

NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCEGENERAL PURPOSES COMMITTEEEquipment for Nuclear Research on the Proton Synchrotron

by

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1. The present capital funds for the Proton Synchrotron cover only the construction of the machine, but considerable capital expenditure will be necessary for experimental plant. Accordingly, a nominal sum of £2,000,000 has been put in the capital estimates for the three years beginning 1/4/1960. The starting date of 1/4/1960 was chosen in the light of present Government policy to freeze capital expenditure until that date.
2. It is now clear that some of this expenditure will, after all, be necessary during 1959/60 if serious dislocation of the work is to be avoided. Particular items which can be foreseen are the following fixed services for the large hydrogen bubble chamber:-

2.1 Motor generators for 4 megawatts D.C.

These generators are due to be ordered in the near future, for D.C. tests on the synchrotron magnet. They will be required for this purpose for only about one year, and they have been chosen to be suitable also for powering the magnet of the large hydrogen bubble chamber. For this reason it is thought proper that they should not be charged to the capital machine construction account, but to the experimental budget. The estimated cost is £60,000.

2.2 Hydrogen gas compressors and ancillaries

The Bubble Chamber Consortium have recently decided to liquefy their hydrogen on the chamber proper, and to supply the liquefier with pure high pressure hydrogen from a fixed installation in the laboratory. This hydrogen supply will therefore become a part of the laboratory, and will have to be provided at each laboratory where the bubble chamber is to be used. The compressors must be ordered soon, and the whole installation must be complete by the middle of 1960 when testing is due to be in progress at the Rutherford Laboratory. A rough estimate of the cost of the compressors is £30,000, of installation work £15,000, and of gas purification and storage plant £30,000.

2.3 Dump tank

The Bubble Chamber Consortium have also concluded, mainly on safety grounds, that a "dump tank" may be necessary, into which liquid and evaporated hydrogen may be deposited. This equipment would also have to be a part of the laboratory installation and would be needed during the testing period in 1960. The tank would be very large (about 17,000 cubic feet has been quoted) and might cost about £50,000.

3. Item 2.1 was foreseen, and is brought up in this way now because of confusion as to which budget should cover its purchase. Items 2.2 and 2.3 could not previously be foreseen, and have arisen from design and development work by the university group. It might perhaps be argued that the D.S.I.R. budget for the bubble chamber should be extended to cover these items, but the original understanding was that the Institute should provide accommodation and fixed services for the chamber. It now transpires that these services are somewhat more elaborate than originally envisaged, and this was not known when the invitation was issued to assemble and test the chamber at the Rutherford Laboratory during 1960. However, the bubble chamber will be very important to the research work at the Rutherford Laboratory, and should be given full support.
4. I recommend that a sum of £200,000, from the £2,000,000 estimates for experimental work, be advanced to the year 1959/60 to cover the rough estimate of £185,000 for items 2.1, 2.2, and 2.3, and an allowance of £15,000 for the inevitable uncertainty in this rough estimate.