12th March, 1962 NI/GP/62/13

NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

GENERAL PURPOSES COMMITTEE

NIMROD VACUUM CHAMBER AND NIMROD ESTIMATES

Note by the Chairman

Dr. Vick, as Chairman of the Nimrod Project Committee, has transmitted to me the Project Committee's conclusions:-

(a) That there is a reasonable chance of the whole Nimrod project being completed within the present estimates;

and (b) That a contract could now be signed with Marston Excelsior for the whole of the work on the Vacuum Chamber on lines that had been agreed with the A.E.A. Director of Contracts and reported to the Treasury.

Dr. Vick also sent me a copy of the enclosed report on the position prepared by Mr. Bowles.

I have agreed on behalf of the General Purposes Committee to the action proposed in paragraph 11 of the paper, and have arranged for the paper to be circulated largely for record purposes. Most of the members of the Committee have taken part in one way or another in reaching this solution, and are already aware of the facts.

Rutherford High Energy Laboratory,
Harwell, Didcot, Berks.

7th March, 1962

NI/GP/62/13
PSPC/P97

NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

GENERAL PURPOSES COMMITTEE

Nimrod Vacuum Chamber being manufactured at Marston Excelsior Ltd.

Note by Mr. P. Bowles

1. At the last meeting of the General Purposes Committee a resume was given of the technical progress made on the Nimrod Vacuum Chamber and the financial and contractual situation. The Committee requested that the NIMROD estimate be re-examined to see whether the estimated cost of the main vacuum chamber could be found within the present estimate. The financial situation would then be discussed in detail with the U.K.A.E.A. Finance Branch. The Treasury would then be consulted before resuming negotiations with Marston Excelsior. The following notes summarise the discussions which have since occurred.

2. A re-examination of the estimates has now taken place both for the buildings and the plant. On the building side work is virtually completed, and the preliminaries are in progress prior to settling the accounts. The report in Appendix I, approved by the Project Committee, states that the approved sum of £3.16M should be adequate.

3. The plant estimates have been re-appraised in detail and discussions held between the estimating engineers and the money spenders. Economies have been made in certain areas and on the assumption that the final cost of the vessels at Marston Excelsior will not exceed £1.454M (see page 10 Appendix II) the present financial provision appears just about adequate.

4. To summarise the estimates the notes in Appendix II were prepared to form a basis of discussion between Mr. Hudspith and Mr. Tatford of the London Office, and Mr. Bowles, Mr. Mullett and Mr. Varney, Harwell. It was considered that the financial position was tight but adequate, but in view of the difficult history of the Marston Excelsior contract the Treasury should be informed. This was done by Mr. Hudspith, and his letter is shown in Appendix III.

5. On the 25th January 1962 a meeting was held between Mr. Tatford, Mr. Varney, Group Contracts Officer, Mr. Smith, Deputy Group Contracts Officer, and Mr. Bowles, N.I.R.N.S. At this meeting it became apparent that re-negotiation of the contract with Marston Excelsior was necessary as a fixed price contract could not be obtained unless very loose reservation clauses were included. On this basis it would have enabled Marston Excelsior to have made very many claims from now until the end of the contract, without savings due to commercial acumen on their part or due to new methods developed by the joint teams, being passed in full back to the National Institute.

6. After discussing the matter further it was agreed that discussions with Marston Excelsior should open on the following basis, a fully costed contract with audited check of overheads, technical cost control of spend, the least negotiable fixed fee, an incentive clause, and a financial ceiling.

7. At a meeting at Marston Excelsior on the 15th February 1962 between the officers mentioned in para 5 and Mr. Dunn, Assistant Managing Director and Mr. Iliff, Works Accountant from Marston Excelsior, agreement was reached that the form of contract should be as outlined in para 6.

It was also agreed that the fee in lieu of profit should form an incentive to produce the vessels at a minimum cost. The present anticipated final cost to the National Institute is estimated at £1.45M - £1.5M inclusive of fees. The effect of the incentive clause on the fee payable would be:-

Basic production cost	Fee payable
£1.25M	£140,000
£1.35M	£135,000
£1.50M	£127,500

The exact amount of fee payable would be calculated as follows:-

(i) If the final production cost is £1.35M then the fee payable would be 10%.

(ii) If the final cost falls between £1.35M and £1.5M then the fee payable would be reduced by 5% of the cost in excess of £1.35M.

(iii) If the final cost is less than £1.35M then the fee payable will be increased by 5% of the difference between the actual cost and £1.35M.

(iv) The financial ceiling above which Marston Excelsior will be contractually bound to complete the contract without further payment will be £1,500,000 plus £127,500, i.e. £1,627,500.

The Director of Contracts recommends that the above terms be accepted.

8. On the practical side the state of the job is as follows: One outer vessel has been completed, vacuum tested, and is now installed in the machine and has proved dimensionally accurate. A second vessel will be transported to site Wednesday, 7th March, the third vessel is virtually completed, and parts for the fourth, fifth and sixth are in production. It is now proven without doubt an outer vessel can be made and delivered to the present construction programme.

9. The Inner Vessel is progressing satisfactorily, the prototype has been delivered to site, the first production vessel will be delivered during the first ten days of March, the second production vessel is being prepared for despatch, and components for the third and fourth are being made.

10. The Header Vessel has benefited from the effort and experience gained from the outer and inner vessels, a section of the thick laminate required has been produced satisfactorily and it is anticipated that the first of the four header vessels will be despatched by mid-June. In place of the remaining four header vessels it has been decided to provide closure plates fitted on areas of the machine where the proton beam is less likely to be extracted. These closure plates have been designed and contract action taken for the supply of the component parts.

11. In view of the positive progress made during the last six months the Project Committee recommend that:-

11.1 A costed contract on the terms outlined in para 7 be accepted.

11.2 Financial approval be given to the contract at a figure not exceeding the ceiling of £1,627,500.

NIMROD PROJECT COMMITTEE

Building Estimate

1. A recent review of the Building Estimate shows that it is possible to complete the Phase I work within the approved sum of £3,160,000. A brief outline of the NIMROD Building Estimate is shown in Appendix I.

2. The S.W.O. estimate of final costs, excluding contractors claims, shows a saving of approximately £41,000. In addition to this a saving of £18,000 has been made on the furniture estimate. The S.W.O. estimate a total of £341,000 to cover all fees. The allowance for fees in the estimate together with the contingency allowance total £353,000. The exact cost of fees cannot be ascertained until the final settlement of all accounts but the margin of £12,000 is considered sufficient.

3. Appendix II shows that the reserve balance stands at £134,475 out of the original provision of £392,200. To prevent prolonging the completion of the main civil contract it is proposed to transfer the sum of £20,000 from the contingency fund under heading D (Civil attendance on machine installation contractors) to the machine vote. This will enable any work required in this category to be carried out as found necessary from approved funds without using the main civil contract. This adjustment will leave approximately £60,000 in the contingency fund for final settlement of accounts which together with the estimated saving of approximately £59,000 on the final costs should allow sufficient margin to meet all known claims. These claims total £82,100 but it should be noted that the majority of these are being resisted and it may therefore take some time to arrive at an economic settlement.

4. Appendix III shows the percentage completion of the state of acoounts listed under the three main headings of Preliminary, Approximate and Final. Roughly one third of the project has been finally disposed of and the remaining two-thirds is all measured and has been rough priced to give a considered estimate. Almost all of this two thirds is contained in a few large contracts. Although a large percentage may be finally agreed within the next six months, experience has shown that the last few per cent may take much longer to agree.

P. BOWLES
G.W. DIXON

20th February, 1962

Appendix I

NIMROD BUILDING ESTIMATES

TREASURY APPROVAL	....	£3,160,000
Building And Civil	£1,737,900	
Mechanical and Electrical	648,900	
Fees	303,000	
Furniture	30,000	
	£2,719,800	
Releases to S.W.O. from the Contingency Fund	257,725	
Total I.T.P. issued	2,977,525	
C.V.C.	48,000	
Balance of Contingency Fund uncommitted	134,475	
TREASURY APPROVAL	£3,160,000	

Appendix I

SUMMARY OF CONTINGENCY FUND

		Provision	Commitment at 13.2.62.	Balance Uncommitted
		£	£	£
A	Measures to meet the tight programme	78,710	78,710	-
B	Temporary works (M & E)	40,000	40,000	-
C	Minor M & E additions and alterations	32,650	32,650	-
D	Civil attendance on machine installations contractors	46,058	21,303	24,755
E	General Contingencies (Civil)	23,065	23,065	-
F	General Contingencies (M & E)	44,497	44,497	-
G	Fees	50,000	-	50,000
H	Final Settlement of Accounts	64,720	5,000	59,720
J	Extension to Control Room	12,500	12,500	-
		392,200	257,725	134,475

Please Note:- It has been found necessary to adjust the breakdown of the contingency allowances under the various headings to meet the actual commitments as they have occurred.
It is proposed to transfer £20,000 from heading D to the machine vote. This will enable the main civil contract to be closed at an early date.

Appendix I

PROGRESS STATEMENT ON MEASURED WORK

	Preliminary	Approximate	Final
	%	%	%
Building and Civil contracts included in Merz and McLellan estimate	1	78	21
Building and Civil contracts not included by Merz & McLellan	-	33	67
Mechanical and Electrical contracts included in Merz & McLellan's estimate	2	38	60
Mechanical and Electrical contracts not included by Merz & McLellan	-	21	79
	1	64	35

Note:- "Preliminary" means that the work has been valued on the basis of drawings prepared before construction. Rough quantities will have been taken and all in rates applied to arrive at the figure shown.

"Approximate" means that the final work as constructed has been measured accurately. These accurate dimensions have been converted into a draft final bill to which the contract rates have been applied; but neither the bill nor "star" rates will have been agreed by the contractor.

"Final" means that the figure shown is as finally agreed with the contractor.

SUMMARY OF ESTIMATE

NIMROD - PLANT ONLY

Ref. No. NRO	Item	Treasury Approved Estimate (Approval given on 24.4.61) £M	Proposed Revised Estimate £M
1	MAGNET	3.200	3.129
2	INJECTOR	0.535	0.545
3	R.F. SYSTEM	0.193	0.203
4	VACUUM SYSTEM	1.907	2.080
5	POWER SUPPLY	1.417	1.452
6	CONTROLS	0.177	0.172
	C.V.C.	0.100	0.025
	CONTINGENCY	0.511	0.434
	GROSS ESTIMATE	8.040	8.040

31.1.62.

Appendix II

NIMROD ESTIMATE - PLANT ONLY

	Description	Net Estimate Approved by Treasury on 24.4.61.	Breakdown of Contingency Approved by Treasury on 24.4.61.	Gross Estimate on 24.4.61	Commitment at at 25.1.62.	Proposed Revision		
						Net Estimate	Contingency	Gross Estimate
		£	£	£	£	£	£	£
NRO/1	Magnet	3,200,000	210,000	3,410,000	2,872,193	3,129,000	116,000	3,245,000
NRO/2	Injector	535,000	34,000	569,000	467,610	544,700	24,800	569,500
NRO/3	R.F.	193,000	15,500	208,500	160,291	202,600	5,900	208,500
NRO/4	Vacuum System	1,907,000	136,500	2,043,500	1,560,494	2,080,000	203,500	2,283,500
NRO/5	Power	1,417,000	104,000	1,521,000	1,368,329	1,452,000	68,000	1,520,000
NRO/6	Controls	177,000	11,000	188,000	69,883	172,000	16,000	188,000
	C.V.C.	100,000		100,000		25,000		25,000
	TOTAL	7,529,000	511,000	8,040,000	6,498,800	7,605,300	434,200	8,039,500

31.1.62.

MARSTON CONTRACT FOR VACUUM VESSELS

		£M.	£M.
Expenditure to 31.12.61., excluding profit.			0.924
Estimated expenditure to complete (based on current programme):-			
Shop Wage Bill	£100,000		
Development Wage Bill	2,500		
Total Wages	102,500		
Estimated overheads @ 250% on total wages	256,500		
		0.359	
Salary Bill		0.074	
Materials & Sub-contracts		0.120	
Further tools		0.017	
			0.570
ESTIMATED TOTAL NET COST OF MARSTON CONTRACT (8 headers)			1.494
Estimated reduction due to cancellation of 4 headers			0.130
ESTIMATED FINAL NET COST OF MARSTON CONTRACT			£ 1.364M.
Estimated fixed fee for profit			0.09
ESTIMATED COST OF VACUUM VESSELS			£ 1.454M

PROPOSED PROVISIONING FOR MARSTON CONTRACT

	£M.
Provision in Treasury Approved Net Estimate	1.32
" " " " Contingency	.06
Savings on other items	.20
TOTAL PROVISION IN GROSS ESTIMATE	1.58

Note 1: It is proposed to include £1.45M of the above total in the Revised Net Estimate retaining the balance of £0.13M in the Revised Contingency.

Note 2: The savings of £0.20M on other items is made up as follows:-

	£M.
Savings on Gross Estimate for Magnet	0.165
Savings on Gross Estimate for Vacuum System (not Marston contract)	0.010
Reduction in identifiable C.V.C.	0.075
	0.250
Less estimate for Closure Plates	.050
	0.200

31.1.62.

COPY

Appendix III

6th February, 1962

Dear Pickavance,

Nimrod Estimate

Bowles and Mullett discussed the present position, with particular reference to the Marston Excelsior contract, with Tatford, Varney, Millen and myself today. I subsequently spoke to the Treasury to clear our lines, and I attach a copy of the letter which I am now sending to them.

We have agreed that you are free to negotiate a fresh contract on a costed basis with Marston Excelsior. From Bowles' figures we still hope to see the whole cost contained within the total Nimrod estimate of £11.2m. But we clearly need a safety margin and the Treasury have to understand that we are in principle at unlimited risk when we undertake a costed contract for a difficult piece of technical development.

We have accordingly corrected the statement made on the original approval at £11.2M to the effect that we then had the Marston contract on a fixed price basis. The Treasury, of course, concur that we must proceed with the revision of the contract. We have also obtained their agreement to a certain amount of elbow room on the total cost of the project should things turn out badly yet again on the Marston contract.

Our understanding here today is that you will still be working to the £11.2M figure for purposes of internal control. But if the General Purposes Committee find that they need some more elbow room, it is there for them to use.

Yours sincerely,

(Signed) H.C. HUDSPITH

c.c. Mr. Drake
Mr. Tatford
Mr. Bowles

Dr. T.G. Pickavance,
N.I.R.N.S.,
Rutherford Laboratory,
Harwell.

Appendix III

COPY

6th February 1962

Dear Dodd,

N.I.R.N.S.: Nimrod

We had a word about the progress of this estimate today. In his letter of 25th April 1961, Fogarty (reference 2-DM.334/339/01) approved the revised estimate for Nimrod at £11.2M. We thought then that we were virtually at the end of the road and we had said that we expected the figure of £11.2M to be a very close assessment indeed of the final outturn.

The main problem facing the Institute when the estimate was revised last April was the development and construction of the vacuum chamber. This work had been undertaken by Marston Excelsior Ltd., an I.C.I. subsidiary, and the development of epoxy resins to the necessarily very high specification had caused great trouble and mounting expense. The company at this stage, after prolonged consideration and discussion of the technical and financial problem, had offered us, as we then thought, a fixed price contract to finish the job at £1.2M. We had been rather surprised at this and in revising the estimate increased this figure by a ten per cent contingency. In the event, costs are now seen as certain to outrun even the company's figure as increased by the contingency.

In the course of further negotiations, the company have stressed that the technical reservations which they made when putting forward the £1.2M suggestion orally were not worked out in detail. When we attempted to work these out in detail with the company it was found impossible to reach agreement - again not by any means to our surprise because we had all along thought the fixed price suggestion from the company a bold one. We are satisfied that we could not possibly uphold against the company that they have committed themselves to a fixed price; and even if we could uphold such a position, it would be wrong to do so in view of the genuine misunderstanding which arose over the reservations and of the able and persistent technical effort which the company have deployed. The solution of this technical problem is, of course, essential to the proper functioning of the whole Nimrod project.

We have decided that the only possible course is to make a fresh contract with Marstons on a costed basis. We shall probably offer them a moderate fixed fee as their own profit element, and we shall, of course, bargain to keep this as low as possible. We would hope to contain the total cost of all development and production by Marstons within £1.5M -£1.6M; although certain items are not yet fully developed even now and we could run into further difficulties. Even if we do run into further difficulties, however, we do not think that total costs can now run much above this figure. Indeed, we are actively pursuing some amendments to the technical specification of certain less important component vessels of the vacuum chamber, and if these succeed we would hope to get our figure down by perhaps £100,000 or so.

/Continued

We still hope to contain this increase within the total Nimrod estimate of £11.2M, and we do not intend yet to depart from this figure for internal control purposes. But we are undoubtedly at risk to the extent, I would assess at this moment, of £200,000 or thereabouts. On the rest of the Nimrod estimate, matters are fairly well advanced. We have paid or committed about eighty per cent of the total, and we are confident that on balance we are likely to come out very close to target.

It follows that the Nimrod estimate will be at risk through the completion of the vacuum chamber work and the new arrangement proposed with Marston Excelsior and may conceivably cost as much as £11.4M or thereabouts. You kindly agreed that, in the circumstances, this could be regarded as covered by normal tolerance and that, since we had corrected our previous statement about the Marston Excelsior contract, you had no objection to our now proceeding to negotiate with Marstons.

I am sending a copy of this letter to Thompson. May I express our very sincere thanks for the expedition with which you have helped us to clear the line here. We have of course been in discussion with Marstons for a long time and things have reached the pass where work might stop if we are not prepared to make further progress payments. So your help directly contributes towards the completion of this important project within the planned programme.

Yours sincerely,

(Sgd.) H.C. HUDSPITH

P.H.F. Dodd, Esq.,
H.M. Treasury,
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London, S.W.1.

c.c. Mr. Thompson
Mr. Drake
Mr. Tatford
Mr. Bowles
Dr. Pickavance