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Defence 1



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MO 18/1

PRIME MINISTER

SUPPLIES OF HIGHLY ENRICHED URANIUM (HEU)

Over the next few months we shall have to address, in the military nuclear field, several issues arising both from weapons policy and from the procurement capacity needed to support it. In the latter category I will put a comprehensive picture before my colleagues as soon as I can; but there is one particular matter which, for reasons explained in this minute, we need to address quickly.

2. We shall use up by 1984 the available stock of highly enriched uranium (HEU) from which we can manufacture fuel that is burnt up in the reactors which power our nuclear submarines. This stock has been accumulated by obtaining supplies from the United States under a toll-enrichment contract negotiated in accordance with provisions in the 1958 United States/United Kingdom Defence Agreement. By the terms of this contract, we supply depleted and natural uranium to the Americans and they enrich it for us in their diffusion plants. The contract and the relevant provisions in the Defence Agreement lapse at the end of this year. We have to consider whether we should continue to rely upon the Americans for submarine fuel, or should make arrangements for ourselves. With the exception of the enriched uranium fuel the propulsion plants of our nuclear submarines are entirely independent of any foreign aid.

3. The present toll-enrichment contract with the US was negotiated with considerable difficulty in 1973 in the

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face of opposition from, among others, Mr Schlesinger, then the US Defense Secretary but now the Energy Secretary directly responsible for these contracts. The basis for the opposition was that the UK, as part of Urenco, is a competitor to the US for the sale of enrichment capacity for civil nuclear power programmes. The US regarded the sale of enrichment capacity to the UK for naval purposes at less than full costs as a hidden subsidy to our commercial enrichment operations. More recently, in discussions with US officials about necessary amendments to those parts of the 1958 Agreement which refer to material supplies, US officials have indicated informally, that if the UK had convincing plans for self-sufficiency, they would be prepared to recommend to the President and Congress a further five year extension of the present arrangements. If the US Government agrees this would tide us over any problems in building the necessary plants for self-sufficiency.

*Paragraph 4 deleted and retained under
Section 3(4).*

Wayland

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5. The alternative has therefore been looked at of meeting our post-1984 HEU requirement in a centrifuge plant which would be built and operated by British Nuclear Fuels Limited (BNFL). It would be based on the Company's proven centrifuge technology, and the Treaty of Almelo, under which we co-operate with the Dutch and Germans on civil

/ enrichment ...



enrichment, allows us to use this technology for defence purposes. Indeed our partners clearly understood that we might do so. If, however, we decided to build our own plant, we need to be prepared for some criticism when our decision became known, because other Governments are being encouraged to refrain from producing HEU for non-proliferation reasons. This should not prevent us from going through with this project but we should tell our Dutch and German partners of our intentions, before any public announcement is made.

6. BNFL have carried out a design study for a HEU plant which would be located at their Capenhurst Works in a Ministry of Defence enclave. This would be physically separate from the civil nuclear facilities at Capenhurst and there would be no problems over international safeguards and inspection. A more detailed account is given in the Annex to this minute. The cost over the next 15 years will be about £160m (at 1979 prices) for providing a 10-year supply, and this total includes the cost of uranium residue recovery facilities which have to be built in any case to replace plants which are now over 20 years old. During the current PESC period the total cost will be about £90m; this is taken into account in the additional bids for defence which I have put forward in PESC, though as explained in the PESC Report the bids themselves are necessarily provisional at this stage.

7. The essence of the case for providing this capability for naval fuel production can be summarised as follows:

a. we have invested heavily in our nuclear submarine capability which has a life expectancy stretching into the next century. However friendly we are with the Americans, continued reliance on them for HEU fuel makes us dependent in a key area and could narrow our defence options if difficulties arose;

b. the American Administration have never been able to enter into a legally-binding

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agreement for the supply of nuclear materials and have insisted at both the Administration, and more importantly at the Congressional, level that any supply arrangement should have a fixed term (initially 10 years but now 5 years) subject to an overriding US right to terminate prematurely. In today's circumstances, where non-proliferation factors may come to weigh increasingly heavily with the US Administration, it is uncomfortable to go on relying on such arrangements. To feel reasonably sure of our ground we would need a long-term arrangement covering something like 10 or 15 years on which a legally binding contract can be drawn up. Given the time it would take to build up our own arrangements, anything much shorter than this simply would not provide enough assurance. But it is hard to see how the US Administration could in practice give us such an undertaking;

*Paragraph 7(c) deleted and retained under
Section 3(4).*

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8. Against this, there is likely to be a cost differential between British produced HEU on a full cost basis and US supplies which might possibly be obtained at marginal costs. On this basis British production could be three times as expensive, although, in practice as the Americans themselves will soon have to replace their ageing plants, the differential is more likely to be less.

9. This is not an easy issue. We cannot be sure of the Americans or of their price. Independence will cost

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us money. We cannot foretell future options other than to say that if we were forced to become independent in a few years time it would be even more costly.

10. Despite the extra cost, I believe on balance that we should make ourselves independent as soon as possible unless I can, quite unexpectedly, obtain a binding long-term guarantee of supplies from the Americans. The matter is urgent because BNFL is becoming heavily engaged on commercial work for both our civil power programme and exports. A firm order on BNFL is required soon to avoid delay in meeting RN requirements and a conflict with civil work.

11. I would propose to explore the US position when I visit Washington for talks with Dr Brown on 16th-18th July. I will report the outcome to you, but for the reasons described in paragraph 9 above we shall have to move fairly quickly to a decision.

12. I am copying this letter to the Home Secretary, the Foreign and Commonwealth Secretary, the Chancellor of the Exchequer, the Energy Secretary and Sir John Hunt.

3rd July 1979

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ANNEX TO
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DATED: 3RD JULY 1979

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1. British Nuclear Fuels Ltd (BNFL) have carried out, under MOD contract, a design study for a centrifuge enrichment plant capable of producing 500Kgs of HEU per year, with provisions for doubling the output at some later date. The firm's report establishes the technical feasibility of the project, code-named DESTINY, and estimates its costs and timescale. The project includes the provision of an HEU residue treatment and recovery plant to replace the facilities presently used at Windscale. These facilities are obsolescent and must be replaced shortly in any case.

2. It is proposed that the enrichment and the residue treatment and recovery plant should be located at the BNFL Capenhurst Works in an MOD enclave which would also take in the existing tritium plant at this site. It would therefore be entirely separate from the civil nuclear activities at Capenhurst and thus avoid all problems connected with international safeguards and inspection; there would be no facilities common to the civil and defence plants.

Costs

3. BNFL's cost estimates, at January 1979 money values, for the project are as follows:

a. Enrichment Plant	<u>£m</u>	
Research and Development	6.0	
Site clearance and preparation	4.5	
Capital cost, including design and utilisation of workshop facilities	71.6	
Subtotal	82.1	(over period 1979 to 1984)
Operating cost (over 10 years)	41.0	(over period 1983 to 1994)
Total	£123.1m	
b. Residue Recovery Plant		
Capital cost	4.9	(over period 1979 to 1984)
Operating cost (over 10 years)	7.2	(over period 1983 to 1994)
Total	£12.1m	

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Thus the BNFL total estimate for DESTINY, before inclusion of BNFL's profit but including the firm's contingencies under the various headings, is £135.2m spread over a period of 15 years. Making a reasonable allowance for profit and adding a small overall contingency leads to a total estimate of the cost of providing a 10 years supply of HEU and a new residue recovery capability of £160m. There are elements in BNFL's estimate which, during contract negotiations, might be reduced but these reductions are not likely to be significant in relation to the global figure of £160m.

4. On the basis of the above figures, the unit cost of HEU from DESTINY would be about £29,000 per Kg when full account is taken of R&D, capital and operating costs for a 10 year production run. This compares with the 1978 price of £10,000 per Kg for HEU obtained from the US under the expiring toll-enrichment contract. This US price is fixed on an artificial basis to be consistent with their domestic and international aims, one of which was to drive enrichment opposition out of business. The US have long written off the capital costs of their diffusion plants and, if we neglect our development and capital costs, the DESTINY unit price would also be about £10,000 per Kg.

5. The price for future US supplies would have to be negotiated. US prices have been rising fairly sharply over recent years and are likely to continue to do so, especially as a large fraction of their operating costs is determined by labour and electricity charges. (This is not true for a centrifuge plant). It is expected, therefore, that the gap between the gross UK unit price and the US price will narrow over the coming years.

Increased Capacity

6. BNFL have examined the feasibility of extending the capacity of the proposed DESTINY plant to 1000Kgs. Their conclusion is that, at an additional cost of £8m, the initial installation could be given all the services and all the space required for doubling plant capacity at a later date. It would be prudent to make this contingent investment. It would mean that the capacity of the plant could be increased more rapidly and at less cost. The need for a subsequent expansion is already apparent. The annual demand for Naval fuel will increase with the build-up of the SSN fleet and the introduction of the longer-life reactor core so that a 500Kg capacity plant will be inadequate in the late 1980s.

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