Private and CONFIDENTIAL

GOVERNMENT'S NUCLEAR POWER PROGRAMME

Public perceptions For many years, there was no great public concern about the safety aspect of nuclear power. For example, the accident at the Windscale plutonium plant in 1967, which was extensively reported on television and in the media, did not cause undue public alarm. More recently, however, there has been an increase in public awareness and, to an extent, in public concern.

The Electricity Council monitors the trend in public opinion on nuclear power, using NOP Random Surveys. Since October 1979, these have shown a falling number of people agreeing that nuclear power has a very good safety record, and a growing minority disagreeing. The November 1982 figures were 46% agreeing and 25% disagreeing.

Opinion has changed more markedly over the period on the question of need. The proportion agreeing that nuclear power is needed to "keep our factories, houses and transport running" has fallen from 65% in October 1979 to 45% in November 1982. The proportions feeling that nuclear power is not needed has increased from 17% to 30% over this period. Since May 1981, there has been a higher proportion against than for building more nuclear power stations. In November 1982, the result was 35% in favour of building more; 40% against.

The people working in the industry have a strong understanding that nuclear power is safe. Those living close to existing nuclear stations, and to Sellafield (formerly known as Windscale) and the prototype fast reactor at Dounreay, tend to be supporters. Other people tend to be against the idea of a nuclear station being built close to their homes. This feeling would very probably be extended to any other industrial development.

The environmentalist groups consistently stress the allegedly adverse impact of nuclear power on the environment, and in particular claim that the technology is unsafe. The present NUM President is strongly opposed to nuclear power, because it is seen as unwelcome competition. The unions

representing workers in the electricity supply industry are staunch advocates of nuclear power, and the TUC made it clear in its August 1981 Review of Energy Policy that it too favours the development of nuclear power.

The important points to stress are:

- New nuclear power stations coming on stream in the next decade will replace older and less efficient plant. Like any other industry, the supply industry needs to replace obsolescent plant by the most modern technology. This will mean electricity prices lower than they otherwise would be, which is important, not least, to large industrial electricity consumers.

- At present, over 80% of electricity is produced by coal. There are obvious advantages in reducing this over-dependence upon one source of fuel. Competition between fuels will exert general downward pressure on costs.

- The 1970s and early 1980s have been characterised by great uncertainty in energy markets. The future seems equally uncertain. All our options for substantial economic energy supplies must be kept open and developed.

- The production of electricity in nuclear power stations has less adverse impact on the environment than electricity production from fossil fuels.

- People working in the industry, at all levels, are satisfied that nuclear power is safe. The safety record, particularly in the UK, is excellent.

- The CEGB's production of electricity from nuclear power stations has as little to do with nuclear weapons as its production of electricity from conventional plant has to do with conventional weapons.

Nuclear Power and Jobs. Nuclear power offers a safe, clean, cheap and secure source of electricity. In France, 40 per cent of electricity is produced in nuclear power plant, and this will reach 60–65 per cent by 1990. French industry has, as a consequence, access to some of the cheapest electricity in the world.

Most major electricity utilities worldwide have decided that this is the technology which is most cost-effective for their future generation needs. Some 281 nuclear reactors are in operation and a further 227 reactors are under construction worldwide. It is very important that we in Britain do not fall behind.

Diversification of the fuel used in electricity generation in Britain has immediate and obvious benefits. British manufacturing industry is all too easily damaged by high costs in the mining industry. An increased use of nuclear power in Britain means more competition between fuels and more secure and less expensive electricity for industry - and that means more jobs.

The UK Record. Lord Rutherford, working in Cambridge in 1919, was the first person in history to split the atom. This work opened up for the first time the possibility that the energy stored in the atomic nucleus could be used as a source of power. It was fitting therefore that, in 1956, Britain's Calder Hall reactor should be the first in the world to generate electricity from nuclear fuel, and feed it into a national grid. The Magnox reactors, developed from the Calder Hall design, provided and still provide a reliable source of base load electricity. Their safety record has been excellent, over twenty years of commercial operation.

The Magnox reactors burn natural uranium. The next generation Advanced Gas Cooled Reactors (AGR) developed in Britain use uranium enriched in the isotope Ur 235. Together with our Dutch and German partners in URENCO, we have achieved a significant technological lead in enrichment technology. URENCO has developed the world's first commercial gas centrifuge plant for uranium enrichment.

Spent fuel from commercial reactors can be reprocessed to recover unburnt uranium 235 and the by-product plutonium. These are very valuable materials which will, at some time in the future, fuel the new generation of fast reactors (see p3). Britain has long experience in reprocessing technology, and British Nuclear Fuels Ltd, at Sellafield, is a world leader in both reprocessing and fuel fabrication. About 60 per cent of the spent fuel reprocessed in the Western world has been reprocessed here in Britain.

The Government's Policy

Britain's nuclear power programme has received bipartisan support in Parliament, ever since 1946 when Mr Attlee took the initial decision to develop civil nuclear power. In 1976 Mr Benn, then Energy Secretary commissioned a thorough review of thermal reactor systems by the National Nuclear Corporation. On the basis of that review, in January 1978, he announced his decision to authorise the electricity supply industries to order two new Advanced Gas Cooled Reactors.

At the same time, he announced that, having regard to the importance of nuclear power, the UK should not be dependent upon an exclusive commitment to any one reactor system. He said: "We must develop the option of adopting the PWR (pressurised water reactor) system in the early 1980s". (Hansard, 25 January 1978, col 1392).

Conservatives supported this statement at the time, and have accepted it as a basis for policy in Government. Work has continued on the adapation of an American PWR design to meet British needs and safety requirements. A public inquiry into the CEGB's application to build a PWR at Sizewell in Suffolk is under way, and the main public hearings, which will be held close to the proposed site, opened on 11 January 1983. Although Sizewell B is proposed to be the first UK power station based on the PWR, our nuclear powered submarines, with over twenty years of totally safe operation, are powered by this type of reactor. Thus, PWR technology is not new to Britain.

The Sizewell inquiry will look into all aspects of the CEGB's proposed new power station. As well as the normal planning considerations the safety and the economics of the proposed development will be considered in depth.

For the future, the Government has re-affirmed its commitment to the development of the fast reactor. It seems likely that reactors of this type will be needed in the early part of the next century. This type of reactor will be able to burn depleted uranium and plutonium recovered from spent fuel from the present commercial reactors, and can create out of it energy equivalent to our present economically recoverable coal reserves. This is of major significance for our future energy supplies.

Britain is among the world leaders in fast reactor technology, and a substantial development programme is concentrated at Dounreay in the North of Scotland.

Safety The nuclear power industry is, by comparison with other energy industries and with most of the chemical and petrochemical industries, safe for both its workers and the public. Successive Governments have ensured that safety considerations have been paramount.

The most serious accident which has occurred in an nuclear plant in Britain was in 1957. This occurred not in a civil plant, but in a reactor at Windscale used to produce plutonium for defence purposes. Within 38 hours, the reactor was cold and under control, but a good deal of radioactive iodine was released. The then Government was concerned that the radioactive iodine would be deposited on the grass, that cows would eat the grass and that in this way radioactivity would get into milk produced in the area. In fact, the levels of activity monitored in the milk did not result in any significant hazard to public health, but instructions were nevertheless issued to all farmers in the area that they were to milk their cows as usual, pour the milk down the drain and send in a bill for the income which they had lost in consequence. This instruction was apparently obeyed meticulously, although according to the bills submitted by the farmers, all the cows doubled their milk production during those two crucial weeks. No ill effects of the incident have subsequently been discovered.

The accident did however have one great benefit, in that it stimulated an exhaustive review of the safety arrangements in the UK. The Nuclear Installations Inspectorate (NII) was established as an independent licencing body, and the principle was firmly established that the operator of any nuclear installation in the UK has the absolute responsibility to ensure its safety. This system has served the country very well indeed. Britain's safety record at nuclear installations is second to none. It is noteworthy that the changes proposed by the Kemeney Commission, which was set up in the US after the accident at Three Mile Island, would make the US regulatory sytem much more like the system we have had in Britain for the last twenty two years.

The questions on safety have to be addressed at various levels:

- How likely is a major accident? - It is unlikely in the extreme. 281 nuclear reactors operate in 24 countries; the technology has been in use for almost twenty years; yet a major accident resulting in any significant hazard to public health has never happened. Nuclear power plants are designed with safety in depth, and are very closely regulated indeed. The accident at Three Mile Island, which was a serious financial disaster, did not pose a significant threat to the people living in the vicinity.

- What if a major accident happened? - First, a reactor core cannot explode like an atomic bomb. However, the worst possible accident that can be imagined at a nuclear plant would be very serious. The same is true of very many other large installations. The point is that the worst possible accidents are precisely the ones which the designers and regulators are so careful to avoid. Throughout history, the great disasters have been natural - plague, floods, earthquake. Apart from wars, hydro dam failures are the only man-made disasters which have caused well over a thousand deaths in a single incident.

- What about the less spectacular risk of radiation escaping from nuclear power plants during normal operation? This is easily measurable and demonstrably insignificant. The environment in which we live is permeated by radiation; a small amount is added by burning nuclear fuel. Neither is significant. The risk of contracting cancer is much greater, however, for people living in areas where oil and coal are burnt, because of the non-radioactive carcinogens produced. The risk is much greater still for people who smoke cigarettes. It has been estimated that the present level of radiation from the nuclear programme is as dangerous to the individual as the smoking of two cigarettes in his or her lifetime.

The Department of the Environment and the Ministry of Agriculture, Fisheries and Food both monitor the effects of pollutants, including those from the nuclear power programme, in the environment. Both are independent of the sponsoring Department of the nuclear industry.

Waste Management. 96 per cent of spent fuel from nuclear reactors is unburnt uranium or plutonium, which is reusable. The remaining waste, although highly radioactive, is produced in very small quantities. One of the virtues of nuclear fuel is that a small volume produces a large amount of energy. Coal and oil, on the other hand, have to be burned in large quantities, and produce large amounts of extremely unpleasant solid and gaseous waste.

The safe storage of highly active waste from nuclear fuel is essential. At present, it is stored at Sellafield, in solution form, in high integrity stainless steel tanks. A process for turning this waste into glass has been developed on an industrial scale by BNFL's partners in France, and work of this kind will soon start at Sellafield. The waste will then be glassified within stainless steel containers, and stored at Sellafield until much of its activity has decayed. (This will take about 50 years). The well-protected capsules will then be disposed of, probably underground in stable geological strata.

Nuclear Energy and Nuclear Weapons

The civil nuclear power industry worldwide has always been alert to the possibility that plutonium extracted from spent fuel or highly enriched uranium could be be used by countries to develop atomic weapons. There are, of course, much easier and cheaper ways in which a country intent upon making nuclear weapons could proceed. Nevertheless, a comprehensive system of international agreements and inspections minimises the risk that the legitimate rights of countries to civil nuclear power do not lead to their developing nuclear weapons.

The prime instrument of control is the Non-Proliferation Treaty. States party to the NPT have undertaken not to provide nuclear materials or equipment to a non-nuclear weapons state unless they are covered by safeguards monitored by the International Atomic Energy Agency. Most other countries not party to the NPT have all their nuclear facilities under IAEA safeguards. There are only four non-nuclear weapons states which are not party to the NPT, where certain nuclear facilities are not under IAEA safeguards. These are India, Pakistan, Israel and South Africa. The safeguards system is designed to verify member states compliance with their stated commitments and to account for all the nuclear materials handled by their civil nuclear programmes so that misuse would be detected at an early stage.

Secondly, the principal exporters of nuclear materials and technology, including the UK, belong to the Nuclear Suppliers Group, and observe agreed guidelines for the transfer of sensitive nuclear items and technology. These are specifically designed to reduce the risk of misuse.

As a country which already has nuclear weapons, we need not submit to IAEA safeguards, but have chosen to do so. The Government has recently reaffirmed that no plutonium recovered from our civil nuclear programme has ever been used for military purposes and that there are no plans to do so in the future.

Common misconceptions

Progress on renewable sources of energy is hampered by concentration on nuclear power	No significant contribution can be expected from the renewable sources of energy at least before the year 2000. Nonetheless, the Government is active in its promotion of R&D in this area.

Conservation could eliminate the need for more nuclear power

Conservation is very important, particularly in reducing the energy used in space heating. However, electricity is relatively little used in this application. In any case, measures such as loft insulation have relatively little impact on the peak demand for electricity, and this is the factor which determines the amount of generating capacity needed. Thus more home insulation, while very sensible in cutting heating bills, does not mean we need to generate substantially less electricity.

The ordering and building of nuclear power stations is grinding to a halt worldwide. In the US, some are closing down.

The building of power plants has been affected by the worldwide recession. However, the situation has been exaggerated by opponents of nuclear power.

In Germany, a 5 year moratorium on nuclear build has recently been lifted. 9 plants are now under construction and 8 are under approval. Nearly all of them are PWRs.

In Switzerland a 5th nuclear plant (BWR) is planned, and this will

mean that 35% of their electricity will be generated in nuclear plant by 1990.

France is pressing ahead with an extensive programme. 27 PWR's are presently under construction.

Recession and higher interest rates combined with delays in the licensing process have led, in the US, to cancellations of generating plants under construction. However, some 20 stations presently under construction are expected to come onstream by the end of 1984 and a further 40 are in an advanced stage of construction. Coal-fired capacity has not been hit so hard as nuclear due to lower initial capital costs, simpler licencing and the availability of cheap opencast coal close to potential power station sites.

The Three Mile Island accident demonstrates that the PWR is intrinsically unsafe.

Not a single injury resulted from this accident. The Presidential Inquiry into the accident by the Kemeney Commission concluded that the small release of radiation had negligible impact on the health of individuals.

Meltdown (as portrayed in the fanciful film, 'The China Syndrome') did not occur. Even if it had, the Commission concluded that there was a high probability that the resulting radiation would have been contained by the reactor building.

The PWR is not inherently unsafe; it is the most common nuclear generating technology in use in the world today. The Commission's main conclusion about the accident at Three Mile Island was that faults in the system of licensing and regulating US nuclear plant were largely responsible for the seriousness of the accident. The changes suggested would bring the US system into line with that in the UK.

The NII will be determined to ensure that the events which occurred at Three Mile Island could not be reproduced in a British PWR. The Electrical Power Engineers Association, which represents the engineers, managers and scientific staff who plan and run the electricity supply industry, has concluded that the PWR "cannot be opposed on the grounds of its safety

implications for the staff who will be involved in its commissioning and operating" (Guardian, 5 January 1982).

The disposal of nuclear waste poses a threat to future generations

Nuclear waste will be glassified inside high-integrity capsules, and stored in safety for about 50 years, until its activity is substantially reduced.

These capsules will then be disposed of, in stable geological formations underground or possibly under the ocean. The chances of their reaching the surface and being assimilated by humans will be effectively zero.

The transport of nuclear waste is a hazard to the public

Nuclear fuel is transported in steel flasks up to 12 inches thick. Arrangements for moving spent fuel in the UK are in accordance with internationally agreed safety standards.

Transportation flasks are subjected to simulated accidents to test resistance to fire and impact. They have been proved safe.

More fuel has been moved by the two UK Generating Boards than by all the rest of the world's commercial

organisations put together. Just over 12½ thousand tonnes of irradiated fuel have been moved from CEGB power stations to Sellafield since 1962 without incident.

Terrorists could steal plutonium from the civil nuclear fuel cycle to release in a public place or to use for weapons production

Plutonium is a very dangerous material if inhaled as fine dust. The most stringent security measures are enforced to ensure that plutonium is not stolen, even in minute quantities. If terrorists wish to poison large numbers of people, there are many easier ways of doing so with less danger to themselves.

It seems highly unlikely that terrorists could make weapons from plutonium from civil nuclear power stations. It is more likely that they could buy such weapons from irreponsible governments. A moratorium on nuclear power generation would not in any way change the nature of the terrorist threat.