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for information

1st September, 1960.

NI/GP/60/36

NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

GENERAL PURPOSES COMMITTEE

Estimates of Capital and Non-Capital Expenditure 1961/62
and Forecast Estimates 1962/63 and 1963/64

Note by the Secretary

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The General Purposes Committee are invited to review these proposals and to approve submission to the Treasury with such amendments as are considered appropriate.

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NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

Summary of Estimates 1961/62, 1962/63 and 1963/64.

	1960/61	1961/62	1962/63	1963/64
	Grant	Latest Forecast		
	£000	£000	£000	£000
Capital Expenditure	4,500	3,964	4,301	3,362
Non-Capital Expenditure	1,750	1,750	2,824	3,109
	6,250	5,714	7,125	6,471
Deduct Amounts Recoverable	4	4	143	58
	6,246	5,710	6,982	6,413

Notes 1. The calculated and assessed capital expenditure for 1961/62 (£5,257,000) has been cut by £500,000 to allow for unforeseen delays.

2. The amounts recoverable for 1961/62 to 1963/64 consist mainly of the receipts from D.S.I.R. in connection with the Oxford Electrostatic Generator Project. The other receipts are from houses, hostels, flats and restaurant.

NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

Financial Estimate 1961/62 and Forecast Estimate 1962/63 and 1963/64 - All figures on £000

	1959/60	1960/61		1961/62	1962/63	1963-64	Later Years	Remarks
	Actual	Grant	Latest Forecast					
<u>Capital</u>								
<u>Nimrod Project</u>	2,781	3,054	2,769	2,250	779	520		See Page 5 Note 1
<u>Electron Laboratory</u>	-	-	-	50	400	800	750 - ?	See Page 5 Note 2
<u>Second Site</u>	-	-	-	-	-	-	20,000 - ?	See Page 5 Note 3 — <i>but.</i>
<u>Extension of P.L.A.</u>	-	-	-	50	130	160	1,660	See Page 5 Note 4
<u>Buildings Rutherford Lab.</u>								
(a) Phase II	49	230	191	120	15			See Page 5 Note 5
(b) Major Schemes	15	240	202	467	851	455	90	See Page 3 Section A
(c) Minor Works	2	30	28	100	100	100		See Page 5 Note 6
(d) Houses, Hostels & Flats	3	20	12	150	200	200		See Page 5 Note 7
<u>Plant Rutherford Lab.</u>								
(a) Nimrod Spares	-	80	30	70	50	40		See Page 5 Note 8
(b) Other NIMROD Plant	3	516	467	985	1,206	641		See Page 4 Section B
(c) P.L.A. Plant	12	175	168	115	160	110		See Page 4 Section C
(d) Other major plant schemes	-	99	50	270	260	40		See Page 4 Section D
(e) Minor plant items	8	55	47	130	150	196		See Page 5 Note 9
<u>Research Reactors</u>	-	1	-			100	900 - ?	See Page 5 Note 10
	2,873	4,500	3,964	4,757	4,301	3,362	23,400	

	<u>Total Cost</u> £000	<u>1960/61</u> <u>Latest</u> <u>Forecast</u> £000	<u>1961/62</u> £000	<u>1962/63</u> £000	<u>1963/64</u> £000	<u>Later Years</u> £000	<u>Remarks</u>
A. Buildings Major Schemes							
1. Extension to NIMROD Experimental Area	280	-	10	150	120		See Page 5 Note 11
2. Rutherford Laboratory Lecture Theatre	100	-	5	70	25		" " " " 12
3. Hydrogen Bubble Chamber Plant Room	55	30	11				" " " " 13
4. Heavy Liquid Bubble Chamber Annexe	75	5	40	30			" " " " 14
5. Beam Handling Power Supply Buildings	50	-	20	30			" " " " 15
6. Orion Computer Building	45	-	35	10			" " " " 16
7. Extension to P.L.A. Buildings	230	30	100	100			" " " " 17
8. Electronic Techniques - Cable Tunnel	10	5	5				" " " " 18
9. Extension to NIMROD Control Block Southern	25	3	19	3			" " " " 19
10. Extension to NIMROD Control Block Northern	50	-	20	30			" " " " 20
11. Rutherford Laboratory Restaurant	85	5	40	40			" " " " 21
12. Site Services and Roads	355	55	100	100	100		" " " " 22
14. Laboratory and Office Block	150	-	10	70	70		" " " " 23
15. Prefabricated Office Building	45	44					" " " " 24
16. Ancillary Maintenance Building	37	25	12				" " " " 25
17. Future Schemes £25,000 to £100,000	488	-	40	218	140	90	" " " " 26
	2,080	202	467	851	455	90	

	<u>Total Cost</u> £000	<u>1960/61</u> <u>Latest</u> <u>Forecast</u> £000	<u>1961/62</u>		<u>1962/63</u>		<u>1963/64</u>		<u>Later Years</u> £000	<u>Remarks</u>
			£000	£000	£000	£000	£000	£000		
B. Other NIMROD Plant										
1. Hydrogen Bubble Chamber Services	200	127	70							See Page 5 Note 13
2. Heavy Liquid Bubble Chamber	345	10	200	100			35			" " " 14
3. Beam Handling Plant	950	70	400	400			80			" " " 15
4. Electronic Techniques	440	40	50	200			150			" " " 18
5. Visual Techniques	450	45	50	255			100			" " " 27
6. Minor Items	917	175	215	251			276			" " " 28
	3,302	467	985	1,206			641			
C. P.L.A. Plant										
1. Analysing Magnet	45	-	15	30						See Page 6 Note 29
2. Major Improvements	80	40	20	20						" " " 7
3. Minor Items	440	128	80	110			110			" " " 30
	565	168	115	160			110			" " " 31
D. Other Major Plant Schemes										
1. Oxford University Electrostatic Generator	205	-	40	125			40			See Page 7 Note 32
2. Orion Computer	355	50	200	105						" " " 6
3. Radiation Monitoring Stations	20		10	10						" " " 7
5. Model Accelerators	40		20	20						" " " 33
	620	50	270	260			40			" " " 34

Notes on Schedule II and Appendix

1. Treasury approval has now been received for £10.671m.
2. Provision has been made for an electron accelerator as indicated in the Institute's report on proposed United Kingdom policy on research in the field of elementary particle physics at an estimated capital cost of £2,000,000.
3. This item has now been revised in the light of the recommendations in the Institute's report mentioned in Note 2.
4. This extension will be spread over a period of 10 years in separate extensions which can each be considered on its merits. Research and Development will proceed on the extension to the P.L.A. and this might result in a serviceable tank 4.
5. No increased approval is expected to be required.
6. Miscellaneous items at Rutherford Laboratory, e.g. alterations, temporary buildings, hard-standing, etc. each costing less than £25,000.
7. To date, approval has been received for £9,500 for conversion of Cosensers House and £118,000 for the construction of 34 houses at Rush Common, Abingdon. Further houses have been approved in principle by the G.P.C. The requirement will be increased if it becomes necessary to replace houses loaned by A.E.R.E.
8. Spares which it is prudent to buy with the plant and normal maintenance spares. The original plant scheme only included those special spares which must clearly be bought with the plant, e.g. spare ferrite frames and spare excitrons.
9. Miscellaneous items of general use at the Rutherford Laboratory, e.g. office machinery, vehicles, cranes, switchboard, machine tools, etc.
10. The reactors so far recommended by the National Institute would be in the category to be financed by D.S.I.R. The provision now made is for a larger type of reactor to be provided by the National Institute at a later date.
11. It is apparent that to make full use of Nimrod a further experimental area will be required. The amount is unchanged from last year's forecast although the expenditure by years has been moved forward.
12. It is not yet possible to give further details of this scheme although it is apparent that a lecture theatre will be needed at the Rutherford Laboratory.
13. Treasury approval has been received for this item - £55,000 for buildings and £200,000 for plant. A review of cost is at present being carried out.
14. Treasury approval has been received for this item - £75,000 for buildings and £345,000 for plant and costs of design at University College.

15. Treasury approval has been received for this item - £50,000 for buildings and £950,000 for plant.
16. Treasury approval has been received for this item, the revised allocation being £45,000 for buildings and £355,000 for plant.
17. Treasury approval has been received for this item at a total cost of £230,000.
18. The approval of this scheme to date is for £10,000 for cable tunnel and £50,000 for special cabling.
19. Approval of this scheme has been given and work is proceeding.
20. A further extension of the Control Block will be required to make maximum use of all available space immediately adjoining Nimrod.
21. Treasury approval of this scheme is still awaited.
22. Various items not directly associated with specific schemes, such as steam, gas and water supplies, electricity sub-stations, link roads, etc.
23. This is an entirely new item and is intended to provide accommodation for the increased number of staff which will be employed at the Rutherford Laboratory in 1963-64. Approval has not yet been requested.
24. Approval for this scheme has been given and the buildings are now occupied.
25. Approval has been given for this scheme and construction is proceeding.
26. Various new buildings will be required but no details are yet available. They will include, however, garages, medical centre, safety store, general stores, Arcon extension, remote test building, additional cooling towers, extension to parasitic area and accelerator development building.
27. Approval has been given for £50,000 for track measuring and scanning equipment. A further proposal for approximately £400,000 for a Helium Bubble Chamber may be submitted in due course.
28. Various minor items of plant (costing over £25) required on the Nimrod project for general research, nuclear research, operations, maintenance, preparation for experiments, etc.
29. In addition to the £45,000 provided, some of the assembly effort will be carried out by the Rutherford Laboratory staff.

30. Drift tubes, klystrons, etc.
31. Various minor items of plant (costing over £25) required on the P.L.A. project for general research, nuclear research, operations, maintenance, preparation for experiments, and the capital items required for the tank 4.
32. The cost of the hardware to be supplied and paid for by the National Institute when Treasury approval has been received to this scheme. The whole of this amount will be re-charged to D.S.I.R.
33. A system of radiation monitoring stations to be installed around the Rutherford Laboratory site.
34. Experimental models for accelerator research.

NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

Non-Capital Estimates 1961/62 and Forecast Estimates 1962/63 and 1963/64

	1960/61	1961/62	1962/63	1963/64
	Grant	Latest Forecast	£000	£000
<u>Rutherford Laboratory</u>				
1. Salaries, Wages, Superannuation, etc. (See Footnote)	141	141	732	929
2. Travelling Expenses	20	20	40	50
3. Stores, Materials and Services	277	262	623	709
4. E.M.R. (See Page 9)	40	55	70	80
5. Charges by A.E.R.E. - Salaries and Wages (See Footnote)	— (1267	1267	100	15
6. Electricity, Steam, etc.,			337	461
7. Other Expenses			767	660
8. Housing Loans	5	5	5	5
	1,750	1,750	2,674	2,909
<u>Electron Laboratory</u>				
9. Salaries and Wages	-	-	70	110
10. Stores Materials and Services	-	-	80	90
	-	-	150	200

NOTE:

Calculations for salaries and wages are based on staff in post of 520, 650, 750 and 850 at the 31st March in 1961 to 1964. These numbers are lower than the ones for which approval is sought in paper NI/GP/60/37, as it is not thought possible to achieve the desired rate of recruitment.

The division of cost of salaries and wages between the Institute and A.E.R.E. will not be known until January 1961, as the offers of employment by the Institute do not expire until the 31st December, 1960. There is, however, no reason to suppose that the sum of (4) and (5) is not realistic.

NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

1961/62 Estimates

Research and Development with Industry and Universities

Project No.	Service	Firm or University	Treasury Authority (Ref: Date: Amount)	Latest Total Estimated Cost	Estimated Cash Expenditure £000			
					1960/61	1961/62	1962/63	1963/64
	<u>Universities</u>	Manchester Oxford University College* Glasgow Battersea College Queen Mary College Southampton Durham Imperial College Global			2.1 16.2 22.0 0.5 0.1 1.5 3.0 0.7 7.5 1.4	2.0 25.9 3.0 0.6 0.1 4.0 4.5 1.4 1.5 3.0	4.0 32.5 5.0 1.0 1.0 4.5 5.5 3.0 2.0 6.0	4.5 37.0 5.5 1.0 1.0 5.5 6.5 3.5 2.5 7.0
	<u>Industry</u>	Vickers Research Global			55.0 - 55.0	46.0 10.0 60.0	64.5 - 70.0	74.0 - 80.0

*Including the preliminary design study for the heavy liquid bubble chamber but excluding the actual design and construction agreement which is covered by item B2 on page 4.