Mr. Snowden

NEPC/M 1

NUCLEAR EQUIPMENT PROJECT COMMITTEE

Minutes of a Meeting to Discuss Hydrogen Bubble Chamber Services, 18th June, 1959.

Present:

Mr. L. B. Mullett - Chairman
Professor C. C. Butler
Mr. M. J. Moore
Dr. T. G. Pickavance
Mr. M. Snowden
Mr. G. E. Simmonds
Mr. A. G. Ashburn
Mr. G. L. Cooper - Acting Secretary

1. Terms of Reference

The purpose of the Committee would be to act as a Management Committee for that part of the Hydrogen Bubble Chamber Project which concerned the Rutherford Laboratory, i.e. Bubble Chamber Services, and to provide formal means of coordination and mutual progressing between the Universities Group and the Rutherford Laboratory. It is not intended to be a design committee.

. most important function of the Committee would be to exercise financial control (such as ensuring the validity of estimates, seeing that proper tender action is taken wherever possible and that tenders are fairly assessed), to approve commitments within the financial powers delegated to the Committee (yet to be defined and approved), to ensure that the General Purposes Committee has fully documented evidence on which to base a decision when larger sums of money are involved, and finally to prepare quarterly financial statements for the General Purposes Committee with all relevant details of financial and contract action in the preceding quarter together with forecasts of action to be taken in the next quarter particularly where action by the G.P.C. is required.

Action Chairman

Mr. Simmonds thought some construction staff, (Messrs. Ashley and/or Cuthbert), should be invited to report on building progress. The Chairman said he would ask them to attend future meetings; also Mr. Nott when the time came for installation of plant. Dr. Pickavance suggested that the agenda prepared for this meeting could be used as a standard for future meetings on this subject. This would ensure that all relevant items were progressed systematically.

It was agreed that the Committee should meet quarterly. The timing would have to be phased with meetings of the National Institute General Purposes Committee and the main Bubble Chamber Committee. Any matters requiring decisions between meetings could be dealt with by correspondence with the Chairman via Mr. Snowden.

2. Programme Dates

Professor Butler thought that the Hydrogen Bubble Chamber Programme still required that the installation of plant at the Rutherford Laboratory should be completed by October 1960, the original target date.

The programme for the Rutherford Laboratory work is generally consistent with this requirement, and detailed discussion of dates was deferred to the appropriate items on the Agenda dealing with Buildings and Plant.

3. Progress on Buildings

The programme called for the Plant Room and Annex to be weather-tight by mid-February and the end of January, 1960 respectively. The latest information from the I.G. Construction Group gives the target date at least a month

later than this and Mr. Bowles was raising the matter at the Construction Group Meeting. The Committee felt that it was important for the earlier date to be met as the time scale called for installation of plant by the end of April, and it was hoped to have some of it delivered and stored in the building even earlier. With regard to the Plant Room, Merz and McLellan had requested full design information by 1st July next, if the weather-tight target date of 15th February, 1960 were to be met. It was important that we should meet this request otherwise delays would be inevitable.

With regard to services for these buildings agreement had still to be reached on special services required for the Annex. A meeting had been held with a representative of H.M. Inspector of Factories and another was to be arranged shortly to settle outstanding points.

There was some uncertainty as to the financial position and this should be resolved. It was important to ensure that the financial records be clearly separated from those of the Synchrotron Project.

4. Progress on Bubble Chamber

Professor Butler summarising the position, said that progress had been satisfactory and was meeting the time schedule. Negotiations leading to the placing of a contract in the U.S. for a hydrogen liquifier were nearly complete, and delivery had been promised for nine months after placing of the contract. Drawings of the plant are needed as soon as possible at the Rutherford Laboratory and Professor Butler said that they should be available 30 days after the contract is placed.

5. Progress on National Institute Plant

Compressors

Tenders had been received from two of the six firms invited. The lowest came from Peter Brotherhood Ltd., the price being £15,000 for two machines. Delivery would take 13 months excluding installation time. Professor Butler said he had been given to understand that Brotherhoods was technically the best firm for this type of machine and it was therefore recommended that they be given the Contract.

Action Chairman and Mr. Ashburn

The Chairman would present a paper for the next meeting of the General Purposes Committee (29th July), recommending that a contract for the supply of the compressors should be placed with P. Brotherhood Ltd. for the sum of £15,000.

Hydrogen Supply

A decision was required as to whether hydrogen should be bought in bottles or made on site in our own electrolytic plant. Mr. Ashburn gave estimates of the comparative costs of these two routes. Bottled hydrogen could be bought for £5. 18s. per 1,000 cu. ft. whereas electrolytically produced hydrogen could be made as cheaply as £1. 3s. per 1,000 cu. ft., and at a rate of 200 cu. ft. per hour. (The estimated consumption rate was 2,000 cu. ft./day.)

With regard to capital costs, the electrolytic plant was estimated to cost nearly £5,400, (£1,650 for buildings based on £5 per sq. ft., and £3,748 for plant) whereas £6,000 would be required for the necessary supply of storage bottles if hydrogen were bought, (30 bottles at £200 each). An additional £1,000 would be required for a monorail over the storage area for handling purposes. The operation of an electrolytic plant is largely automatic, (only occasional topping up required), and so manpower requirements would be very modest. On the basis of these figures Mr. Ashburn recommended that hydrogen should be produced electrolytically on site. Professor Butler said that the important factor was the purity of the hydrogen. Of the three samples of bottled gas tested, two failed to give the purity required and the third was at present being analysed*. It was noted that any

*Subsequent to this meeting it was learned that this third supply also failed to meet our specification.

electrolytic plant would be adaptable for the production of deuterium from heavy water, which might be required at a later date. However it was suggested that more detailed figures be obtained before a decision in favour of an electrolytic plant is taken. For example, it was pointed out that some storage capacity would be required even if hydrogen were produced electrolytically and this would increase the capital cost by approximately £3,000.

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Mr. Ashburn

Dump Tank

It was hoped that detailed specifications would be ready by the end of the month in order that contract action could begin. It had been decided to sink the tank below ground level and it was to be constructed of plain carbon steel.

It was not clear whether a cylindrical or spherically shaped vessel was most desirable (especially from the financial point of view) and it was therefore agreed that this point should be left open in the specification. The target date for completion and installation was the end of 1960.

Liquid Nitrogen Supply

Mr. Ashburn gave estimated costs of buying our liquid nitrogen requirements from the B.O.C. as compared with making our own on site. (Paper NEPC/P3) The comparison indicated that it would be preferable for us to choose the former alternative, i.e. buy nitrogen. Professor Butler pointed out that our requirements might be very intermittent and this would put considerable strain on delivery arrangements with the firm. He said that in the U.S. they preferred to make their own for this reason even though supply facilities were superior to those in this Country.

Dr. Pickavance thought it would be preferable to buy liquid nitrogen for the following reasons:

a) Breakdown of production plant was more frequently encountered than breakdown of supply from the factory;

b) A.E.R.E. and presumably the Rutherford Laboratory was classed by the supply companies in the same category as hospitals and therefore were assured of guaranteed supplies even under emergency conditions (e.g. industrial strikes);

c) It was A.E.A. and National Institute policy to place work out to contract wherever possible, and certainly, when other factors were equal (e.g. costs), this should be the course adopted.

It was agreed that quotations should be obtained through Contracts Section from firms willing to supply liquid nitrogen. The problem of intermittent demand should be written into the terms of any proposed contract. A decision whether to buy or make our own liquid nitrogen could be taken when firm prices for supply had been received.

There was some discussion over the problem of transport of liquid nitrogen. Mr. Ashburn thought this would present considerable difficulty, and suggested that the supply tanks should be located as near as possible to the Bubble Chamber. Professor Butler however thought this would be inadvisable as it would take up valuable floor space in the Experimental Area. He foresaw no special difficulty in installing supply lines from outside this area and quoted American costs of £10 per ft.

It was agreed that the liquid nitrogen storage tank should be located between the Annex and Plant Room at a site where it can be conveniently filled from either supply tanker or liquifier. Sufficient space would be left in the Plant Room for a liquifier in case it is decided to install one of these.

Magnet Supplies

Two 1 MW generators will be available early in 1960 and will be installed

in the Alternator House for magnet coil testing; they will subsequently be moved to the Plant Room. Two more generators will be delivered by February 1961 and they will also be installed in the Plant Room. The suppliers (G.E.C.) have been asked to make provision for incorporating a flywheel with each generator in order to double the rotational energy, if this is subsequently found to be necessary.

Professor Butler said a booster pump would be supplied by the Universities for magnet cooling purposes and a decision was needed as to where this should be installed. Mr. Snowden suggested that in view of the move to C.E.R.N., attachment to the chassis might be advisable; alternatively it should be sited remotely in the service trench. Mr. Moore didn't think attachment to the chassis would be possible although with the silent type of pump installed at Liverpool location very near to the magnet had given no difficulty.

6. Beam Requirements

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Mr. Snowden

The Chairman pointed out that the beam engineering requirements for the Bubble Chamber would require discussion in the near future. Mr. Snowden would be asked to arrange these discussions and coordinate the requirements. The requirements of the proposed Propane Bubble Chamber should be considered in the same discussions.

7. Finance

The Chairman introduced a paper (NEPC/P1) on the control of expenditure within A.E.R.E. and the National Institute with the object of providing a basis for discussing what financial powers should be invested in the present Project Committee. Dr. Pickavance suggested that he as Director, Rutherford Laboratory, should be permitted to authorise up to £10,000 on the advice of the Project Committee given under the Chairman's signature. Between £10,000 and £20,000 he would need the agreement of the Chairman of the National Institute (Lord Bridges). Above £20,000 approval of the General Purposes Committee would be required. He suggested these figures would be such as to permit reasonable control of expenditure within the Rutherford Laboratory without requiring an excessive number of authorisations from higher authority. It was agreed that this proposal be made to the Governing Board.

The Chairman said that quarterly financial statements including summaries of commitments and estimates of requirements, would be required by the General Purposes Committee and that these statements should be considered before submission at a full meeting of the Committee.

8. Any Other Business

(a) Compressors

Professor Butler said the Universities would be providing three 20 H.P. low pressure hydrogen compressors. In view of the different power supply arrangements at the Rutherford Laboratory and C.E.R.N., he suggested that the National Institute provide the motors required for these. A similar request would later be made to C.E.R.N. This proposal was accepted.

(b) Technical Committee

The question was raised as to whether a technical committee parallel to the Project Committee was required to discuss detailed aspects of design. It was agreed that for the present such discussions, if required, would best be held informally immediately after meetings of the Project Committee.

9. Next Meeting

The next meeting will be held at the Rutherford Laboratory on Wednesday, 29th July at 10.00 a.m.

G. L. Cooper

30th June, 1959.