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IN CONFIDENCE

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N.I. (G.P.)(53)23

NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

GENERAL PURPOSES COMMITTEE

7 GeV Proton Synchrotron

Vacuum Equipment for the Injector

Note by the Chairman

The attached paper PSPC/P32 is a report on tenders for the high vacuum pumping plant for the injector of the 7 GeV proton synchrotron. The Project Committee recommend that the contract be placed with Messrs. Edwards High Vacuum. Messrs. Edwards' tender of £53,378 is some £7,200 higher than that of Messrs. Metropolitan-Vickers, but some of this difference represents un-needed items which would be eliminated later with a reduction in price. The Project Committee express a strong preference for Messrs. Edwards' pumps since they are already proved, while Messrs. Metropolitan Vickers' pumps still require development.

It is hoped to place the contract early in January. I would be grateful, therefore, if members of the General Purposes Committee would let the Secretary know by 7th January 1959 whether they wish a meeting to be arranged to discuss the matter, or if they have any comments on the proposal. If there are no objections to this proposal I will approve it on behalf of the Committee.

For the attention of Members of the General Purposes Committee.
For the information of Members of the Governing Board.

VACUUM EQUIPMENT FOR THE PHOTON SYNCHROTRON INJECTORTENDER SUMMARY AND RECOMMENDATION1. Introduction

A number of large pumping units providing a total speed of 8000 litres/sec. are needed for the linear accelerator together with some smaller units for associated equipment. All high vacuum pumps are to use mercury, and an automatic liquid air production and distribution plant is required for the associated vapour traps. Details are set out in specification PS 248-020*.

Invitations to tender were sent to Edwards High Vacuum Ltd., Metropolitan-Vickers Electrical Co. Ltd., and Leybold Vacuum Sales Ltd.

A summary of quotations is given in Table I. Table II shows price breakdowns which were obtained from Metropolitan-Vickers and Edwards in order to assist in assessing their respective offers. Post-tender discussions have also been held with both firms.

2. Discussion

Edwards have offered a much more complex liquid air distribution system than Metropolitan-Vickers and this accounts fairly closely for the price difference between the two firms. Whilst the Edwards system could be considerably simplified, it is not clear at present whether it would be advisable to adopt a system as simple as that of Metropolitan-Vickers. Further discussion and possibly some experiments too are necessary.

There is little difference between prices for pumping units, particularly when allowance is made for some changes which are necessary in the Edwards offer (Table II). However, the pumps offered by Metropolitan-Vickers require some development work, not of a trivial nature, whereas the Edwards designs are already proved.

Since pumping units are by far the most important part of the contract, it is therefore considered that the Edwards offer should be accepted. Delay in placing the order will affect time scales adversely, so it is suggested that the reduction of cost due to simplifications should be negotiated later.

3. Recommendation

It is recommended that this contract be placed with Edwards High Vacuum Ltd. at the tender price of £53,378 subject to subsequent negotiation of reductions resulting from simplification of pumping units, reduction in the number of spare control units, and possible simplification of the liquid air distribution system.

D.W. Fry
Chairman Project Committee

* Not circulated to the General Purposes Committee

SUMMARY OF TENDERS. High Vacuum Pumping Plant for Linear Accelerator

	<u>Metro-Vick</u>	<u>Edwards</u>	<u>Levbold</u>
Diffusion Pumps	5-20" flared to 24" (one spare) 7-9" (one spare)	5-14" (one spare) 3-9" (one spare)	8-10" on two manifolds 4-2 1/2", 2-10"
Backing Arrangement	Boosters plus rotary pumps	Rotary pumps	Boosters plus rotary pumps
Refrigeration	Liquid air upper baffle. 'Kelvinator' lower baffle.	Liquid air upper baffle 'Frigidaire' lower baffle	Liquid air upper and lower baffle
Cooling Water	7 KM and 7 G.P.M. at 15°C. 53KM and 18 G.P.M. at 35°C.	23 G.P.M. at 35°C. Refrigeration in place of cooled water on upper half of 24" pumps.	12 G.P.M. temperature not specified.
Electrical Power	77 KW	77 KW	Not specified.
Liquid Air Supply	4 - Phillips PW 7000 machines	3 - Phillips PW 7000 machines	Not specified.
Liquid Air Distribution	Gravity feed from reservoir, traps flowing full. Magnetic shut off valves to each trap. Cold air return to machines.	Pumped supply from distributors and reservoir automatically controlled to each baffle.	Automatic control to each baffle, method not specified.
Spare	Included to value of £150	Not included	Not included. Mercury not included.
Price	£46,182 (Subject to cost variation of wages and materials)	£53,378 (firm price)	£77,550
Delivery	Commence 40 weeks complete 52 weeks.	34 weeks.	44 weeks.

TABLE 11 PRICE BREAKDOWNS

	Metropolitan-Vickers	Edwards
Pumping Units (including mercury and installation truck)	£27,201	£28,821 (would be amended to £27,962 by removal of un-necessary items)
Control Units	6,821 (includes 2 spare units and spare components to value of £151)	9,470 (Only 1 spare unit necessary - would be amended to £8,439)
Liquid Air Machines (excluding import duty)	10,510	7,563
Liquid Air Distribution	1,650	7,524
TOTALS	£46,182	£53,378