Has a copy gone to Brooks – R.T.M
✓ Venn.
✓ Varney ✓ Contracts – Mr Farmer
✓ Mr Lemmerods.

Mr P. BOWLES.

6th November, 1959 NI (GP) (59) 46

NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

GENERAL PURPOSES COMMITTEE

FOUNDATION BLOCK FOR NIMROD GENERATORS

Covering Note by the Secretary

Members will remember that, at the last meeting of the Committee, it was reported that design and contract action on the motor alternator foundation block had become very urgent and that a paper would be submitted, by correspondence, as soon as possible. Design and negotiation with the English Electric Company Ltd., have now reached the stage at which this can be done.

The special urgency is due to the fact that it is now found necessary to pour the foundation block simultaneously with the foundation pit containing it, whereas it was previously expected to complete this latter first. The main foundations of the alternator building (which are already started) will therefore be delayed unless the work on the block can start very soon.

As agreed at the meeting, the Chairman would like members to consider the recommendations made in the enclosed paper and, if they approve, to let me know as soon as possible. If there are no objections, he will approve the recommendations on behalf of the Committee.

RUTHERFORD HIGH ENERGY LABORATORIES,
Harwell,
Didcot, Berks.

NI (GP) (59) 46

RUTHERFORD LABORATORY

Foundations for the Rotating Plant for NIMROD Magnet Power Supply

1. It will be recalled that in March 1958 a contract was placed with the English Electric Company for the Rotary Plant for the Magnet Power Supply. Although the Engineering Specification called for a foundation block, the English Electric Company did not tender a price because of the novel engineering problems involved. Notwithstanding this the contract was placed on the basis that the English Electric Company would be responsible for the design, supply and erection of the machine foundations at a price to be agreed.

2. The design of the rotary plant is now complete and the vibration problems involved are more thoroughly appreciated. In the design proposed the machine bed comprises a monolithic block of reinforced concrete, supported by springs inside an inverted U shaped foundation. The machine block must be capable of supporting the alternators, flywheels, and motors, weighing 400 tons without appreciable bending of the 100 ft. long shaft. In addition during normal operation there is a power reversal of 350,000 H.P. every 2½ seconds, which produces forces of 120 tons at the feet of each alternator. In order that these disruptive forces will not be transmitted to the machine parts, or the building foundations, the proposed resilient mounting is essential.

3. Because of the novelty of the problem the English Electric Company recommended specialist advice, and we agreed to the appointment of Messrs. Mertz and McLellan as consultants. They have had long experience in the design of foundations for Power Stations and Industrial Plants, and it was convenient in that they were already engaged in the design of the Alternator House.

4. The cross section of the proposed design is illustrated in the appendix, and it is recommended that the machine block be constructed simultaneously with the floor building, and machine foundation. For this reason, the English Electric Company were instructed to invite a single tender from Messrs. Chivers, who are contractors for the main buildings, as the Project Committee agreed that it would be impracticable for two Civil Engineering Contractors to operate in the same building.

5. Tenders have now been received from the English Electric Company and they offered the following alternatives:

5.1. A fixed price of £48,536 which includes a sum of £5,650 to cover contingencies. It also embraces all design and consultancy charges.

5.2. A cost plus price made up as follows:

Civil Engineering.	25,650
Sub bed plate, steel mattress, ducting etc.,	3,784
Provision of Model and Site tests tests.	2,002
Design Office, Inspection, Site Supervision and Erection.	2,000
Consultants Fees	6,000
English Electric cover charges to include for profit.	3,450
	42,886

This offer is given as an estimate and it is made clear that contingencies will be charged as extras.

6. In view of the unusual nature of the foundation system and the "tight" construction programme the English Electric Company have had to request priced schedules from Messrs. Chivers on the basis of preliminary drawings. In addition the Civil Engineering Construction of this block is very difficult and we are of the opinion that many contingencies could arise in the course of the work. In view of this it is considered that the fixed price quotation constitutes the better offer. In regard to the Civil Engineering rates on which the quotation is based, the Quantity Surveyor advises us that although these are higher than those the Authority obtained on Phase I construction, they are nevertheless fair and reasonable for the Oxford Area.

7. Neither of the above quotations have included the foundation springs and vibration dampers which are at present out to tender, but the English Electric Company have informed us that those will cost approximately £11,000. If the fixed quotation is accepted the total cost of the foundation could then be £59,536.

8. At the last General Purposes Committee a sum of £40,000 was shown to be included in estimates as a notional sum to cover these requirements. As there is no contingency in the Power Supply Estimates and savings of £20,000 cannot be made elsewhere a revision of estimates will be necessary at the appropriate time.

9. It is recommended that:

9.1. The contract with the English Electric Company be extended to cover the machine foundation at a cost of £48,536.

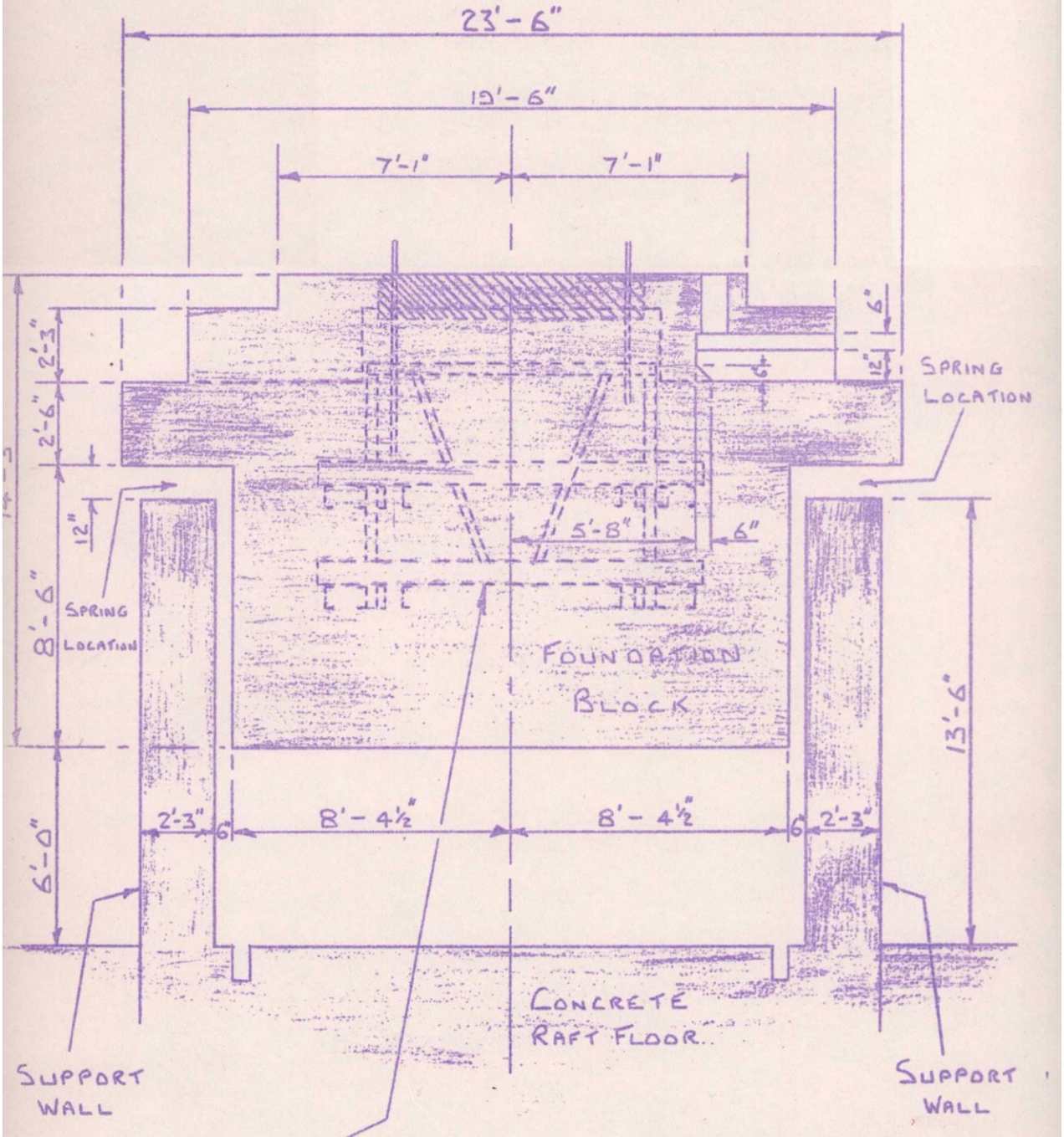
9.2. A further order be placed with the English Electric Company for the springs upon return of their tenders, the estimated value of this being £11,000.

9.3. The estimates for the Magnet Power Supply be increased by £20,000 to cover the above additional costs.

P. Bowles.

7th November, 1959.

OVER ALL LENGTH OF BLOCK = 102'-6"



SECTION THROUGH MOTOR-ALTERNATOR FOUNDATION BLOCK