BRITAIN

SGHWR: green to amber?

Allan Piper reports on uncertainties surrounding the next generation of British nuclear reactors.

GROWING doubts about the future of the British-designed Steam Generating Heavy Water Reactor (SGHWR) have led the House of Commons Select Committee on Science and Technology to call an inquiry into progress on the reactor system, now at the end of the design stage. The committee two years ago successfully urged the controversial adoption of the SGHWR for the next phase of Britain's nuclear energy programme. It has now expressed concern over "the widely reported intention of the Secretary of State for Energy [Mr Anthony Wedgwood Benn] to review the SGHWR project in the near future".

In fact Mr Benn is currently awaiting reports on technical and economic aspects of the SGHWR from the United Kingdom Atomic Energy Authority (UKAEA), which has recommended a "take-stock" review, and from the Central Electricity Generating Board (CEGB). Parliamentary questions and statements from key leaders of management and unions within the nuclear industry have fed speculation that the reactor may be abandoned as part of the government's present review of public expenditure.

Mr Benn is expected to appear as an early witness in the select committee inquiry, probably before the forthcoming Parliamentary recess. The heads of the nuclear industries and the CEGB will be invited to appear at a later date.

Disagreement over the choice of the SGHWR as the commercial successor to the Advanced Gas Cooled Reactor (AGR) has continued since the initial 4000 MW ordering programme was announced by Mr Benn's predecessor in July 1974. The go-ahead came then in spite of opposition within the nuclear industry and the CEGB's preference for a much larger programme using mostly American Pressurised Water Reactors (PWRs). The SGHWR was eventually favoured on safety grounds even though estimated construction costs were around 10% higher.

Officially, the SGHWR still has the green light. But there are amber tinges. The PWR has been given a clean bill of health by the Chief Scientist at theDepartment of Energy (DEN), while technical difficulties have pushed design costs of the SGHWR above original expectations. Following a major design review in the middle of 1975, and a further revision earlier this year, the CEGB has calculated that the SGHWR could eventually prove more costly than equivalent coal-fired capacity.

This week Mr Benn spoke in Parliament of the new activity on the American reactor front. Last month he admitted that the UKAEA had recommended a careful look at progress on the SGHWR project, and hinted that once reports have been received the reactor's future will be considered in the light of recent changes on the energy scene. The CEGB, which currently has 15,000 MW of new generating capacity either under construction or ready for commissioning, will probably indicate that with the present slump in electricity demand the first commercial SGHWR planned for Sizewell in Essex is no longer urgently required.

Ditching the project would mean the loss of political face and perhaps more, but it would also avoid economic and technological complications. Development of the SGHWR is not regarded as a crucial step along the path towards fast breeder reactor (FBR) technology, while the export potential of the reactor remains limited; most other countries are expected to opt for the comparatively well proven PWR. Moreover, imported Canadian heavy water, needed to moderate the SGHWR, is likely to prove unexpectedly expensive.

Within the nuclear industry there is feeling that buoyancy can be maintained without the SGHWR if further commercial AGRs can be ordered. The first of the two AGR reactors at the 1,250 MW installation at Hinkley Point in Somerset is now running successfully up to full power, bringing confidence that the much-publicised developmental hitches can now be left behind. Additionally, there are hopes that with a go-ahead for the first commercial FBR this autumn, fast breeder technology could lag only three or four years behind SGHWR technology.

If the SGHWR is abandoned Britain could buy herself into PWR technology and establish an export base under licence. Japan and the USA, and several European countries, however, already have strong footholds in the market, which means that Britain would probably be restricted to the manufacture and export of component hardware. Mr Benn's junior, Alex Eadie, is meanwhile stressing that any reversal of SGHWR policy would not be at the expense of British technology.

Last week the DEN would only reaffirm that Mr Benn was awaiting reports from the UKAEA and CEGB. The UKAEA says simply that it is carrying out an appraisal which will be made available to Mr Benn in the near future. The CEGB is giving no outward sign that any imminent interruption to the SGHWR project is foreseen, and does not expect to have reliable cost figures ready for Mr Benn before next spring. An initial safety report is awaited from the Nuclear Power Company, responsible for design; this is not expected to arrive at the CEGB until next month, and is to be followed in turn by more detailed specifications in April 1977. □

CANADA

Towards a conserver society

Like other industrialised countries, Canada must look to conservation as an important element in its future energy stategy. This point has received considerable emphasis from an important quarter, as David Spurgeon reports from Ottawa

ENERGY conservation seems to be the major pre-occupation of the Science Council of Canada in its tenth anniversary year, judging by the statements and publications emanating from its members. The most recent came from the chairman, Josef Kates, who is president of a Toronto firm of systems analysts. "Energy conservation is not an option—it is a necessity," he says in the council's annual report. " . . .The *highest priority* in any comprehensive national energy policy should be *a wide-ranging, imaginative energy conservation effort.* Such an effort must involve every individual and every organisation, private or public."

Dr Kates reinforced his points at a press conference given when the report was published. The reason for his concern is that Canada is the "second most energy intensive country in the world, and energy shortages could threaten the very fabric of our way of life." He says that if Canada's energy requirements also double by 1990, as is currently forecast, the needed capital investment could be as high as $200 billion—or about 5 to 6% of GNP between then and now. This is some 50% higher than the 3.5% average between 1950 and 1975, and the interest rate on this capital is likely to be

from 50 to 100% higher than in the 1960s.

This may mean that by the 1990s energy costs will be twice or three times what they are today, and if per capita consumption is also 50 to 100% higher, energy costs could require from two to four times today's proportion of personal income. Canada's historical advantage in such energy-intensive industries as forest products, mining, agriculture, metallurgical and chemical industries could therefore be seriously attenuated. And if primary industries weaken, Canadians could not look to the secondary sector for compensation.

Dr Kates proposes that a much higher priority be given immediately to a comprehensive energy conservation programme, and that Canada must now begin to develop the energy technologies that will permit her to achieve a stable energy use pattern in the long run. This means exploiting renewable energy forms such as solar, wind, geothermal, biomass and tidal power. A major programme of research and development, of the kind first proposed by the Science Council in 1968, must be undertaken "to demonstrate the feasibility of alternative energy technologies."

A recent investigation indicates that "if we were able to hold Canadian energy consumption at present levels and continue to use existing or moderately-expanded hydro-electric capacity to provide approximately 25% of our energy needs, the remaining 75% (now met almost totally by non-renewable hydrocarbons, oil, gas and coal) could be provided within the next 50 years or so by renewable resources such as solar, biomass and wind energy."

At the press conference Dr Kates described the Conserver Society study the council's largest and most important project. The concepts behind this study, outlined in the "Statement of Concern" published in *Science Forum*, are summed up in the comment that "we face a transition from a 'consumer society' to a 'conserver society'"—that is, to a society which included among its features "doing more with less," "a greater appreciation of external or social costs," a return to the habits of thrift, saving and avoidance of waste for society as a whole, and so on.

"The transition to a Conserver Society," the Science Council paper says, "does not mean that we are going into a period of austerity and shortages. In fact, it is the reverse. Only by adopting a more rational and conserving approach to the common energy, resource, and environmental pool that sustains us all, can we ensure a continuing high standard of living for future generations." □

THIRD WORLD

Talking about technology transfer

The transfer of technology from developed to underdeveloped countries, a subject examined at UNCTAD IV at the end of May, was also discussed at the recent World Employment Conference. Robin Sharp reports

SCIENCE and technology, said the man on the rostrum, could increase production everywhere "on a scale that would make poverty unnecessary as a global phenomenon within the foreseeable future." The speaker was a senior official of the United Nations Development Programme, addressing last month's World Employment Conference in Geneva.

But for many people his otherwise heartening words raised questions. How is the scientific know-how and technology of the rich to be adapted and made relevant to the needs of the poor? How are the benefits of these high-cost, skill-intensive fields to be transferred to those possessing limited skills and no hard currency? And how, at the end of the day, can it be ensured that the transfer does not enrich 10 men at the expense of a thousand others? Among the many dilemmas of development these are some of the most intractable, and the debates in Geneva proved it once again.

Some of the figures can be frightening. In the industrialised countries, the average investment required to create one job is in the region of $5,000. The developing countries, with most of the world's poverty, need to create five times as many jobs per million population in order to meet the basic needs of their people, with only one-tenth of the per capita income available to do it. Hence, on a rough rule-of-thumb calculation, an average investment of $250 per job is what they can afford. There is little science and less technology to be had for that kind of money.

On this fundamental issue, delegates to the World Employment Conference found themselves deeply divided. At one end of the spectrum, speakers denounced the appropriate technology movement as a neo-colonialist stratagem designed to perpetuate the supremacy of the rich countries. In more measured terms, the French Minister of Labour also questioned the international division of labour proposed to the conference by the International Labour Organisation (ILO), whereby developing countries would specialise in the production of everyday consumer goods, using less sophisticated technology and unskilled labour, while the industrialised countries would concentrate their economies even more in the high-technology sectors.

Put more favourably, however, what the ILO was proposing in its report to the conference was a Basic Needs Strategy in which much greater effort in the field of appropriate technology was seen as essential for maximising the use of labour in the Third World. Given the present level of 300 million unemployed or underemployed in the developing countries, and their estimated need for 1,000 million new jobs over the next 25 years, the ILO strategy is to many the more persuasive formulation. With it has to be swallowed a slower rate of national growth, but in most developing countries the alternative—in terms of human and social cost—would be even less palatable.

Among Third World delegations, the Latin Americans in particular were convinced that they should "continue to incorporate the most advanced technology into those activities where it was necessary in order to eliminate the technological gap." At their preparatory meeting, by contrast, the African group had strongly endorsed the need for more work on appropriate technology as a matter of priority.

In the end, it was the western industrialised countries which blocked the ILO's proposal for two new bodies to promote efforts in this field. A Consultative Group on Appropriate Technology was suggested as a mechanism for mobilising resources and determining research priorities, linked with an International Appropriate Technology Unit designed to identify and focus research in areas where technological innovation would have a significant impact.

Again lacking the support of the employers and western governments, the developing countries and the workers' group declared their support for an international code of conduct on technology transfer, as proposed by UNCTAD a month previously in Nairobi. As well as recommending a timetable for drafting and adoption of this code by the end of next year, the UNCTAD meeting also agreed on the immediate setting-up of regional technological centres under the aegis of either UNCTAD or the UN Industrial