

CONFIDENTIAL

N.I.(G.P.)(57)2nd Meeting

21st November, 1957

NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

GENERAL PURPOSES COMMITTEE

Minutes of the Second Meeting of the General Purposes Committee held in the Board Room, Treasury Buildings, Whitehall at 2.30 p.m. on Monday, 11th November, 1957

PRESENT:

Lord Bridges (In the Chair)
Mr. G.W. Dixon
Mr. D.W. Fry
Professor R.E. Peierls
Sir Donald Perrott
Sir Philip Morris
Dr. T.G. Pickavance
Mr. P.J. Searby) Secretaries
Mr. J. Grieve Smith)

1. MINUTES OF LAST MEETING

The Committee approved the Minutes of their first meeting.

2. MAIN BUILDINGS FOR THE 7 GeV PROTON SYNCHROTRON

The Committee had before them N.I.(G.P.)(57)3 on the Main Buildings for the 7 GeV Proton Synchrotron.

Dr. PICKAVANCE said that the magnet would be housed in a concrete building with walls and roof of sufficient strength to support the necessary shielding, the bulk of which would be provided by earth mounds. The roof of the magnet building itself would be covered with concrete and earth and there would be a thick concrete shielding wall separating the magnet from the experimental area. The experimental area would be shielded on all sides, but not overhead, by earth banks. External beams would be absorbed at the ends of long tunnels driven into the back wall of the experimental area. Shielding overhead to avoid excessive "sky shine" radiation would be provided at the targets where necessary. The contours of the site would be exploited to ensure that the most intense part of the beams were driven into the hillside and came to rest far underground.

A control room block would contain the facilities essential to the remote operation of the machine, together with counting rooms, an experimental preparation area and accommodation for the operating crew. The motor alternator house and a laboratory and office block would be located nearby.

The following points were made in discussion:

- (a) The accommodation provided was the minimum needed at the start, but it would be possible to provide additional ordinary accommodation on the site at a later date, if necessary. While, it was unlikely that any further protected accommodation would be needed,

it would be possible, though more difficult, to extend this also.

- (b) The only risk to the public that could arise would be that if the shielding over the top of the targets were faulty, the radiation background might rise above the tolerance level at some distance from the machine, but this could occur only while the machine was actually in operation. There would be continuous monitoring and precautions would be taken to ensure that the overhead shielding was used when needed. There would also be precautions to make sure that the beams were properly focused into the hillside tunnels. The consequent radioactivity in these tunnels would not be very great and, as the area was uninhabited, that would not give rise to any hazard.
- (c) The Atomic Energy Research Establishment gave full access to the Chief Inspector of Factories, subject only to reserving the right to refuse admittance to Inspectors who had not received security clearance. There was, however, a gentlemen's agreement with the Factory Inspectorate over the application of the Factory Acts to the laboratories. The Committee felt that the National Institute should follow the example of the A.E.R.E. in offering the Chief Inspector of Factories their full co-operation.
- (d) It was essential to have floors in the magnet building and experimental area able to withstand a load up to 10 units each of 200 tons weight distributed at random because it could not be known in advance exactly what experiments would be conducted and what equipment they would involve.
- (e) Messrs. Chivers' contract price of £1,018,715 was very satisfactory and £90,000 below the next best tender. Chivers had agreed to keep within the programmed dates and could be expected to do so. Mr. FRY said that details of the motor alternator house had not yet been fixed; £100,000 had originally been allowed for this, but it was now known that the cost would be rather greater. Other variations, however, had brought the expected net increase in cost down to £32,000. This was allowed for in the Quarterly Statement.
- (f) In paragraph 3(iii) of the Appendix to the paper, it was recommended that Messrs. Chivers be paid for the cost of importing any excess over 50 per cent. of the tradesmen and steel fixers employed on this contract; and a sum of £20,000 had been included in the estimates to cover this. The Committee felt that there should be some stipulation to prevent Chivers from exploiting this clause by switching imported labour from other contracts; it should be made clear to the firm that the Authority would not tolerate any artificial inflation of the number of imported workers. The Committee also considered that there should be an upper limit to the cost of imported labour to be borne by the Institute.
- (g) H.M. Treasury had not made any allowance for contingencies and additional costs under the cost variation clause when approving the original estimate of £1.9M for the main buildings. The new estimate of £1,959,000, on a comparable basis, similarly did not

make any allowance for these items: it also excluded a new item, Industrial Group fees, which would have to be borne in any event. The Treasury should be informed that a total expenditure of £378,000 under these three headings was to be expected.

The Committee:

- (1) Agreed that the Chief Inspector of Factories should be shown plans of the project and his co-operation invited.
- (2) Agreed that the contract with Messrs. Chivers should safeguard the Institute against any unnecessary diversion of imported labour from other projects and should set an upper limit on the cost of importing labour to be borne by the Institute.
- (3) Invited the Authority to inform H.M. Treasury that a cost of £378,000 was likely to be incurred in addition to the new estimate of £1,959,000.
- (4) Agreed, subject to (2) above, that a contract for the main building and civil engineering work be placed with Messrs. W.E. Chivers & Sons Ltd. in the sum of £1,018,715.

3. SPECIAL MOTION CRANES

The Committee had before them N.I.(G.P.)(57)5 on the Special Motion Cranes for the 7 GeV Proton Synchrotron.

Three cranes of unique design would be required for the magnet building. It was believed that no cranes of this type had ever been manufactured in this country before, and it had therefore been necessary to select a manufacturer to carry out preliminary studies of the problems involved. The Wharton Crane & Hoist Company had done this work and had submitted a satisfactory tender for the cranes, which the Committee were invited to approve at a forecast price of £35,000.

The Committee:

- (5) Agreed that a contract should be placed with the Wharton Crane & Hoist Company for the three special motion cranes at a forecast price of £35,000.

4. ANCILLARY BUILDING

The Committee had before them N.I.(G.P.)(57)6 on the Ancillary Building for the 7 GeV Proton Synchrotron.

Mr. FRY said that this would be a dual purpose building: initially it would provide space for large-scale experiments leading to final design and for preliminary assembly of components during the construction period; eventually it would be used as a local workshop for the Institute. In order to meet their schedule it was proposed to use a prefabricated building, which would cost about the same as an orthodox building, but which could be erected very much more quickly.

The Committee:

- (6) Approved the proposed ancillary building at a total cost of £70,000 and approved single tender contract action on Messrs. Taylor Woodrow (Exports) Ltd. for the building structure, on the basis of a forecast price of £25,000 for this part of the work.

5. MISCELLANEOUS CRANES

The Committee had before them N.I.(G.P.)(57)7 on Miscellaneous Cranes. Two travelling cranes of normal type would be required for the experimental area and two for the injector. Tenders had been received and were being examined. It was expected that the contract for the four cranes would cost £45,000.

Professor WILKINSON said that he thought a crane might also be needed in the parasitic area. Dr. PICKAVANCE said that the design of this building did not lend itself to the installation of a travelling crane but that mobile lifting tackle could be used.

The Committee:

(7) Agreed that a contract should be placed for four travelling cranes at a forecast price of £45,000.

(8) Invited the Project Committee to consider the need for a crane in the parasitic area.

6. MECHANICAL VENTILATION AND AIR CONDITIONING PLANT

The Committee had before them N.I.(G.P.)(57)8 on Mechanical Ventilation and Air Conditioning Plant for the Magnet and Injector Room, which it was estimated would cost approximately £55,000. When the magnet was not in operation, the magnet room was so heavily insulated from the atmosphere that it would remain at more or less constant temperature, but when in operation the magnet gave off considerable heat and some form of air cooling was therefore necessary.

It was suggested that the air conditioning proposal might not give adequate temperature control.

The Committee:

(9) Invited Dr. Pickavance to re-examine the proposed air conditioning plant to ensure that it would be satisfactory.

(10) Agreed, subject to (9) above, that a contract should be placed for mechanical ventilation plant at a forecast price of £55,000.

7. QUARTERLY STATEMENT NO. 1

The Committee had before them N.I.(G.P.)(57)4, the first Quarterly Statement submitted in accordance with the decision of the first meeting of the Committee. The revised estimate for the total project was now £7,030,000, compared with £6,900,000 in the original estimate. The plant estimate was unchanged at £5,000,000; the revised building estimate was £1,960,000; and there was an additional item of £70,000 to cover the cost of the ancillary building.

Expenditure on building was expected to total about £200,000 in the current financial year ending April 1958. Expenditure on building in 1958-59 was now expected to be £1 million, as against what was believed to be an original Estimate of £800,000; (estimated expenditure on plant remained unchanged). Sir DONALD PERROTT said that the government's recent restrictions on capital expenditure by the Authority and others would mean that

there could be no increase in the original Estimate for expenditure for the Institute. Dr. PICKAVANCE said that this would mean that the progress of the project would be rather slower than present planned.

Note: It was discovered after the meeting that the figure of £800,000 was wrong. The original Estimate for 1958-9 was £960,000; and thus the revised estimate of £1 million would not necessitate any appreciable slowing down.

Dr. PICKAVANCE drew the Committee's attention to the nominal price of £70,000 per ton for magnet steel, on which the £1.5M for the magnet yoke was based. He had now heard informally that the price of steel might be higher than this.

The Committee:

(11) Took note of the first Quarterly Statement.

8. GENERAL PROGRESS

Dr. PICKAVANCE reported that the preparation of the foundations was ahead of the programme. The main problem before them now was the power supply, but they hoped to get contracts out at the end of the month. There had been difficulty in securing satisfactory switching apparatus. They had had discussions with Messrs. B.T.H., but their ignitron-type switches had not yet been tested at such a high power and such tests could not be started before February 1958. The Swiss firm, Messrs. Brown Boveri, however, made excitron-type switches which were inherently superior to ignitrons in some respects and had been fully tested and proved for the required duty. Therefore the Brown Boveri proposals were technically superior and might well turn out to be the only acceptable ones. Brown Boveri were prepared to put out the maximum amount of sub-contracting (i.e. about half the contract) in the U.K. The switches and control gear would, because of their special nature, have to be made in Brown Boveri's own factory and the warranty of the equipment would not therefore be adversely affected by such sub-contracting.

Tenders had been received for ferrite, but not yet evaluated. They expected to have conducted tests on samples before the next quarterly meeting of the Committee.

The Committee:

(12) Took note of the progress report made by Dr. Pickavance

9. NEXT MEETING

The Committee agreed to hold their next meeting on 24th February, 1958. Any urgent matter arising before then would be dealt with by the Chairman, as agreed by the Committee at their first meeting (Item 2 (d)). In such an event, a paper would be circulated to the Committee giving the members a chance to comment.

The CHAIRMAN expressed the Committee's gratitude to Mr. Fry and Dr. Pickavance for the very clear papers which they had submitted to the Committee and for the full answers which they had given to the questions.

Distribution:

Lord Bridges
Professor P.M.S. Blackett
Sir David Brunt
Sir John Cockcroft
Professor J. Diamond
Mr. J. Gridley
Dr. H.W. Melville
Professor H.S.W. Massey
Sir Philip Morris
Professor N.F. Mott
Sir James Mountford
Professor R.E. Peierls
Sir Donald Perrott
Dr. B.F.J. Schonland
Sir George Thomson
Professor D.H. Wilkinson
Mr. G.W. Dixon
Mr. D.W. Fry
Dr. T.G. Pickavance
Mr. F.A. Tatford
Mr. P.J. Searby
Mr. J. Grieve Smith