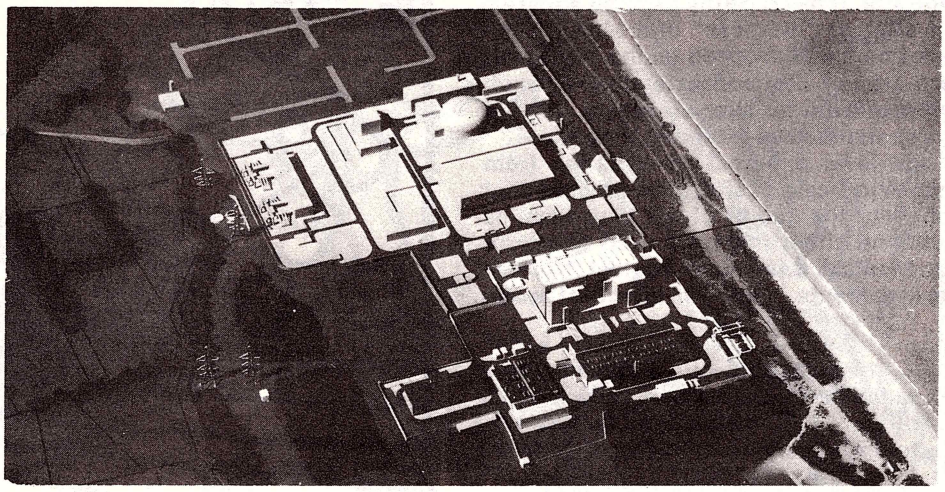
Nuclear Plans



CEGB mock-up of the Sizewell PWR

Sizewell

The Secretary of State for Energy, Mr. Howell, has promised that the Sizewell inquiry will take into account the economic, environmental and safety aspects of the development as well as planning aspects. Among the things to be considered are:-

1. The CEGB's requirement for the power station in terms of the need for secure and economic electricity supply taking account of the Government's long-term energy policy;

2. The safety features relevant to the design, construction and operation of the station and in particular the views of the Nuclear Installations Inspectorate as the licensing authority;

3. The arrangements for waste management, in the light of the views of the authorising Departments; and

4. Implications of the proposed development (including both construction and operation) for agriculture and fisheries, local employment, water supply and disposal, transport requirements, coast protection, housing and public services, and local amenities.

A group of anti-nuclear organisations recently wrote to Mr. Howell with a series of demands about the forthcoming public enquiry. The demands in the letter, which was sent without any consultation with SCRAM, included that there should be at least a year between the publication of the PWR safety report and the inquiry, that there should be public funding for objectors, and that the groups should be consulted about the appointment of the 'expert assessors'.

The Minister rejected these demands out of hand. As a result, at least one of the groups, the Political Ecology Research Group, will boycott the inquiry. It also looks increasingly unlikely that another of the groups, FoE Ltd., will attend.

Part of the inquiry's remit is to consider the application in the light of the Government's energy policy. The Minister's refusal simply confirms that the inquiry will be a farce.

Keep It In The Ground

An excellent monthly newsletter with uranium news and information from all over the world.

Published by WISE in Amsterdam, it is available from WISE-Oxford, 34 Cowley Road, Oxford or The Smiling Sun Shop, 37 West Nicolson Street, Edinburgh. Price 25p; annual subscription £4 (only from Oxford).

Corporate Plan

Depleted Uranium from the present thermal reactor programme, if used in fast reactors, could provide as much energy as all the proven coal reserves, according to the 'Medium Term Development Plan'* of the Electricity Council. Regular orders for fast reactors, however, are unlikely until after the end of the century. But the introduction of commercial fast reactors in the UK would be 'facilitated by international co-operation'.

The Medium Term Plan proposes several courses of action to maintain supplies of electricity and limit price increases. These include the placing of new orders for nuclear plant "consistent with the CEGB's thermal reactor strategy' and... "... assisting customers in the smooth transition of energy demand towards electricity produced from the more plentiful resources of coal and nuclear power."

The report is vaguely enthusiastic about CHP schemes, but doesn't say how much energy they are expected to contribute. The industry is said to 'strongly support' the investigations into CHP which should be completed by the end of 1982.

Conservation is expected to save 20% of expected energy demand by 2000, but the report is less enthusiastic about renewable sources which are not expected to make a significant contribution by the end of the century. Of the renewable sources the industry is most enthusiastic about windpower. Detailed investigations at three sites will begin soon to assess their potential for 1MW windmills. Further developments would involve the installation of a cluster of perhaps 10 windmills.

Despite their lack of enthusiasm for renewable energy sources, the Electricity Council appear to have an even lower opinion of their customers; 'increased resistance to large-scale industrial developments, including new power stations or coal mines, could extend further timescales for the introduction of such projects. Because of further increases in the price of electricity the extent of fraud, or at least reluctance to pay bills, is expected to grow, exacerbating cash flow problems."

*- Medium Term Development Plan, 1981-88.
The Electricity Council, 30 Millbank, London SW1P 4RD.

White Paper

The most recent White Paper*, produced by the Government in response to the Select Committee on Energy's report on Nuclear Power, was published in July.

The report reaffirms the Government's commitment to a programme of P.W.R. stations but they do say that:- "The Government will keep its strategy under review and does not propose to authorise specific new nuclear power station orders until it is fully satisfied that each is justified".

Robin Cook M.P. writing in the 'New Statesman' (21st Aug. 1981) believes that this statement reveals signs of retreat. The White Paper fails to commit the Government to one power station a year for a decade. The Government's original nuclear commitment was based on the need to build 15 Gigawatts over the next decade but the White Paper's forecasts are based on a need for 20 Gigawatts by the end of the century.

The Government also seem to be hedging their bets on economics, saying that:- "... if the nuclear industry can build competitively there is the prospect of continuing substantial work load for it." Robin Cook may be rather optimistic in seeing signs of retreat in the White Paper. It could be that this is merely the Government's 'low profile' approach.

The Government were clearly upset by the Select Committee's criticism of their analysis of the costs and benefits of Energy Conservation. The White Paper assumes that conservation will save 20% of demand by the end of the century. The impact of conservation, says the Government, is difficult to assess. It is difficult to allocate the savings from most types of conservation to specific fuels. Fuel substitution makes the situation more complicated, and many consumers may chose to take some of the benefits in increased comfort. The Department of Energy is commissioning further research into this area.

A recent study by Gerald Leach points out that although 90% of domestic energy demand is met by fossil fuels, it is ultimately the most expensive fuels which are saved. Electricity is the most expensive, followed by oil (See Energy Manager May 1981).

Surely the best way for the Department of Energy to further its research is to try an experimental energy conservation programme.

*- 'Nuclear Power: The Government's Response to the Select Committee on Energy's Report on the Nuclear Power Programme'. Cmnd. 8317, £2.30.

Besides their historical and political connections, nuclear weapons and nuclear power have one very obvious common factor; they both expose the public — us — to radiation. This could happen catastrophically, in war or after an accident at a nuclear power station or weapons storage site. It has recently become apparent that military planners see nuclear power sites as "weapons" of a kind. In last September's Square Leg war-game a mock-bomb was dropped on the Windscale plutonium factory/reprocessing plant. An area of Scotland extending through Clydeside to the North-East was declared sterilised for over a century. With a different wind direction, the "poisoned" area would have extended to London.

We are already exposed to "routine low-level releases" of radiation from power stations, weapons factories and from Windscale. It should be obvious that the struggle against the nuclear threat is about the quality of our lives now, as well as about averting catastrophe. To work on either front, we need to inform ourselves: here JANE BOWERS of the Medical Campaign Against Nuclear Weapons outlines what is known - and the arguments - about the effects of radiation.

Clou

Recently, the public in Europe and the USA has become increasingly aware of the danger of emissions of radioactivity from nuclear power stations. The major accident at the Three Mile Island reactor has brought home the reality of the danger, and information about other accidents which have occurred since the beginning of nuclear power electricity generation has been widely publicised. The continued building of nuclear power stations, and the steady increase in nuclear weapon arsenals, increases the most catastrophic possibility that a nuclear power station could be hit by a nuclear weapon.

Recently published figures show that an attack on a reactor in the Rhine-Neckar valley, when the wind was coming from the south-east, would render uninhabitable one third of the area of West Germany. This implies a very pessimistic outcome for densely-populated Europe from even a very limited nuclear exchange between the USSR and NATO. This contrasts with the picture currently painted by British Government publications, which claim that a high proportion of the population of Britain would survive an all out nuclear war, and be able to rebuild a decent society on the ruins.

The measurement of radiation effects on humans.

Making detailed calculations of the effects of radiation requires consideration of many complex factors, some of them interactive. Conclusions are based on the results of previous studies of radiation effect; these studies have inevitably been limited by events. For instance, the bombings of Hiroshima and Nagasaki are the only occasions which have caused very large scale exposure of humans to very heavy doses of radiation. The results of these events have been studied very intensively by the Japanese for 35 years. Recently, however these studies have been shown to rest on seriously erroneous estimates of radiation dose. It will take several years' work to correct the Japanese calculations. In the meantime, there is a severe shortage of accurate data on the effects of radiation.

Studying the effects of low-level radiation on the human body is made difficult by the statistical requirement for large numbers of subjects when the incidence of an abnormality is low. To detect a tenfold increase in childhood cancer, i.e. 5 per 1000, a test population of 10 million is required. As evidence accumulates, however, each revision of the calculations of radiation effects has tended to show that they were more dangerous than previously believed. For instance, until recently it was believed that low-level radiation was harmless, at the dose levels permitted for workers with radioactive materials; now it is generally believed that any level of dose carries some risk.

Radiation is measured in several ways. The curie is the unit of activity, defined as 37 million emmissions per second. It does not tell what type of radiation or the amount of energy involved. The rad is the unit of dose which measures the energy absorbed per unit mass. One rad is the absorption of 100 ergs by a gram of matter e.g. living tissue.

The most significant measure, from the point of view of damage to living organisms, is the rem (Roentgen Equivalent Man), which is equal to a dose in rads multiplied by a factor called the relative biological effectiveness (RBE). This takes into account the greater effectiveness of some types of radiation in producing biological effects. Different types of radiation which deposit the same energy in the tissue can produce different damage. This is due to factors such as their different depth of penetration of the tissue. For beta and gamma radiation, the RBE is approximately 1. For high energy neutrons, which are also emitted by a nuclear explosion, it is about 10.

Short term radiation effects.

The effects vary considerably from one person to another, depending, for example, on age and health, but for a group subjected to a dose of 600 rem delivered over a day or two, survival is almost impossible. 400 rem delivered over the same period would kill about 50%. Exposure to 100 rem for the same period of time would cause sickness and some deaths. The symptoms of radiation sickness are loss of hair, vomiting, diarrhoea and internal bleeding. Some types of cells stop dividing and in some tissues this causes a rapid decline in their number. One cell type affected is the white cells in the blood, which are essential for the body's ability to resist infection, so that deaths can result from infections which would normally be trivial.

Long term radiation effects.

The survivors of Hiroshima and Nagasaki have shown an increased incidence of several types of cancer including leukaemia, cancer of the thyroid, breast, bone, lung, oesophagus, stomach, urinary organs and lymph glands.

Reports indicate a high incidence of microcephalia and other abnormalities among infants born after the bombs, but there has not been enough systematic study to give firm conclusions.

ds of Death

The long term effects of a release of a given quantity of radiation depend very much on the specific isotopes present. The half-life of the isotope is the amount of time required for its rate of emission of radioactivity to fall to half of what it was initially. The half-life of Strontium-90 is 28 years, of Caesium-137 30 years, of Plutonium-239 24,000 years. Other isotopes have half-lives of seconds or days. Thus some emissions cause a longer-lasting radiation hazard than others which have the same initial activity. Another important factor is that some isotopes are actually stored by the body. Heavy metals are deposited in the skeleton, nearest the blood supply, where they can steadily irradiate the bone marrow, causing a risk of leukaemia. Even very small quantities of Caesium-137 or Strontium-90, which are present in nuclear reactors, can deliver a high local dose when stored in the skeleton.

A clinical follow-up of a group of people treated with radioactive Thorium for one ailment, found that 60% developed liver cancer over 20 years. Thorium is concentrated in the liver and they had received a cumulative and highly localised dose of 20,000 rads.

The radiation hazard caused by a nuclear weapon hitting a nuclear power station.

Consider the radiation effects caused by a one megaton weapon exploding at ground level. Given a steady wind speed of 15 miles per hour, the lethal zone is about 400 square miles. Taking a maximum acceptable dose of 2 rem per year (the current maximum accepted radiation dose to civilians in the USA), 12,000 square miles would be unuseable for a year. More than 20,000 square miles would be uninhabitable for one month. Let us compare this with the radioactivity which would be released if a one megaton weapon was exploded on a 1000 megawatt nuclear reactor. Assuming that the radioactive material in the core is vaporised, it would combine with the radioactivity of the weapon. Both would rise into the characteristic mushroom cloud and spread in the same way as fallout from a nuclear weapon alone.

Long-lasting Danger

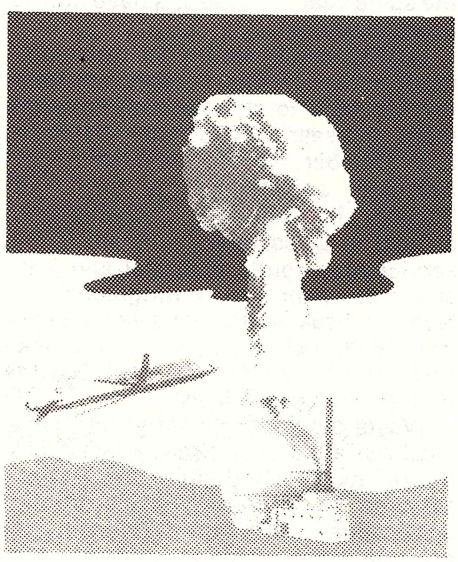
For the first week the effects would be much the same as for the weapon alone. Its initial level of radioactivity is much higher than that of the power station. But the average half-life of isotopes released by the nuclear power station is much longer than the average half-life of isotopes released by the weapon alone. Thus the level of radioactivity in the affected zone remains high for much longer. The lethal zone would be more than 500 square miles. An area of 64,000 square miles would suffer a cumulative dose of 2 rems per year for a month. This is three times larger than the area affected by a nuclear weapon alone. An area of 25,000 square miles would suffer a dose of 2 rems per year for a full year. This is twenty times larger than the zone of equal devastation by a nuclear weapon.

In Britain and Europe, increasing numbers of nuclear power stations are being built near centres of population and heavily cultivated land. Probably many of these power stations are also near military installations which would be targets in a war. It is difficult to believe that a power station might not be hit accidentally, by a missile aimed at a military target.

Unknown Risks

The figures given above for the radiation dose rates following such a catastrophe do not allow for the fact that radioactive wastes are usually stored initially at the reactor site. Nor does it allow for the fact that many reactors are built in pairs within a hundred yards of each other. Allowing for these facts, it has been recently suggested that dose rates following the destruction of a nuclear reactor by a nuclear weapon could be two to six times greater than those given here.

The British Government has been publishing optimistic estimates of the country's capacity to recover from a nuclear war. None of these estimates have made allowance for the fact that Britain is littered with targets which, if hit, would enormously exacerbate the effects of the nuclear weapons themselves. This omission may be due to mere carelessness; or it may be due to the Government's apparent desire to persuade us that a nuclear war would not be an unspeakably dreadful disaster. It cannot be reiterated too often, nuclear war would cause devastation and suffering on a scale beyond our powers of imagination, far beyond anything ever seen on this planet before.



Further Reading

'Catastrophic Releases of Radioactivity', Fetter, S.A. and Tsipis, K., Scientific American, April 1981.

'Nuclear War — Prevention is Better' published by the Edinburgh branch of the Medical Campaign against Nuclear Weapons, obtainable from the Human Ecology Centre, 15 Buccleuch Place, Edinburgh, 50p.

'Radiation, Your Health at Risk' published by the Radiation and Health Information Service, 9 Marion Close, Cambridge, 50p.

Waste Dumping

Nuclear waste is hotting up—or rather the issue of waste dumping is, despite government attempts to quieten it down. Two enquiries have been held into proposed "experimental" drilling at Mullwharchar in South-West Scotland and in the Cheviots, Northumberland. Publication of the reports on these enquiries has been held off so long that the only explanation possible is that the government hopes that the objectors will somehow fade away.

But now a new enquiry has been announced — in Somerset in January/February 1982. Dates for enquiries in Nottinghamshire, Avon, and Leicestershire are due to be announced soon. Here Mary Scott describes the state of play with waste dumping proposals and opposition in the UK.

Events in Britain 1978-81

In connection with the high level nuclear waste disposal programme, the UKAEA made planning applications in 1978 for test drilling at Altnabreac in Caithness, Mullwharchar in Galloway and the Cheviots in a Northumberland National Park. Planning permission was given for Altnabreac, and drilling began in winter 1978. Permission was refused for the other two sites, and Local Public Enquiries followed — into Mullwharchar in February-March 1980 and into the Cheviots in November-December of the same year. The results have still to be announced.

In 1980, responsibility for waste disposal research was transferred from the UKAEA to the Natural Environment Research Council (NERC). Last October, NERC submitted four planning applications to drill at: Puriton in Somerset, Wymeswold airfield in Leicestershire, Brent Knoll service area south of Bristol and Ratcliffe on Soar in Nottinghamshire. None of these applications was accepted. NERC has appealed, and consequently a series of local planning inquiries now seems likely.

Waste disposal is clearly not just a local but a national issue, a fact highlighted by the handling of the Somerset case. In refusing NERC's drilling application, the County Council did not cite local planning reasons, but called for a Planning Inquiry Commission to look into the wider issues — thus implicitly recognising the national dimensions of the case.

The date has been set for the public inquiries into the Somerset applications, for January and February next year. The Somerset County Council's refusal to consider the NERC applications has been treated by the Department of the Environment as a straight refusal.

Test drilling applications in Wales and Hereford/Worcestershire, expected last year, have still not been lodged. More can be anticipated over the next few years — there are at least 20 more shortlisted sites, most in Scotland, none discounted by NERC.

Future Policy

On 20th April, in a Sunday Standard interview, UKAEA Chairperson, Dr. Walter Marshall said that no radioactive waste would be buried in Scotland for at least 100 years; wastes had to be allowed to cool down first. Meanwhile, they are stored above ground at Windscale.

However, Dr. Marshall does not make government policy, and in response to a request from Gordon Wilson MP, Malcolm Rifkind MP was unable to guarantee that the government could back Dr. Marshall's statements.

On the other hand, the statements do seem to tie in with the main recommendations of the 2nd Annual Report of the Radioactive Waste Management Advisory Committee (RWMAC), published in June.

Some inconsistencies aside, the general theme of this report is that there is no hurry — waste disposal timescales can be lengthened and ultimate decisions left to future generations. The report advises that, for at least 50 years, or even longer, high level wastes might best be contained above ground or subsurface in an engineered storage system. Only then need it be decided whether to continue storage, dispose of the waste in a permanent site, or seal the store, thus turning it into a disposal facility.

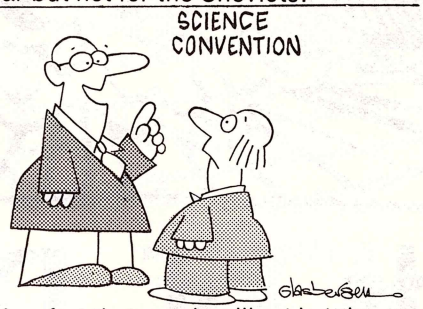
However, the report states that current accumulations of low and medium level wastes present a more urgent problem.

Research has now begun into potential disposal sites, partly through an assessment of existing mines and cavities.

In view of the statements made by Dr. Marshall and RWMAC, Dafydd Elis Thomas MP asked in Parliament whether the government intended abandoning the test drilling programme. The answer was negative.

Contracts

In March, tenders were invited from contractors interested in participating in the radioactive waste management research programme for 1982/83 — without awaiting the results of the Mullwharchar and Cheviots inquiries, and thus making a mockery of the inquiry process. Very detailed documents sent out to interested contractors included reference to the Mullwharchar, Cheviot, Somerset and Hereford/Worcestershire sites. MPs Alan Beith and Gordon Wilson asked questions in Parliament about these contracts and the pending inquiry results. From the replies, it would appear that contractors are being "lined up" beforehand for Mullwharchar but not for the Cheviots.



"It's a fact that people will eat hot dogs no matter what you put in them. Which brings me to my idea for disposing of nuclear waste..."

Conclusions

So what's going on? Despite the "no great urgency" line on high-level wastes, the very expensive test drilling programme is still continuing, with local public inquiries likely to cost £300,000 each, judging by previous experience.

At the inquiries, the UKAEA justified the test drilling programme precisely on the grounds of urgency. Government embarrassment, now that this urgency supposedly no longer exists, may partly explain the long delay in announcing the result of the Mullwharchar inquiry. However, the government is also undoubtedly waiting for the most politically convenient time to announce its decision, having become aware of the strength of local opposition to drilling, strongly apparent during the inquiries and currently instrumental in delaying the Wales and Hereford/Worcestershire applications.

The search for safe waste management technology is shockingly unadvanced, even after 25 years' research. The industry's claims that they are confident of finding a solution do not add up to actually doing so! The RWMAC advises that "it may be better to leave to future generations the flexibility of deciding how and when to dispose of the solidified waste, having ourselves carried out the research and development to provide them with information on the technical options." Let us not be fooled by such statements into thinking we would thus be doing future generations a favour. There may not, in fact, **be** a safe and economic solution to the problem of disposal of high-level nuclear wastes.