

*Members of the national, provincial and overseas Press visited the UK Atomic Energy Authority's Dounreay Experimental Reactor Establishment on Wednesday, October 17, 1962. The visit was arranged primarily to show the work on the Fast Reactor Experiment.*

*This is the text of an introductory talk by Sir William Cook, C.B., F.R.S., Member for Reactors, as it was published in the ATOM magazine in December 1962.*

It is now almost three years since the Dounreay Fast Reactor went critical in 1959. It had been a long and arduous task since the work here at Dounreay started in 1955. We did not realise in 1959 when celebrating criticality the many tedious problems which would have to be overcome with this reactor before we got it up to power. It has taken three years of dedicated labour on the part of the staff of the establishment and great tribute is due to them.

In all this period members of the Press came only in 1957 during the construction phase. So it is high time that you came and saw for yourselves the state we have reached. And it is a great pleasure to us to invite and to have you here. We would have liked to invite you a little earlier but we were anxious to clear the remaining hurdles and get the reactor up to reasonably high power so that you could see it operating.

The situation today is that it is running at 30 MW thermal and generating some 3MW of electricity. It would be sanguine of me to expect that we have got out all the bugs. I expect there are still some troubles ahead. We will therefore run the reactor for a period of months at this power level of about 30 MW to see whether there are further troubles. If this can be done successfully we will increase the power level nearer the design limit of 60 MW.

All the troubles we have had have not been an unmixed blessing. We have learnt a lot, and learnt what to avoid in a reactor of this type. Certainly with hindsight, if we were starting afresh, we should design the reactor very differently. But this after all was the purpose of the reactor and we can go to the next stage with greater confidence.

For a power generating station, both the design of the reactor and the fuel it uses will be different from the Dounreay reactor, and we are hard at work preparing to start a prototype of a commercial reactor. The design will incorporate all the lessons we have learnt from Dounreay, and the Dounreay reactor will itself be an essential testing ground for the different fuel for this prototype and of the control characteristics.

This work on new fuel embraces not only testing but fabrication and reprocessing, so that the techniques of the complete fuel cycle can be investigated and the groundwork of the economics of the system laid. The Dounreay establishment, which you have seen today, has all the facilities for making plutonium-bearing fuels, irradiating them, examining the results in highly active caves, and for reprocessing.

The importance of the work is great. All major countries are agreed on the importance of fast reactors for future power production. Extensive programmes are in being in U.S.A., in Euratom, and in Russia. Many other countries are keenly concerned with the future of plutonium utilisation for peaceful power production. The main reason for the importance given to the fast reactor by these countries is the breeding capability of this type – the possibility that these reactors can produce more fissile plutonium than they consume.

But to us in the U.K. there is an added factor – and, in the next two decades at least, a more important factor. We have a large nuclear power programme based on thermal reactors and this programme will increase both because nuclear power is within grasp of being competitive with conventional power in the U.K. and because our energy demand in the next two decades would otherwise lead to enormous imports of fuel. All of these thermal reactors produce plutonium as a by-product. By the early 1970s we shall have produced 20-30 tons of it. If we can use this good fissile material in fast reactors we shall make more economic the power costs from our thermal stations.

So work is actively on hand now that Dounreay is running on the design and development of a fast reactor large enough to serve as the springboard for the design and construction of large power stations by our nuclear industry. There is a long way to go and many difficult problems to overcome. But you will have seen today what we are doing on the Dounreay reactor and its associated plants and seen some of the work and our ideas for the future.