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NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

GENERAL PURPOSES COMMITTEE

ADDITIONAL REQUIREMENTS FOR NIMROD POWER SUPPLY

Note by the Chairman of the Project Committee

1. INTRODUCTION

In consequence of the serious failure of the Bevatron Power supplies which resulted in the loss of operational time at maximum energy for several months, the safety and reliability of the Nimrod Power Supply have been re-examined in collaboration with the H.M. Factory Inspectorate, Lloyd's Register of Shipping and engineers of the University of California Radiation Laboratory. The following additions will give a higher standard of safety and reliability and are recommended at a cost of £34,000.

2. SAFETY

2.1 It is considered that shafts subject to the onerous duty typical of pulsed machines should be fitted with a complete instrument installation to give regular information about their behaviour. It is therefore recommended that torsional twist measuring equipment and fixed optical alignment equipment be fitted, and an inspection hole be provided in each motor shaft, to enable borescope inspection to be carried out. The cost of these items is £16,000.

2.2 It is also considered that preheating of the alternator shaft under starting conditions is necessary to minimise the possibility of brittle fracture. The cost of this including suitable turning gear is £7,000.

2.3 Further items now considered to be essential from the safety point of view are additional isolators and locking schemes, improved rotor coil supports and improvements to the oil lubricating system to increase the safety margin in case of a fractured oil pipe. The cost of these items amounts to £6,000.

The total cost of these safety requirements amounts to £29,000

3. RELIABILITY

To avoid machine shut-down in the event of cooling fan failure, it is proposed to make certain modifications to the forced ventilated rotor resistances.

A change from lead acid batteries to nickel iron batteries, together with facilities for rapid charging, is proposed to ensure that, in the event of an emergency shut-down, fully charged batteries will be available for running the machine up again with the minimum of delay.

Certain improvements are also required to the temperature measuring equipment to ensure complete reliability.

The total cost of these items for increasing the reliability amount to £3,000.

4. FACILITY FOR SPLITTING THE ALTERNATOR SET

A minor modification would permit operation with a single alternator connected to both flywheels. This would permit the operation of the plant at approximately the same pulse energy but at a reduced repetition rate should

one alternator fail. The present arrangement would involve a reduction in peak energy when working on one alternator.

This facility can be provided at a cost of £2,000.

5. SUMMARY

Additional requirements for Safety	£29,000
" " reliability	3,000
Facility for splitting the set	2,000
	£34,000

6. RECOMMENDATIONS

It is recommended that this additional expenditure of £34,000 be incurred on the Brown Boveri and English Electric contracts within the approved total estimates for the Power Supply.

D. W. FRY

Chairman, Nimrod Project Committee

A.E.R.E.
Harwell.

would be as follows :

Architects	..	}	£27,000
M. & E. works	..		

(Buildings supplied,
delivered and erected,
including heating, light-
ing, plumbing and foundations)

Furniture	..	7,000
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External services, including roads, drains, heating mains and cables	..	7,500
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Fees	..	3,500
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£45,000

4. Recommendation

Approval is sought for the scheme as a whole with authority to proceed immediately at an overall cost of £45,000. This expenditure is expected to fall wholly in the year 1960/61, for which a sum of £50,000 has been provided in the estimates.

P. BOWLES