PRIME MINISTER

21 November 1986

CCU REPORT - LESSONS OF CHERNOBYL

We have to demonstrate that the benefits of nuclear power can be harnessed safely.

The first obstacle to this is the Chernobyl incident itself. Fortunately, it can now be demonstrated that the chain of shortcomings which led to the incident were unique to the fundamentally-flawed design of the Chernobyl reactor, the Russians' safety philosophy and their lax operating régime. (Incidentally, on this subject you might like to glance at the attached newspaper article by Lord Marshall. He uses a nice analogy to explain the design failing:

> "The Chernobyl reactor is a bit like having a powerful automatic car which has a design fault so that, if it is driven below 20 mph, the operator needs to give constant attention to the brake to stop the speed surging away - and if the fan-belt snaps or if a piece of rust interrupts the flow of coolant water, the car instantly accelerates to 100 mph or more with no chance for the driver to put the brake on in time. The Chernobyl reactor actually "accelerated" from a fraction of full power to 100 times full power in just four seconds."

The second obstacle to regaining public confidence is the worrying impressions left by the authorities' inept handling

of the domestic "crisis" caused by the Chernobyl fall-out. Put to a serious test, the contingency arrangements were seen to be wanting, not least as regards information and advice to the public.

Before long, the Sizewell decision will be in the public arena. The antis will do their upmost to arouse public concern, including reminders of the "shambles" created by the fall-out from a nuclear incident as far away as Kiev. Both in the context of Sizewell, and follow-up nuclear stations, the Government must be able to confirm with conviction that the contingency arrangements for any form of nuclear accident have been comprehensively overhauled in the light of the lessons learnt from Chernobyl.

So far, the CCU have been long - and painstaking - on diagnosis but short on prescription. To be fair, there are good arguments against rushing into a hasty overhaul of the contingency arrangements. But the Government will become increasingly exposed to criticism of typical complacency and lack of urgency unless we rapidly start building on the foundations now laid by the CCU Report.

Conclusion

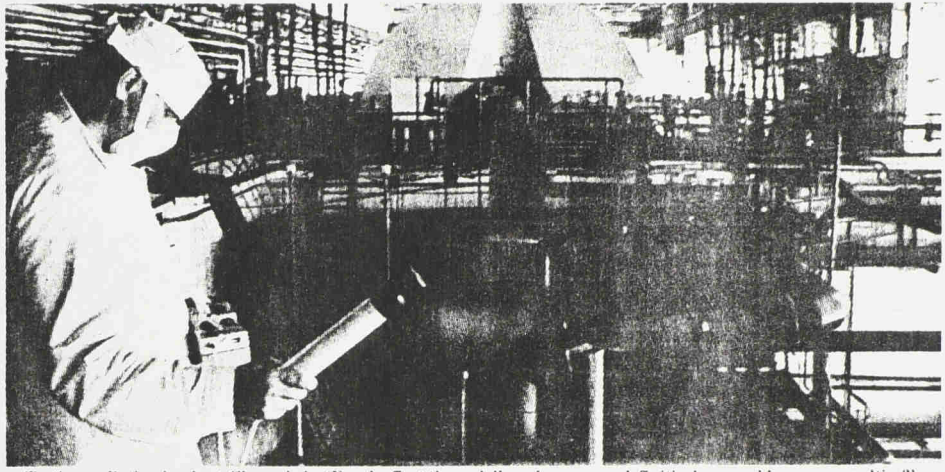
A solid start has been made, but a greater sense of urgency is needed if we are to counter public unease and avoid the risk of yet more delay to Sizewell.

JOHN WYBREW

In the shadow of Chernobyl

With decision time on Sizewell approaching, the vital question is : Could disaster strike here?

By Lord Marshall



Testing radiation levels at Chernobyl : 'For the first time, civil nuclear power definitively caused human casualties?'

WITHIN a few weeks the Government expects to receive Sir Frank Layfield's report on proposals to build a pressurised water reactor at Sizewell. In an ideal world the political and public debate on Sizewell ought to be based on the technical and economic arguments presented at the inquiry, including the important safety issues which took up 150 days.

The public's consideration of nuclear power is now, however, dominated by the Chernobyl accident.

Chernobyl was a severe disaster. For the first time civil nuclear power definitively caused human casualties — 31 people died. That is very much to be regretted as is the upheaval caused by the evacuation of 135,000 people within a radius of 30 kilometres and the fear and concern the accident brought to the people in many countries.

But for us here in the United Kingdom, the most important question we must ask is a simple one: "Could Chernobyl happen here"?

In my opinion it could not, and Academician Legasov, who led the Russian delegation to the Vienna Conference in August on the accident has stated categorically that the Chernobyl accident is simply not possible in any reactor built or operational outside the USSR. Why is that the case?

Although there were gross violations by the operators, the prime cause of the accident was inherent design shortcomings.

In technical terms, the Chernobyl reactor is a boiling water, pressure tube, graphite moderated reactor. As designed, it has inherent shortcomings, most of which were identified by a team of British engineers who studied this reactor in 1975, and many of these shortcomings were acknowledged by the Russians at the Vienna meeting.

"Shortcomings" is the word chosen by the Russians themselves. A particular "shortcoming" which concerned the British engineers in 1975 was that the Russian reactor has a "positive void coefficient". If the amount of steam in the reactor core increases for any reason, then the power of the reactor tends to go up and still more water converts to steam which causes more power and so on.

It is possible to compensate for this undesirable characteristic by careful design, but in Vienna the Russians told us they had done this only for normal operating conditions, and that at any power below 20 per cent, their reactor could have what is called a "positive *power* coefficient."

Such a coefficient is a description of the fact that when *all* technical features are taken into account, then a simple increase in power leads to a further increase in power and still further increase in power and so on.

The Chernobyl reactor is a bit like having a powerful automatic car which has a design fault so that, if it is driven below 20 mph, the operator needs to give constant attention to the brake to stop the speed surging away — and if the fan-belt snaps or if a piece of rust interrupts the flow of coolant water, the car instantly accelerates to 100 mph or more with no chance for the driver to put the brake on in time. The Chernobyl reactor actually "accelerated" from a fraction of full power to 100 times full power in just four seconds.

The Russians have admitted that they knew of these shortcomings from the beginning and they chose to compensate for them not by built-in engineering devices but simply by instructing the operators to avoid potentially unsafe regimes. The Russians now admit "their designers made a tremendous psychological mistake" in placing responsibility for the fundamental safety of the reactor upon the continuous discipline, attention, understanding and concentration of the reactor operators.

It is not possible that such a situation could occur in the UK because of the differences in safety philosophy between the Russians and ourselves.

First, in the United Kingdom our reactors must have inherent characteristics which provide built-in protection and that is true whether we build gas-cooled reactors or water reactors. Neither of them have characteristics of the kind I have described for Chernobyl. In either case, if anything untoward happens, the natural characteristics of the reactor compensate and oppose the change.

Second, in the United Kingdom those natural defences are supplemented by engineering features which either prevent, or limit and terminate any fault. It is physically impossible to withdraw control rods from our reactors all at once, or rapidly, and if the operator mishandles the control rod system, the reactor automatically "fails safe" — that is, it closes down.

Third, our system designs must be tolerant to operator action. If the operator attempts to take action which could pose an immediate threat to the reactor such action will be prevented by design provisions or the reactor will automatically close down.

Fourth, our operators are well qualified and trained, not just for routine operations, but for unusual and accident situations. The Russians themselves have admitted that improvements in their operator training programmes are required.

Finally, our entire nuclear system is overseen by an independent nuclear inspectorate second to none, which can at any time without hindrance or challenge close down any reactor. The Russians do not appear to have the same independent inspection capability.

For all these reasons, the difference between the Chernobyl reactor and the reactors we operate or might contemplate, including the proposed pressurised water reactor (PWR) at Sizewell, is not a matter of degree, but is a matter of gross qualitative difference.

We are satisfied that there is no narrow technical issue which we in the West could or should learn from the Chernobyl disaster.

But that is the technical position, and progress in this country or indeed in any democracy does not depend narrowly on a technical appreciation, it depends ultimately on public acceptance, and there is no doubt that the Chernobyl events have shaken the confidence of the British public in the safety of nuclear power.

Because of the importance that our designers attach to defence in depth and because of our strong safety culture, I am confident that an accident on the scale of Chernobyl could never happen here.

It is important that we remember this when we are considering the future of nuclear power in this country — particularly bearing in mind that since the accident, our competitors in France and Japan have reaffirmed their intention to expand their nuclear programme, and the Russians themselves have recently outlined ambitious plans to increase nuclear power production.

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