be required to obtain 30-40MW of new renewables capacity, with further, probably larger, orders in later years aimed at a total of 150MW by the end of the century. Details of how the costs of the Scottish Renewables Obligation will be passed on to electricity consumers have still to be determined. In Northern Ireland an initial order of 15MW is planned, with a target of 45MW by 2005.

The British renewables orders will start in November 1994, with further orders expected in 1995 and 1997 to commence in 1996 and 1998 respectively. The overall target, as set out in the government's white paper on coal ("Renewables obligations", *Safe Energy 94*), is for 1,500MW of new renewables by the year 2000.

The size of the renewables orders has been criticised as inadequate by environmental and commercial groups. The schemes fail to reflect the environmental benefits of renewable energy, the size of the available resource or the interest from companies to develop the resource. The inadequacy is particularly great in Scotland which has over 50% of Britain's wind, wave and hydro resource, but is to get only its per capita 10% share of new renewables under the government's plans. ❑

South-west renewables

RENEWABLE energy sources could meet up to 12% of south-west England's electricity demand by the year 2000, according to a joint report by South West Electricity (SWEB) and ETSU, the government's Energy Technology Support Unit.* It is the first in a series of regional studies commissioned by the Department of Trade and Industry.

The main technologies considered of short-term significance in the south west are onshore wind power; energy from municipal, industrial and agricultural wastes; and arable coppice — with some contribution from landfill gas, biogas from other wastes and hydro power.

In the long-term, with possible development of offshore wind and tidal barrage, a resource of 27 terawatt hours a year (TWh/y), almost two and a half times present electricity consumption, could be exploited.

The SWEB area has been a main beneficiary of the Renewables Order of the Non Fossil Fuel Obligation, securing 41 of the 197 renewable energy contracts in England and Wales.

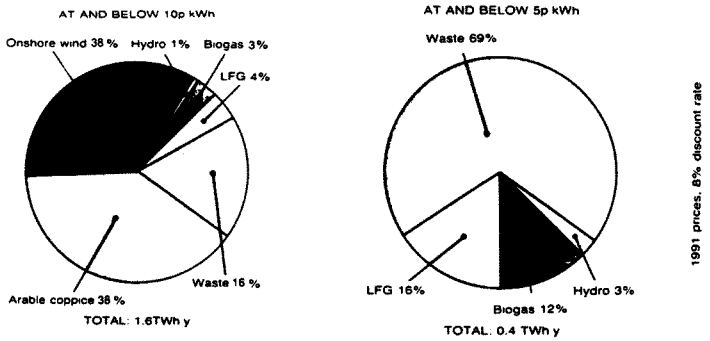
Onshore wind power makes up by far the largest capacity of the existing schemes, with smaller contributions from hydro power, landfill gas and sewage.

In assessing the likely development of renewable resources in the near future, the report took into account the technical, economic, environmental, planning and institutional criteria applicable to each individual technology, using an 8% discount rate, and present day cost estimates which exclude potential cost reductions from future technological advances.

It was estimated that 1.6TWh/y could be generated at a cost of 10p or less per kWh and 0.4TWh/y at below 5p/kWh. At 10p/kWh the major contributors are arable coppice and onshore wind (38% each) and at 5p/kWh they are waste (69%), landfill gas (16%), biogas (12%) and hydro (3%).

Though recognising the vast resource available in the region from tidal barrages and offshore wind, the report does not believe these offer an economic option, at least in the short to medium term. ❑

*** "Renewable sources of electricity in the SWEB area — future prospects"; SWEB/ETSU, 1993.**



Regional resource at and below 10p/kWh and 5p/kWh

Dutch solar

A major housing project at Apeldoorn, Netherlands is to incorporate what it is caimed will be Europe's largest solar energy system.

The Woodhuis complex will include a thousand homes fitted with roof solar panels. The system will be supplemented by gas-fired central heating to ensure continual heating and hot water.

The joint venture, by the local municipality and energy distributor PGEM, will receive grants from the Dutch government and the European Community which will cover most of the Dfl 3,670 of each solar unit.

For around Dfl 700 (about £250), householders will have a solar system which is expected to save 50% on energy bills. ❑

Swiss photovoltaics

PHOTOVOLTAICS, producing electricity from sunlight, are making slow but steady progress in Switzerland.

At the start of this year there were 500 installations producing 3.3MW (peak), an increase of 1.5MW on the previous year — five years ago there were none.

Photovoltaics now produce enough electricity to meet the consumption of 400 homes. Their 1.8GWh annual output is, however, still well short of the 50GWh/y target which has been set by the Swiss government in its Energy 2000 programme. ❑

Solar conference

THE sixth North Sun conference, on the special challenge and potential of using solar energy at high latitudes, will take place in Glasgow next year.

Ten years after the inaugural North Sun '84, in Edinburgh, the conference will give participants the opportunity to contribute to the advancement of solar technology, broaden their ideas on solar utilisation and meet colleagues from other countries with similar climates.

North Sun '94 will take place from 7-9 September 1994 and further details can be obtained from: North Sun '94, Mackintosh School of Architecture, Glasgow School of Art, 177 Renfrew Street, Glasgow G3 6RQ, Scotland, UK (telephone 041-332 9797, fax 041-353 0995). ❑

Offer backs efficiency

LIMITED measures to promote energy efficiency have been drawn up by Offer, the electricity regulator, for introduction in April 1994.

Included in a review of electricity supply price control, published in July, is the compulsory annual expenditure by the English and Welsh regional electricity companies (RECs) of £1 per customer on energy efficiency for the next four years. This will provide about £22m a year of new funding to promote measures including insulation, low-energy lighting and energy audits. Schemes put forward by the RECs will have to be approved by Offer in consultation with consumer bodies.

Other changes to the supply price formula announced by Professor Stephen Littlechild, the director general of electricity supply, will remove "the artificial incentive to sell more electricity" by reducing "to about one fifth the unit-related term" in the supply price control formula.

Electricity supply — essentially arranging purchase of electricity and billing of customers — represents only 6% of the final cost of electricity. The more important review of distribution costs — which make up about a quarter of the total — will be announced next year, as will a review of supply price controls in Scotland.

Environmental groups have criticised the limited scale of the energy efficiency measures. Friends of the Earth wants to see "companies being given a profit motive for energy efficiency projects rather than just being driven by the regulator."

In evidence to the Commons Environment Committee inquiry into energy efficiency, Littlechild was asked about his duties to permit only a "reasonable demand" for electricity and whether environmental issues formed part of his assessment of this demand. His response was that this was an issue on which Offer had still to form a judgement.

It also emerged from the inquiry that Littlechild and his gas industry equivalent, Sir James McKinnon, had held no formal joint meeting with government on energy efficiency. Littlechild admitted that no joint research had been undertaken and conceded that far more co-ordination was needed.

Asked about the likely effect of VAT on domestic fuel and power, Littlechild expressed confidence that it would reduce consumption but declined to comment on the proportion of this saving that would be from reduced comfort rather than improved energy efficiency.

■ The problem of damp housing was highlighted in a recently published Scottish house condition survey.

Over 25% of Scottish homes suffer from damp, condensation or mould, and the cost of bringing all Scotland's houses up to an acceptable standard has been put at £3.7 billion. The Scottish House Condition Survey 1991, the first in Scotland, was carried out by Scottish Homes and found that 95,000 dwellings (5%) were below Tolerable Standard, mainly because of dampness. ❑

Polish energy efficiency

THE potential for domestic energy saving in Poland has been shown in a demonstration project in Krakow.

There have been major obstacles to energy efficiency in Poland, where efficiency in space heating is put at 30% compared to about 80% in western Europe. These include the practice in apartment blocks of charging for heating according to floor space rather than heat used. Temperature control is usually done by opening and closing windows.

Energy subsidies, which have encouraged energy wastage for the past 50 years, are being removed and energy bills are becoming a significant burden for Polish families, but they can rarely afford to invest in energy efficiency and there are often, in any case, technical difficulties.

The demonstration project, carried out over the last heating season, was sponsored by the UN Agency for International Development. It achieved a 20% energy saving in an apartment block fitted with insulation and thermostatic radiator valves. Greater savings are expected as residents get used to using the new system effectively. Due to the success of this initial study, two larger projects are now being planned. ❑

EC renewables study

A renewable energy study for the Commission of the European Community has shown that new measures will be needed if renewable energy technologies (RETs) are to make major inroads into the energy market.

At present, through its ALTENER programme, the EC has set targets for 2005 of: 8% primary energy supply by RETs, a tripling of electricity generation by RETs (excluding large hydro), and a 5% share of motor vehicle fuel consumption for bio-fuels.

The study concludes that these targets will not be met by existing policies alone.

The technical potential for RETs is assessed to be 343 million tonnes of oil equivalent — 47% of the level of EC final energy consumption in 1990. However, under present EC and national policies, renewables will be limited to 6.5% of the market by 2010, just 50% more than the present level.

RETs face "a wide range of constraints on their recognition and utilisation as viable alternatives to existing energy technologies," states the report, which goes on to identify policies and measures which could alleviate or remove the barriers to commercialisation.

These include the setting of national targets for RETs, funding for research and development, education and training, regulations on CO_2 and other emissions, and energy efficiency. A range of financial measures are also proposed including support for capital intensive schemes, internalisation of environmental and other costs, tax relief/subsidies, and a carbon tax.

The implementation of these measures could raise the market share for RETs in the EC to 13% by 2010, and similar action in central and eastern Europe could see renewables use growing to 12%.

Under the study's proposals, provided they are backed by a wide range of policies and measures at national and local level, CO_2 emissions would be reduced by 5% of their 1990 level by 2005 and by 12% by 2010.

The importance of small-scale, decentralised systems is stressed in the report, with decentralised energy supply expected to make up 60% of the RET total. ❑

More Thermie

A new batch of energy technology projects is to receive funding from the European Community Thermie programme.

Abel Matutes, EC commissioner for transport and energy, plans a total of Ecu129m of funding for 37 projects, 30% of which are on the rational use of energy, 25% renewable energy, 21% hydrocarbons and 19% solid fuels.

Several large European collaborative programmes in the buildings and transport sectors are included. "Total mobilisation of CO_2 reduction potentials in residential building stock by optimised energy rehabilitation" is a German-Dutch Scheme. Jupiter (the Joint Urban Project in Transport Energy Reduction) will involve the UK, Belgium and Denmark, while Germany, the UK and Greece plan a joint scheme to focus on energy saving in municipal transport systems.

520 new and innovative energy technology projects have received Ecu415m under the Thermie programme since 1990. ❑

Wave prospects improve

NINE words in the closing address at a wave power conference, held in Edinburgh in July, gave the first glimmer of hope from official sources that the search for this clean energy might, at long last, move to the place where it ought to have started: in the sea, *writes David Ross.*

The representative of the European Commission, Dr Giancarlo Caratti, said: "We want to put one foot in the water." This means that, if the Council of Ministers takes his advice, the European Community will be providing cash support for the world's first wave power station in the open sea.

The conference, promoted by the EC and organised, at Heriot-Watt University, by the National Engineering Laboratory, was attended by 100 delegates from 20 countries.

Caratti, who handles wave power for the Commission, made one other statement of considerable importance. He said that in future we should not "base decisions on future predicted costs." This is a reference to the silly practice, which started back in 1978 when wave energy was little more than toy ducks in a bathtub, of making calculations about what would eventually be the cost of a unit of electricity when full-scale wave power stations were built.

Caratti has shown that he does not talk just to please his audience. At the EC conference held in Cork last October he was emphatic that it was too soon to go offshore and that that must wait for "a second phase".

He appears now to be indicating that, in his opinion, that time has arrived. It has still to be seen whether the Ministers agree.

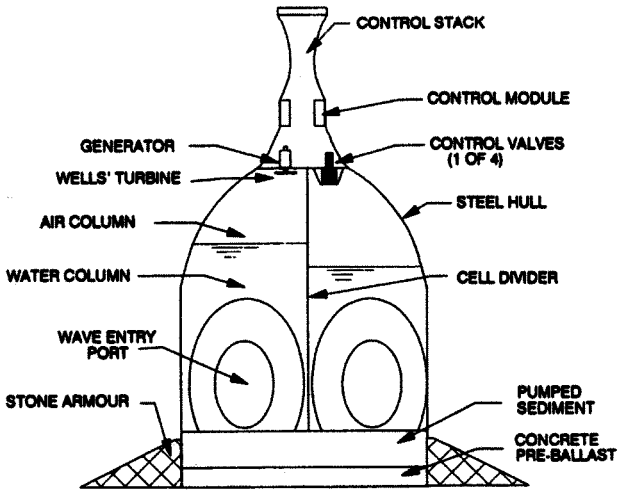
He also announced that he expected the next two-year grant from the EC to be double the last: up from £900,000 to £1.8-£2.2 million.

There is widespread belief that the first offshore plant will be a two megawatt Osprey, an oscillating water column standing on the seabed 500 metres out from Dounreay.

The Osprey has apparently impressed the EC because it has gained support from private industry — believed to include British Steel and Scottish Hydro-Electric. It has been developed by Applied Research and Technology (ART), an Inverness company, and Queen's University, Belfast. Survey work on possible sites off Dounreay, recently carried out for ART by AEA Technology, have established that the sea and seabed conditions in the area are suitable.

It is thought that there will also be a new gully device on Islay, facing due west to receive the Atlantic swell, rated at about 150 kilowatts, twice that of the existing south facing device. The new model should have greater efficiency, using three turbines instead of one, and incorporating other technical advances.

The third beneficiary of EC support will probably be a 500 kW oscillating water column on the shore of the island of Pico in the Azores. When wave energy is developed, Portugal, with more than 500 miles of coast facing the Atlantic, will be one of Europe's major producers of electricity.



Outline of the ART Osprey

■ There was an extraordinary outburst during the discussions at the Edinburgh conference. Peter Clark, a partner in the government's consulting engineers Rendel, Palmer & Tritton (RPT), took the microphone and declared: "You are listening to an honest man. There were some very serious allegations made by people who were responsible for reporting last time round. Those allegations were completely false.

"Wave energy is the most interesting thing I have worked on. Only a fool kills a very interesting subject and a good source of income. If you had seen my defence of wave energy before Acord [the Advisory Council on Research and Development] you would all have been cheering."

RPT was the company which gave the first cost estimates for wave electricity in 1978, putting it at around 30p a unit. This figure — which would be 80p in today's prices — did great damage to a nascent technology.

It was not clear what occasion Mr Clark was referring to when he spoke of "last time round". He appeared to be saying that he was present at the meeting of Acord in 1982, from which the wave programme manager was excluded, which decided to shut down the government programme.

Professor Stephen Salter, a leading figure in wave energy and a major critic of RPT, had wanted to reply to the remarks but Clark disappeared immediately after making his contribution, and attempts since the conference to reach him to clarify his views have been unsuccessful.

There are a lot of people who would like to know just what happened at the secret Acord meeting, which took place at a time when the Thatcher government was clearing the decks for its programme of ten pressurised water reactors. But the government has refused to release the contemporary minutes of the meeting. ❑

Wave scientist shifted

TOM THORPE, the Harwell scientist who brought calm to the stormy waters of wave energy, has been removed from his post by ETSU, the government's Energy Technology Support Unit responsible for renewable energy, *writes David Ross.*

Thorpe spent three years producing a two-volume report on wave power ("Wave costings", *Safe Energy 93*).

The Department of Energy Steering Group was particularly demanding, insisting on meticulous scrutiny of every cost estimate for every nut and bolt, refusing to recognise that the cost of a prototype was a dubious guide to the cost of electricity once production starts.

Eventually, in the words of Professor Stephen Salter, Thorpe "completely dissolved" the bitterness, resentment and suspicion which had existed. He should, said Salter, now be continuing his work, to update and improve and refine the wave power devices. Instead, "he has now been given work at ETSU which is much below his capacity."

Thorpe has declined to comment but it is known that he was shattered by the news.

ETSU claims that he had undertaken a specific task which he had completed. This sounds thin to those who know the full story.

He was given the task after a storm of criticism had hit the government. Two Select Committees had heard from Salter, and from engineering consultant Gordon Senior, of the way in which the research programme had been manipulated. The Thorpe inquiry was intended to smother criticism during the period leading to last year's general election.

Thorpe has been rewarded for his hard work with removal from wave energy, and wave energy has been deprived of the one ETSU scientist it trusted. ❑

Biodiesel

A trial of biodiesel fuel by Reading Bus ("Bio-diesel buses", Safe Energy 92) was completed in June. The fuel, derived from rape seed oil and known as RME (rape methyl ester), proved successful on rural, town and intercity buses, with no breakdowns or noticeable smoke emissions.

However, Reading Bus will not be continuing with RME because of the cost of the fuel which is imported from Italy. At 24p/litre, RME is much more expensive than the 10-11p of conventional diesel fuel. The managing director of Reading Bus, Rod Wilson, believes that locally produced bulk supplies could cost as little as 12-14p/l.

A recent study by ETSU,* the government's Energy Technology Support Unit, puts the cost of RME significantly higher at between 19.5 and 36p/l, depending on the price of rape seed oil and the use of by-products: straw, glycerine and livestock meal.

The environmental benefits of RME have been questioned in several recent reports ("Bio-fuel for thought", *Safe Energy 94*). The ETSU study shows that there can be great variations, particularly in CO_2 emissions. While biofuel emissions are CO_2 neutral — the CO_2 emitted being equal to the uptake of CO_2 while growing — the use of nitrogen fertiliser and energy used in conversion and distribution can significantly reduce the benefit over fossil fuels.

ETSU found that the energy ratio (output to input) can range from 1.3 to 3.8, depending on by-product use. Providing the straw is also used as a fuel, the energy ratio would be around 2.5 or more. The main energy input is in the nitrogen fertiliser, which UK farmers tend to over-use. From studying nitrogen fertiliser use in Austria and other European countries, ETSU believes that significant reductions in nitrogen input would result in only a small yield reduction.

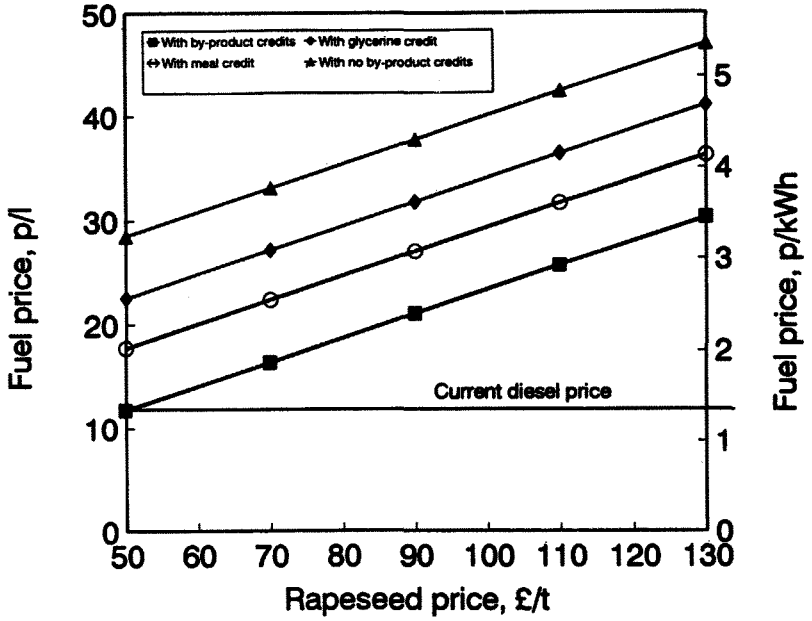
In Austria, where RME accounts for about 5% of the diesel market, nitrogen use is strictly controlled. RME production is being supported in France, Italy and Germany with several new biodiesel factories being built.

If all present rape grown in the UK were used for biodiesel, it would represent about 4% of the diesel market, and the land currently removed from food production under EC rules could provide 6.4% of the market.

Using figures from the Department of Land Economy, Cambridge, on land that will have to be taken out of food production, it could be used to produce 10-15% of diesel fuel by 2000 and 51-56% by 2010.

The current emphasis on rape seed oil is tending to overshadow other biofuels, like short rotation coppice and woody grasses, which offer solid combustible fuels at much better energy ratios. ❑

*** "A review of the potential of biodiesel as a transport fuel" by Faith Culshaw and Clare Butler, ETSU/Department of Trade and Industry, September 1992.**



Price of biodiesel at different rapeseed prices

Transport troubles

JOHN GUMMER, the environment secretary, has announced measures to "complete" the government's programme for meeting its commitment on stabilisation of CO_2 emissions by the year 2000.

The government will "reinforce" the Energy Saving Trust in its role of promoting domestic energy saving measures, cut central government's own energy use by 20% by the end of the century, and "further" curb transport emissions. The year 2000 target for increased use of CHP in flats and offices has been raised from 4,000MW to 5,000MW.

It is not clear how these objectives are to be achieved, with the greatest doubt being over transport emissions.

Gummer appears to have taken on board criticism from environmentalists and business representatives that transport should carry more of the burden in meeting the CO_2 stabilisation commitment. But the Department of Transport (DoT) remains fundamentally opposed to restrictions on road vehicle emissions.

This conflict recently led to delay in the publication of a Department of Environment (DoE) consultation document on sustainable development.* And eventual publication of the document was undermined the following day by a DoT announcement that plans for six-lane link roads beside the M25 orbital motorway would go ahead. The project is regarded by Gummer and his department as a prime example of unsustainable development. ❑

*** "UK strategy for sustainable development: consultation paper", Department of the Environment, 2 Marsham Street, London SW1P 3EB — responses by 30 September.**

Coal closures

WHEN the government was forced to review its announcement last October of 31 pit closures, Michael Heseltine, President of the Board of Trade, came up with a white paper which claimed to reprieve 12 to 19 of the pits. But since then, 20 pits have been shut and it has emerged that British Coal (BC) plans to close a further 15 pits by next March.

If the government gives its approval, it will make a mockery of the coal review and subsequent white paper published last March.

The government is pressing ahead with its privatisation of the remnants of British Coal and a sell-off could happen as soon as next July. Meanwhile, BC is offering its closed pits to the private sector, but many of the bids received have been to use the land and assets with no intention of mining coal.

With National Power and PowerGen closing coal-fired stations and moving to gas and Orimulsion fuel, the prospects for British coal-mining look bleak. ❑

LETTERS

The international transport of 'civil' plutonium: briefing paper; by Fred Barker.

National Steering Committee Nuclear Free Local Authorities; 1993, 46pp, £10.

World trade in plutonium is set to explode over the next few years, especially if the government does as it is "minded" and allows British Nuclear Fuels to open its Thermal Oxide Reprocessing Plant (Thorp).

Bearing this in mind the Nuclear Free Local Authorities (NFLAs) have published a report highlighting the many dangers of transporting plutonium.

If Thorp is opened, argues the report, the UK will make a dramatic contribution to the increase in transport of plutonium. Over the next decade, 3-4 tonnes of plutonium could be transported annually from Sellafield to Japan and to European destinations, including Germany, Italy, Holland, Spain and Switzerland. "This trade is likely to involve a combination of road, sea and air movements, and will raise profound safety, security and proliferation issues. For the governments and companies involved, these movements will create public relations and diplomatic problems of nightmare proportions."

The storm of international protest caused by the shipment of plutonium to Japan from France means it is unlikely that any other shipments will occur until 1996. It is BNFL's expectation that sea shipment will be the main method used in future to Japan. However, it is their intention to fly plutonium created by reprocessing back to European customers, Carlisle airport likely to be used, with a possibility of one extra flight per week.

The report highlights the inherent dangers in this policy. Flight packages for plutonium conform to International Atomic Energy Agency standards, which the agency admits cover "an inadequate proportion of foreseeable aircraft accidents." According to the report, it is estimated that in about 15% of air transport accidents a plutonium release could occur from packages designed to current IAEA standards.

While the IAEA recognise the inadequacy of its regulations and is working on updating them the new standards proposed still fall short of those currently in force in the US. Further, the IAEA will not propose any changes until 1996 and it will take a further 5 years before the new regulations are incorporated into national laws. In light of this, the IAEA says that individual states have the "option to forbid" the use of packages developed to meet the current standards. The UK should exercise this option, say the NFLAs.

For sea transport the packages used will be type B, the same as that for air transport. Again the relevant IAEA standards are seriously inadequate. "Ship fires routinely burn at temperatures of 1,100°C for over 20 hours, compared to the IAEA fire test of 800°C for 30 minutes. It has also been estimated that ocean depths along 70-90% of the shipping route to Japan would generate enough pressure to break open a package designed to meet the IAEA immersion test." There is therefore a clear need for sea shipment package standards to be upgraded.

The report also warns of a draft code under discussion within the International Maritime Organisation which would allow plutonium to be transported on general cargo vessels and passenger ships, instead of restricting it to purpose built vessels. Any such proposal should be rejected by the UK government, say the NFLAs.

Barker's report also examines the serious threat of plutonium falling into the hands of terrorists as a result of transport, particularly in the case of slow sea transport. Arguing: "There is an urgent need to take forward proposals for the international management and disposal of plutonium to be managed, stored and safeguarded by the United Nations under the Security Council. Options for eventual plutonium disposal should also be actively developed. These include irradiating plutonium in MOX fuel in dedicated reactors, or adding plutonium in high level waste, prior to geological disposal."

Finally the NFLAs believe that the government should establish a new independent committee, similar to the Radioactive Waste Management Advisory Committee, to "advise on the technical, environmental, safety, and security implications of major issues concerning the transport of radioactive materials." It should produce an annual report and specific advice as necessary.

Reprocessing lies at the heart of the matter, and as there are no compelling technical or economic reasons for this then, "the safety, security and proliferation concerns associated with the transport of plutonium add weight to the argument that Thorp should not be allowed to start up."

MIKE TOWNSLEY

Getting started in AT: a guide to careers & courses in alternative technology and renewable energy; by Peter Daley and John Glover.

NATTA; 1993, 22pp, £2.

There is one underlying problem for a guide to career opportunities in renewable energy — the lack of career opportunities in renewable energy. However, this is a most welcome publication from the Network for Alternative Technology and Technology Assessment (NATTA), which does the best it can given the reality of the situation.

There appears to be growing interest in careers in alternative technology, and future prospects, if only by comparison, look brighter now than in the past. I hope that NATTA has the resources to update this guide as opportunities increase.

The authors surveyed 200 companies directly involved in renewables, with some rather depressing results. Many letters were returned unopened, the companies having gone bankrupt. One respondent offered the observation that: "It seems to us that large numbers of people are being trained regardless of the fact that there are very grave possibilities of their never being able to obtain employment in their chosen field, ie alternative energy."

This would seem to be borne out by the guide itself, which has eight pages of contact addresses for university and other courses but only two on trade and other contacts.

There is also useful introductory material on what alternative technology is and the current state of the industry.

Anyone thinking about a career in renewable energy and alternative technology should find this a very useful pamphlet.

GRAHAM STEIN

REVIEWS

The Earth Summit Agreements: a guide and assessment; by Michael Grubb, Matthias Koch, Abby Munson, Francis Sullivan and Koy Thomson.

Earthscan/The Royal Institute of International Affairs ; 1993, 180pp, £12.50 (pb) £25 (hb).

The Earth Summit in Rio last year was a landmark event, attracting 150 heads of state and government and 30,000 people in total — 9,000 from the media. But what was the UN Conference on Environment and Development (UNCED) all about, what was agreed and what did it all mean? Thankfully we now have a book which aims to answer these questions.

This is not the publication for someone looking for an A4 handout on the subject, nor for anyone who wishes to pore over every last dot and comma of the agreements, but it provides an excellent and suitably detailed summary of those 12 days in Rio — not to mention the years of preparatory meetings. In the preface it is described as a book "of immense value not just to professionals in the field of environment and development, but to people everywhere with a deep interest in these issues."

The above-mentioned seeker of an A4 handout on the Earth Summit will find everything they want to know in the very useful three page summary and conclusions at the start of this volume.

Part one of the book provides a helpful background to and overview of the process leading up to the Earth Summit, the outcome and the future prospects.

The five agreements: the Framework Convention on Climate Change, the Convention on Biological Diversity, Agenda 21, the Rio Declaration and Forest Principles, are examined in detail in individual chapters, in part two.

One of the book's most telling sentences, on the North-South disputes endemic in the negotiations, states: "The ... North-South apartheid reflected in the agreements will remain a central problem in attempts to promote sustainable development, and progress will be slow without more open international discussion on both consumption patterns and population." Later, the book describes the lack of money made available for the South as "casting an immense shadow over the whole UNCED exercise."

Many non-governmental organisations (NGOs) had hoped that UNCED would see the setting up of new UN bodies to promote sustainable development. With the backing of some governments, NGOs lobbied unsuccessfully for an agency to promote energy efficiency and renewable energy, which would have balanced the existing International Atomic Energy Agency which currently plays a rather incongruous role as the only UN body directly concerned with energy matters.

One of the few new institutions to emerge from the UNCED process was the Commission on Sustainable Development (CSD). Hailed by some as the saviour of UNCED, its role is to "ensure the effective follow-up of the Conference," in particular "to examine the progress of the implementation of Agenda 21." This will be no easy task; Agenda 21 runs to 40 chapters, providing an 'action plan' for sustainable development. It is "the key intergovernmental guiding and reference document on the issues for the rest of the decade," according to Grubb et al.

A pessimistic assessment of the prospects for the CSD, and of the failure to create other institutions is summed up in a quote from Helge Ole Bergesen, writing for the International Institute for Environment and Development: "UNCED ... points to an intriguing 'Catch 22': you cannot change the institutional structure without changing the institutional structure."

Undoubtedly the high profile of NGOs in the UNCED process was a great success, and the authors mention that in some countries governments see an important role for NGOs in helping implement and even formulate policies.

One of the few minuses with this book — and it is a failure of all the otherwise excellent publications from the RIIA Energy and Environment Programme — is the absence of an index. As a book designed to be used as a reference document, this is a significant failing.

Its main pluses are the understanding of the UNCED process and related issues shown by the authors, together with its blend of summary and analysis. It is a valuable work on the Earth Summit, well worth reading.

GRAHAM STEIN

LITTLE BLACK RABBIT

Private army

Rumours have reached LBR that the UKAEA Constabulary is to be privatised this autumn, along with other parts of the AEA. No prizes for guessing the front runners to take over the job of guarding the country's nuclear industry. Yes, it's the company that operates its very own early release scheme for prisoners, Group 4. How long before the country's stockpiles of Uranium and Plutonium start going AWOL?

Not cricket

Electricity regulator, Prof. Stephen Littlechild, recently appeared before the Commons Environment Committee to assist with its inquiries on energy efficiency ("Offer backs efficiency", p19). Nothing strange about that, but why was it necessary for the first 16 minutes of Littlechild's cross-examination by our elected representatives to be heard in private session?

Such secrecy is normally reserved for the Defence Select Committee, and even LBR has been unable to find out what was discussed.

Car trade-in offer

As environment secretary John (Selwyn) Gummer battles it out with the Department of Transport over vehicle emissions ("Transport troubles", p21), perhaps he could learn from the Hungarians.

Trabant and Wartburg drivers are being offered the chance to swap their fume-belching two-stroke cars for public transport passes. A Trabant is worth two years of free travel, and a Wartburg three. What value a Lada or Skoda?

Defensive move

After finishing an interview with the BBC on the 1993 Defence Estimates, the Beeb asked the Defence Secretary Malcolm Rifkind to stay on to do a piece for *Newsnight* about depleted uranium tipped weapons and alleged links with a mysterious disease in British service personnel returning from the Gulf. "Oh no, no, no" said Rifkind "I'm much too busy, I have to rush off, but my junior Mr Hanley will do it".

Mr Hanley stuck faithfully to the government line that there was no evidence members of the British Armed Forces who served in the Gulf conflict suffering from any unexplained symptoms — though Newsnight had found somebody in the military hospital in Woolwich who would have loved to talk to them, but was refused permission by the Ministry of Defence.

And guess who was sitting at the Beeb watching poor Mr Hanley squirm — Malcolm Rifkind who had been in such a hurry to get away.

Tactical withdrawal

Some of LBR's cousins, who live near AWE Aldermaston, saw Malcolm Rifkind arrive at the nuclear weapons factory for urgent consultations the day after the BBC's *Panorama* programme did a devastating expose of the place. While he was there one of the plutonium glove boxes thoughtfully caught fire. Rifkind exited pdq.

Camp followers

For anyone who thought that Butlin's was bad enough, LBR brings news of a children's holiday camp in Chelyabinsk, Siberia. Two rooms in a building at the camp were found to be home to a colony of bats. Further investigation by scientists found the bats to be "dripping with radiation". Apparently the bats feed over nearby Karachai Lake which is a dump site for the Mayak military-chemical complex.

Name game

Safe Energy readers may be familiar with acronyms like ALARA: as low as reasonably achievable, and BATNIC: best available technology not involving excessive cost. Now, following approval for PowerGen to burn Orimulsion — the filthy oily sludge from Venezuela — a new term has been coined; CATNIP: cheapest available technology not involving prosecution.

Thorp Bubbles

With the second consultation on the Thorp reprocessing plant now under way, BNFL, the plant's owners, are less than pleased at the appearance of cartoon style speech bubbles appended to advertising hoardings saying "I don't want a dose from Thorp." Thousands have appeared in London Underground alone.

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