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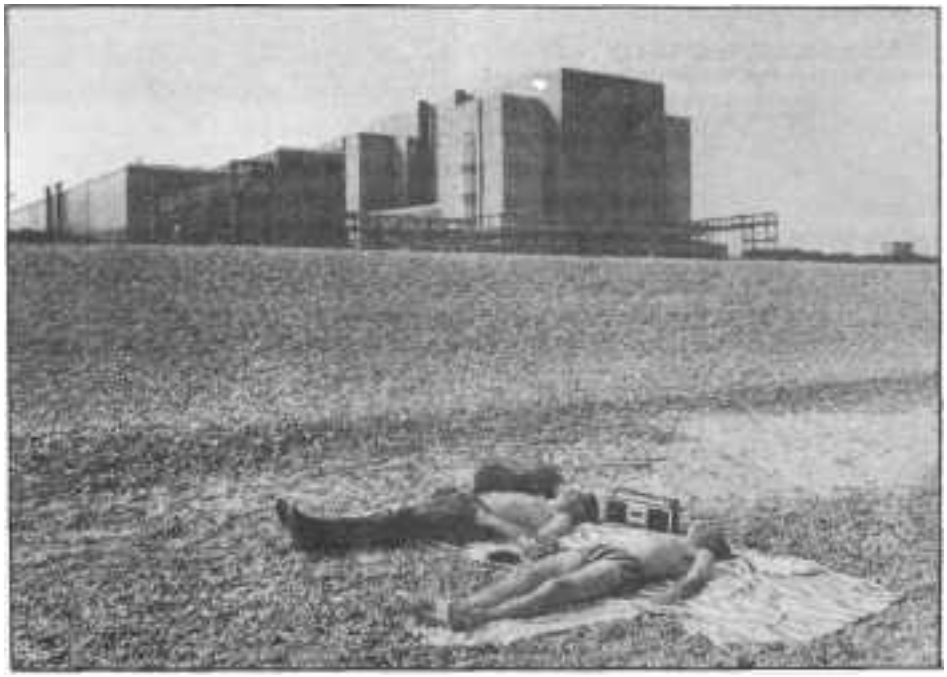
Sizewell Syndrome



Sizewell Nuclear Power Station, Suffolk

Together with the privatisation of Britain's North Sea oil interests, one of the most important mainstays of the present Government's energy policy is its enthusiasm to build American Pressurised Water Nuclear Reactors (PWRs). This is despite the fact that a PWR has not been ordered in the USA for over four years. The American nuclear industry desperately needs an order from Britain to help rejuvenate itself and re-open export markets.

Just seven months after taking office in May 1979, the new Tory Government announced an expanded nuclear power programme of ten extremely large nuclear power stations. At least one nuclear station was to be ordered each year in the decade from 1982, equivalent to 'a programme of the order of 15,000 megawatts over ten years'. The first station was to be a PWR 'subject to the necessary consents and safety clearances'.[1] Since then, it has been a more or less open secret that subsequent nuclear stations would also be PWRs.

Yet it is already 1983 and the process of consent, let alone construction, is only now getting under way. The public inquiry into Sizewell 'B' — the first PWR, proposed for Sizewell on the Suffolk coast — only began in January and is expected to last until the autumn. If everything now goes according to plan, construction of the first PWR will not be able to start before mid-1984.

Delays have been one of the great hallmarks of the British nuclear industry. This particular delay, associated with the reactor's design and cost, has not dampened the Government's enthusiasm. Nor has it reduced the enthusiasm of the Central Electricity Generating Board (CEGB) — the nationalised industry which controls the supply of electricity in England and Wales and which has ordered Sizewell 'B'. The nuclear lobby seems to take the view that, in the long run, time is on their side and that they will still be going strong when the opposition has grown up, become accountants and moved back to Surbiton.

Whatever their view of the opposition to the PWR, further delay in the Sizewell 'B' project could prove to be its undoing. For the Tory Party is alone in supporting the PWR. The Labour Party, since 1982, is totally opposed to the development of the PWR. The Liberals have been opposed to nuclear power for some years although its ally, the SDP, is yet to develop policy. The future of the PWR in Britain, rather like British Telecom, probably depends on the result of the next election. If the Tories fail to secure an overall majority, then Sizewell 'B' is unlikely to get beyond the drawing-board.

'Need'

Until recently, there was a broad consensus between the Tory and Labour Parties on the need for nuclear power. This was based on the fear of an impending shortfall in the supply of energy. Under both Tory and Labour administrations, the Department of Energy has produced forecasts which predicted an energy 'crisis' in the form of a widening energy 'gap' between the demand for, and the supply of, energy. The 'gap' was to be filled by nuclear power.

These forecasts have been heavily criticised for extrapolating past patterns of demand into the future; and for treating 'energy' as a single homogeneous whole. Alternative projections have been made which fit different forms of energy to end-uses where they can be used most efficiently — and therefore avoiding the appealing but erroneous assumption about a constant relationship between energy demand and economic growth. Using energy more efficiently also means an important role for energy conservation. But such an approach means a commitment by the Government to invest in conservation technology. The Tories, however, regard the price mechanism as the most effective means of encouraging conservation. If prices rise, consumers will be forced to invest in conservation. Never mind that consumers may not be able to afford the investment; the 'market' will ration energy efficiently.

The most significant aspect of the official forecasts, however, has been that they have consistently had to be revised downwards in the light of actual reality. The most recent projections, published as part of the Department of Energy's evidence to the inquiry, are mainly significant for the fact that, out of eight possible scenarios (allowing for different rates of economic growth, fuel prices and so forth), only one exceeds the 'lower case' of its predecessor, which is just three years old. In the Department of Energy's new projections, even the most optimistic assumptions about economic growth are not expected to repeat the high patterns of growth in energy demand of the 1960s. The estimate used, very informally, by the Department as a central estimate, suggests annual growth in primary energy demand of less than 1% and even negative growth is considered (Table 1). The equivalent growth in electricity demand **is 1.5%.**

Table 1

Average Annual Rates of Growth in Energy Demand — actual and projected

	Primary Energy*	Electricity	GDP
1960-70	2.42%	6.6%	2.89%
1970-80	—0.52%	1.5%	1.6%
1980-2010	—0.17% to 1.57%t	0.1% to 2.6%	0.5% to 2.5%

Source: Department of Energy
*Primary energy demand is the amount of primary fuels (coal, nuclear, oil, gas) actually used in production.
•(•Central estimate is 0.86%

Table 2

Primary Energy Demand — actual and projected

	millions tonnes of coal equivalent				
	Coal	Nuclear	Total	Coal as percentage of total	Nuclear as percentage of total
1960	198.6	2.6	286	69%	0.9%
1970	156.9	11.9	363	43%	3.3%
1980	120.8	**15.4**	345	35%	4.5%
1990	118.0	35.1	**376**	31%	9.3%
2000	118.0	60.1	406	29%	14.8%
2010	129.0	117.2	446	29%	26%

Source: Department of Energy

Table 3

Proportion of electricity generated by coal and nuclear power — actual and projected

	million tonnes of coal equivalent			
	Coal	Nuclear	Coal as percentage of total fuel used	Nuclear as percentage of total fuel used
1960	53.5	2.6	82%	4%
1970	77.3	11.8	70%	11%
1980	89.7	15.3	77%	13%
1990	85.0	35.1	67%	27%
2000	82.8	60.1	55%	40%
2010	49.5	117.2	29%	69%

Source: Department of Energy

Table 4

Projected Commissioning of New Base-Load Generating Plant Not Yet Ordered

	GW	
	Coal	Nuclear
1991-2000	0.6	15
2001-2010	11.3	31

Source: Department of Energy

More important are the projections for how increases in electricity demand are to be met. Following the 'central' estimate of Table 1 — which assumes high UK industrial growth and low fuel prices and is quite favourable to coal — total demand for coal is seen to be static (Table 2), while the proportion of electricity to be generated by coal progressively falls (Table 3). Nuclear power, on the other hand, experiences an equally dramatic rise, gradually reducing coal's contribution to electricity from 80% to under 30%. This would be achieved by keeping to the Government's programme of building starts this decade on 15 GW[2] of new nuclear capacity. That is the programme shown in Table 4 — 15 GW of new nuclear plant ordered this decade for commissioning in the 1990s. In comparison, new coal plant envisaged is just 0.6 GW.

That these nuclear power stations would be PWRs is made clear by the Central Electricity Generating Board (CEGB). It has stated quite clearly to the Sizewell Inquiry that, 'subject to the normal processes of assessing and justifying each new generating station project in turn, it is likely that new nuclear power reactors will be of the PWR type.'[3] In other words, if the CEGB can secure approval for a PWR at Sizewell, then almost all future power stations to the end of the century will be PWRs.

Emphasis, meanwhile, has shifted from an energy 'crisis' of shortage of supply to a different type of 'crisis'. In its evidence at the Sizewell Inquiry, the Department explains that: 'As with other fuels, the Government's objectives for electricity are that there should be *secure* supplies, provided to the consumer at the lowest possible cost . . . The *energy crises* of the last 10 years have shown the danger of *over-dependence on one fuel,* and the wisdom of a sensible degree of *diversity of supply.*[4] (My emphasis).

Since coal-fired power stations are currently responsible for some 80% of electricity supply, the 'solution' to this 'crisis' of 'over-dependence on one fuel' is to be the rapid development of the PWR — for which both the technology and fuel (uranium) are to be imported. The explicit purpose of the PWR programme is to reduce the importance of coal in the supply of electricity. It is coal, in the view of the Government, which is at the root of the threat to security of

[1] 'Statement on the Nuclear Programme and the Nuclear Industry', Secretary of State for Energy, December, 1979.
[2] 1 GW = 1,000 megawatts.
[3] CEGB Statement of Case, Sizewell 'B' Power Station Public Inquiry, Volume 1, page 62.
[4] Proof of Evidence for the Sizewell 'B' Public Inquiry, Department of Energy, October, 1982.

electricity supply. This is the internal threat posed by trade unions. The *Daily Telegraph* explains: 'Nuclear power is potentially cheap and a capital-intensive form of energy ... It is thus less vulnerable to being cut-off by politically motivated trade unionists or (as in the case of oil) foreign powers. For these reasons, we must hope it becomes the energy of the future.'[5] The present Tory Cabinet agrees that: 'a nuclear programme would have the advantage of removing a substantial portion of electricity production from the dangers of disruption by coal miners or transport workers.'[6] If that is the aim of government policy, then clearly it does not matter that, according to the Department of Energy, Britain has at least 300 years supply of extractable coal, using current technology.

Costs

The CEGB acknowledge that, for capacity reasons alone, immediate construction of Sizewell 'B' is unnecessary. But, based to a large extent on future prices of nuclear fuel relative to coal, they argue that it is economic to construct Sizewell 'B' to replace existing coal plant.

The capital cost of building coal stations is generally accepted to be cheaper than for nuclear stations. The argument in favour of

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nuclear stations is based on the supposed cheapness of their fuel and operating costs. However, it has become increasingly difficult to support this line of argument. Colin Sweet, in the *Costs of Nuclear Power,* has pointed out that for the Magnox stations (the first generation of British reactors), the CEGB's own accounts indicate that fuel costs, as a proportion of total generating costs, rose from 35% in 1971/2 to 91% in 1979/80. 'As conventional cost structure gives fuel and operating costs amounting to about 30% of total costs, this rise in fuel costs . .. places nuclear costing on its head.'[7]

In fact, nuclear capital costs are also rising. In research based on US data, Charles Komanoff has shown that, between 1971 and 1978, nuclear capital costs increased twice as fast as coal capital costs, after allowing for the effects of inflation; and that capital costs of nuclear plants will probably increase in the 1980s by an amount equal to the increase in the 1970s.[8]

The CEGB estimate that Sizewell 'B' will cost £1,147 million to construct. Sweet estimates that the actual cost is likely to be at least double the CEGB's figure. Small increases in construction times can have a disproportional effect on cost; and it is with the failure to keep to construction schedules that the British nuclear industry has had such difficulties in the past. Meanwhile, the CEGB estimates Sizewell 'B' will take *7.5* years to build, compared with US experience of an average 8.5 years with broadly similar PWRs.

Although more of a PWR (compared to an AGR) can be pre-fabricated off-site, this is most likely to assist in keeping costs down if there is to be an ordering programme of PWRs; if no significant design changes are made for subsequent PWRs which follow Sizewell 'B'; and if the 'option' of retaining the AGR for future nuclear stations is not taken up.

Such an ordering programme would effectively write-off much of the infrastructure investment even in AGR nuclear stations. The CEGB takes no account of the wider economic and social effects of prematurely closing-down coal-fired stations. Since 1978, at a cost of over 5,000 jobs, 42 coal stations have been fully or partially shut-down, some before the end of their economic life. Perhaps most important are the broad economic effects of a PWR programme. If construction on five PWRs began before 1990, the cost of that alone would exceed the cost of Trident. If a 15,000 megawatt programme was actually pursued, it would require at least 10 PWRs' being ordered by the end of the decade. Such a programme would, 'without question ... be the greatest spending programme in the history of British tecnnology — not excluding military programmes .'[9] Strictly speaking, it may therefore be erroneous to talk of cuts in government expenditure as opposed to a reallocation of expenditure — towards the PWR and Trident and away from areas of social need.

In fact, the two nuclear programmes — PWR and Trident — may not be unrelated. Plutonium, one of the key raw materials for the production of Trident, is created as a by-product in nuclear reactors. Nuclear exchange contracts between the British and American governments have existed since 1959, by which Britain exchanges plutonium for enriched uranium for use in its nuclear submarines. The USA is how reported to be short of plutonium for Trident.

Safety/operating experience

In the United States, there has not been a new order for a PWR since 1978. It is important to note that the decline of the US industry pre-dates the accident at Three Mile Island where a PWR came close to catastrophe in 1979. Nevertheless, one of the difficulties for the PWR in the USA has been to satisfy the Government's safety standards and still keep the PWR economic compared to coal. The American Nuclear Regulatory Commission has identified some 15 unresolved safety problems associated with PWRs.

Where an accident does occur with a PWR, there is less time to react to it than

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with other nuclear reactors. In fact, PWRs are inherently more unstable than the gas-cooled reactors which have until now been preferred in Britain. This is an important reason why there remains a lobby within the CEGB which favours the AGR in preference to the PWR.

Moreover, the larger a PWR, the more unstable it is considered to be. Yet the PWR proposed for Sizewell would be one of the largest PWRs anywhere in the world. The operating experience of such PWRs is therefore correspondingly low. There is significant operating experience in the USA of only three PWRs of comparable size to Sizewell 'B'. None of these are of the standardised design, known as SNUPPS, on which the design for Sizewell 'B' is based. There is no operating experience of the SNUPPS design in the USA, where there are currently two such PWRs under construction.

There have, in any case, been design changes to SNUPPS which are claimed to reduce the cost of Sizewell 'B' while increasing safety. Design changes were made very hurriedly by a 'task force' led by Sir Walter Marshall (who has since become chairman of the CEGB) in the early part of last year when the original design proposed by the American corporations, Westinghouse and Bechtel, was found to be too expensive. In the design of nuclear power stations, there is a trade-off between safety and cost. But in the case of Sizewell 'B' it is claimed, effectively, that Britain will build an American PWR cheaper, safer and quicker than the Americans can achieve. This seems — to put it mildly — rather implausible.

It is important for the CEGB to assume that no significant design changes will be necessary for PWRs which may follow Sizewell 'B', so that maximum benefit can be achieved from pre-fabrication and costs kept down. The CEGB is anxious to avoid the extremely expensive experience with the AGRs, where less pre-fabrication is possible and important design changes were made as

each reactor was constructed. However, the reality is that the design for Sizewell 'B' is a desk-study of a reactor with no operating experience. A number of the design aspects of Sizewell 'B', including some of the emergency arrangements, have not been tested before. If Sizewell 'B' is eventually built, we will be witnessing yet another prototype.

The PWR lobby

From his experience as Secretary of State for Energy, Tony Benn has described the PWR lobby as the most powerful lobby he has come across during his time as Minister. The lobby in favour of the PWR exists both within and outside the Department of Energy. Brian Sedgemore, Benn's Parliamentary Private Secretary when he was at the Department of Energy, has described the 'power struggle' that took place at the Department between Benn and his civil servants[10] who, because of his opposition to the PWR, by-passed him and briefed the 'Think Tank' that reported directly to the Prime Minister.

Not unlike many other high technology industries requiring heavy capital investment, a stable domestic market is a pre-requisite for the opening of lucrative export markets. Partly because of its poor construction record, and partly because it is unique to Britain, not a single AGR has been exported. The company which hopes to benefit particularly from the export potential of the PWR is GEC, headed by Lord Weinstock. GEC is very influential within the National Nuclear Corporation, the sole remaining industrial consortium sponsored by the Government to construct nuclear power stations.

Weinstock has an agreement to construct Westinghouse PWRs in collaboration with French manufacturers whereby the pressure vessels would be produced in France and the turbines by GEC. As Sedgemore writes: '(in 1978)...what they (GEC) wanted was a system which would enable them to sell their turbines and reactor internals abroad more effectively and this could only mean a PWR... His (Weinstock's) basic interest was not in PWRs at all but in developing a new turbo-generating industry with 3,000pm turbo-generators. These he could export. But he needed to test the new technology involved and this could only be done if the Government ordered a PWR and allowed him to supply the generators for testing...' In short he wanted the Government to pay for the development costs of his new technology.

Weinstock lost that particular battle, but less than two years later, the Tory government agreed to press ahead and order a PWR. If there is a hierarchy that surrounds decision making about nuclear reactors, clearly export potential comes higher than concern about relative safety.

The public inquiry

It may seem strange that orders should be made for the PWR in parallel to the public inquiry. But there is really nothing odd about it at all. It is not the role of the inquiry to make policy. The Government, by having a public inquiry, is not abdicating its right to make policy and to pursue it. The Government has decided that it wants to build a PWR, and the CEGB have made it pretty clear that they intend future power stations to be PWRs. The next site, after Sizewell, has already been chosen — Hinkley Point in Somerset. Areas with potential future sites include Wales, Scotland, Northumberland, Kent and Dorset. The Government recently appointed Sir Walter Marshall as chairman of the CEGB. Sir Walter, formerly chairman of the Atomic Energy Authority and head of the task-force on the PWR, may not know much about coal, which currently accounts for over 80% of the fuel used by the CEGB, but he knows plenty about PWRs.

The Sizewell inquiry is not a national inquiry about whether or not the PWR should be introduced into Britain. It is a local public inquiry into the CEGB's application to build a PWR at Sizewell. At the same time, it has been made abundantly clear that future inquiries, into any PWRs after Sizewell, will be 'site-specific' only. This means that 'general' issues such as the PWR's safety and the outlook for electricity demand, which has fallen drastically every few years for over 20 years, will not be re-opened.

This ambiguity about the inquiry's status is in line with the Government's view that it 'might make more rapid progress towards its objective by a *low profile approach* which avoided putting the Government into a position of confrontation with the protestors.'[11] (My emphasis). From the Government's point of view, the inquiry's role is to help increase public acceptability of the PWR.

The Government would be well pleased if the objectors were limited to environmental groups. But opposition to the PWR is very much broader than that. The opposition to the PWR can use the inquiry as a platform from which to make visible the breadth of opposition to the PWR of key interest groups such as the emergency service, transport and construction workers and the local authorities whose areas would be affected by a serious accident. Objections at the public inquiry by representative organisations such as trade unions and local authorities can play an important role — but only if they are made in the context of the broader campaign. This is the approach taken, for example, by the ANC.

Offshore water outlet at Sizewell

The opposition

The Government's choice of the PWR as the basis of its expanded nuclear power programme has had the effect of broadening the base of support for opposition. This is particularly the case in East Anglia and other areas which already have a nuclear power station; and in the trade union movement.

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The trade unions are extremely important because it is their members who would be directly involved in constructing and operating a PWR; and in attempting to contain an accident. Until recently, however, there has been surprisingly little concern among trade unions about energy policy. Within the TUC, the formulation of energy policy is the

[5] *Daily Telegraph*, 7 March, 1978.
[6] Leaked Cabinet Minutes of 23 October, 1979, published in the national press.
[7] Colin Sweet *The Costs of Nuclear Power* ANC 1982. £1.25 from ANC National Office, PO Box 216, Sheffield S1 1BD.
[8] C Komanoff, *Power Plant Cost Escalation*, New York, 1981.
[9] Colin Sweet, *op cit.*
[10] Brian Sedgemore *The Secret Constitution*, 1980, Chapter 4, 'Power Struggles at the Department of Energy'.
[11] Leaked Cabinet minutes, *op cit.*

responsibility of the Fuel and Power Industries Committee, on which are represented the unions with members in the energy sector, including power engineering. Most of the unions represented have members employed in the nuclear industry, the main exception being the NUM. A number are opposed to both the PWR and to any increase in the proportion of electricity generated by nuclear power; whatever their view of nuclear power generally, none of these unions are ardent supporters of the PWR. ASTMS, for example, which has many members in the nuclear industry, is playing an active part in the recently established Campaign Against the PWR.

The GMWU, the union with the largest number of members working in nuclear power installations, is opposed to the PWR on the basis of need, cost and safety and takes the view that 'there is no case for changing the balance between coal-fired and nuclear-fired stations. A 15 GW programme of nuclear power stations would have the effect of prematurely closing coal-fired stations.'[12]

A number of unions outside the TUC Fuel and Power Committee are also taking a major interest. Members of unions representing emergency service workers in the fire, ambulance and hospital services would actually have to deal with an accident arising from the operation of a PWR — either with the reactor itself or with the transportation of its irradiated waste fuel. COHSE (health service workers), NUPE (ambulance and health service workers) and the Fire Brigades Union are all actively involved in the Campaign Against the PWR. Support for the campaign also extends to transport, construction and agricultural workers in the TGWU and UCATT.

At the last Labour Party conference, a resolution opposed to the siting of a PWR 'at Sizewell or anywhere else in the United Kingdom on the basis of need, cost and safety' and for a coal production target of 200 million tonnes a year was passed overwhelmingly on a card vote by a ratio of 4.5 votes to 1. This vote means that the majority of unions affiliated to the Labour Party support total opposition to the PWR.

In East Anglia, the Eastern Region TUC, and many of the individual unions, are also opposed to the PWR, including some of the unions with members working in Sizewell 'A' — the Magnox nuclear power station that has been operating next to the Sizewell 'B' site since 1966. A number of local authorities — whose areas may be the reluctant hosts of future PWRs; be affected by an accident, or have irradiated PWR fuel transported through them — are also opposed to the PWR. A broad-based National Campaign Against the PWR was launched by the ANC at a national rally and conference in London last autumn. The rally brought together over 1,000 people, mainly representatives of the trade unions, political parties, environmental and other national and local organisations actively opposed to the PWR. Certainly not all the groups and organisations are anti-nuclear. But all are opposed to the PWR.

The decision about the PWR is not one of technical choice that will be decided simply by debate at the inquiry. If this were the case, then there would be public funds available to ensure that the fullest case could be put against the PWR and there would have been a more serious attempt at reaching agreement about the procedures to be adopted. But only the CEGB and the other official bodies in support of the PWR are in receipt of public funds — at a 'public' inquiry. The Tory government is set on its programme of PWRs if it can be sure of public acquiescence. For them it is an important political issue. It should be high on the agenda for the labour movement as well. •

[12] *Energy: Planning for the future,* GMWU, 1981.