C3SS32

Prime Minister:

The purpose of this long and complex minute is to let you know that Sir Keith Joseph intends to authorise reluctantly the SERC to buy an American rather than a British machine on what seem to be good scientific grounds.

PRIME MINISTER

PUBLIC PURCHASING POLICY: MOLECULAR BEAM EPITAXY MACHINE FOR NOTTINGHAM UNIVERSITY

28/3

1. I believe that you should know of a recent purchasing decision I have made which could give rise to parliamentary interest, especially as it relates to a scientific instrument; I am aware of your interest in this particular sector of British industry.

2. Within the Science and Engineering Research Council's Low Dimensional Structures (LDS) initiative, the Council is providing dedicated molecular beam epitaxy (MBE) machines to enable various university groups to grow their own LDS samples for a wide range of physics experiments with potential commercial promise. These samples are precisely tailored materials consisting of layers of atomic thickness. They exhibit radical new properties which must be fully understood if their promise as the basis of the next generation of semiconductor devices is to be realised. MBE machines are sophisticated and expensive pieces of equipment requiring skill and experience to set up and use effectively.

3. For Nottingham University's part in this SERC programme, the University requires a machine which can achieve in excess of 100,000 electron mobilities in gallium arsenide. The SERC endorse this performance requirement, though DTI say that the SERC were less than precise in the early stages of formulating it. This is a point to which we can return later, to ensure that there is no similar lack of precision in future cases of this sort; but it does not affect the present issue. The machine needs soon to be installed, and operating to full capacity, if the UK work in this field is not to fall seriously behind that of our competitors, principally the USA and Japan.

4. According to all the experts whom SERC have consulted, there is at present only one make of machine which is capable of achieving these mobilities very soon after installation with relatively inexperienced growers. This is the Varian Gen II machine, which is manufactured in the United States. I make the point about the experience of the growers because, in this work, the mobilities obtained depend almost as much on the skill and experience of the growers as on the machine itself; and the Nottingham work will be in the University's Physics Department where such skill and experience is not great. Provided the programme at Nottingham starts soon, it will still be at the forefront of world research. Materials produced there will be made available elsewhere in the UK, as in Nottingham itself, both for research and for the training of postgraduate and post-doctoral people some of whom may ultimately find careers in the British semiconductor industry. Without such a machine, the research programme cannot proceed and aspects of the wider LDS programme are likely to be jeopardised. SERC have sought my Department's approval to their awarding Nottingham a research grant embodying the Varian machine, the cost of which exceeds SERC's delegated authority.

5. The Department of Trade and Industry, whom we consulted, had reservations about SERC's proposal. DTI claims that a British machine, the VG80H manufactured by VG Instruments plc, is likely to be capable of achieving 100,000 mobilities within a small number of months and believes that, on public purchasing policy grounds, SERC should purchase the VG80H for Nottingham. Officials have been discussing the question for some time without resolving the impasse. Geoffrey Pattie wrote to me recently making this point himself, and also pointing to the damaging capital which Varian, who are in contention with VG Instruments in the world market for this type of machine, would try to make if they pulled off the Nottingham contract. He recognised however that the decision was for me.

6. Here I must say that my understanding is that there is no guarantee of reaching the required mobilities with a VG machine (though that is very likely), nor of exactly how long it might take to do so. This is particularly the case where the operators are relatively inexperienced.

7. One further relevant point is that, within the wider LDS programme, SERC intend to purchase one or more VG machines for teams in other universities where such high mobilities are not required or where materials other than gallium arsenide are being used. In particular my Department has already approved the purchase by SERC of a VG machine for Cambridge.

8. Peter Brooke chaired a long meeting with DTI and SERC on 21 March, and thoroughly satisfied himself personally as to the strengths of the arguments on both sides. These, when boiled down to their essentials, are much as I have outlined above. But it emerged at Peter Brooke's meeting, perhaps more strongly than previously, how imperative the time constraint is, given the danger of our falling behind our competitors; this seemed to Peter - and to me when he told me about it - to be a telling point against the VG for this particular application.

9. Sir John Kingman and the Vice-Chancellor of Nottingham have become increasingly restive at the delay in approving the proposed research grant. I therefore felt that it would not be right to keep them waiting much longer while further discussions were held, especially as the ground has been gone over very thoroughly already. Given my position as the progenitor of the public purchasing policy (when I held a different office), it naturally grieves me, as I know it grieves SERC, to rule against a British manufacturer. I nevertheless view the scientific needs, coupled with the time factor, as being the overriding considerations in this particular case. I have therefore approved SERC's proposed research grant including the purchase of the Varian machine.

10. My officials will work closely with SERC and DTI on the terms of the SERC announcement, to ensure that it is worded in the least damaging way. For example, the information about the Varian contract and about the other contracts which SERC are concluding with VG Instruments will probably be brigaded together in the same announcement. And in all other ways we, DTI and SERC will work closely together to seek to limit any damage this decision may cause to the British scientific instrument industry.

11. I am copying this letter to Peter Rees, Grey Gowrie, Geoffrey Pattie and Sir Robert Armstrong.

KJ

KJ
27 March 1985

Department of Education and Science

10 DOWNING STREET

From the Private Secretary

29 March, 1985.

This is just to record that the Prime Minister has seen and noted your Secretary of State's minute of 27 March about the purchase of a molecular beam epitaxy machine for Nottingham University.

(Timothy Flesher)

Ian Hughes, Esq.,
Department of Education and Science.

CC(A)D

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From the Minister of State
for Industry and Information Technology

GEOFFREY PATTIE MP

T F Lynch.

Rt Hon Sir Keith Joseph Bt MP
Secretary of State for
Education and Science
Elizabeth House
York Road
LONDON
SE1

4 April 1985

Dear Keith

MOLECULAR BEAM EPITAXY (MBE) MACHINE FOR NOTTINGHAM UNIVERSITY

will request grec.

Thank you for your letter of 27 March together with the copy of your memorandum to the Prime Minister.

Naturally we are very disappointed that you have decided in favour of the Varian machine and against the British machine for the Nottingham programme.

Our claim that the V80H was capable of achieving 100,000 mobilities within two months from mid-February has now been amply justified. The Royal Signals and Radar Establishment exceeded the 100,000 mobility mark on 29 March in the short overall timescale of just 21 days. If one excludes the machine preparation time the actual operational period was only five days.

Although it is to some extent water under the bridge I think it worth saying again that neither Varian nor VG guarantee a performance of more than 40,000 mobilities since, as you say, much depends on the skill and experience of the operators as to what levels are achieved. We have no reason to believe that V80H operators need to be any more experienced than those on the Varian machine and indeed our advisers reject such a suggestion.

AP1/AP1ABQ

I note that in your memorandum to the Prime Minister that you made no mention of the price difference between the two machines, namely that the British machine costs £460,000 and the Varian machine at least £650,000.

I am copying this letter to the Prime Minister, Peter Rees, Grey Gowrie, Sir Robert Armstrong and Sir Robin Nicholson.

Your decision will seriously damage the prospects of the British product in world markets.

Yours ever

Geoffrey

GEOFFREY PATTIE

M12/M12AES

EDUCATION : Policy : R 5.

W.0281

29 March 1985

MR ADDISON, NO 10

PUBLIC PURCHASING POLICY: MOLECULAR BEAM IPITAXY MACHINE FOR NOTTINGHAM UNIVERSITY

I have seen a copy of the minute from the Secretary of State for Education and Science to the Prime Minister on Public Purchasing Policy and the purchase of a Molecular Beam Epitaxy Machine for Nottingham University. Although the minute does not say so, I was consulted by DES at a fairly late stage in the discussion between them and DTI on this matter. I took advice from an industrial research laboratory which is very prominent in this field and concluded that the differences between the American and British machines were notional rather than real and that hence the DTI argument was correct. However I do recognise the difficulty that Sir Keith Joseph faces in a situation like this when he is asked to overrule the scientific assessment of one of the research councils. Moreover, I should like to point out that SERC have stuck to their preference, despite the very substantial financial penalty it carries, with the American machine being about 50 per cent more expensive than the British machine. Thus SERC's decision has cost them a couple of their precious "alpha grants" and one would hope that this financial pressure ensures that they do not make this type of recommendation lightly.

RBN

ROBIN NICHOLSON

P.S. Since dictating this minute I have been telephoned by the Managing Director of the British Company which lost the order, protesting at the "crazy public purchasing policy" of the Government. He also claimed that a major investment decision which his Company was about to make, which would have created a number of new "high-tech" jobs is now likely to be aborted. He said that he would be writing to the Prime Minister. I told him that the DTI had accurately and vigorously put his Company's case but that SERC had stuck to their judgement and that the Government's purchasing policy did not involve a Secretary of State overriding the purchaser's preference when he was satisfied that all the relevant information had been brought to his attention.

I enclose a relevant cutting from The Observer of yesterday.

EDUC:

Policy: PKS.

Observer 31/3/85

SPORT
PAGES 45 – 48

29

Fury over US high-tech deal

by GARETH DAVID

THE directors of VG Instruments, one of our leading scientific equipment manufacturers and a quoted offshoot of BAT Industries, are up in arms at the Government's decision to allow Nottingham University to pay some £700,000 for a US rival to one of VG's most successful and advanced products.

VG director Peter Robinson is writing to the Prime Minister to ask why the Department of Education and Science did not insist that the order was placed with a British company which could have supplied the equipment considerably more cheaply.

Robinson says VG could have supplied a more powerful machine than that being sold to Nottingham by Varian Associates of the US at only £500,000, and with it provided the chance for further employment in the high-tech industry in the UK.

At the centre of the dispute is what is called a Molecular Beam Epitaxy (MBE), a piece of equipment that effectively boils solids in an ultra-high vacuum and is used for dramatically reducing the size of electronic components. Nottingham University requires an MBE for its research into the development of 'fifth generation' thinking computers.

Mrs Thatcher is known to have a keen interest in this area as it represents the future of the semi-conductor business, where Britain lags behind Japan and the US.

Independent research into the calibre of the machine manufactured by VG Instruments' VG Semicon offshoot has shown that it is 20 per cent more efficient than the performance guaranteed by Varian Associates for its US-manufactured machine.

Robinson believes that Information Technology Minister Geoffrey Pattie was in favour of buying the British product, but was over ruled last week on the advice of the Science and Engineering Research Council (SERC).

'The world's foremost researchers, including Bell Laboratories, Westinghouse, and Texas Instruments, are happy to buy VG machines against American competition, yet here we have a British university being given ministerial approval to buy a US machine that will cost more and perform no better,' complains Robinson.