

British PWR

One year back

The announcement last week by Britain's Central Electricity Generating Board (CEGB) that it will be applying for permission to build its first pressurized water reactor (PWR) at Sizewell in Suffolk was not unexpected. That it may also choose to build another reactor, possibly another PWR, on the same site two to four years later, was more of a surprise. The CEGB says, however, that two 1,200-MW reactors on the site would be roughly in line with permission granted in 1974 to build one 2,000-MW advanced gas-cooled reactor alongside the existing 420-MW Magnox station.

The CEGB will be putting in a formal planning application for the first plant, Sizewell B, early next year. That will include a basic reference design drawn up by the National Nuclear Corporation. By the end of next year, the main stage of the design will be put to the Nuclear Installations Inspectorate for fault analysis, well before the public inquiry expected to take place in the summer of 1982.

The form of the inquiry is not yet settled. Past experience, especially that of the Windscale inquiry in 1978, suggests that, if the board is given the go-ahead, it will be mid-1983 at the earliest before construction can begin, putting back the British government's plans for the next generations of nuclear power stations by one year.

The basic design of the British PWR is that of the Westinghouse Corporation, but its adaptation to local conditions, and especially to British safety standards, is a considerable task. According to the industry, the British standards are among the most stringent anywhere, chiefly because of the multiplicity of stand-by systems required. Designing the buildings to house the Westinghouse system for the soft sands of Sizewell will also add time.

About a dozen of the 200 or so engineers now working on the design have come from Westinghouse and the US Bechtel Corporation, an arrangement that has prompted some opposition from those outside the industry who feel that Britain has the expertise to go it alone. The Bechtel Corporation, which has helped to design PWRs throughout the world, has claimed that the cost of building a PWR in the United States is about \$850 per kW compared with the estimate of £1,000 per kW in Britain. Apart from differences in the accounting basis of these calculations, much of this difference is said to stem from the present strength of sterling, additional safety requirements, construction problems specific to the Sizewell site and the low productivity of the British construction industry. In any case, according to the generating board, the figures now being talked of are estimates, not contract prices.

Judy Redfern

Mining Polish sulphur Trying harder

Sulphur production in Poland's Tarnobrzeg basin is to be doubled as part of the country's economic recovery plan. The present output of the area is 5 million tonnes per year, one-third of world production, of which 80 per cent is exported, so that this increase could play a major part in paying off Poland's soaring international debts.

Sulphur production is both one of the oldest and one of the newest industries in Poland. In 1415, King Wladyslaw Jagiello granted the miners of Krakow the right to prospect for "sulphurous minerals" in the vicinity. Four hundred years later, in his classic treatise "*On the Resources of the Carpathians and Other Polish Mountains and Plains*" (Warsaw, 1815), the Polish mineralogist Stanislaw Staszic remarked that "Poland stands on sulphur". By the end of the nineteenth century, however, existing mines had been worked out, and in 1921, the last of the old mines, at Posadza, closed down.



Between the Wars, several geologists suggested that sulphur beds might be located in the Miocene sediments of the Sub-Carpathian foreland, but it was not until 1953 that substantial deposits were located at Tarnobrzeg. Open-cast mining began the following year. Towards the end of the 1960s the Gryzbow and Jeziorko mines were opened; these use a borehole method of underground melting, and some 80 per cent of Polish sulphur is produced by this technique.

The Polish sulphur industry is now backed by a considerable research and development structure. Environmental problems of the industry and the re-

generation of worked-out pits were elaborated in the early 1970s by a special team at the Krakow Academy of Mining and Metallurgy, and as the officials of the Tarnobrzeg mine point out, land reclamation begins as soon as a particular sector of the pit is exhausted. Plans are in hand to use closed-cycle water in all borehole mines.

Although Poland is the world's largest sulphur producer, there are, however, occasionally odd shortages on the home market. Earlier this year, Gdansk radio noted that the local epidemiological station, which is responsible for environmental monitoring, had been unable to obtain necessary supplies of sulphuric acid. In 1979, it received only 8 litres, instead of the 200 ordered.

The increased production from Tarnobrzeg, which should remedy such defects as well as boosting exports, should not, in the short term, make serious inroads into Poland's sulphur reserves. According to one expert at Tarnobrzeg, at the current rate of production, Polish mines already in operation hold enough reserves for at least another 75 years, and a similar amount of sulphur is estimated to lie in other natural deposits not yet even broached.

In the Soviet Union the outlook for sulphur production seems less optimistic. Although the Soviet Union has some indigenous sulphur, the deposits are deep and difficult to exploit, and some 10-12 per cent of Poland's sulphur exports go to the Soviet Union. A joint Soviet-US survey also indicates that there will be a world shortage in sulphur by the year 2020, because of soaring demands from the Third World. The promotion of research into cost-effective method of recycling sulphur would help the situation — at present, reclaimed sulphur costs four times mined sulphur.

For the moment, however, the main problem faced by the Polish sulphur industry is how to extract the sulphur fast enough. At the Tarnobrzeg open-cast pit, for example, the stockpile between the mine and the processing plant is virtually zero, and a breakdown in the conveyor belt lasting more than a few hours could bring the processing plant to a halt. The transport/export process is also operating full-tilt. Sulphur is exported either by rail or through the liquid-sulphur terminal at Gdansk (the home port of Poland's three liquid-sulphur tankers). So when, early in September as a kind of postscript to the recent industrial unrest in Poland, the Tarnobrzeg sulphur-workers finally went out on strike — seeking pay and social security parity with miners rather than factory workers — the authorities were quick to ask for the election of a strike committee to keep the disruption as brief as possible.

Vera Rich