24th November, 1961 NI/61/23

NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

GOVERNING BOARD

Progress at the Rutherford Laboratory

Note by T. G. Pickavance

Proton Linear Accelerator

In the third half-year of operation 1744 hours were scheduled, of which 867 were used. This rather low overall efficiency of 50% was caused by unreliability of minor components which are being replaced progressively; during the last month of the period the efficiency was 79%.

Five university teams, one from A.E.R.E. and two from the Rutherford Laboratory made regular use of the machine during the half-year.

The accelerator was closed down at the end of September to commission the new experimental area; during the shut-down further improvements have been made to increase reliability, and additional equipment has been installed to permit regular operation at 50 MeV.

Nimrod

The injector operated at 15 MeV for the first time at the beginning of August, and has been performing satisfactorily.

The blockage in the production of magnet pole pieces, reported at the last meeting, has been overcome and over 200 have been delivered. Production is now running at the scheduled rate of 25 per week. One alternator was shipped to the Laboratory some time ago for continued tests by the contractors. It has now been aligned and coupled to its motor and flywheel, and tests are in progress. The vibration which had caused concern is now very much less in amplitude. At the highest temperature so far obtainable (without a load) the amplitude is 3½ thousandths of an inch; at the works it had been 28 thous. under the same conditions. Experiments at the works have shown that the thermal unbalance (and the vibration) can be further reduced by fitting air scoops to the alternators. From this point of view the alternators should be quite satisfactory, and the one now under test may be used to commission the rectifier equipment and to begin load tests on the magnet in January 1962.

The second alternator, which had been stripped at the works as part of an investigation into clicking noises, has been found to have unsatisfactory poles. The contractor has agreed to manufacture new poles at his own expense. This alternator cannot now be delivered to the Rutherford Laboratory before May 1962, and doubts naturally arise as to the quality of the poles on the first machine. It has been agreed that these poles will also be changed at the contractor's expense if we so decide. At the time of writing a rather formal enquiry into the desirability of pulsing the first machine, in the presence of Lloyd's Register of Shipping, has not been concluded. Safety of the staff, the machines and associated plant is the criterion. A decision to defer pulsing until after a rebuild would delay the programme by six months or more. Our engineers believe that it will be

safe to pulse the machine. The magnet polepieces and the alternators are being made by the same firm, whose performance on both has in our opinion been unsatisfactory. Design, development and contractual matters were satisfactory on both, and the defects have been in manufacture. The fault with the pole pieces was in production planning, and has now been rectified after much effort by staff of the Institute and the Authority. The fault with the alternators has been bad workmanship in one of the firm's factories.

All the processes in producing outer and inner vacuum vessels of the required quality have now been proved, and a comprehensive system of quality control has been introduced. The intense concentration of effort from the Laboratory has been maintained, to the point where we are in danger of over-straining the men concerned. The first production outer vessel left the final jig for dimensional checking and drilling on 20th November, and is due for shipment during December.

The programme has been re-assessed by the Project Committee; the date for trials of the complete machine to begin is now September 1963. It has been decided that the probable saving in time from the manufacture of a commissioning vacuum vessel, mentioned in the last report, would not justify the expenditure and effort involved.

Buildings

Work has started on the restaurant. The upper floors of the extension to the Laboratory and office block have been completed and partly occupied. The new P.L.A. experimental area has been completed.

Auxiliary apparatus

Fifteen short quadrupole magnets are being ordered, to supplement the fifteen long quadrupoles already on order. Nine 6" x 36" H-type bending magnets have been ordered. Power supplies for half of the total requirement of quadrupoles and bending magnets are also on order.

Many of the main items of the heavy liquid bubble chamber have been ordered, and final machining of some components has started. The Treasury have approved the liquid helium bubble chamber.

Accident

Board members were informed of an explosion in October causing serious injury to Mr. E. C. Gibbs. Mr. Gibbs is making a good recovery. I appointed a Board of Inquiry to report confidentially to me on the causes and to recommend action to avoid a recurrence. The report has been completed, and the recommended action is being taken.

Rutherford High Energy Laboratory,
Harwell, Didcot, Berks.

Dr. Stafford

22nd November, 1961

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GOVERNING BOARD

Treasury Acceptance of N.I.R.N.S. Five-Year Forecasts

Note by the Secretary

The five-year forecast of expenditure, revised as decided at the last meeting, was submitted by the Office of the Minister for Science to the Treasury on 28th September, 1961. A copy of the revised detail is appended.

The revised forecast was accepted by the Treasury in a letter dated 13th October, 1961, from which the following is an extract:-

> "The proposals relating to the future financial provisions for the N.I.R.N.S. programme over the period 1962-1967, which are now before us, show a significant and welcome reduction on the July proposals. We are prepared to accept the new programme for planning purposes. As you suggest, we should not regard it as immutable in all respects. The N.I.R.N.S. would be free to propose changes in order to accommodate unforeseen items and we for our part would be free to propose economies if the circumstances justified this. As you will recognise, we shall need to continue the normal system of project control. When we have the detailed proposals for the Electron Laboratory we shall wish to look very carefully at the capital and recurrent estimates, bearing in mind experience over NIMROD, and at the spread of expenditure between years. We will also have to take into account the total expenditure in the nuclear physics field which is contemplated at the time."

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