

NI (GP) (59) 2  
(REVISED)

7 GeV PROTON SYNCHROTRON  
QUARTERLY STATEMENT No. 6

- . This report shows in Appendix I the latest estimate compared with the last quarterly Statement dated 19th September, 1958.
- . The plant estimate is increased from £5.15m to £5.43m due to an increase in the estimated cost of the Vacuum System.  
  
The building estimate shows an increase from £2.28m to £2.34m due to a number of items enumerated in the Notes attached to Appendix I. The approval of the Committee to the revised estimate is sought.
3. Appendix II shows predicted expenditure by years compared with the Treasury Grant.
4. Appendix III shows the expenditure and commitments up to 3rd January, 1959.
5. Appendix IV shows anticipated contract action to the end of the present quarter.
6. Appendix V shows financial position in graphical form.

D.W. FRY

Chairman, Project Committee

A.E.R.E. Harwell,  
22nd January, 1959.

Appendix I  
(Revised)

7 GeV PROTON SYNCHROTRON

Revised Cost Estimates - 22nd January, 1959

| <u>Item</u>                       | <u>£ Million</u>                                           |                                                      |
|-----------------------------------|------------------------------------------------------------|------------------------------------------------------|
|                                   | <u>Last Statement</u><br>(Cost Estimates<br>dated 19.9.58) | <u>Revised Cost</u><br><u>Estimates -</u><br>22.1.59 |
| 1. <u>Magnet</u>                  | 2.6                                                        | 2.6                                                  |
| 2. <u>Injector</u>                | 0.45                                                       | 0.45                                                 |
| 3. <u>R.F. Equipment</u>          | 0.15                                                       | 0.15                                                 |
| 4. <u>Vacuum System</u>           | 0.50                                                       | 0.78                                                 |
| 5. <u>Power Supply</u>            | 1.30                                                       | 1.30                                                 |
| 6. <u>Controls</u>                | 0.15                                                       | 0.15                                                 |
|                                   | <u>5.15</u>                                                | <u>5.43</u>                                          |
| 7. <u>Buildings</u>               |                                                            |                                                      |
| Main and Ancillary Building Works | 1.46                                                       | 1.52                                                 |
| Engineering and Services          | 0.56                                                       | 0.56                                                 |
| Fees                              | 0.23                                                       | 0.23                                                 |
| Furniture and Fittings            | <u>0.03</u>                                                | <u>0.03</u>                                          |
|                                   | <u>2.28</u>                                                | <u>2.34</u>                                          |
| <u>TOTAL</u>                      | <u>7.43</u>                                                | <u>7.77</u>                                          |

For explanatory notes - See next page.

7 GeV PROTON SYNCHROTRON

Notes on Revised Cost Estimates - 30th January, 1959

1. PLANT

Vacuum System

The estimate has been increased from £0.5M to £0.78M

This estimate, which is based on the latest design information, is made up as follows:-

|                                          |                 |
|------------------------------------------|-----------------|
|                                          | £               |
| Main Vacuum Vessel                       | - 325,000       |
| Ancillary Equipment and Handling<br>Jigs | - 83,000        |
| Pumping Equipment                        | - 190,000       |
| Straight Sections and Connections        | - 72,000        |
| Installation                             | 110,000         |
| <u>Total</u>                             | <u>£780,000</u> |

The estimated cost of the Vacuum Vessel was reported to the General Purposes Committee at the special meeting on the 16th January, 1959 when approval was given to the placing of a contract with Marston Excelsior for development and production of the first Section and manufacture of the remaining Sections of the Vessel. This contract accounts for an increase in the estimates of £178,000.

Increases in the cost of Ancillary Equipment and Handling Jigs, and installation costs amount to a further £102,000.

The effect of the re-design of the Vacuum Vessel on other sections of the estimate cannot be assessed at this stage and the estimates have not been amended. It is possible, however, that some increase to the estimate for the Magnet may be necessary at a later date.

2. BUILDINGS

There is a net increase of £59,500 in the building estimate.

The principal items contributing to this increase are:-

- (i) An increase in the estimate for underground storage of storm water.
- (ii) The addition of a building for Cooling Water Pumps and Water Treatment Plant.
- (iii) Extension of the Preparation Area by a further two bays.

Appendix II

7 GeV PROTON SYNCHROTRON

Actual and Predicted Rate of Expenditure and Treasury Grant

| ITEM      | 1957 - 58<br>ACTUAL | 1958 - 59<br>PREDICTED | 1959 - 60<br>PREDICTED | 1960 - 61<br>PREDICTED | 1961 - 62<br>PREDICTED | TOTAL<br>PREDICTED |
|-----------|---------------------|------------------------|------------------------|------------------------|------------------------|--------------------|
| PLANT     | £<br>68,586         | £<br>487,000           | £<br>2,235,000         | £<br>2,220,000         | £<br>420,000           | £<br>5,430,586     |
| BUILDINGS | 265,187             | 753,000                | 1,000,000              | 250,000                | 59,000                 | 2,327,187          |
| TOTAL     | £333,773            | 1,240,000              | 3,235,000              | 2,470,000              | 479,000                | 7,757,773          |

| ITEM      | TREASURY<br>GRANT<br>1958 - 59 | ESTIMATES<br>FOR<br>1959 - 60 | PROVISION IN<br>1959/60<br>ESTIMATES<br>FOR 1960 - 61 |
|-----------|--------------------------------|-------------------------------|-------------------------------------------------------|
| PLANT     | £<br>1,425,000                 | £<br>2,440,000                | £<br>1,937,000                                        |
| BUILDINGS | 990,000                        | 1,000,000                     | 73,000                                                |
| TOTAL     | £2,415,000                     | 3,440,000                     | 2,010,000                                             |

The actual expenditure during 1958 - 59 up to 3rd January, 1959 is:-

|           |          |
|-----------|----------|
| Plant     | 112,169  |
| Buildings | 575,742  |
| Total     | £687,911 |

Appendix III(1)

7 GeV PROTON SYNCHROTRON

Recorded Commitments and Expenditure up to 3rd January, 1959

| Item                                   | £<br>Value | Firm                            | £<br>Expend-<br>iture | Remarks           |
|----------------------------------------|------------|---------------------------------|-----------------------|-------------------|
| <u>MAGNET</u>                          |            |                                 |                       |                   |
| Magnet Sectors                         | 1,394,000  | Joseph Sankey                   | 47,409                | Includes Refining |
| + Copper for Magnet Coils              | 54,575     | British Copper Refiners         | 49,575                |                   |
| Transporter - Magnet Sectors           | 1,720      | Carrimore Sixwheelers           | 1,724                 |                   |
| Survey Equip. & Services               | 11,750     | N.P.L., Hilger & Watts & B.R.S. | 783                   |                   |
| + Miscellaneous                        | 225        |                                 | 20                    |                   |
| x Magnet Coils                         | 314,250    | Metro-Vickers                   |                       |                   |
| x Extrusion of Copper for Magnet Coils | 67,286     | James Booth                     |                       |                   |
| <u>Total</u>                           | 1,843,806  |                                 | 99,511                |                   |
| <u>INJECTOR</u>                        |            |                                 |                       |                   |
| Electro Static Generators - 650 K.V.   | 15,050     | S.A.M.E.S. France               | 7,525                 |                   |
| 350 K.V.                               | 1,989      | " "                             | 1,989                 |                   |
| 3 x 125 K.V.                           | 7,170      | " "                             | 3,585                 |                   |
| + E.H.T. Platform                      | 3,063      | Portsmouth Aviation             |                       |                   |
| B.T.H. Modulators                      | 15,800     | B.T.H.                          |                       |                   |
| H.P. Alternators (2)                   | 1,164      | Electro-Dynamic Constr.         |                       |                   |
| + E.H.T. Platform Mech. Equipment      | 2,755      |                                 |                       |                   |
| D.C. Gun Vacuum Equip.                 | 6,000      | Edwards High Vacuum             |                       |                   |
| Vacuum Vessel for Linac.               | 11,970     | Babcock & Wilcox                |                       |                   |
| + D.C. Gun Stand & Rails               | 1,882      | Talbot Pensonby                 |                       |                   |
| x Roughing Pump Units                  | 3,096      |                                 |                       |                   |
| x Refrigerated Oil Traps               | 1,274      | Edwards High Vacuum             |                       |                   |
| x Frame for Linac R.F. Liner           | 5,812      | Firth Vickers S.Steels          |                       |                   |
| x Linac R.F. Liner                     | 20,630     | London Aluminium Co.            |                       |                   |
| + Miscellaneous                        | 13,136     |                                 | 2,390                 |                   |
| <u>Total</u>                           | 110,791    |                                 | 15,489                |                   |
| <u>R.F. EQUIPMENT</u>                  |            |                                 |                       |                   |
| + Ferrite Frames                       | 42,296     | Phillips, Lindhoven             |                       |                   |
| Bias Supply                            | 3,460      | Hackbridge & Hewittic           |                       |                   |
| Rectifier Transformer                  | 1,115      | English Electric                |                       |                   |
| R.F. Cavity Cooling Equipment          | 11,256     | J. & E. Hall, Ltd.              |                       |                   |
| Accelerator Unit Cavity                | 12,000     | Marston Excelsior               |                       |                   |
| Miscellaneous                          | 6,502      |                                 | 3,143                 |                   |
| <u>Total</u>                           | 76,629     |                                 | 3,143                 |                   |

## Appendix III(2)

| Item                                                 | £<br>Value | Firm                     | Expend-<br>iture | Remarks |
|------------------------------------------------------|------------|--------------------------|------------------|---------|
| <u>VACUUM SYSTEM</u>                                 |            |                          |                  |         |
| Main Pumping Equipment                               | 154,297    | Edwards High Vacuum      | 61,718           |         |
| x Roughing Pump Units                                | 9,286      | General Eng. (Radcliffe) |                  |         |
| x Refrigerated Oil Traps                             | 3,823      | Edwards High Vacuum      |                  |         |
| x Miscellaneous                                      | 1,535      |                          |                  |         |
| <u>Total</u>                                         | 168,941    |                          | 61,718           |         |
| <u>POWER SUPPLY</u>                                  |            |                          |                  |         |
| + Rotating Machinery                                 | 472,250    | English Electric         |                  |         |
| + Converter Equipment                                | 556,000    | Brown Boveri             |                  |         |
| <u>Total</u>                                         | 1,028,250  |                          |                  |         |
| <u>CONTROLS</u>                                      |            |                          |                  |         |
| Tektronix-oscilloscopes                              | 842        | Livingstone Labs.        | 842              |         |
| x Miscellaneous                                      | 1,669      |                          | 52               |         |
| <u>Total</u>                                         | 2,511      |                          | 894              |         |
| <u>PLANT - Grand Total</u>                           | £3,230,928 |                          | £180,755         |         |
| <u>BUILDING WORKS</u>                                |            |                          |                  |         |
| Opening up Contract                                  | 84,645     | W.L. Chivers             | 60,000           |         |
| Exploratory Boring                                   | 2,606      | The Cementation Co.      | 2,606            |         |
| Trial Bore Holes                                     | 1,399      | W.L. Chivers             | 1,219            |         |
| Main Civil Contract                                  | 1,066,062  | W.L. Chivers             | 600,842          |         |
| Arcon Building                                       | 42,000     | Taylor Woodrow           | 38,094           |         |
| Miscellaneous                                        | 1,231      |                          | 924              |         |
| <u>Total</u>                                         | 1,197,943  |                          | 703,685          |         |
| <u>FEES</u>                                          |            |                          |                  |         |
| Consultants                                          | 107,200    |                          | 42,750           |         |
| Quantity Surveyors                                   | 40,170     |                          | 3,810            |         |
| Industrial Group                                     | 85,000     |                          |                  |         |
| <u>Total</u>                                         | 232,370    |                          | 46,560           |         |
| <u>FURNITURE</u>                                     |            |                          |                  |         |
|                                                      | 1,614      | A.E.R.E. Stock           | 1,614            |         |
| <u>ENGINEERING &amp; SERVICES</u>                    |            |                          |                  |         |
| Electric Cables                                      | 3,728      | Sterling Cables          | 3,728            |         |
| L.H.T. Switchgear                                    | 7,283      |                          | 46               |         |
| Transformers                                         | 2,934      | Yorkshire Electric       | 2,934            |         |
| 25 Ton Crane                                         | 9,366      | Wharton Cranes           | 8,784            |         |
| Special Cranes (3)                                   | 34,290     | " "                      |                  |         |
| Misc. Cranes (5)                                     | 39,700     | " "                      | 11,810           |         |
| Heating & Hot Water Services                         |            |                          |                  |         |
| Prep. Area, Control,<br>Assembly & Test<br>Buildings | 7,702      | Z.D. Berry & Sons        | 5,340            |         |
| Carried forward                                      | 105,003    |                          | 32,642           |         |

## Appendix III(3)

| Item                                                                       | £<br>Value | Firm                  | £<br>Expend-<br>iture | Remarks |
|----------------------------------------------------------------------------|------------|-----------------------|-----------------------|---------|
| <u>ENGINEERING &amp; SERVICES</u><br><u>(CONTINUED)</u>                    |            |                       |                       |         |
| Brought Forward                                                            | 105,003    |                       | 32,642                |         |
| Shielding Block Trolleys<br>& Traction Unit                                | 16,845     | Robert Hudson, Ltd.   |                       |         |
| Distribution Switch Board                                                  | 5,580      | English Electric      | 2,543                 |         |
| Lighting & Small Power Prep.<br>Area, Control, Assembly                    |            |                       |                       |         |
| + & Test Buildings                                                         | 11,310     | N.G. Bailey & Co.     | 9,687                 |         |
| + Cables                                                                   | 13,166     | Various               | 11,266                |         |
| Lift, Passenger & Goods,<br>Main Building                                  | 3,790      | Evans Lifts           | 2,420                 |         |
| 415 V Switchgear-Alternator<br>Building                                    | 5,945      | Reyrolles             |                       |         |
| + Miscellaneous                                                            | 23,075     |                       | 20,759                |         |
| Water Treatment Plant                                                      | 15,256     | The Permutit Co.      |                       |         |
| Lighting & Small Power -<br>Office & Lab. Magnet &<br>Alternator Buildings | 40,444     | N.G. Bailey & Co.     | 9,505                 |         |
| H.O. Cranes, Assembly &<br>Test Building                                   | 1,293      | Herbert Morris, Ltd.  |                       |         |
| Pipework Services, Heating,<br>Hot Water & Ventilating<br>- Main Building  | 65,181     | Z.D. Berry & Sons     | 255                   |         |
| x Air-Conditioning Equip.<br>- Magnet & Injector<br>Rooms                  | 45,480     | Matthew Hall          |                       |         |
| x 80 Ton Crane- Alternator<br>Building                                     | 18,372     | Cowans Sheldon, Ltd.  |                       |         |
| x 10 Ton Crane - Alternator<br>Building                                    | 5,850      | John Smith (Keighley) |                       |         |
| x Shielding Block Lifting<br>& Turning-over equip.                         | 3,704      | John Barnsley & Sons  |                       |         |
| <u>Total</u>                                                               | 380,294    |                       | 89,077                |         |
| <u>BUILDINGS - Grand Total</u>                                             | £1,812,221 |                       | £840,936              |         |

NOTE:- Items marked thus x, have not previously been reported.

Items marked thus +, have changed since the last report.

7 GeV PROTON SYNCHROTRON

Appendix IV

Known and anticipated Contract Action during period 1.1.59 to 31.3.59

| Item                                                                       | Estimated Value | Firms likely to be considered                                  | Remarks                                                                                                                                                                                                                               | Action sought                                            |
|----------------------------------------------------------------------------|-----------------|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| <u>INSTALLATION</u><br>(Electrical)                                        | £               |                                                                |                                                                                                                                                                                                                                       |                                                          |
|                                                                            | 100,000         | Competitive Tender                                             | Contract expected to be placed by 31.3.59                                                                                                                                                                                             | None at this stage                                       |
| <u>MAGNET</u><br>Sector Datum Screws                                       | 1,000           | Competitive Tender                                             | Contract to be placed by 1.2.59                                                                                                                                                                                                       | None                                                     |
| Services of Surveyor and assistant                                         | 4,000           | Hilger & Watts                                                 | Tender due shortly                                                                                                                                                                                                                    | None                                                     |
| Main Pole Pieces                                                           | 275,000         | Sankey's<br>G.P.C.<br>De Havilland<br>Richard Thomas & Baldwin | Contract expected to be placed by 31.3.59                                                                                                                                                                                             | None at this stage.<br>A special paper will be prepared. |
| <u>INJECTOR</u><br>High Vacuum Pumping Equipment for Linac                 | 54,000          | Edwards High Vacuum                                            | Contract to be placed by 31.1.59                                                                                                                                                                                                      | None. G.P.C. approval has been given.                    |
| <u>VACUUM SYSTEM</u><br>Development and manufacture of Main Vacuum Vessels | 325,000         | Larston Excelsior                                              | It is expected that this contract will be placed in two stages:-<br>1. Development & manufacture of one vessel - £100,000 (est.)<br>2. Manufacture of further 8 vessels - £225,000<br>Contract for 1st Stage to be placed by 31.1.59. | G.P.C. Approval has been given                           |
| Demineralsised Water Chilling Plant                                        | 12,000          | Competitive Tender                                             | Tenders due in 30.1.59.<br>Contract to be placed by 28.2.59                                                                                                                                                                           | None                                                     |

## Known and anticipated Contract Action during period 1.1.59 to 31.3.59 (continued)

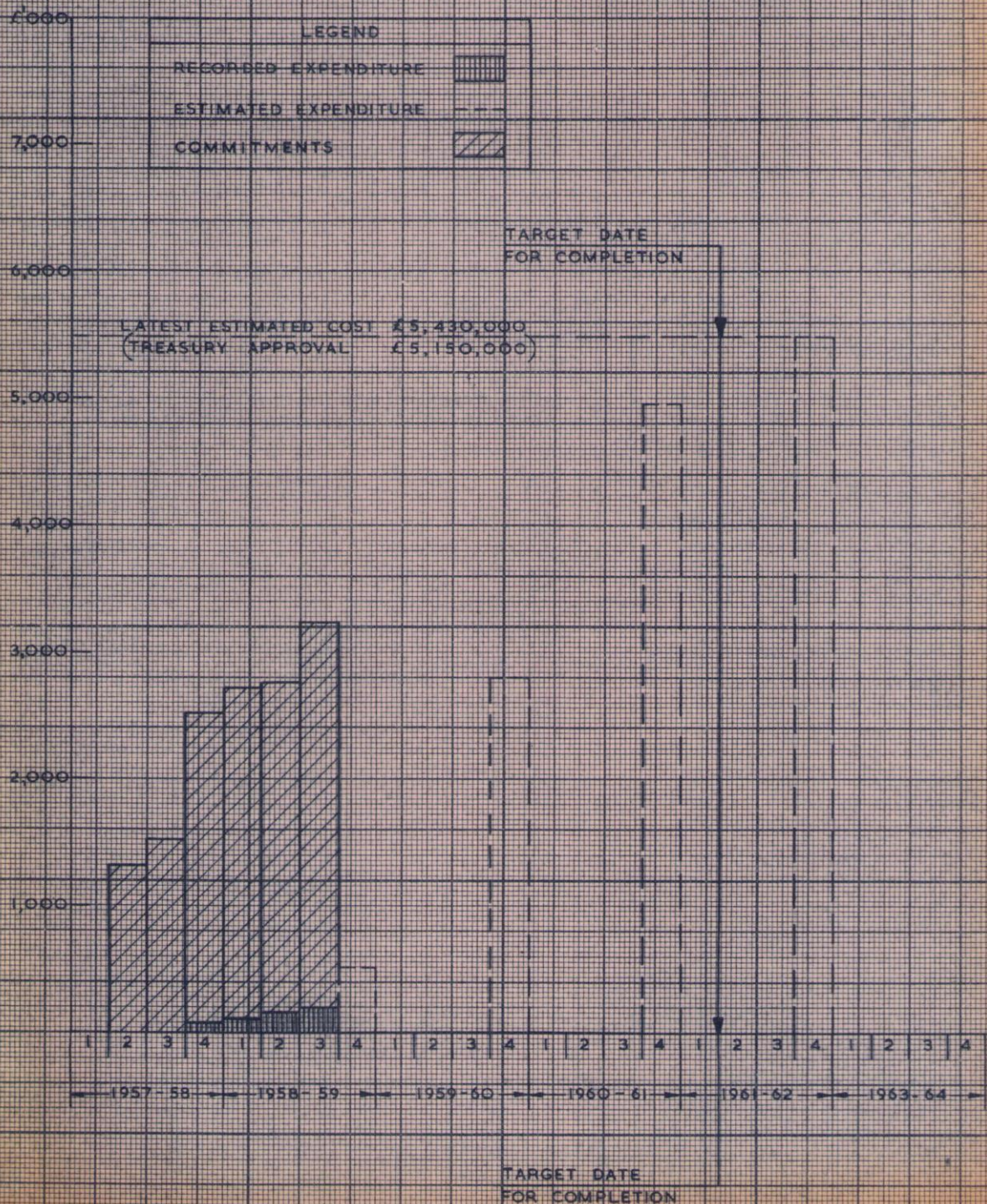
| Item                                                                                          | Estimated Value | Firms likely to be considered                                                                                                                                           | Remarks                                                                                       | Action sought |
|-----------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|---------------|
| <u>CONTROL SYSTEM</u><br>Telephone Intercom. System                                           | £<br>10,000     | Standard Telephones and Cables<br>Automatic Telephone and Electric Co.<br>Siemens-Edison Swan<br>Modern Telephones, Ltd.<br>English Telephone Co.<br>Competitive tender | Tenders due in 11.2.59<br>Contract to be placed by 1.3.59                                     | None          |
| Control Equipment                                                                             | 15,000          |                                                                                                                                                                         | Tenders due in 30.1.59<br>Contract to be placed by 28.2.59<br>This will be a running contract | None          |
| <u>BUILDINGS</u><br><u>Engineering and Services</u><br>Cooling Tower<br>Water Treatment Plant | 12,000          | Permutit<br>John Thompson Kennicott<br>Patterson Engineering                                                                                                            | Contract expected to be placed by 31.3.59                                                     | None          |

U.K.A.E.A. (R.G.)

PLANT EXPENDITURE

QUARTER ENDING - 3rd JAN 1959

7 GeV PROTON  
SYNCHROTRON PROJECT



U.K.A.E.A. (R.G.)

TOTAL EXPENDITURE  
QUARTER ENDING 3rd JAN. 1959.

7 GEV. PROTON  
SYNCHROTRON PROJECT

