THIRTEENTH REPORT

COMMITTEE ON PUBLIC UNDERTAKINGS (1986-87)

(EIGHTH LOK SABHA)

BHARAT ELECTRONICS LTD—CAPACITY UTILISATION, PRODUCTION & PRICING, RESEARCH AND DEVELOPMENT

(MINISTRY OF DEFENCE—DEPARTMENT OF DEFENCE PRODUCTION & SUPPLIES)

Presented to Lok Sabha on 26-11-1986
Laid in Rajya Sabha on 26-11-1986

सत्यमेव जयते

LOK SABHA SECRETARIAT
NEW DELHI

November, 1986/Agrahayana, 1908 (Saka)

Price : Rs. 5.50

CORRIGENDA TO THE THIRTEENTH REPORT OF THE COMMITTEE ON PUBLIC UNDERTAKINGS(1986-87) ON BHARAT ELECTRONICS LTD. - CAPACITY UTILISATION PRODUCTION & PRICING, RESEARCH AND DEVELOPMENT.

Page	Para	Line	For	Read
(i)		25	casting	costing
4	1.9	19	Yalkietalkie	Walkietalkie
16	1.29	3	in formation	information
18	1.38	5	ensuring	ensuing
20	1.42	12	ilisation	utilisation
22	1.48	8	Higher	High
22	1.48	10	Reader	Radar
23	1.50	3	mechine	machine
24	1.55	last line	SEL	BEL
25	1.55	1	same	some
25	1.57	4 from bottom	drilling.	drilling
28	1.63	1	singleunit	single unit
29	1.66	6 from bottom	matte	matter
31	1.70	13	Ompany	Company
32.	1.72	7	remifications	ramifications
35	2.4	4	full-t me	full-time
35	2.4	9	chanalised	canalised
37	2.9	2	targetted	targeted
37	2.9	2	than	then
38	2.10	5	CML	CMD
40	2.18	last line	Delete "I.T.V.Picture Tubes"	
41	2.18	Insert heading at the top		" T.V. Picture Tubes".
43	2.22	10	981-82	1981-82
43	2.22	11	982-83	1982-83
44	2.24	last line	rekork	rework
45	2.25	3	Delete "into"	
45	2.27	last line	thr	the

Page	Para	Line	For	Read
48	2.53	11	tnbes	tubes
59	2.67	2	compenents	components
60	2.69	3	syanide	cyanide
65	2.86	7	olauses	clauses
71	2.104	1	changing	charging
71	2.104	14	exprience	experience
77	2.123	last line	built	build
82	3.13	4	comulative	cumulative
88	3.31	2 from bottom	J8	JS
90	3.37	13	fro	for
92	3.38	4	except	expect
94	3.42	9 from bottom	ss^{o} C	55^{o} C
94	3.42	7 from bottom	Slemens	Siemens
101	3.51	9,10	infroctuous	infructuous
103	3.55	2	the	to
112	-	21	drought	brought
121	-	21	Delete "to"	
121	-	23	bys	by
127	-	last line	head	ahead

CONTENTS

COMMITTEE ON PUBLIC UNDERTAKINGS
(1986-87)

CHAIRMAN

Shri K. Ramamurthy

MEMBERS

Lok Sabha

2. Chowdhry Akhtar Hasan
3. Shri Narayan Choubey
4. Shri Dinesh Goswami
5. Shri Harpal Singh
6. Shrimati Sheila Kaul
7. Shri Haroobhai Mehta
8. Shri Satyagopal Misra
9. Shri Braja Mohan Mohanty
10. Shri K. R. Natarajan
11. Shri Ram Bhagat Paswan
12. Dr. Sankta Prasad
13. Shri K. Ramachandra Reddy
14. Shri Chiranji Lal Sharma
15. Shri V. S. Vijayaraghavan

Rajya Sabha

*16. Shri Jagesh Desai
17. Shri Krishna Nand Joshi
18. Prof. C. Lakshmanna
19. Shrimati Ratan Kumari
20. Shri Santosh Kumar Sahu
21. Shri G. Varadaraj
22. Shri Jagdambi Prasad Yadav

SECRETARIAT

1. Shri N. N. Mehra—*Joint Secretary*
2. Shri S. S. Chawla—*Chief Financial Committee Officer*
3. Shri Rup Chand—*Senior Financial Committee Officer*

---

* Elected w.e.f. 22-8-1986 in the vacancy caused by appointment of Miss Saroj Khaparde as Minister of State.

INTRODUCTION

I, the Chairman, Committee on Public Undertakings having been authorised by the Committee to present the Report on their behalf, present this Thirteenth Report on Bharat Electronics Ltd.

2. The Committee's examination of the working of the company was mainly based on the Report of the Comptroller and Auditor General of India, 1982, Union Government (Commercial) Part-XI.

3. The Committee took evidence of the representatives of the Bharat Electronics Ltd. on 1 October, 4, 5 and 6 November, 1985 and also of the representatives of the Ministry of Defence (Department of Defence Production & Supplies) on 4 and 5 March, 1986.

4. The Committee considered and adopted the Report at their sitting held on 20 November, 1986.

5. The Committee wish to express their thanks to the Ministry of Defence (Department of Defence Production & Supplies) and Bharat Electronics Ltd. for placing before them the material and information they wanted in connection with examination of the Company. They also wish to thank in particular the representatives of the Department of Defence Production & Supplies, Department of Electronics, Department of P&T and the Undertaking who appeared for evidence and assisted the Committee by placing their considered views before the Committee.

6. The Committee also place on record their appreciation of the assistance rendered by the Comptroller & Auditor General of India.

NEW DELHI;
November 26, 1986.
Agrahayana 5, 1908 (*S*)

K. RAMAMURTHY,
Chairman,
Committee on Public Undertakings.

CHAPTER I

FIXATION AND UTILISATION OF PRODUCTION CAPACITY

(i) *Fixation of Capacity*

According to audit, the Company had fixed production capacities in terms of physical output for the products manufactured in the Components and the Radar Divisions at Bangalore and for the opto-electronic devices produced at Pune Unit. In respect of the equipment manufactured at Ghaziabad Unit, the production capacity had been fixed only in terms of value. In respect of the products manufactured at the Low Power and High Power Equipment Divisions at Bangalore, however, the rated capacity had not been fixed either in terms of physical output or in terms of value.

1.2 In this connection, the Committee on Public Undertakings (1971-72) in their Third Report on the working of the Company, observed as under:

> "The Committee think that the rated capacity of the plant should be fixed in terms of physical output as the value of production was liable to change. If the rated capacity of the plant was not indicated to them by the supplier of the plant or Collaborator. BEL, it is suggested, would undertake an assessment of the ultimate and rated capacity on their own and then keep a watch over the progress made to achieve that capacity."

1.3 Again in their Twenty-fifth Report (1972-73), on the action taken by the Government, the Committee, while reiterating their earlier recommendation, observed as under:

> "The Committee are not convinced with the Government reply. They are still of the view that the rated capacity should be fixed in terms of physical output and not in terms of value of production as the latter is liable to change."

1.4 The Committee enquired as to why, in spite of specific recommendations of the earlier Committee on Public Undertakings, the rated capacities had not been fixed in terms of physical output in the Low and High Power Equipment Divisions at Bangalore and Ghaziabad Units. Furthermore, in the absence of fixation of capacity, what

was the mechanism available with the Company to ensure that various production facilities established had been put to optimum use. The BEL in its written reply stated *inter alia* as follows:—

> "The product mix in the equipments divisions cover a very wide range which change from year to year and also cover the entire frequency spectrum. Assessment of rated capacity in terms of single physical output in these circumstances is fraught with inherent difficulties in establishing equivalent for various products.
>
> Due to difficulties in fixing rated capacities in terms of physical products, capacities are determined in terms of standard hour outputs. The mechanism available with BEL for ensuring utilisation of the production facilities and control thereof, are:—
>
> (i) Close monitoring of the actual production against targets in each work centre;
>
> (ii) monthly machine utilisation records;
>
> (iii) labour efficiency statements.
>
> All these are closely monitored at various levels of the Management."

1.5 During evidence, the representative of the Company also added:—

> "The rated capacity for equipment, we still maintain, is not possible to fix in terms of physical quantity of different types of equipments. This fact has also been recognised by the Bureau of Public Enterprises in their report on PES, 1978-79. They have gone into this question in detail and found that due to the variety of products, variety of facilities required for a particular product-mix, due to changing nature of the product from time to time, or due to the modifications and improvements, it is not possible to talk in terms of rated capacity for certain types of industries.....It is not possible to do it in engineering industries of this nature."

1.6 The Committee enquired whether the Company had ever thought of referring the question of fixation of rated capacity of a competent industrial engineering concern. To this, the representa-

tive of Company stated:

> "The BPE (Bureau of Public Enterprises) which monitors the performance of the public sector undertakings have themselves examined this and have concluded that it is not possible to fix this in respect of this type of engineering company."

1.7 During oral evidence, the Committee also enquired from the Ministry as to why in spite of specific recommendation of Committee on Public Undertakings, the rated capacities have not been fixed in terms of physical output in the Low and High Power Equipment Divisions at Bangalore and Ghaziabad Unit. The Defence Production Secretary then stated:

> "The matter of fixing capacity has been before Public Undertakings for quite some time. When I came to this Department, I had also asked all my Defence Production Units like Ordnance factories as to what were the capacities and the utilisation. I found that in some units, it was easier to assess capacities than in others. In the case of BEL also, it appears they are faced with difficulties. BPE had examined the question of capacity. In Vol. I of Enterprises Survey for 1978-79 at page 65, their conclusions are given, *viz.* that in the case of enterprises manufacturing engineering goods, the problem of determining the capacity and utilisation was most acute, as most of them manufacture a wide range of products, and the product-mix gets altered from time to time on the market situation. They have also mentioned that there is no unanimity with regard to capacity, in the case in question. Where it is a single product company having uniform continuous process, it is easy to determine capacity; but in the case particularly of engineering companies, and companies which have a diverse product basket, it is not an easy thing. If we can find any expert in the country on whom we can rely for secrecy, I would be prepared to spend Rs. 4 lakhs to enable him to assess their capacity. I believe the Committee was also formed by CMD. They are not aware of any expert who can fix capacity for a unit like Ghaziabad. Each unit is having a little variation. If there is any one who can suggest about the expert or the Committee can tell us in principle. I for one, would be prepared to recommend to the Government that this expansion is worthwhile, let us have the capacity assessed.

1.8 When again asked if the matter of fixation of rated capacity could be referred to some reputed Management Institute for their advice, the Defence Production Secretary then stated in evidence that "I am prepared for its being referred to anyone anywhere in India who can be trusted for secrecy."

1.9 As regards non-fixation of capacities in terms of physical output in the two Divisions at Bangalore and Ghaziabad, the Ministry stated in their written note furnished to the Committee as follows:—

"This aspect had been examined in detail by the Ministry and the Ministry has agreed with the Company's view that it is not possible to fix the rated capacity in terms of physical quantity of different types of equipment. It is also true that assessment of rated capacity in terms of single physical output is fraught with inherent difficulties in establishing equivalents for various products. This is because the manufacturing facilities established are general facilities which can be used for many types of products and the production is of diverse equipment with the product-mix and complexity continuously changing. While considering the question of rated capacity in term of physical output in these divisions of the Bangalore unit the following salient features of the production operations in these Divisions have to be borne in mind:—

(i) Products manufactured range from a tiny 'Yalkietalkie' to sophisticated and complex professional equipments like Radars and Broadcast Transmitters. The pattern of production is, therefore, essentially diversified batch production.

(ii) The production quantities of a type may vary from 1 to 5,000 numbers per annum.

(iii) Most equipments go out of the production line in a period of 5 years or so.

(iv) Even in cases like Radars, considerable modifications are involved from one model to another with the result that ability to handle number of modifications to an existing product line must also be catered for.

(v) The recent strides rapid advancements in Electronics technology render the manufacturing process constantly obsolete over the years. The phenomenon considerably influences the requirement of manufacturing facilities like machines, equipments, etc.

(vi) In some cases, special purpose machines require to be installed although there may not be full load all the year round for these machines. This is mainly because sub-contractors, both in private and public Sectors, do not find it possible to take up such loads.

(vii) Modernisation of facilities, particularly at the time of replacement, is necessary from the point of view of increasing technological efficiency as well as productivity."

1.10 The Committee pointed out that in the industrial engineering field, there are two capacities. One is ideal capacity and another is normal achievable capacity. When asked about the views of the Ministry with regard to the fixing of normal achievable capacity for BEL, the witness stated:

"I asked for the figures for the last three years what is their capacity utilization. They have given me the figures of equipment production, component production, TV tubes, etc.....They have a system by which they work out the capacity and they work out the utilization. The only point is, whether that should be in the manner in which we wanted them to do. And I am saying that I am prepared to ensure this, if it is possible to do so."

1.11 The Committtee enquired from the Ministry that in the absence of any fixed criteria in regard to rated capacity, how could the Ministry evaluate performance of the Company, the Department of Defence Production in their written reply stated:

"The performance of the Company is evaluated by the Ministry closely with regard to the Company's targets for the year through the mechanism of the monthly progress reports submitted to it by the Company, Quarterly progress Review meetings held with the Company, Production progress Review meetings held twice a year pertaining to important defence requirements, Steering Committee meetings pertaining to major Defence Projects such as Plan ARFN, Plan ADGES etc. Financial performance reviews also are included in such evaluation."

1.12 The Committee wanted to know whether in the event of difficulties in fixation of rated capacity in terms of physical output, could it be possible for the Company to fix the capacity in terms of

standard man-hours taking into account the established production facilities. The Company in written reply stated as under:—

> "Fixation of 'rated capacity' in terms of standard hours is, however, not possible in the circumstances of the Company. While the total standard hours required for each equipment is used for annual target setting, fixing a rated capacity in terms of standard hours for the plant would mean that the plant is capable of producing that many standard hours irrespective of the product-mix for the year (whether the capacity is used for the production of a single equipment line or a diverse mix of different equipments). This is not physically true. Though many of the manufacturing facilities established are general purpose facilities which can be used for many types of products, it should be appreciated that the loading of different products would result in different utilisation patterns of the manufacturing facilities. This is because the machining and assembly requirements of different product may result in abnormally high occupancy in some centres while some others may be rendered idle either partially or completely. Thus, the rated capacity cannot be arrived at by simple arithmetic."

In this connection, the Chairman, Audit Board, during evidence of BEL, commented as under—

> "I can give the instance of another major public sector undertaking operating at Bangalore. In that case, the product-mix envisaged originally was no longer the current product-mix and the question arose how the rated capacity of that plant can be compared with reference to the actual performance. According to the original product-mix, 890 pieces of equipment were to be produced. It was calculated how many standard man hours were required for those 890 pieces of equipment for which that particular plant was set up originally. On that basis, the rated capacity was worked out into standard man hours. Now, what was the time required for the current product-mix per piece and on that basis, the current rated capacity was fixed. The capacity of that plant was worked out or translated in terms of standard man hours to work out the current production and relate that to actual performance."

1.13 The Committee have observed from the audit Report that in response to the instructions of the Ministry to define production

capacity in terms of "available standard hours output", the Company worked out and submitted in a note to the Board in April, 1982 that the production capacity of Equipment and Components Divisions (based on optimum standard hour clearance) worked out to 34,00,800 hours and 43,58,818 hours respectively. These capacities were communicated to the BPE and the Government. It was also reported to the Board that on this basis, the capacity utilisation during 1981-82 worked out to 72 per cent and 76 per cent respectively in Equipment and Components Divisions.

1.14 The standard hours available and utilised in Equipment and Component Division during 1982-83 and 1983-84, as reported by audit were as under:—

(in lakh hours)

Year		Available Targets	Actuals	Percentage utilisation
1982-83	(i) Equipment Division	22·17	15·98	72
	(ii) Component Division	38·02	31·64	83
1983-84	(i) Equipment Division	21·94	17·72	81
	(ii) Component Division	31·03	27·92	90

1.15 While estimating the above capacity, only 1200 standard hours per worker per annum were taken into account as against 2400 effective hours (excluding Sundays and General holidays) available in a year. The reasons for excluding the remaining 1200 hours as given in the Board Note were as under:—

	Hours per annum per operator
Absenteeism at 15 per cent	360
Design and modification problems requiring fresh allocation of resources	120
Variations in actual operating conditions viz. work organisation, work flow and materials flow compared to conditions originally envisaged	120
Quality management problems conformance to altered specifications at Customers' requests and associated rework/restart on jobs	120
Reduction in capability arising from change in age mix of men and machines	120
Minimum mismatch between fabrication, assembly and testing arising from customer commitments	120
Other allied problems like industrial relations, welfare, seasonal peak absenteeism, production engineering, power cut, machine breakdowns etc.	240
TOTAL	1200

1.16 Audit has pointed out that the reduction of 50 per cent of the total effective hours for purpose of working out the available standard hours per operator per annum is *prima facie* on the high side and the allowances given above are also not based on any detailed and independent work studies. It is not, therefore, clear how far they could be relied upon to indicate a meaningful comparison of the utilisation of production capacities.

In this connection, the Company in its reply given to audit in April, 1983, stated *inter alia* as under:—

> ".....The figure of 1200 standard hours per annum per direct worker (from available working hours of 2400 hours) is only a bench-mark for production planning and cannot be treated as a norm for rated capacity. Achievement of 1200 hours in any particular year depends upon the specific circumstances of that year, *viz.* whether the product-mix of the year consists primarily of stabilised products or new products etc. Factors such as learning curve, development problems, product-mix factors etc., if they are pronouncedly adverse in a year, will make it difficult to achieve the 1200 hours bench-mark."

1.17 It was further stated that "the figure of 1200 standard hours being adopted by the Company is only a parameter for macro-production planning and control and not as norm for rated capacity."

1.18 During evidence, the Committee enquired as to when and on what basis the Company arrived at a conclusion that 50 per cent of the available man hours was reasonable as a bench-mark for production planning and whether this aspect was considered and approved by the Board. The representative of the BEL explained as under:

> "Out of 365 days in a year, after removing the holidays, we came to 300 days. We work eight hours a day. So, that comes to 2400 hours. In theory, 2400 hours are available.....50 per cent comes in this context. It is not that 2400 hours are available because of the factors ILO mentioned. We feel that 50 per cent. that is, 1200 hours are available. Now, what are the factors which we have to taken into consideration, how many hours allowance is to be made, all these were put up to the Board and were approved by the Board on 27th April, 1982."

1.19 The Committee drew attention of the Company to the following guidelines issued by the BPE in 1971:—

> "The Committee are of the view that every undertaking should be free to fix annual targets of production so long as they are equal to or near the rated capacity. But if an undertaking wants to fix a target lower than the rated capacity in spite of there being a clear demand for the products, it should get the prior approval of the Government. This will give an opportunity to the Government to satisfy itself whether deviation from the rated capacity in a particular case is justified or not."

1.20 The Committee then enquired whether the Company obtained prior permission of the Government to lower down the rated capacity from 2400 hours to 1200 hours. The Director (Finance) of the Company stated:

> "This 1200 hours was agreed to by the Government..... It has been agreed to by the Government that it should be the benchmark:.....It was done only once..... Once it was agreed by the Government, we are adopting it year after year."

1.21 Explaining reasons for allowing 50 per cent reduction of the available hours for fixing the rated capacity, the BEL stated in its written reply:—

> "The Company considers that in a light Engineering industry of this type, where complex technologies with changing product mix and changing priorities constant introduction of new equipments or modifications etc. are involved, 1200 man-hours is reasonable as a bench-mark for production planning."

1.22 In this connection during evidence, the representative of the Company further stated:

> "The International Labour Organisation has made a study of what is the effective output that you can get in a working day or working month or a working year. There are different factors.... There is a basic work content in each job. In addition to that, work content is added by defects in design and specification of a project. Another element of work content is added by inefficient methods of manufacture or operation. Further the element of ineffective time is added due to shortcomings in

the management and finally ineffective time out of the control of the worker. Therefore, it is impossible to expect that just because 2400 attendance hours are available, you can get 2400 standard hours output per one operator. We have on the basis of our experience and value judgement of factors over all these elements and we have concluded that in the case of equipment division because of the particular situation that obtains there, 1200 hours per operator per day is the maximum attainable standard hours."

1.23 The Committee enquired from the Ministry whether they were satisfied with the deduction of 50 per cent of the available hours for capacity utilisation for various reasons advanced by the Company and whether the utilisation of capacity computed by BEL was realistic. The Ministry stated in their written reply as under:—

"The Bench Mark to be adopted per worker per annum was considered in detail by the Ministry in March 1982 after careful consideration of various aspects like absenteeism and other related problems peculiar to Defence Electronic industry such as power cut, machines break down, etc.

For the present utilisation of capacities on the basis of standard hours per worker is considered realistic. However, it can be reviewed as and when better parameters become available."

1.24 In so far as Ghaziabad Unit is concerned, its rated capacity is reported to have been fixed in terms of value. The Committee enquired from the Ministry whether this could be a reliable yardstick to measure the capacity utilisation especially in view of inflationary trend in prices. The Department of Defence Production in their written reply have stated:—

"According to the Company inflationary trends in prices of products of the Ghaziabad Unit has not occurred to vitiate capacity measurement against the capacity fixed in value terms. For instance, for major equipment like the 3-D Mobile Radar, over a period of four years the price went down by 0.50 per cent. For another item the price went down by 0.6 per cent. The maximum price increase on a linear—not compounded—scale is 3 odd per cent i.e., much less than in many industries. The Ministry is of the view that the capacity in terms of value is

as reliable as any other indicator, taking into account the inherent difficulties limitations in fixing capacity in multi-product engineering industries as has also been accepted by the Bureau of Public Enterprises."

(ii) *Capacity utilisation*

1.25 The actual utilisation of capacity in the Components and Radar Divisions at Bangalore and in Ghaziabad Unit during 1977-78 to 1983-84 was as under:—

(a) *Components Division*

Sl. No.	Particulars of Components	Year	Rated Capacity	Target	Production	Utilisation of capacity	
						Planned	Actual
1	2	3	4	5	6	7	8
			(In millions)			(Per cent)	
1.	Mica Capacitors	1977-78	6·00	2·50	1·31	41·7	21·8
		1978-79	6·00	Not fixed	1·20		20·0
		1979-80	0·50	Not fixed	0·14		28·0
		1980-81	0·50	Not fixed	0·12		24·0
		1981-82	0·50	Not fixed	7812 Nos.		Negligible
		1982-83	0·50	Do.	328 Nos.		Negligible
		*1983-84	0·80	Do.	340 Nos.		Do.
			(In numbers)				
2.	Hybrid Micro-circuits	1977-78	60,000	80,000	23,196	133·3	38·7
		1978-79	60,000	50.000	19,846	83·3	33·1
		1979-80	60,000	22,500	19,321	37·5	32·2
		1980-81	60,000	31,000	22,052	51·7	36·8
		1981-82	60,000	33,000	43,000	55·0	71·7
		1982-83	60,000	42,000	48,735	70·0	81·2
		1983-84	60,000	49,000	61,986	81·6	103·3

*Production line is closed.

1	2	3	4	5	6	7	8
			(In millions)				
3.	Integrated Circuits	1977-78	0·5	0·47	0·39	93·0	78·0
		1978-79	0·5	0·65	0·43	130·0	86·0
		1979-80	1·5	0·99	0·70	66·0	46·7
		1980-81	1·5	0 92	0·69	61·0	45·7
		1981-82	1·5	0·76	0·67	50·8	44·9
		1982-83	1·5	1·34	0·61	89·2	40·7
		1983-84	1·5	1·25	0·98	83·3	65·3
			(In numbers)				
4.	Quartz Crystals.	1977-78	260,000	170,000	150,000	65·4	57·7
		1978-79	260,000	Not fixed in numbers	170,000		65·4
		1979-80	280,000	157,000	161,000	56·1	57·5
		1980-81	280,000	104,000	115,000	37·1	41·1
		1981-82	280,000	186,000	160,000	66·4	57·1
		1982-83	280,000	197,000	207,850	70·3	48·3
		1983-84	280,000	226,000	178,980	80·7	49·7
			(In numbers)				
5.	Transmitting Tubes, vapotron and Ceramic Tubes	1977-78	18,000	Not fixed	10,596		58·9
		1978-79	18,000	Not fixed.	10,133		56·3
		1979-80	18,000	13,701	8,878	76·1	49·3
		1980-81	18,000	15,600	7,282	86·7	40·5
		1981-82	18,000	13,095	9,862	72·7	54·8
		1982-83	18,000	13,542	8,690	75·2	48·3
		1983-84	18,000	9,919	8,943	55·1	49·7

1	2	3	4	5	6	7	8
			(In numbers)				
6.	Cathode Ray Tubes	1977-78	1,800	1,500	1,200	83·3	66·7
		1978-79	1,800	1,500	1,596	83·3	88·7
		1979-80	1,800	1,360	1,446	75·5	80·3
		1980-81	1,800	1,600	1,099	88·9	61·1
		1981-82	1,800	1,180	1,277	65·5	70·9
		1982-83	1,800	1,415	1,485	78·6	82·5
		1983-84	1,800	300	440	16·7	24·4
			(In millions)				
7.	Receiving Valves	1977-78	5	5·10	4·00	102·0	80·0
		1978-79	5	4·63	3·81	92·6	76·2
		1979-80	5	3·85	2·98	77·0	59·6
		1980-81	5	3·20	2·02	64·0	40·4
		1981-82	5	2·26	2·21	45·2	44·2
		1982-83	5	2·15	1·08	43·0	21·6
		1983-84	5	0·56	0·68	11·2	13·6
			(In numbers)				
8.	X-Ray Tubes	1977-78	1,800	Not fixed in numbers	1,471		81·7
		1978-79	1,800	Do.	1,360	..	75·6
		1979-80	1,800	2,345	1,545	130·3	85·8
		198 -81	1,800	1,700	1,277	94·4	70·9
		1981-82	1,800	2,010	2,047	111·7	113·7
		1982-83	1,800	2,350	1,626	130·6	90·3
		1983-84	1,800	1,285	1,374	71·4	76·3
			(In millions)				
9.	Silicon Semi-Conductors	1977-78	20	19·70	17·29	98·5	86·5
		1978-79	20	18·50	17·41	92·5	87·1
		1979-80	23	19·60	20·27	85·2	88·1
		1980-81	23	24·40	17·24	106·1	75·0
		1981-82	23	25·52	22·58	110·9	98·2
		1982-83	25	24·80	24·17	99·2	96·7
		1983-84	25	25·50	21·02	102·0	86·0

1	2	3	4	5	6	7	8
			(In numbers)				
10.	Magnetrons or Microwave Tubes	1977-78	250	Not fixed	243	..	97·2
		1978-79	300	290	245	96·7	81·7
		1979-80	300	375	273	125·0	91·0
		1980-81	300	320	147	106·7	49·0
		1981-82	300	385	232	128·3	77·3
		1982-83	300	285	285	128·3	95·0
		1983-84	300	315	300	105·0	100·9
			(In millions)				
11.	Power Devices	1977-78	2	3·80	1·99	190·0	99·5
		1978-79	2	0 42	1·86	21·0	93·0
		1979-80	2	1·99	1·77	99·5	88·3
		1980-81	2	2·15	1·53	107·5	76·4
		1981-82	2	1·99	1·97	99·5	98·6
		1982-83	2	1·84	1·86	92·0	93·0
		1983-84	2	2·70	1·40	135·00	70·0
			(In numbers)				
12.	T.V. Picture	1977-78	100,000	120,000	70,912	120·0	70·9
		1978-79	150,000	100,000	134,221	66·6	89·5
		1979-80	150,000	180,000	168,434	120·0	112·3
		1980-81	200,000	180,000	141,669	90·0	70·8
		1981-82	200,000	200,000	170 000	100·0	85·0
		1982-83	200,000	200,000	195,504	100·0	97·7
		1983-84	200,000	200,000	204,100	100·0	102·1
			(In millions)				
13.	Ceramic Capacitors	1977-78	30·00	36·00	34·06	120·0	113·5
		1978-79	30·00	40·00	33·01	133·3	110·0
		1979-80	40·00	46·50	32·04	116·2	80·1
		1980-81	40·00	40·00	25·31	100·0	63·3
		1981-82	40·00	34·00	33·52	85·0	83·8
		1982-83	40·00	40·00	21·25	100·0	78·1
		1983-84	40·00	35·00	32·05	87·5	80·1

1	2	3	4	5	6	7	8
			(In millions)				
14.	Germanium Semi-Conductors	1977-78	20	18·00	18·18	90·0	90·9
		1978-79	20	20·00	17·42	100·0	87·2
		1979-80	20	21·00	20·37	105·0	101·8
		1980-81	20	21·00	16·22	105·0	81·1
		1981-82	20	21·00	21·17	105·0	105·8
		1982-83	20	21·00	21·49	107·0	107·4
		1983-84	20	17·00	18·32	85·0	91·6

1.26 It may be seen that targets set were lower than the capacities established and in respect of 7 out of 14 products lines (item 1 to 7 in the table above), capacities were being underutilised.

1.27 The Committee desired to know the reasons for fixation of lower targets as compared to the rated capacity for most of the products. The BEL stated in its written reply as under:—

> "In the case of Components, lower targets were fixed only in respect of those items where market requirements were becoming uncertain. Some of the lines have also since been closed—e.g., Mica Capacitors, Cathode Ray Tubes, Receiving Valves. In respect of Hybrid Microcircuits and Quartz Crystals, this continues to cater to a large in-house requirement and the quantities produced every year vary depending on the product mix in the equipment Division.
>
> In the case of Radar Division, for the manufacture of Superfledermaus Fire Control Radar, for certain special operations, machines like Jig-boring machine, Gear Grinding and Gear cutting machines etc, say upto 25 per cent of the fabrication capacity, were procured. These machines could not be used to the full extent as the production of the Fire Control Radar has been given up. All other production facilities are put to optimum use."

1.28 During evidence, the representative of that Company clarified that "targets are fixed based on expected market demand. If there is no market, we do not plan that much volume of production."

1.29 The witness further stated:

> "The Department of Electronics for example make a projection that so many B & W and Colour TVs are likely to be

made in 1985-86 and 1986-87. It is another source of information, so we do not have to conduct an independent survey.....we gather in formation from Television Manufacturers Association, ELCINA etc. We also take into account demand projected by the Department of Electronics."

(b) *Radar Division*

1.30 In addition to 3 main types of Radars covered under the Collaboration agreements, the Company developed 12 types of Radars for Defence application and 2 for Civilian application, based either partially on Collaborator's designs or entirely on its own designs. The capacity of Radar division has been expressed in physical terms equivalent to main Radar 'X'.

1.31 The capacity set up initially in 1967-68 was for production of a certain quantity of 'X' type Radars, which was increased to 1½ times in 1970-71. At the instance of the Government, the capacity was further increased to double the original quantity in 1971-72 by installing additional facilities at an estimated cost of Rs. 58,00 lakhs (details of actual expenditure incurred are not available with the Company). However, as the expected orders for 'X' type Radars did not materialise, the additional man power required for Production of Radars was not deployed and the production capacity was restricted to 1½ times the original quantity annually.

1.32 The particulars of utilisation of capacity for Radars (including the spare parts produced) during 1975-76 to 1983-84 (as evaluated and furnished by the Company) were as follows:—

Year	Utilisation (per cent)
1975-76	75·9
1976-77	83·3
1977-78	81·5
1978-79	94·4
1979-80	96·3
1980-81	46.3
1981-82	101·9

1.33 The company stated (April 1983) that for utilising the general purpose capabilities available in the Division, apart from continuing the existing production lines, 5 non-radar items required for Defence, are proposed to be taken up for production in this Division from 1983-84 onwards; while this would fully engage the Assembly capacity in the Division, some fabrication capacity, say upto 25 per cent might not be utilised since it would not be possible to use some of high cost machinery specially meant for production of 'X' type Radars. It was further stated that the Company could not take up the development of a successor to Radar 'X' as the issue was engaging the attention of the Defence Services since 1968.

1.34 The Company further stated in December 1984 that with a view to utilise the surplus fabrication capacity of Radar Division, 7 non-radar items (including 2 for Defence and one for AIR) were taken up in 1983-84 besides undertaking substantial individual jobs to the extent of 87,622 standard hours for other divisions as well as a fabrication sub-contract for TIFR. Further by transferring 14 production machines to other divisions and reducing manpower by 36 men, fabrication facility has been reduced correspondingly.

1.35 The Committee enquired as to why did the Ministry take so long to decide on successor equipment of radar and until that how much was idle capacity and whether it was utilised or not. The Secretary, Defence Production then stated:—

> "Taking the second part first, I have been informed that the idle capacity was not totally just idle but was made up of by producing something else. Not fully, but a part of idle capacity was utilised. As regards the time taken in deciding on the successor equipment, I have gone through the chronology of dates and I find that the Ministry has been continuously pursuing this matter about early decision on a successor equipment. For the first time, BEL wrote to the Government in January 1979. In January 1979, the then Secretary wrote to the General (Staff). On 6th January the Chief of Army sent a reply. In August, 1979 again the Secretary, Defence Production wrote. Then, in August, 1979 a reply came from the Deputy Chief of Army Staff. At that time it was said that it would take some time to take a decision. In February 1981 again the then Secretary wrote. Then in March and in September 1981, reminders were sent. In November 1981 a reply came that some trials were being tried out. Then in January and February 1982, two systems were carried out. In

March 1982, a trial report was submitted. In August, 1984, the first meeting of the negotiating committee was held. In April 1985, the proposal was considered by the CCPA. In May 1985, a contract was signed by the Ministry of Defence. So, this was the position."

1.36 The Ministry have also informed the Committee in their written reply that "the production of Radar 'X' at BEL ceased from January, 1983. However, the spare capacity of the Radar Division was effectively utilised by taking up production of other products."

(c) *Low Power and High Power Equipment Division, Bangalore*

1.37 In respect of Low Power and High Power Equipment Divisions at Bangalore, the extent of utilisation of capacity was not available as the rated capacity had not been fixed either in terms of physical output or in terms of value. During 1981-82, however, the utilisation of capacity in terms of standard hours fixed by the Company in April 1982, worked out to 61 per cent in Low Power Equipment and 75 per cent in High Power Equipment Divisions.

1.38 Asked about the measures proposed to be taken in the ensuring years to reduce idle capacity, the representative of the Company stated during evidence as follows:—

"The causes for the idle capacity must also be understood. They fail under four broad categories; (i) want of work; (ii) want of operator; (iii) breakdown of the machine and (iv) shortage in infrastructure, *i.e.* power supply. Want of work for the machine will, in turn, mean poor planning. Work load may be there for the company, but because planning has not been effective, the job does not reach the machine. It is the sub-category of want of work.

For the latter three factors you cannot plan; so, you cannot try to utilise that capacity, except that we are stepping up the in-house generation capacity.

So far as want of work is concerned, it again arises sometimes due to what you have planned not reaching the machine, either because of shortage and/or defective raw material, held-up in upstream operation etc. Even if those contingencies are taken care of, and allowances are made, it will leave a certain number of hours of unutilized capacity. In those circumstances, we try to find out whether this capacity can be used by other divisions because each division has its own facilities. Another divi-

sion may be looking for them. We try to find work within the factory. In the context of the radar division, we were able to locate jobs in the TV plant we were setting up. A lot of machining for the special purpose machine which we built for the TV plant, was done in the radar division. That will take care of it to some extent. It will leave a certain capacity for which we were not able to find work. We have tried to attract jobs from outside company, but unfortunately we were not successful. There are two reasons for this. People want a complete job done not just one operation. When I don't have the capacity for some of the operations even for the equipment that we have to make, I cannot take on outside jobs. Next is the price—they say our prices are high. They are able to get it done from small scale entrepreneurs, small companies where a similar machine may be available at a lower rate, Idle capacity is worrying us and we are considering ways to avoid."

1.39 When asked further whether the Company was quantifying idle capacity every year and whether it was being reported to the Board, the witness stated:—

"We are not reporting about the idle capacity in each work centre. Significantly, we inform the Board about the Radar Division. We make the Divisional Head responsible for maximum utilization of the facilities available and it is his job to try to get job from his colleagues as well as to go out to try to get jobs done from outside."

1.40 The Committee pointed out that in the Components Division, the targets fixed were lower than capacity established. Actual utilisation was still lower. When asked as to how it happened, the representative of BEL stated that:

"Targets are fixed based on expected market demand. If there is no market we do not place that much volume of production."

1.41 When asked whether any scientific market survey was done in this regard, the witness stated:—

"It depends upon what we mean by 'Market Survey'. For entertainment electronics etc. radio and TV industry, there are associations like ELCINA, ITMA etc. with whom we interact. The Department of Electronics for

example make a projection that so many B&W and Colour TVs are likely to be made in 85-86 and 86-87. It is another source of information. So we do not have to conduct an independent survey.... We gather information from Television Manufacturers Association. ELCINA etc. we also take into account demand projected by the Department of Electronics."

(d) *Ghaziabad Unit*

1.42 The facilities established in the Unit were designed to achieve an annual production of certain Defence equipment of the average value of Rs. 1790 lakhs (at 1975 price level); 59 per cent of this capacity related to a particular type of equipment. There was a drastic curtailment in the orders for this equipment resulting in lot of idle capacity. To utilise the idle capacity, a diversification programme was taken up for balancing the plant which were reported by the Company (June 1982) to have resulted in increase of the annual production capacity to Rs. 2,000 lakhs (at 1978 pricelevel). Details of utilisation of capacity during the 5 years upto 1981-82 were as follows:—

Year	Capacity	Target fixed	Actuals	ilisation of capacity	
				Planned	Actual
	(Rupees in Lakhs)			(Per cent)	
1977-78 .	2000	1228	756	61·4	37·8
1978-79 .	2000	1204	856	60·2	42·8
1979-80 .	2000	1610	1229	80·5	61·5
1980-81 .	2000	2077	1934	103·8	96·7
1981-82 .	2000	2309	2319	115·5	115·9

1.43 It may be seen that the capacity had been underutilised upto 1979-80. Further while the production capacity of Rs. 2,000 lakhs was at 1978 price level, the targets and achievements for various years indicated above were in terms of the sale value for the respective years and hence the figures were not comparable. Allowing for price escalation after 1978, the capacity utilisation appeared to be low even during 1981-82.

1.44 Asked as to how idle capacities in various Divisions of the Company were proposed to be utilised and whether the Ministry had

given any directions in this regard. The Ministry of Defence stated in a written reply as follows:—

> "No specific guidelines have been given by the Ministry. However, the idle capacities in various divisions is automatically utilised by the Company by re-arranging the product-mix. For example the idle capacity in Radar division was utilised for production of communication equipment being produced by other Divisions. No separate directions were given by the Ministry to BEL in this regard."

1.45 When asked whether the question of the capacity utilisation was deliberated in the Board meeting, the C&MD of BEL stated:—

> "....each year we have a Board meeting to consider the production programme as well as the programme in the previous year, that too in addition, item-wise for the year. We also see how many standard hours will be used in each department and how many sub-contracts will be brought from outside. This is gone into in a Board meeting about the production programme annually."

1.46 Asked in the absence of any fixed criterion with regard to the capacity utilisation, what figures are projected to Government by BEL to satisfy them with regard to full capacity utilisation and performance of the Company, the representative of BEL stated:—

> "In such cases the targeted or projected production has inevitably to be taken as the capacity of the enterprises for the period under view. This therefore shows that usually we fix a production target for the year which takes into account the customer priorities, the orders on hand and the production capacity as we envisage in terms of the detailed elements of production load. This production target becomes the point from which the performance, is reviewed and the actuals are reviewed against the production target. Quite apart from this, we also monitor at the management level the number of standard hours output per operater, all output of direct operator per month, the machine utilisation, the idle time, the labour efficiency and things like that to make sure that the trend at least is positive and there are no unutilised pockets of a very serious nature. In the case of components production because it is more or less

series production except for certain divisions like magnetrons we are able to fix capacities and if we fix the targets which are lower than the rated capacity, it is only because of poor market situation."

1.47 The Committee then enquired as to how the Company arrived at a conclusion that a particular job required so much time, whether any work study in this regard was undertaken, the witness stated:—

"There are standard industrial engineering tables which give elemental timings for each type of operation using those tables, we allot for a particular job so many standard hours. As we undertake variety of jobs the actual works study i.e. measurement of time taken by observation becomes impossible."

(iii) *Machine utilisation*

1.48 The table given below shows the percentage of utilisation of machinery in the Equipment Divisions at Bangalore and in the Ghaziabad Unit for the last five years upto 1983-84:—

	1979-80	1980-81	1981-82	1982-83	1983-84
A. Bangalore					
Low Power Equipment Division. . . .	71	68	70	68	65
Higher Power Equipment Division . . .	51	55	60	54	58
Reader Division .	61	59	62	54	52
B. Ghaziabad Unit . .	65	65	68	66	63

1.49 In this connection the Audit observed as follows:—

(i) The utilisation of machinery in the Components Division at Bangalore had not been ascertained. It was stated by the Company in October, 1979 that as most of the plant and machinery held in the Division were special and process equipment designed for the production of various products, "it would not be meaningful if the utilisation of these equipment is sought to be measured."

(ii) The idleness of machinery in the company ranged from 35 to 48 per cent in 1983-84. The main reasons for idleness of machines were want of work, want of operator and electricals|mechanical break-down.

(iii) To end of March, 1984, 8 machines costing Rs. 11.84 lakhs were idle for varying periods of 6 months and above in Bangalore and Ghaziabad units.

1.50 Asked about the steps taken by the Company to improve machine utilisation, the Company in their written reply has stated:—

"Steps taken by the Company to improve mechine utilisation and reduce idleness include—

(i) rationalising the product mix in the Equipments Division by further divisionalisation;

(ii) introduction of Computers for effective Production Planning and monitoring;

(iii) establishing separate Cost Centres for high value machines like NC|ONC.

1.51 Asked that without ascertaining and recording the utilisation of machine in Components Division, how could the Company ensure that all the machines were put to profitable use. The Company in a written reply stated as follows:—

"Most of the plant and machinery held in the Components Division of the Bangalore Unit are specials process equipments designed for the particular product. It would not be meaningful if the utilisation of these equipments is sought to be measured adopting the same methods as are usually adopted for general purpose machinery such as machine tools. For example, the utilisation of equipment like furnaces, plating baths etc. cannot be measured by the time the equipments have been used. Moreover, equipment like furnaces cannot be switched off at all and they have to be 'ON' all the while. A more meaningful measure of utilisation of such equipment is the output obtained which is being monitered and controlled separately. As the output obtained is itself a measure of end-control over the utilisation of such equipment, no separate time data are collected on the utilisation of the equipment in the Components Division. This has been the practice since the beginning."

1.52 As regards the reasons for the decline in machine utilisation in Rader Division during 1982-83 and 1983-84, the Company have also stated:—

> "The reasons for the decline in machine uilisation in the Radar Division of Bangalore Complex was on account of discontinuance of the Fire Control Radar reduction, which was the major production line for the Division. The successor equipment has been decided upon only very recently."

1.53 During evidence, the Committee pointed out that the target achievement in the Radar Division in 1981-82 was 101.9 per cent whereas the machine utilisation of the Division in that year was only 60 per cent. When enquired the reasons for the low utilisation of machines in Radar Division, the representative of the Company stated:—

> "The machine utilisation is on the basis of the number of hours individual machines have worked. The machine utilisation need not share the same trend as the target achievement. The machine utilisation in the Radar Division has been falling from 1979-80 because FC Radar production started tapering off from that year onwards....Even now machine utilisation continues to be poor because certain machines which were meant only for FC Radar are either idle or partially utilised."

1.54 The Committee enquired whether the utilisation of machinery was steadily falling, the representative of the Company then stated:—

> "I do not have the figures upto 1984-85, but as far as I can recollect, the utilisation of machines in the Radar Division has improved in the last two years with the transfer of certain projects from the other two Divisions. But as long as the FC Radar production was not utilising something like 12 major machines to the full extent, the percentage utilisation in the Radar Division will be low."

1.55 The Committee then pointed out that in spite of the transferring of certain projects from other two divisions to Radar Divisions, the machinery utilisation has come down from 54 per cent to 52 per cent. Even in the year of the strike the Company had achieved machinery utilisation to the extent of 54 per cent. Thereupon, the representatives of the SEL admitted that 'in spite of the fact that that

Project transferred from other divisions were able to utilise same of the machines the average utilisation was pulled down by the fact that certain machines were practically idle.'

1.56 When asked as to why did the Company not advertise the selling of machinery to a private concern if the machinery was not going to be of any further use or not fully meeting the utilisation level, the representative of the company explained:

> "In the case of the Radar machines which could not be fully utilised, we could not decide whether they could be disposed off till its successer radar was decided upon. But now that we know that the new radar is going to be, and what its design is, we will have to decide about what machines are needed. Those, that are not needed, will have to be put on auction block."

1.57 Asked about the steps taken by the Company to improve the machinery utilisation, the representative of the Company stated:—

> "It is a matter which we moniter every month. The machine utilisation or the machine idleness depends on situation where there is no work or where the operator is not available. It also depends on break-down of machinery and, of course, on availability of power supply. We have been having situations where the power cut was up to the extent of 80 per cent. So, we have taken steps in the last couple of years to augment the in-house power generating capacity. By the end of this financial year, we will be further augmenting it and we will be able to be practically independent of the Karnataka State Electricity Board, in so far as the power supply is concerned. So, that one factor which affects the machine utilisation will be taken care of. So far as want of work is concerned, we are trying to improve our production control and planning system as far as breakdown is concerned, we are now trying to improve the maintenance to avoid this. Finally, we discovered that one other factor which was distorting the machine utilisation figure, was the fact that whether it is Rs. 30 lakh CNC machine or Rs. 5000/- drilling machine, they were treated alike. Certain common machines like drilling machines and tapping machines which are low value machines are provided for secondary operations in each work centre. We have now

decided that they should not figure in the machine utilisation because these machines are installed not on the basis of what is the load but to make sure that we do not lose too much time in movement of material from place to place; we provide these machines at each work centre. So, if we separate these low cost machines and concentrate on the high cost machines, we will get a better control over the machine utilisation."

1.58 The Committee pointed out that in 1981-82 the company achieved full target production as a result of capacity utilisation to the extent of 101 per cent. However, the idleness of the machinery in Equipment Divisions in Bangalore and Ghaziabad ranged from 30 to 40 per cent in that year. Furthermore, in order to achieve the targeted production the Company is reported to have given subcontracting to outside party and thereby made their own machines idle. Asked what steps have been taken by the Company to reduce idleness of the machinery the representative of BEL stated:—

"The conclusion that we are sub-contracting at the expense of in-house capacity is wrong. There are twenty production centres roughly which are all involved in making a product, but the load on each work centre differs from product to product. With a particular product-mix, you may find that for precision turning you do not have in house capacity, but for precision milling you may have surplus capacity. Precision turning we subcontract. But the average machine utilisation largely depends upon how many precision milling you have..."

1.59 Asked whether the Company quantified the idle capacity of machinery every year and whether the matter was being reported to the Board regularly, the representative of BEL stated:—

"We are not reporting about the idle capacity in each working centre. Signficantly, we inform the Board about the Radar Division. Otherwise, we make the Divisional Head responsible for maximum utilisation of the facilities available, and it is his job to try to get job from other colleagues as well as to go out to try to get it done from outside."

1.60. The Committee on Public Undertakings (1971-72) in their Third Report on the working of BEL recommended that rated capacity of plan should be fixed in terms of physical output as the value

of production was liable to change. The Committee also reiterated the recommendation in their Twenty-fifth Report (1972-73). In spite of this, the Committeee are sorry to note that the rated capacity in terms of physical output has not so far been fixed by the Company in respect of Low Power and High Power Equipment Divisions in Bangalore and also in Ghaziabad Unit, though the Company is reported to have fixed production capacities in terms of physical output for the products manufactured in the Components and the Radar Divisions at Bangalore and for the opto-electronic devices produced at Pune Unit.

1.61. The Committee also find that in Ghaziabad Unit the production capacity has been fixed only in terms of value. The Committee do not consider it as a reliable yardstick for measuring the capacity utilisation in view of inflationary trend in prices.

1.62. The Committee are informed that in response to the instructions of the Ministry to define production capacity in terms of "available standard hours output" the Company worked out in April, 1982 the production capacities of Equipments and Components Divisions at Bangalore to 34,00,800 hours and 43,58,818 hours, respectively. While estimating the capacity in terms of "available standard hours output" the Company took into account the availability of only 1200 hours per direct worker per annum as against 2400 effective hours. On this basis the capacity utilisation during 1981-82 worked out to 72 per cent and 76 per cent respectively for the said two Divisions. The Committee are also informed by the Company that because of peculiar situation obtaining in the Divisions 1200 hours per operator per annum was the maximum attainable standard hours. The Company has further maintained that these 1200 standard hours are only the bench-mark for production and planning and were not to be treated as norms for rated capacity and in the event of product mix factor being adverse in a particular year, it may be difficult to achieve even the 1200 hours bench mark. In this connection, the Department of Defence Production have also supported the position maintained by the Company that "for the present utilisation capacity on the basis of standard hours per worker per annum adopted by the Company are considered realistic and matter can be reviewed later as and when better parameters become available."

1.63. During evidence, the representative of the Company contended before the Committee that it was not possible to fix rated capacity in terms of physical quantities of different types of equipments and

that assessment of rated capacities in terms of singleunit was fraught with inherent difficulties in equivalents for various products. The witness further stated that "it was not possible to do it in an Engineering Industry of BEL's nature due to changing pattern of production and improvements and modifications needed from time to time". As regards the suggestion whether the question of fixing the rated capacity could be referred to some reputed Management Institute for advice, the Defence Production Secretary while agreeing in principle stated in his oral evidence "if there is any one who can suggest about the expert or the Committee can tell us, in principle I for one would be prepared to recommend to the Government that this exercise is worthwhile and let us have the capacity assessed". He further added "I am prepared for its being referred to anyone anywhere in India who can be trusted for secrecy".

1.64. To another suggestion that if the rated capacity in terms of physical output could not be fixed, could it be fixed in terms of standard man hours by taking into account the established production facilities. To this also the representative of the Company did not agree saying "rated capacity cannot be arrived at by simple arithmetic". The Chairman Audit Board, however, has cited before the Committee the example of another similar major undertaking operating at Bangalore viz. Bharat Earth Mover Ltd. whose product mix envisaged originally was no longer the current product mix and the question arose how the rated capacity of that plant could be compared with reference to actual performance. For that purpose they first calculated the standard man hours required for original Product mix i.e. 890 pieces of equipment for which that particular plant was originally set up. On that basis the rated capacity of plan was worked out into standard man-hours. Then the time required for the current product-mix per piece was worked out and on that basis the current rated capacity was fixed. In short the capacity of the plant was first worked out into standard man hours to assess the current production and then it was related to actual performance.

1.65 While reiterating their earlier recommendation, the Committee stress that BEL should immediately undertake an assessment of the rated capacity either in terms of physical output or in terms of standard man hours on the lines of the example cited by Audit. The Committee are of the view that in the absence of the fixation of rated capacity on the basis of correct norms it is not possible to assess the capacity utilisation in the right perspective. The Committee also feel that the deduction of 50 per cent of the total effective available hours for purpose of working out the available standard man-hours per operator per annum is prima facie on the high side and is not acceptable as

this is not based on any detailed and independent work studies. The Committee therefore recommend that the Government should appoint suitable Consultants or Expert Authority to determine the capacities for Companies such as BEL which could determine a yard-stick for assessing the capacity utilisation on scientific basis. The Committee also suggest that Government may also review the whole question of deduction of 50 per cent of the total effective hours for purpose of working out the available standard man-hours per operator per year with a view to arriving at a better parameter for the meaningful assessment of the production performance of the Company. While doing so, the Government may keep in view the experience of similar concerns elsewhere in India and abroad..

1.66 According to BPE guidelines issuued in 1970-71, every undertaking was free to fix annual target of production so long as it was equal or near about to the rated capacity. However, if some undertaking wanted to lower the rated capacity it had to get prior approval of the Government therefor. This provides an opportunity to Government to satisfy itself whether the deviation from the rated capacity was justified. On enquiry whether the rated capacity of 2400 hours fixed by BEL was lowered to 1200 hours with the prior specific approval of Government, the Finance Director of the Company informed the Committee that "1200 hours fixed were agreed to by the Government ... It was done only once. Once it was agreed to by Government we are adopting it year after year". As per BPE instructions the Company had to seek prior permission of the Government. Again to a pointed question, whether the Company got approval of Government prior to reducing the standard man-hours capacity, the witness did not give an unequivocal reply. The Committee are therefore constrained to conclude that the Company has clearly violated BPE's instructions on the subject to which the administrative Ministry have also acquiesced by according approval subsequently without any deliberations or indepth study. The Committee consider it a clear case of lapse both on the part of Company and also the Ministry and express their displeasure for not following the BPE's guidelines by the Company as well as the Ministry in a vital matter.

In order to obviate recurrence of such lapses the Committee desire that BPE's guideline on subject may be circulated by the Ministry again to all public undertakings under their control for their guidance and strict observance and any case of lapse coming to the notice of the Ministry should be appropriately dealt with.

1.67 The Committee are concerned to note that the percentage utilisation of machinery in the Low Power Equipment Division and

Radar Division at Bangalore has been declining steadily. The percentage utilisation in Low Power Equipment Division came down from 71 per cent in 1979-80 to 65 per cent in 1983-84. The position in the Radar Division is still dismal. There, the percentage utilisation of machinery has come down from 61 per cent in 1979-80 to 52 per cent in 1983-84. Though the utilisation of machinery is reported to have improved in Radar Division during the last two years by transferring certain projects from other two Divisions, the Committee have found that in spite of transfer of some projects from other Division to these Divisions, the machinery utilisation has not improved but has come down from 54 per cent to 52 per cent. In this connection the representative of the Company also admitted that "in spite of the fact that project transferred from other Divisions were able to utilise some of the machines, the average was pulled down by the fact that certain machines were practically idle." It was also admitted by the representative of BEL that "as long as FC Radar Production was not utilising something like 12 major machines to the full extent, the percentage utilisation of machinery will continue to be low."

1.68. In the Ghaziabad Unit, the position is somewhat better but there also the utilisation of machinery has come down from 65 per cent in 1979-80 to 63 per cent in 1983-84. It was 68 per cent in 1981-82 and 66 per cent in 1982-83. The idleness of machinery in the Equipment Division at Bangalore and Ghaziabad Unit is reported by audit to have ranged from 35 to 48 per cent in 1983-84 and the main reasons advanced therefor are want of work, want of operator and electricity|mechanical break down. Till the end of March, 1984, 8 machines costing Rs. 11.84 lakhs were idle for varying periods of six months and above in Bangalore and Ghaziabad Units. In the Components Divisions, at Bangalore, the utilisation of machinery had not been ascertained so far.

1.69 The Committee have observed from the Audit Report that in the Components Division, for 7 out of 14 products, the targets fixed were lower than the capacity established. The Committee, therefore, recommend that the Company should take immediate action to ascertain the extent of utilisation of machinery in the Components Division and take concerted and effective measures for utilisation of all the machines fully to their established capacity and in no case the machines be allowed to remain idle, partly or fully

1.70 The Committee are also informed by the Company that the machinery utilisation with the Radar Division has been going down from 1978-79 because FC Radar production started tapering off from

that year onward. Even though the Company has established capacity in terms of plant and machinery for an annual production of certain quantity of 'X' type Radars, the manpower engaged was restricted to an annual production of 75 per cent of the quantity leaving the machine capacities unutilised. The Committee also note that in Radar Division, the capacity set up initially in 1967-68 for production of 'X' type Radars was increased to double the original quantity in 1971-72, at the instance of the Government, by installing additional facilities at estimated cost of Rs. 58 lakhs. However, the expected orders for 'X' type products did not materialise. The additional man power required for production was not deployed and production capacity was restricted to original quantity. In this connection, the Company has also stated in April 1983 that apart from continuing the certain existing production line, non-radar item required for defence were proposed to be taken for production from 1983-84 onwards. While this will engage fully the Assembly capacity in the Division, some fabrication capacity upto 25 per cent might not be utilised because of non-utilisation of some of the high cost machinery specially meant for production of 'X' Type Radars. It is also reported that the Company could not take up the development of a successor to Radar 'X', as the issue was engaging attention of Defence Services since 1968. The production of 'X' Type Radar at BEL ceased from January 1983.

1.71 The Committee take a serious view of a large number of machines lying idle in which a huge capital has been invested which cannot be allowed to remain blocked. Further, if the machines are kept idle it will have its own reflection on the prices, production and also on the payment to labour for the working hours. On the one hand the cost per man hour would go up, on the other the value of the machines depreciates with the passing of each day. The Committee therefore, recommend that financial loss suffered by the Company during the last 5 years in terms of production due to the machinery remaining idle, should be quantified and the Committee may be apprised of it. The Committee may also be informed of the steps proposed to be taken to minimise the idle capacity of machines. In this connection, the Company|Government should also examine the feasibility of disposing of such of the machines as are not going to be made use of in future. The Committee would like to be informed of the action taken in this regard within next six months...

1.72 During evidence, when enquired whether the idleness of the machinery and stabilised capacity were being reported to the Board, the representative of the Company admitted that "we are not report-

ing down the idle capacity in each work centre. We informed the Board about the Radar Division". The Committee recommend that the idle capacity of machines in all the units of BEL should be quantified and reported to the Board regularly after every six months alongwith the reasons therefor and also the measures taken to improve the utilisation of machinery etc. so that the Board should have the opportunity to look into the problem in all its remifications and take suitable action where necessary. The Committee also desire that the Ministry should also specially monitor the utilisation of machinery in the Company so as to ensure that there is no slackening of efforts at any time at any level. Concerted efforts should also be made for utilisation of the idle machine capacity to alternative uses. The information with regard to idle capacity should also be brought out in the Annual Report of the Company.

CHAPTER II

PRODUCTION COSTING AND PRICING

A.—*Fixation and achievement of Production Targets.*

Details regarding the value-wise targets and achievement in the Bangalore and Ghaziabad Units along with the Bangalore reasons for shortfalls, for the years from 1977-78 to 1983-84 are indicated below :

(a) **Bangalore Unit**

(i) *Equipment Divisions*

Year	Low Power Equipment		Percentage of shortfall	High Power Equipment		Percentage of shortfall	Radars		Percentage of shortfall
	Target	Actuals		Target	Actuals		Target	Actuals	
1	2	3	4	5	6	7	8	9	10
	(Rs. in lakhs)			(Rs. in lakhs)			(Rs. in lakhs)		
1977-78	1947	1193	38·8	1554	835	46	2340	1712	26·8
1978-79	1401	1201	14·3	1360	883	35	2064	2134	—
1979-80	1500	1452	3·2	1278	1161	9	1810	1643	9·2
1980-81	1868	911	51·2	1321	766	42	1762	927	47·4
1981-82	2743	1652	39·8	1968	1590	19	1931	1956	—
1982-83	2565	2218	13·5	2952	2137	27·6	2036	1370	32·7
1983-84	2620	2776	—	2498	2688	—	2105	2062	2·0
1984 85	2950	3052	—	2993	3342	—	2270	2136	6·0

2.2 It is seen that the targets fixed for the years 1978-79 to 1980-81 were less than the target fixed for 1977-78, leaving lot of unutilised capacity. Even these derated targets could not be achieved. Some of the important reasons for shortfall in production compared to targets as reported to the Board during various years were as under:—

(i) Non-materialisation of expected improvement in efficiency;

(ii) Labour unrest on shop floor, absenteeism and industrial relations problems;

(iii) Delays in development of products, delays in obtaining bulk production clearance.

(iv) Shifting of priorities to other equipments;

(v) Static overall productivity due to uneven loading of production;

(vi) Delays and initial teething troubles in productionisation of newly developed products.

(vii) Giving priority to exports.

(viii) Delays in obtaining supplies of materials from indigenous/foreign suppliers.

(ix) Power cut and labour unrest.

2.3 (ii) *Components Division*

Year	Target	Actuals	Percentage of shortfall
	(Rs. in lakhs)		
1977-78 .	2445	2166	11.4
1978-79 .	2576	2488	3·4
1979-80 .	2991	2890	3·4
1980-81 .	3256	2409	26·0
1981-82 .	3420	3295	3·6
1982-83 . .	3808	3375	11·4
1983-84	3539	3181	10·1

2.4 Reasons for shortfall with reference to targets as reported to the Board were as follows:—

(i) Delays in internal re-transfers of 100 operators, conversion of 250 part time operators to full-time and recruitment of fresh batch of 100 operators.—Relocation of T.V. Picture Tube Plant.

(ii) Periodical adjustments taking into account the off-take by Radio and T.V. industry, inventory levels, direct/channalised imports by other organisations, etc.

(iii) Reduced demand for Receiving Values.

(iv) Slump in the market for T.V. Picture Tubes for certain period and similar scaling down of production of Integrated Circuits.

(v) Strike in the factory.

(vi) Power cut and lay off during first quarter of 1982-83. Reduced demand for X-ray and rectifier tubes and all ICs.

(vii) Loss in production value due to reduction in selling prices of picture tubes, small signal devices, etc. Low production in terms of quantity was due to power problem.

2.5 (b) *Ghaziabad Unit*

Year	Target	Actuals	Percentage of shortfall
	(Rs. in lakhs)		
1977-78	1228·00	756·00	38
1978-79	1204·00	856·33	29
1979-80	1610.00	1228·57	24
1980-81	2077·50	1934.03	7
1981-82	2309·00	2319·33	..

2.6 Reasons for shortfall as reported to the Board were as under:—

(i) Labour unrest and power failures.

(ii) Unprecedented floods, continued agitation of labour culminating in lockout from 9th March, 1979.

(iii) Continued lockout till May, 1979 and abnormal conditions till July, 1979, power supply difficulties and technical problems relating to newly-designed equipment.

2.7 The following steps are reported to have been taken by the Company to improve the gap between targets and actuals:—

(i) Investments in in-house power generation and supply, so as to be independent of vagaries of power supply of the Karnataka Electricity Board.

(ii) Introduction of a system by which the initial designs are fully evaluated in-house to ensure that the specifications are met before bulk production proceeds ahead.

(iii) Better planning system at the development stage.

(iv) Restructuring of the LPE and HPE Divisions (into four separate production divisions) for better production and facilities planning.

(v) Relating to delays in getting bulk production clearance, this aspect is largely beyond the control of the Company. BEL here is only one of the inputs to the larger decision making system. However, the Company has taken steps for improved interaction.

(vi) Institution of de-centralised Computer facilities in the Production Divisions.

2.8 The Committee pointed out that in so far as High Power Equipment is concerned, in 1980-81 the shortfall in achievement was 42 per cent, in 1981-82 it came down to 19 per cent in 1981-82 but again increased to 27.6 per cent in the year 1982-83. Asked whether the Company could not improve the performance, the representative of BEL stated:—

"In 1984-85, there is improvement. We have also detailed the steps we are taking to make sure that there will be no shortfall in our targets by improvement in our planning, by-house power generation, by bifurcation of

some of the larger divisions into small and compact divisions, with providing each division its own data based unit etc."

2.9 The Committee enquired as to what strategy had been worked out by BEL to achieve targetted figures, the witness than stated:—

"The shortfalls can be attributed to launching designs which were not fully evaluated at the shop floor which leads to interruptions in production, modifications etc. Now we are tackling that by having full design evaluation before the production is launched. We are trying to improve planning also. So far, we have been depending upon the Central EDP computer to give us the bill of material schedule, especially order schedule, the materials drawn from the stores and all that, which has certain inherent difficulties. So, we are now giving each division a computer in order that information can be feeded in and output obtained more quickly."

2.10 The Committee noted that three main reasons had been attributed by the Company with regard to non-achievement of targets were, initial teething trouble; delay in development of products and delays in obtaining bulk production clearance. Asked as to what measures were proposed to be taken by the Company to overcome these problems, the Director R&D of BEL then stated:—

"The problems are different and the answers are also different. To put it in a nutshell, the interaction for products which are developed initially outside BEL, i.e. D.R.D.O. is put on more intensive basis. Earlier, there used to be time lag between the development of project and the user's requirement. Sometimes, the user may want it very urgently. This is not fully appreciated. The development effort made and the additional product engineered is almost equal to or more than what is done in the initial stages in the D.R.D.O. There are a lot of development. That is why, it goes into in-house R&D. So, the time delay is attributed to two ways. One is, late entering into the field. That is being corrected by compiling data with DRDO, and better monitoring system. That is for the projects which are developed outside.

On the in-house development projects, planning and investigation is done at the developing stage so that corrective action wherever needed can be taken in time. These are broadly two methods which are followed."

In this connection, the CML also added that:—

"In 1984-85, the two divisions namely, LP & HP Divisions have exceeded the targets. Only in Radar Division there is a marginal slip. It is a minus 6 per cent. In the overall performance there has been an increase in the output."

2.11 Asked as to why there was deterioration in the Radar Division where the shortfall has increased from 2 per cent to 6 per cent. The representative of the BEL then stated:—

"We had transferred some of the equipment that were traditionally in the Low Power Division and High Power Division to the Radar Division. We felt that, given the facilities that they have and the fact that the equipment were in production in the other two Divisions, there should be no difficulty for the Radar Division to produce those equipment also during that year. When we transferred to another Division, it took some time—a longer time than we had anticipated—for them to get familiarity with the product and complete the product. That was one factor which resulted in shortfall. The second factor which was totally unexpected was this. There were two radars which were to have been produced and despatched that year. Although we completed all work they were held up. It is laughable matter, but we could not get over it. One IC which we obtained from our collaborator absolutely misbehaved; there was no answer to that, there was no way to get over that. The entire batch of ICs had to be withdrawn by the supplier and a fresh batch of ICs were to be supplied; that took place after the year was over. It was a last minute catastrophe."

2.12 The Committee are unhappy to note the dismal production performance of BEL. Audit has reported shortfalls in the production targets fixed in the Low Power and High Power Equipment Divisions and Radar Division at Bangalore during 1977-78 to 1982-83. In 1980-81, the shortfall in production targets was as high as 51.2 per

cent in Low Power Equipment Division, 42 per cent in High Power Equipment Division and 47.4 per cent in Radar Division. However, in the subsequent two years i.e. in 1983-84 and 1984-85 actual production in the Low Power and High Power Equipment Divisions exceeded the fixed targets. It was only in Radar Division that the shortfall continued and it increased from 2 per cent in 1983-84 to 6 per cent in 1984-85. The production performance of Ghaziabad Unit has also been far from satisfactory upto 1980-81. The percentage of shortfall varied from 7 per cent in 1980-81 to as high as 38 per cent in 1977-78.

2.13 The Committee are also informed that BEL was to produce and despatch two Radars in 1984. Although, the Company completed all the work, their despatch was held up as one IC obtained from the collaborators misbehaved. The Company was not able to get over the problem and ultimately the entire batch of ICs was returned to the collaborators and a fresh batch was received from them after a year. In this connection, the representatives of the BEL also admitted in evidence "it is laughable matter that we could not get over it. One IC which was obtained from our collaborator absolutely misbehaved and there was no way to get over that." The Committee are surprised that in spite of technological advancement claimed by the Company it was completely helpless in rectifying an IC procured from collaborators and it resulted in considerable delay in production and delivery of the vital equipment to the Armed Forces, etc. The Committee desire that the whole matter should be probed thoroughly with a view to fixing responsibility as to why the ICs were not properly tested in the Company when received from the collaborator and why the defect in the IC could not be got over by the Company itself and the consequent loss suffered by BEL on this account. The Committee also desire to be apprised of the extent of the collaborator's responsibility involved in this regard and what action has been taken by the Company to realise damages from the collaborator on this account.

2.14 The Committee have also observed that the targets fixed for the year 1978-79 to 1980-81 were less than the targets fixed for the year 1977-78 leaving thereby a lot of unutilised capacity. Even these derated targets could not be achieved by the Company.

2.15 According to the Company, some of the common reasons for the shortfall in production during all these years were delays in development of product, delays in obtaining bulk production clearance, initial teething trouble in productionisation of newly developed products, delays in obtaining supply of components from indigenous foreign suppliers, etc. The Committee do agree that some of the factors could not be predicted with any degree of certainty but a few of them could have been foreseen by theCompany at the time of fix-

ing the targets. The shortfall in targets could have been avoided had the Company made adequate arrangements for proper monitoring and follow up of production. Therefore, in Committee's view the preliminary factor responsible for the shortfall in production targets year after year was that the Management did not fix up realistic targets after assessing all relevant factors. The Committee suggest that the Company should streamline their machinery for target setting so that the production targets set for various Divisions are more realistic than what they have been in the past. The Company should also ensure that once the targets are fixed every effort should be made to achieve them.

2.16 The Committee note that to minimise the gap between the targets and achievements, the Company has taken certain important steps which include in-house power generation, better planning at the developmental stage, bifurcation of large division into small compact divisions, decentralisation of computer facilities to provide each division its own data based unit etc. The Committee hope that with these steps the Company will not only be able to maintain the progress achieved in 1984-85 by Law Power and High Power Divisions at Bangalore but will bring about a marked improvement in the production performance of all other Divisions of the Company.

B. Rejections and Re-work

2.17 The audit has brought out the following points noticed in rejections and rework in various Divisions of the Comany:

I. Rejections

(i) *Equipment divisions*

No norms were laid down for rejections to assess the quality of performance, fix responsibility for abnormal defective work and initiate remedial measures. The quality levels were ascertained on a monthly basis and compared with past performance and only abnormalities were investigated. No monthly reports were submitted to higher Management on the quantum of rejections in each of the Divisions duly analysing the reasons alongwith the labour and material costs involved therein.

(ii) *Components Division*

2.18 Norms were fixed in respect of 6 out of 14 components that too only for the assembly stage of manufacture. In respect of fabication of parts required for the assembly of components, no norms were fixed. An analysis of assembly rejections in T.V. Picture Tubes, Germanium Semi-conductors and Ceramic Capacitors revealed the following I. T. V. Picture Tubes

(a) The process rejections of raw bulbs from 1977-78 to 1983-84 in respect of the main product viz. 20" tube were as follows:

Year	Total consumption	Goods output	Rejections	Percentage of rejection
	(In numbers)			
1977-78	77330	70273	7057	9·12
1978-79	150197	133580	16617	11·06
1979-80	176409	166862	9547	5.41
1980-81	150445	140116	10329	6·87
1981-82	177994	167412	10582	5·94
1982-83	206159	193620	12539	6·08
1983-84	216602	202473	14129	6·52

2.19 It may be seen that the rejection percentage of raw bulbs had been high and varying. Though the Company introduced mechanical handling by means of an integrated conveyorisation system the processes for dispensing chemicals were being manually operated.

(b) The comparative position of rejection levels at the Japanese Collaborator's works (as intimated by them in June 1971), rejection norms fixed by the Company and actual process rejections during 1979-80 to 1983-84 were as follows:—

Operation	Rejection levels in Collaborators works	Norms fixed by the Company	Actual rejections				
			1979-80	1980-81	1981-82	1982-83	1983-84
	(Per cent)						
(i) Bulb processing :							
Screen coating	0.1	5	11	15	16	12	9·9
Lacquaring-0.2 Aluminising-0.8 Baking - 1.5	2.5	15	21	21	22	23	20.7
(ii) Tube Processing :							
Sealing	0·6	1	..	2	1	2	1.8
Exhausting	2.9	3	6	4	6	9	7·3
Ageing	0·5	1	4	5	7	7	5·1
(iii) Quality Inspection:							
First Inspection	2.9	12	16	17	17	15	13·2
Final Inspection	0·9	4	4	4	4	3	3·1

2.20 The Company intimated (May 1982) that the higher process rejections compared to the levels in Collaborator's works were due to the following:

(i) *Bulb processings*

—Quality problems in indigenised chemicals.

—Inefficient manual method of dispensing chemicals in the Company compared to automated process at Collaborator's plant.

— Manual handling of jobs in the Company as against the automatic handling at Collaborator's plant.

(ii) Tube processing:

— Manual processing adopted as against automated processing in the Collaborator's works.

(iii) Quality Inspection:

— Adoption of higher quality levels whereby the Company markets only 'A' quality tubes as against lower 'B' and 'C' grades which were also passed and marketed by Collaborators.

2.21 As norms fixed by the Company took into account all relevent factors like experience, low production volume compared to international procedures, and passing of only 'A' grade tubes it was not clear why the actual rejection rates were higher (except in final testing) than the norms fixed.

2.22 The table below gives particulars of 2 components *viz.* Germanium Semi-conductors and Ceramic capacitors where the scale of rejections during 1979-80 to 1983-84 was more than the standards fixed (except in respect of ceramic capacitors during 1983-84 (information as furnished by the Company).

Year	Input Quantity	Standard rejections		Actual rejections	
		%age	Quantity	%age	Quantity
1	2	3	4	5	6
(i) Germanium Semi-conductors Power Transistors [Cans]					
1979-80	5,38,826	6·08	32,761	6·91	37·214
1980-81	4,60,001	5·05	23,230	6·40	29,425
1981-82	7,53,521	4·06	30,593	5·94	44,772
1982-83	6,99,598	3·66	25,605	5·21	36,481
1983-84	4,71,822	2·14	10,097	5·85	27,593
Weighted average for 5 years	29,23,768	4·18	1,22,286	6·00	1,75,485
Diodes (Whiskers)					
1979-80	70,52,498	20·62	14,54,225	18·40	12,97,350
1980-81	55,54,613	22·19	12,32,569	25·97	14,42,542
1981-82	83,89,152	20·00	16,77,830	35·70	29,94,672
1982-83	53,28,055	20·00	10,65,611	26·53	14,13,550
1983-84	14,30,336	21·87	3,12,814	27·02	3,86,543
Weighted average for 5 years	277,54,654	20·69	57,43,049	27·15	75,34,657
Diodes (Semi-sealed)					
1979-80	76,74,738	21·02	16,13,230	25·01	19,19,590
1980-81	52,74,013	21·82	11,50,790	22·03	11,61,942
1981-82	70,13,202	20·63	14,46,824	23·08	16,18,722
1982-83	49,33.255	20·63	10 17,731	20·65	10,18,750
1983-84	12,72,729	22·10	2,81,273	17·99	2,28,936
Weighted average for 5 years	2,61,67,937	21·06	55,09.848	22·73	59,47,940
Ceramic Capacitors Discs					
1979-80	1,45,98,190	3·09	4,52,340	3·67	5,36,464
1980-81	1,24,10,205	3·13	3,88,826	6·59	8,18,103
1981-82	1,80,59,290	3·01	5,53,249	3·69	6,66,608
1982-83	1,74,51,790	2·76	4,81,124	3·05	5,32,970
1983-84	1,87,51,500	2·98	5,59,775	2·52	4,72,200
Weighted average for 5 years	8,12,70,975	2·98	34,25,314	3·72	30,26,345

1	2	3	4	5	6
Barrier Layers (GFO)					
1979-80	1,41,06,000	2·70	3,81,561	3·10	4,37,920
1980-81	1,03,92,800	2·77	2,88,101	10·16	10,55,800
1981-82	1,19,70,400	2·76	3,29,818	2·68	3,21,050
1982-83	98,64,200	2·68	2,64,314	3·28	3,23,300
1983-84	1,04,83,400	2·78	2,91,454	3·03	3,17,950
Weighted average for 5 years	5,70,16,800	2·73	15,55,248	4·31	24,56,020
Plaquettes (High-K)					
1979-80	94,98,100	4·13	3,92,350	10·11	9,60,660
1980-81	79,13,000	4·16	3,29,285	14·81	11,71,650
1981-82	92,38,050	4·19	3,86,811	10·72	9,90,090
1982-83	84,37,500	4·23	3,57,038	11·73	9,89,710
1983-84	73,05,400	4·22	2,08,437	9·15	6,68,500
Weighted average for 5 years	4,23,92,050	4·18	17,73,921	11·28	47,80,610

II. Rework

(i) *Equipment*

2.23 The monthly reports on rework submitted to the Management contained only a Division-wise statistical data. No analysis of the reasons for rework was made. The cost of rework in the Divisions during 1977-78 to 1983-84 worked out to 25.02 lakhs hours valued at Rs. 940.81 lakhs.

(ii) *Components*

2.24 A major rework activity related to in-process rejections of T.V. Picture Tubes including reclamation of parts from defective T.V. guns. This was done alongwith the regular production on grounds of convenience and smooth operation. The extent of expenditure on rekork was not assessed and reported to higher Management.

2.25 The Committee enquired that in order to exercise effective control why norms had not been fixed for rejections in Components into Division, the BEL stated in the written reply:—

> "While no norms as such have been laid down but each of the Component Divisions have a system of looking at the extent of rejection and rework for control purposes. Generally, the percentage of rework related to production is held within 2 per cent. Since rework is resorted to during the course of production there are no rejections of the equipment as such at the end of the production process."

2.26 Labour and material costs involved in the rework and restart during the years 1982-83 to 1984-85 are stated by BEL as under:—

Division	Labour Cost (with overheads)			Material Cost (with overheads)		
	1982-83	1983-84	1984-85	1982-83	1983-84	1984-85
				(Rs. in lakhs)		
Lower Power	29·32	28·20	30·99	35·75	44·39	34·42
High Power	21·48	22·38	19·11	22·84	24·98	33·77
Radar	36·82	23·87	23·16	20·91	13.90	14·26

2.27 When enquired as to why the analysis of the reasons for rework was not done and whether it was being done, the BEL in its written reply has stated:—

> "While Division-wise statistical data relating to rework in the Equipment Divisons is given to Management on a monthly basis, the analysis of the rework is a shop floor activity which is being done daily in the shop itself by the shop executives and the departmental heads. Required corrective action is taken immediately as a part of the production system itself.
>
> In the Components area, rework does not arise generally, but only rejections—except in the case of the TV picture Tubes. Here, rework activity is related to inprocess rejections and in the nature of operations, the re-work is done along with thr regular production."

2.28 During evidence, the Committee pointed out that the main points involved with rgard to the rejections were:—

(i) No norms had been laid down thereof;

(ii) fixation of responsibility was another factor;

(iii) quality levels were not ascertained on a monthly basis; and

(iv) monthly reports were not being submitted to the Management.

2.29 Asked why were the monthly reports not being submitted to the higher authorities, the representatives of BEL then informed:

"In the case of Components Division, for a majority of the products though not for all of them, and we have the norms for yields at different processing stages, we monitor the yield and they reported in monthly reports upto my level, that is the Unit's Head level. In the case of equipments we have not laid down any norms because here unlike in the case of components, where items cannot be reworked except in quite a few cases, the parts can be re-worked and the total rejections will be very few. Secondly we have been keeping a track of the trend of the percentage of re-work and it is around 2 per cent. The reasons for rejections are also recorded in terms of whether it is due to a mistake in the tool or whether it is due to operator's mistake or a mistake in the design and the man-hours spent on re-work are also booked under various code-heads. But it is difficult to lay down a norm for the rejections because of production is and batch size vary. In the case of new products, it takes time to stabilise production and rejections are likely to be high in the initial stages. So we have not laid down any norms."

2.30 The Committee pointed out in the Component Division in Bangalore, norms were fixed in respect of 6 out of 14 components that too only at the assembly stage of manufacture. For the rest of the items no norms had been fixed. The Committee enquired whether that was a fact to which the witness replied in the affirmative.

When further asked whether there was no plan to cover the rest of the items about the fixation of norms, the witness stated:

> "We have no proposals to establish this at the moment because these left out do not lend themselves to this type of yield monitoring at the different stages of production ....There are rejections but the norms against which we monitor the actuals do not exist....The X-ray tubes, transmitting tubes, magnetrons these are the types of things which do not lend themselves to monitoring in this manner.... The fact that we do not have the norm for rejections does not mean that we do not ensure quality. We have laid down, during the process of manufacture of any product, as to at what stages inspection will check the quality of either the part or of the assembly or the whole. When inspection checks the quality, let us say that it does not conform, the inspector rejects the item. Then what is called 'sentencing' is done. It can be of three categories; can be accepted under a deviation; can be re-worked; to be rejected because it is not possible to re-work. What we were earlier referring to is this category: total rejections and condemnation to scrap. So the impression that we do not check the quality is not correct. Just because we do not have a norm for the rejections it does not mean that we do not check the quality. We check the quality of everything we make."

2.31 The Committee then pointed out that fixation of the norms involved two three things prescribing certain qualities reducing the number of rejections; and fixation of responsibility on the person responsible. All these factors have to be taken care of. It is not only the question of ensuring the quality but the Company will have to reduce the number of rejections also.

2.32 Asked whether the Company followed any method in regard to other items for which norms had not been fixed so far, the witness then replied:—

> "We monitor the level, e.g. when we launched the production of ten tubes, we monitor how many good ones come out; but we are unable to say whether the number of good tubes we get is satisfactory, or we have to bring down the rejections. We study when a part does not come out all right. When we do that, we come across diffe-

rent categories of difficulties; defect in raw material, defect in the tool, operator's mistake, and design mistake. We analyse things in these categories. But it becomes difficult to ascribe the mistake to an individual from the point of view of taking punitive action, except in a few cases where an operator continues to be negligent about what he is required to do, and he consistently makes mistakes. Then we take action."

2.33 The Committee then enquired whether in comparison with other industries of the world, the percentage of rejection of BEL was less or more, the witness then added:—

"I can only speak in general terms, unsubstantiated by any hard facts. The rejection levels are higher in our case, compared to other countries. In the case of TV picture tubes also, we have information as to the rejection level, yield level recommended by our orginal collaborators, and what we have been able to achieve..... Due to certain steps that we have taken, we have been able to bring about a reduction of rejection in TV picture tubes. A similar effort is on, to bring about reduction in rejection in various other activities also."

2.34 The Committee enquired that when the overall rejection of TV tubes was as much as 55 per cent as reported by the Company will it not have any impact on the value of production to this, the witness stated:—

"The rejections have to be categorised into re-workable rejections and non-reworkable rejections. The entire 55 per cent does out come under the category of non-reworkable. In other words, if a defect is discovered at some process stage, in many cases it is, at the stage of stage of defect, discovery can be possible to re-cycle it to make it a good thing. Suppose the necessary thickness of the screen coating was not applied for any reason, be re-worked and made alright. On the other hand say, there is a crack in the glass, no rework is possible, the TV tube is scrapped.....But, quite often, rejection is understood to mean non-conformance to the specification. The category of non-conformity that cannot be reworked is scrap."

2.35 The Committee then pointed out that the percentage of rejection ultimately goes into the cost of production therefore, suitable steps had to be taken by the Company to ensure that the percentage of rejection gradually declines. Asked what steps were proposed to be taken by the Company in this regard especially when there was no norm fixed to this, the witness stated:—

> "We try to improve the quality and to reduce the rejection. This is a continuous process. During the current year (1985-86), what has been running into two digit has been brought into a single digit, and the overall rejection has been brought down. Where we have not fixed norms, it is because we have no guidelines to fix them. Take current level and aim at 5 per cent lower as a target for the next year. This is the sort of exercise that we have now started."

2.36 Asked as to what remedial measures are contemplated by BEL to bring down in process rejections in TV tubes manufacturing, the BEL in its written reply stated as under:—

> "Several measures to bring down the process rejections in the TV Tube manufacture have been taken. These include stringent Quality Control procedures, tightening of stage inspection activities, stricter assessment of quality of raw materials supplies, introduction of automation in certain areas etc. These have yielded considerable improvements as can be seen from the following table:—

	Operation	Rejection levels in Collaborator's works	Norm fixed by the Co. (%)	Actual rejecton 1981-82	1982-83	1983-84	1984-85	1985-86 Upto August 1985
(i)	Bulb processing							
	Screen Coating	0·1	5	16	13	10	13	3
	Lacquering-0.2 Aluminising-0.8 Baking-1.5	2.5	15	22	23	21	17	4·7
(ii)	Tube Processing							
	Sealing	0·6	1	1	2	2	2	1·3
	Exhausting	2·9	3	6	9	7	7	4·0
	Ageing	0·5	1	7	7	5	5	3·4
(iii)	Quality Inspection							
	First Inspection	2·9	12	17	15	13	15	6·7
	Final Inspection	0·9	4	4	3	3	3	1·4
	Overall % Rejections	10	35	55	54	46	46	22·2

2.37 It is seen from the table of actual rejections supplied by BEL that in all cases of norms fixed by the Company are not very much higher and the performance of the Company is still upto the norms. The Committee enquired the reasons for such a big difference between the norms fixed and actual rejections by the Company, especially when BEL has claimed that they are upto the international standard. Thereupon, the CMD of BEL stated:—

> "On page 68 of this Audit Report we have mentioned the reasons for reduction of the norms.... Therefore, there is no denying that because of the adoption plan that we are operating in comparison with the collaborators' Plant, problems we face like the ones I was mentioning earlier the power supply and apart from the power supply cuts, we are also faced with problems of power supply fluctuations in process industries like TV where maintenance of temperature during the course of production at different stages within specified temperatures, these problems are there. We find that problems are there in supplying the various quantity in the process industry also. Nevertheless, a drive is on to inculcate a quality consciousness at different stages so that the ratings are improved. The ratings at different stages are reduced."

2.38 The Committee were also informed by BEL that grade A, B & C categories of TV tubes referred to the finished products. Grade A is for TV pictures; Grade B is for display terminals and Grade C is for lower end use for data etc. Since the use of these display terminals in our country was very low, the Company was not marketing any tube for that.

2.39 In other countries because there is sufficient offtake which is not matched for TV picture quality that is sold in those markets. The Committee then pointed out that rejection of collaborators' work norms included A, B & C categories and norms for rejection have been fixed by the Company on their own. And these are 5 and 15 even in the case of category A. The BEL is violating their own norms to a greater extent. To this, the CMD stated "Now we are coming closer to our own norms. Now, it is coming down to 4.7".

2.40 While referring to the percentage of rejections being given for various years i.e. 5.41 for 1979-80, 6.81 for 1980-81 and 6.08 for 1981-82, the Committee enquired the reasons for the higher percentage of rejections the CMD then stated:—

"In 1980-81, the work situation was very poor. There were more non-recoverable rejections. This is something which does happen and in the ultimate analysis it occurs for various reasons. The figure has now stabilised around 6%."

2.41 When again pointed out that BEL reached a stage of 5.41 per cent in 1979-80 and they have not been able to reach even that stage which reached with the drawbacks enumerated by the Company, the witness then admitted that "this happens due to inefficiency we are trying to improve to the best of our ability.

2.42 When attention of the BEL was drawn to the fact that in TV tubes process, the norms prescribed have also not been achieved, the witness then admitted that "norms fixed in those areas were rather ambitious."

2.43 The Committee enquired that in view of the fact that BEL has developed expertise for manufacture of TV tubes where did the Company stand in comparison with other competitors in the matter of rejections. The witness then stated:—

"In our case we only allowed only grade A tube to go through. This is the basic point. We don't allow Grade B to go into the market. It is difficult to compare unless they are assured of quality which I cannot assure. It is because I cannot assure what exactly they will do. We know, collaborators abroad for some reasons do it. In airports it is used. You need not have that type of tube that you have for seeing your TV programme. Announcement are made in airports. It is used in large number of cases elsewhere also. That kind of thing does not require Grade A tube. Second quality integrated circuits are sold. It is known the world over. We are approached by certain companies to give them our rejects. But we decided to maintain quality. We decided to destroy second quality. We don't give it to non-mil] end use. Only Grade A goes into the market. It is difficult to compare unless you have the quality of assurance."

2.44 The Committee have noticed that in the Equipment Divisions no norms were laid down by BEL for rejections so as to assess the quality of performance and to fix responsibility for defective work. Reasons for rejections have also not been analysed with a view to taking remedial measures. No monthly reports were submitted to the

higher Management on the quantum of rejections, the labour and material costs involved therein, etc. The BEL has admitted in their written reply that "while no norms as such have been laid down for rejections but a review is undertaken during the course of production to ensure that there are no rejections of equipments as such at the end of production process."

2.45 In the Component Divisions also, the norms were fixed only for 6 out of 14 products and that too for the assembly stage of manufacture. Even for fabrication of parts required for assembly of components no norms were fixed. In the case of other two important components viz. Germanium Semi-conductor and Ceramic capacitors, the actual rejections were also more than the norms fixed by the Company.

2.46 The Committee are also informed that the high process rejections compared to the collaborators' works levels were due to inefficient manual method of dispensing chemicals, manual handling of job and adoption of higher quality of levels whereby the Company markets only Grade 'A' quality type as against lower 'B' and 'C' grades passed and marketed by collaborators.

2.47 The Committee are not convinced of the reasons now advanced by the Company for high rejections of raw bulbs and tube processing. The Committee feel that while fixing the norms the Company must have taken into account all the relevant factors and as such there can be no justification for the actual rejections being higher than the norms fixed. The Committee desire that the exact reasons for excess rejections should be identified by an expert independent body within six months of the presentation of this report and suitable remedial measures taken to bring down the rate of rejections within the permissible limits.

2.48 The Committee have also found that the process rejections of raw bulbs came down from 11.06 per cent in 1978-79 to 5.41 per cent in 1979-80. It started rising gradually, thereafter and in the year 1983-84 it was as much as 6.52 per cent. To a specific question as to why the Company was not able to maintain even the level of 5.4 per cent which the Company had reached with certain drawbacks like manual handling, inefficient method of dispensing chemicals, quality problems, etc. the CMD admitted during evidence that "this happens due to inefficiency and we are trying to improve to the best of our ability."

2.49 To another question that even in tube processing actual rejections rates were higher than the norms fixed by the Company, the representative of the BEL stated that "norms fixed in that area were rather ambitious." He also admitted that "rejections levels are higher in our case compared to other countries." The Committee feel that while fixing the norms the Company has not taken into consideration the reality. The Committee see no reasons why the Company should not be able to sustain even the level of rejections achieved in 1978-79 in spite of certain drawbacks. The Committee recommend that on the basis of experience of working and with reference to norms obtaining in other enterprises producing similar products BEL should fix appropriate norms based on realities and also tighten its control measures to see that the percentage of rejections does not exceed the norms.

2.50 In this connection, the Committee would like to draw the attention of BEL/Government to the recommendations of the earlier Committee on Public Undertakings contained in the 67th Report (4th Lok Sabha) on Production Management in Public Undertakings emphasising that the public sector enterprises should evolve some permissible limits for rejections so that whenever rejections go beyond that limit causes should be analysed and remedial measures taken. The Committee had also recommended then that all public undertakings should lay down norms for actual rejections of each item or category of items so that the Management becomes aware of the categories of rejections well in time and devise remedial measures before it is too late. The Committee desire that in pursuance of this recommendation, the Company should also fix norms for all its products produced in Equipment Divisions, Component Divisions and other Divisions.

2.51 The Committee have also noticed that the cost of re-work in the Equipment Division at Bangalore Unit from 1977-78 to 1983-84 worked out to Rs. 940.81 lakhs but the analysis of the reasons for rework has not been made by the Company. In the Component Divisions, also, the major rework activity relate to inprocess rejections of TV Picture Tube including reclamation of parts from the defective TV guns. The extent of expenditure on rework has also not been assessed and reported to the higher Management. The Committee recommend that BEL should immediately analyse the reasons for the high cost rework involving about Rs. 940.81 lakhs in Equipment Division and also to assess the extent of the expenditure incurred on rework in the TV Picture Tubes. The outcome thereof should be reported to the Committee.

C. Costing System

(a) *Standard Costing*

2.52 The Committee on Public Undertakings (1971-72) had recommended, in their Third Report that "the BEL should take urgent steps to introduce standard costing so that performance could be watched against standards. If BEL still faced certain accounting difficulties in this connection, the matter should be thrashed out in consultation with Accounts and Audit authorities."

2.53 The above recommendation was accepted by the Government in December, 1972 and the Committee was informed that the Company intended to introduce standard costing in the first instance in respect of 2 products, viz., Receiving Valves and Germanium Semiconductors from April, 1973 with eventual extension of the system to other items, to be considered after assessing the results, by which time computer facility would have also been introduced. Accordingly, standard costing was introduced for the above 2 items in 1973-74 and discontinued from 1974-75 "temporarily till the prices returned to reasonably stable levels".

2.54 According to Audit, the standard costing system had neither been reintroduced nor the approval of Government obtained for its permanent discontinuance.

2.55 The Company explained in December, 1979 that practical utility of standard costing was doubtful in an environment of erratically changing prices and that a cautious approach was necessary in introducing standard costing in monetary terms in the Components Division. This argument is not acceptable as according to audit the environment of erratically changing price is a universal phenomenon and other undertakings have not given up standard costing on grounds of changing prices. Moreover, standard costing is not vitiated by large price variances, which could be explained as such, on the other hand the system of standard costing brings out other controllable variances which are useful for Management control. In addition, Government's approval has not also been obtained for the discontinuance of the system introduced earlier at their instance.

2.56 Asked about the reasons for discontinuing the standard costing from 1974-75 introduced in BEL in 1973-74 after acceptance of the recommendations of Committee on Public Undertakings, BEL in its written reply has stated as follows:—

> "The system of standard costing in monetary terms was planned to be introduced by the Company for all products of

the Components Division in the anticipation that the prices of materials and labour would take a foreseeable pattern. But, two factors came in the way:

(i) Steep and violent hike in oil prices, from 73 to 83, affected material prices erratically,

(ii) Fluctuations in the Rupee value of Foreign Currencies affected BEL seriously since 80% of the materials are imported. This rendered the operation of standard costing in monetary terms difficult and the Company had no option but to limit it to quantitative aspects only. In respect of products of the equipment divisions, the objective of standard costing is achieved by the comparison of actuals with standard bills of materials and standard hours for labour. On the Components side, in respect of established product lines, the system is to analyse variances in quantitative aspects both in respect of materials and labour but not in monetary terms."

2.57 On being asked whether the Company had decided to reintroduce the standard costing, and if not, whether the approval of Government had been obtained for its permanent discontinuance. The Company then informed the Committee that the question of reintroducing the standard costing was being examined by them afresh, taking the present situation into account. In reply to another question, the Company has informed that in the absence of standard costing in monetary terms, other effective control measures like standard costing in quantitative terms, preparation of cost statements and review reports are utilised effectively.

2.58 Asked as to what type of efficient cost control was being exercised at present in the Company and was any review conducted in this regard, the BEL *inter-alia* stated in its written reply that "efficient cost control is exercise through bill of Materials for material control; standard hour determination for labour contents; and machine utilisation and idle time Reports. The systems and procedures are constantly under review and refinement."

2.59 The Committee enquired from the Ministry as to what steps were proposed to be taken by them to ensure the implementation of accepted recommendations of the Committee. The Department of Defence Production stated in their written reply as under:—

"Specific instructions and guidelines will be issued to the Company for implementation of the recommendations of

Committee on Public Undertakings. It may further be stated here that in respect of standard costing, instructions have already been issued to the Comany for implementing the directions of the Committee on Public Undertakings to the extent possible. However, Ministry agrees that in the circumstances prevailing the Company had genuine difficulties in undertaking standard costing in monetary terms. This should not however, be taken to mean that there was lack of control as the essential features of standard costing have been stated by the Company as having been practised in physical terms (by way of controlling material, labour and machine-hour inputs). To start with, the company is trying to introduce standard costing in monetary terms for one or two products (such as TV tubes). Based on the experience gained in this direction, the Company would decide its possible expansion to other products in future."

2.60 When enquired the reasons for discontinuing the standard costing in BEL just one year after its introduction in 1973-74 the Finance Director of BEL stated:—

"The Company had introduced the standard costing earlier based on the recommendations of the COPU and then found that it was difficult to operate and therefore, had to give up. So the precise circumstances in which the Company had to do this have been asked. The situation was that even at the time of last COPU the difficulties were brought up by the Company. But a decision was taken that the company must introduce the standard costing. This was given effect to. In January, 1973 standard costs were worked out in respect of two component divisions. But it was very soon found that it led to lot of difficulty. In October and November, oil crisis came. I would like to point out that the company uses 80% imported materials and only 20% indigenous. So it is highly dependent on the international situation both regarding price situation and currency situation. The standard costing consists of two parts. One is drawing up physical standards in terms of materials and labour and the second is in terms of value standards or price standards. It was found that if you set up a standard for a bill of material based on today's price, foreign currency situation gets out of date within one month. It has been

the situation right from October, 1973. Constantly you will be changing only the standard price. These were the circumstances in which this had to be given up..... ....In 1974, the company first thought that unless the things stabilised, it will be impossible to operate in the existing circumstances. I would like to submit the circumstances under which the company had to give up this exercise. Since last year, things are slightly better and we may be able to attempt it once again. We have every intention of trying it and if it is feasible, we will try to expand it.

2.61 Asked that when the Company gave up the standard costing did they intimate the fact to the Ministry, the witness then stated "We intimated to them only when it came out in the Audit Report and not earlier. Upon this, the Committee asked again that when it was introduced at the instance of the Government, should the Company have not intimated the fact to the Government before giving it up, the witness then stated that "at this stage it was thought to discontinue it temporarily and frankly speaking it was not brought to the notice of the Government."

2.62 In view of the fact that as the Company had made only general observations with regard to reintroducing the costing system at a convenient stage, the Committee asked for the specific time schedule for the re-introduction of that system, the witness then stated:—

"In a department where hundreds of devices are being made, it is difficult to reintroduce but in those departments which are dealing with a single product, it may be possible. We have a TV Picture Tube Department which has a single product. It is easy to resort to standard costing system there. In such departments which have limited number of products, we can probably succeed. If we had started with such a department, we might have probably succeeded....We can try in the coming year itself. We can make that commitment to the Committee. We will start with the Picture Tube Department and if we succeed, we will extend it to other departments also.... Experts say that in certain areas this is not at all feasible."

2.63 As far back as in April, 1972, the Committee on Public Undertakings (5th Lok Sabha) has recommended in their 3rd Report that BEL should introduce standard costing so that the performance of the Company could be judged against the set standards. In pursuance

of this recommendations, the Company is reported to have introduced standard costing for two products viz. Receiving Valves and Germanium Semi-conductor from April, 1973 with the eventual extension of the system to other items to be considered after assessing the results. The standard costing was discontinued in 1974-75 "temporarily till the prices returned to reasonable suitable levels." The standard costing have neither been re-introduced nor the approval of Government has been obtained by BEL for its permanent discontinuation.

2.64 The Company is also reported to have informed Audit in December, 1979 that the practical utility of standard costing was doubtful in an environment of erratically changing prices. The Company has advanced two main reasons for the discontinuation of costing system just after one year of its introduction and there were steep and violent hike in oil prices from April, 1973 to 1983-84 and fluctuation in rupee value foreign currencies which adversely affected BEL's operations as Company uses 80 per cent imported materials as against only 20 per cent indigenous materials. These factors therefore, rendered the operation of standard costing in monetary terms difficult and the Company had thus no option but to limit it to qualitative aspect only. The environment of erractically changing prices being a universal phenomenon, the Committee see no justification for BEL to discontinue the system of standard costing just one year after its introduction in Components Division, especially when other public undertakings have not given it up on the plea of changing prices. Moreover, standard costing is not vitiated by large price variations which could be explained as such. On the other hand, the system of standard costing brings out other controllable variances which are very useful for management control.

2.65. The Committee are also informed that the Company is examining afresh the question of reintroducing the standard costing taking into account the price situation. In this connection, the representative of BEL during his oral evidence also admitted that "since last year, things are slightly better and we may be able to attempt it once again. We have every intention of trying it and if it is feasible we will try to expand it". The Committee, therefore, recommend that BEL should take urgent steps to reintroduce the standard costing so that performance of the Company could be watched against the standards.

2.66 The Committee are distressed to point out that whereas the Company took the vital decision to discontinue the standard costing system they had not bothered to obtain prior approval of the Government in this regard. In fact, the Finance Director of BEL admitted

during evidence that "we intimated to them (Government) only when it came out in the Audit Report and not earlier .... frankly speaking it was not brought to the notice of the Government." The Committee feel that when the costing system was specifically introduced in the Company at the instance of the Government, the Company ought to have taken approval of the Government before its discontinuation. The Committee, therefore, desire that Government should issue specific instructions and guidelines to the Company in this regard so as to avoid the recurrence of such a lapse in future. The Government may also direct the Company to implement and see that these recommendations are implemented in letter and in spirit.

(b) *Consumption of Precious Metals*

2.67 According to the Audit Report, in the manufacture of various compenents, the Company used precious metals like gold, platinum, silver, nickel, etc. either in a pure form or in the form of alloys, powder, suspension, solutions, salts, wires, strips, foils and crucibles etc. Gold potassium cyanide used in gold plating was being manufactured and supplied by sub-contractors out of the gold issued by the Reserve Bank of India on Gold Control Permits as well as out of gold recovered by the Company from waste solution|scrap and issued to sub-contractors. The Company had also established processes for recovery of Gold, platinum and silver from waste solution and scrap. Information regarding the value of the precious metals used in the manufacture of components in each of the year was not readily available. In respect of gold plating of semi-conductors alone, the value of gold content used from 1980-81 to 1983-84 worked to Rs. 410.24 lakhs (at average price of Rs. 145 per gram).

2.68 The Company has also informed the Audit that the value of precious metals used in the manufacture of components during 1981-82, 1982-83 and 1983-84 was Rs. 22.90 lakhs, Rs. 24.09 lakhs, and Rs. 23.65 lakhs, respectively. In addition reconciliation of input of precious metals issued for production with the output i.e. content in parts produced|plated and the quantity recovered if any, was not also being done.

2.69 Asked as to why reconciliation of input of precious metals issued for production was not being done with the quantity produced to safeguard against theft, pilferage etc. and what were the difficul-

ties in doing this reconciliation. The Company stated in written reply as under:—

> "Gold is used in the form of Gold potassium syanide for plating of parts and components. Standards are established for the different types of parts for plating. Each time plating is carried out, different parts are plated together. To maintain the concentration of the solution in the bath, it is constantly topped up with addition of Gold potassium cyanide of the required strength. In view of the large number of parts plated, and the varieties of parts involved, it is found highly difficult to keep measure of each part plated without large scale interruption of processing, i.e. the baths to be stopped for assessing balance quantities in tanks and each item to be measured for gold plating thickness. After plating, some parts get scrapped at various stages and it is highly impractical to keep track of these rejected quantities in various stages to the source of their batch processing for plating. Reclamation of gold is done when accumulation of scraps from various batches, including rejects from purchased parts reaches appropriate size for recovery, which may be about 3 to 4 times in a year. Hence, it is not feasible to keep batch-wise linkage."

2.70 The BEL has further stated:

> "The process of plating has been undergoing revolutionary changes from full plating to flashing. Hence, the accumulation and recoveries are progressively less and less. In view of these constraints practical, physical controls established are: issues according to established standards, maintenance of records of issues and recovery, details of scraps processed and gold recovered, and responsibility entrusted to a senior level executive."

2.71 When asked as to how, in the absence of such a reconciliation, the Company was able to ensure that there was no abnormal wastages, excessive use and pilferage of the precious metals, the Deptt. of Defence Production in a written reply have stated:

> "As explained by the Company, all precious metals are held under tight security. The responsibility for storage is fixed and consumption is monitored through suitably evolved procedures. There are effective internal control system, checks and supervision. At certain crucial

points in the process, the executive himself draws the precious metals, takes it over work spot and ensures that the items is consumed. The reconciliation of input and output is not considered feasible."

2.72 The Committee desired that whatever inputs the Company was making in production process that should be fully accounted for i.e. when 'X' amount of gold is put into and 'Y' amount is recovered, it should be possible to find out the extent of the loss or wastage. It was just possible that during manufacture of components somebody by not taking proper care might give a thick coating resulting in wastage of gold. The representative of the Company, during his oral evidence before the Committee explained:

"So far as the thickness we are supposed to deposit on any part, we have our specifications and we do have a sample check. You must remember that most of the gold coating is used in the semi-conductor. There a very tiny amount of gold is deposited. If every part is checked, it will be time consuming and the effort involved in measuring the deposit on each of these small strips will be counterproductive and not cost effective. So, we do a sample check. We check it under an instrument which checks the amount of deposit. You will also appreciate that because we are under constant pressure about cost of manufacture particularly, in components because it is a competitive market, it is in our own interest to make sure that we do not over-cost or over-deposit.....X is issued to the shop and Y is recovered. 'X' minus 'Y' goes into the strip which is gold plated."

2.73 When the Committee asked the views of the Ministry with regard to the steps taken by BEL to ensure that there was no abnormal wastage, excessive use and pilferage of precious metals, the Secretary, Defence Production and Supplies stated in evidence:

"We discussed this matter with them and also applied our minds to this problem. As the gold is issued in the form of a chemical, there is no possibility of pilferage. Secondly, they have laid down a number of internal checks and systems. They have also informed me that

there has been no case of any significant or substantial loss in operating this scheme. I specifically asked them to give me the yearwise losses and they have stated that there has been no case of loss as such. There has been no loss of precious metals reported on account of thefts."

2.74 As regards controls exercised to check wastage, pilferage etc. the witness stated:

"There are nine checks. Gold is used in the form of gold potassium cyanide for plating of parts and components. Standards are established for the gold-plating and for various processes. Issues are controlled pertaining to the requirements. At the end of each month, issues for that month are reviewed with regard to products and quantities completed. Scraps and rejections are store-credited in each of the respective divisions where gold-plating is done..... For each consumption centre there is monitoring, and for rejection of scrap there is a Central Report. A quarterly report is sent to the Board of Control. There is some reconciliation and account."

2.75 In reply to a question as to what was the guarantee that the correct proportion of the precious material was being mixed in the production process and there was no loss, the witness stated:—

"It should be remembered that each consumption centre keeps trace of the quantity used, consumed, issued from the stores, and the quantity, finally utilised and so on. They watch the quantity being used in the plating and also the quantity being rejected or treated as scrap."

2.76 Asked whether any scientific method has been evolved to ascertain the consumption of gold in production process, the witness stated:—

"I entirely agree with you that we should be satisfied that reasonable care is being taken to see that there is no unnecessary wastage, pilferage, etc. What they have furnished to me gives the impression that they have a fixed standard and they are monitoring the recovery and all that. Whether that is within the approved standard or not, I do not know. Therefore, I suggest for the

consideration of the Committee that I can direct them to prepare a stock position every month or whatever time is convenient, to know the process followed is within the approved norms or not. If no norms have been prescribed. Whether they need to be prescribed and they should be prescribed within a fixed time."

2.77 Asked whether it was not possible for BEL to measure quantity of gold used in production process, the witness stated:—

"That does not give you full reconciliation because everything that is scrap or rejected cannot be recovered."

2.78 The Committee then drew the attention of the Company to a circular issued by BPE in August, 1974 to all the public undertakings emphasising that in the use of precious metals and chemicals adequate care should be taken and norms for their consumption and wastage in the processing should be laid down on the basis of expert advice. There should also be proper management control to ensure that important data about consumption and wastage of these precious metals, chemicals, raw materials, etc. used in production are reported to the Management. Where the losses are of a substantial nature, these should be reported without delay to the Board of Directors and the Government.

2.79 The Committee enquired whether the question of consumption of the precious metals, recovery and wastage was ever discussed in the meetings of the Company's Board of Directors and whether any report was sent to the Government. In reply, the representative of the Company admitted that "we have not reported to the Board or the Government." The Committee then pointed out that by not reporting either to the Board or the Government, had the Company not violated the guidelines of BPE in the use of precious metals. Thereupon the CMD stated:—

"It says only when there is an exception, then it is to be reported. We never had any loss of that type. The point refers to where there is leakage or excessive consumption of gold. It has not been established. The Audit has gone into it in some detail and there has been no suggestion that there is any excessive consumption. . . Now it is for the last 15 years we have been doing this operation. There has never been any case of excessive leakage or wastage of gold, it has neither come out in the internal audit nor in the Audit Report."

2.80 In this connection, the Department of Defence Production and Supplies stated in their written reply:—

> "BPE guidelines refer to required report to the Board and Government only where the losses are of a substantial nature. It is understood from the company that there have been no cases of loss of a substantial nature. The question of BPE guidelines not having been followed, does not arise."

2.81 The Committee find that in the manufacture of various components, the Company uses precious metals like gold, platinum, silver nickle, etc. either in the pure form or in the form of alloys, powder, suspension, solution, salts, wires, strips etc. Gold pottassium Cyanide used in gold plating was being manufactured and supplied by sub-contractor out of gold issued by Reserve Bank of India on Gold Control permits as well as out of gold recovered by the Company from waste solutions|scraps and issued to sub-contractor. The value of the gold pottassium cyanide for gold plating of semi-conductor used during the years 1980-81 to 1983-84 worked out to more than Rs. 410 lakhs (at the average price of Rs. 145 per gram). Similarly, the value of the other precious metals used in the manufacture of components during 1980-81 to 1983-84 was about Rs. 71 lakhs.

2.82 The Committee have also been informed by Audit that the Company is not conducting any reconciliation between the total input of precious metals issued for production with the output i.e. actual contents in parts produced|plated and the quantity recovered from the waste solution, rejected parts, whereby the Company is not ensuring against excessive use of metals, abnormal wastage, etc.

.. 2.83 In this connection, the Committee would like to draw the attention of the BEL Government to the instructions issued by BPE to all public sector undertakings in August, 1974 emphasising that in the matter of use of precious metals and chemicals, adequate care must be taken for laying down norms for consumption and process wastage. There should also be proper management control to ensure that important data about consumption|wastage of precious metals and chemicals is reported to the higher Management.

.2.84 During oral evidence of Department of Defence Production and Supplies, the .Committee pointed out .that when they desired to know from the Company with .regard to the .standards or scientific method evolved by them to ascertain consumption of gold

in production process, they could not satisfy the Committee. The Defence Production Secretary then stated that "I entirely agree with you that we should be satisfied that reasonable care is being taken to see that there is no unnecessary wastage, pilferage etc." He also added "I suggest for consideration of the Committee that I can direct them to prepare a stock position every month or whatever time is convenient to know whether the process followed is within the improved norms or not. If no norms have been prescribed whether they need be prescribed and they should be prescribed within the fixed time." The Committee recommend that the Government should issue immediate instructions to the Company to prepare and submit to the Board/Ministry a reconciliation statement of input of precious metals used for production with the output at periodical intervals. While issuing instruction the procedure being followed in similar enterprises in India or abroad or by the appointment of Consultants may also be taken into account, if considered necessary.

D. *Pricing Policy*

2.85 According to the objectives of the Company, a sound and rational pricing policy was to be followed for its products so as to ensure that the customer obtains a quality product to International Standards and specifications at a reasonable price. The Company was also to play an important stabilising role in rational control of market prices for such items where competition was involved, in close and active consultation with the Government agencies where relevant. Some of the major items of equipment manufactured by the Company was sold to Defence and other Government departments, in which the Company enjoyed almost a monopoly. In the case of components, the Company effected sales also in the open market and had to face stiff competition from the private sector/imports. The Board of Directors of the Management did not formulate any pricing policy for the products keeping in view the different classes of customers of the products to be sold.

2.86 In the case of equipment, the Company generally quoted fixed prices, based on estimates/actual cost experience as available at the time of quoting, which included an *ad hoc* provision towards escalation in the cost of materials and labour during the projected delivery period. Only in respect of contracts for certain major equipments supplied in bulk to Defence, All India Radio and Doordarshan, the Company included escalation olauses towards exchange rate variation, wage escalation, etc. In the case of Defence, the prices and terms were generally fixed after negotiations.

In the case of components, the prices were fixed from time to time on the basis of cost of production, capacity of the market to bear, competition from the private sector, imports, etc. There was, however, no set periodicity for review and revision of prices.

2.87 In this connection the Ministry stated in March 1983 that "It is not advisable to lay down that prices of components should be revised at regular periodical intervals. Business conditions do not change with regularity. Prices of imported equipments are kept in view while fixing the prices of components....."

The above reply according to Audit is not convincing as keeping in view the actual costs of production, a periodical review of selling prices is certainly necessary in order to ensure that Company is not underselling the products and wherever possible, the selling prices could be suitably readjusted to cover the additional costs.

2.88 Asked as to why a rational pricing policy for the products had not so far been formulated. The BEL stated in their written reply as under:—

> "The Company follows the guidelines laid down by the Government on pricing policies of Public Enterprises, in Office Memoranda No. BPE|46|Adv(F)|68|25 dated 27-12-68 and BPE No. 1(76)Adv.(Fin)|70 dated 18-6-70. It has not, therefore, found the necessity for evolving a separate pricing policy. The broad pricing situation is as follows:—
>
> (i) The Company does not adopt any 'Cost Plus' policy but goes by fixed prices.
>
> (ii) In the case of components, the prices are set by the market forces of demand and supply in a largely competitive environment.
>
> (iii) In the case of equipments, the customers assess the prices quoted by the Company (since they are aware of the worth of the equipments in the international market) before accepting them."

2.89 In this connection, the Department of Defence Production and Supplies have also stated in their written reply as under:—

> "As the Government guidelines on pricing are rational and meet the Company's circumstances, the Company has

not felt any need to lay down different policies in this regard. Nor has the company sought any special concessions or relaxations from the Government guidelines."

2.90 According to BEL the selling prices of the Company for equipments sold to Indian Defence Forces compare very favourably with the landed costs. When enquired as to how the prices in respect of the products sold to the Defence Department, were fixed, the CMD of BEL stated during his evidence as under:—

"..... They are all fixed prices and at the time of the quotation we assume that there is likely to be some change in the course of production. And based on that we submit a quotation which is comparable to the international price or the price in other nations. These fixed prices are agreed in consultation with the Defence Ministry, the customer."

2.91 The Committee then pointed out that supposing for a contract 'A' the Company had negotiated certain price with the Army agents and after the price settlement, the Company might take 4 to 5 years in producing that particular item. In the meantime, in the midst of producing of the contract 'A' item, the Company might have faced certain hardships due to research and development, marketing, etc. The Committee enquired that in the face of the hardships faced, could the Company revise the negotiated price subsequently, the Finance Director of BEL then stated:—

"There are two types of cases. One is the established product and the other is the newly developed product. In the case of an established product, there is no change in the price quoted. If it is a newly developed product, we agree on a budget price. We have a broad idea as to what the price should be. That is treated as a budgetary price. May be in a year or two, before the delivery starts we firm it up. But it is not more than 10 per cent up or down."

2.92 The Committee enquired whether a periodical review of selling prices with landed cost of similar products imported was being done by the Company and if not how did the Company ensure that it was not underselling its products. The BEL stated in the written reply as under:—

"Selling prices are constantly reviewed with reference to the market situation based on inland costs as well as the landed costs of similar products which were available in most cases. Where underselling, *viz.*, quoting at less than international prices, is resorted to, it is done only in the overall interest of the country's defence budget, but the Company has always ensured that adequate returns were got on the investment and a 12% dividend was paid to the Government on its capital."

2.93 During oral evidence the representative of BEL also stated in this connection that—

"In the Components side we have necessarily to review the prices once every month because the price determines the off take from our factory. We have a Sales Manager (Components). He comes up with the review. For example, for TV manufacture, we have to constantly monitor the market fluctuations. As far as equipments are concerned the cost accounts branch goes into the loss or gain on each batch of an equipment. It puts it up to the production Department. The production Department goes into that and finds out whether it is due to excessive labour or other factors. After their analysis, then it is put up to the management."

2.94 The Committee enquired as to how the selling prices of various products manufactured by BEL were fixed. In reply, the Company stated in its written reply:—

"In the case of equipment, the Company generally quoted fixed prices and in the case of Defence the price and terms was generally fixed after negotiations. Prices of components were determined by the market situation."

2.95 BEL has also stated that the selling prices of the Company for equipments sold to Indian Defence Forces compare very favourably with the landed costs. In most cases the prices are less than even the FOB prices of equipment. Taking the major products made by the

Company during the last 3 decades, the price comparison with international prices was as follows:—

Equipment	Applicable year of supply	BEL Prices to Defence	International price in Indian Rupees	Base for international price.
		Rs.	Rs.	
100 W Libear Amplifier	1981-82	32,130	57,250	BEL's export
HB Set (LHP-219)	1980-81	26,570	57,475	BEL's export
FC Radar	1982-83	45,50,000		
	1978-79		74,04,000	BEL's export
Cymbeline Radar	1985-86	72,40,000	79,22,000	Estimated price payable by Army, if imported from licensor.

2.96 Enquired whether the Ministry was satisfied that the Company had been charging reasonable prices for its products supplied to Defence and other Government Departments. The Ministry in their written reply have stated:—

> "The prices quoted by BEL are reasonable and further the prices are subject to negotiations by the concerned Indenting Department. The pricing policy being followed by M/s. BEL is on fixed quotation basis and they do not operate on cost plus. In regard to civilian items, BEL has to operate under competitive conditions. In regard to Defence items, for those which are under development, BEL submits budgetary quotations which are firmed up through negotiations by a price Negotiating Committee. A ceiling for price escalation in respect of items to be supplied over a long period has been agreed to by Government at FA(DS)'s level."

2.97 In this connection, the Defence Production Secretary also stated, during his oral evidence before the Committee that:—

> "....at least I am satisfied—may be one or two exceptions here or there—that the Company has been charging reasonable prices so far as the supply to Defence is concerned. The question is what is reasonable and what is more reasonable or less reasonable or unreasonable as such.

It can be defined if you go by the BPE guidelines. The comparison should be made with the landed cost of imported goods....I am informed that supply of 80% of the products that they are supplying are being supplied at less than the landed cost of those commodities."

2.98 When enquired whether any set formula had been evolved by BEL with regard to their pricing system, the witness stated:—

"There are two types of situations. One is, we are going to develop a new item and the budgetary allocation is given. After the prototype is made, we know what is the cost and then, the item is offered and quotations are invited. In case, it is a free flow, they know the quotations."

2.99 When again asked whether the prices are determined by BEL under set formula, the witness stated:

"They do not determine price on that basis. When the Company has quoted certain price, it may be free flow production. They also know the market conditions. They may be knowing the comparable cost of imported equipments. They know the cost price, plus overhead, plus other expenses. We do not want cost plus system in our Company. We do it only where there is no other choice...."

2.100 The Committee also pointed out that the Company is reported to be incurring huge losses on some of the consumer electronic products sold in the open market and the loss is being made good through profits earned at products supplied to Defence Services and other Government Civilian Departments. Thereupon, the witness stated "I will look into that aspect myself and try to give the details."

2.101 The Committee note that the major items of equipments produced by BEL in which the Company enjoys almost a monopoly are sold to Defence and other Government Departments. In the sale of components produced by the Company it faces competition from private sector and imports.

2.102 The Committee have also noticed that so far the Board of Directors of the Company have not formulated any pricing policy for their products.

The pricing policy followed by BEL is on fixed quotations and not on cost plus basis. The selling prices are reviewed and revised by

BEL from time to time in the light of new developments but no set periodicity for this purpose has been prescribed.

2.103 During evidence, the Committee were informed by the Defence Production Secretary that the Government guidelines on pricing were being followed by BEL who have not felt any need to lay down different policies in this regard. The BEL has also not sought any special concession or relaxation from the Government guidelines.

2.104 On enquiry whether BEL has been changing a reasonable price for its products supplied to Defence and other Government Departments, the Department of Defence Production and Supplies have informed the Committee that the prices quoted are reasonable and are also subject to negotiations by the concerned Indenting Department. In the case of components supplied to Civilian Departments, the Company faces stiff competition from private sector/imports and prices are fixed from time to time on the basis of cost of production, capacity of the market to bear, competition from the private sector, imports etc. In so far as supplies to Defence Services are concerned, all those items which are still under development, the selling prices of BEL compare favourably with the landed cost of similar equipments to be imported. The Company generally quotes fixed price based on estimates/actual cost exprience etc. which includes an ad hoc provision for escalation in the cost of material and labour during the projected delivery period. Therefore for this purpose the Company initially submits a rough estimated cost through the budgetary quotations which are later firmed up after scrutiny and negotiations by the Price Negotiations Committee.

2.105 The Committee are also informed that when under-selling (i.e. quoting at less than international price) is resorted to by BEL, it is done in the overall interest of the country's Defence budget after ensuring an adequate return on investment and a payment of 12 per cent dividend to Government on its capital.

2.106 On being pointed out that BEL suffers huge losses on some of the consumer electronics products sold in the open market but the loss is more than made good through the profits on products supplied to Defence and other Government Departments, the Defence Production Secretary then promised that "I will look into this aspect myself." As the Defence allocations do not come under the budget review, the Committee desire that a special care should be taken by the Ministry to ensure that they are not being over-charged by BEL.

2.107 The Committee also recommend that the Government should conduct a detailed study of supplies made by BEL to Defence and other Government Departments during the last 3 years with a view to finding out as to how much profits or losses the Company has incurred on each of these contracts and also to find out that the Company had not made any unreasonable high profits as monopoly supplier of equipments. The Committee may be apprised of the result of the study within six months of the date of presentation of their report.

2.108 The Committee do agree that keeping in view the different classes of customers or the products to be sold it may not be possible to lay down any uniform method on the basis of which the BEL could be asked to determine the price of its products. The Committee are, however, not convinced of the arguments advanced by the Company and also by the Government that 'since Company is following in general the guidelines of the Government . there is no need to lay down . any detailed price policy.' The Committee feel that as per objectives of the Company a sound and rational pricing policy has to be formulated for its products so as to ensure that the customers get quality products of international standard at reasonable price. The Committee, therefore, recommend that the Government should consider the feasibility of determining the pricing policy for its products which may take into account different selling conditions such as competitive selling, partial or total monopoly selling, selling only to Government Departments in the public interest, etc.

E. Backlog of Orders

2.109 As on 1st April 1982, the value of pending orders in Bangalore and Ghaziabad Units amounted to Rs. 24,121 lakhs and Rs. 10,800 lakhs respectively. As on 1st April 1984, value of such pending orders in Bangalore and Ghaziabad units amounted to Rs. 20,638 lakhs and Rs. 11,077 lakhs respectively. In respect of Ghaziabad unit the value of pending orders of Rs. 11,077 lakhs represent production for 2.8 years, assuming an annual turnover of Rs. 40 crores.

2.110 Of the pending orders of Rs. 10,800 lakhs (as on 1-4-82) relating to Ghaziabad Unit, Rs. 10,619 lakhs pertained to Defence users and Rs. 181 lakhs to Civilian users. These included orders valued at Rs. 6 lakhs due for delivery in 1978-79, Rs. 2 lakhs due in 1979-80, Rs. 33 lakhs due in 1980-81 and Rs. 1468 lakhs due in 1981-82. The huge backlog of orders valued at Rs. 1,509 lakhs as

on 1st April 1982 apart from affecting future deliveries must have also affected the User's requirements particularly in the sensitive area of Defence. In this connection, the Ministry stated (April 1983) that the slippages in delivery had come down to Rs. 35 lakhs by end of December 1982 comprising mostly of spares items and copies of technical publications. The Ministry further stated:—

> "The turn over of the Unit in the year 1982-83 is expected to be of the order of Rs. 28 crores. Expansion plans are on hand to raise the capacity to attain a turnover of Rs. 40 crores per annum. The orders on hand would, therefore, amount to around 2½ years production only."

2.111 In the written reply furnished to the Committee, the Company has stated that as on 1-4-1985, the pending orders (not backlog) are of the order of Rs. 41,937 lakhs. The Party wise break up is as follows:—

	lakhs
Army .	19382
Air Force .	10475
Navy .	3042
DPSU. .	1252
All India Radio .	268
Doordarshan	4037
Others	3481

The orders are expected to be liquidated in 2-3 year's period.

2.112 According to Audit, the details of the value of orders in respect of which slippage in delivery schedules had taken place were not available. But as on 1st April, 1982, slippage in delivery ranging upto 4 years had taken place in respect of orders valued at Rs. 1509 lakhs.

2.113 When enquired the reasons for such a huge backlog of orders, the Departments of Defence Production and Supplies in their written reply stated:—

> "The high value is on account of orders placed by the Services for their requirements over the next 3-4 years as per the Government policy. The year-wise targets for all the

equipments are fixed for four years and reviewed in the quarterly performance Review Committee Meeting and half yearly production progress Review Meetings. The progress achieved is also reported in monthly progress Reports by the Company. For the Performance Review Committee Meetings and production Progress Review Meetings Secy. (DP&S) reviews each and every item against targets set. Ways and means to make up the slippages if any are also suggested. The existing orders would be cleared by 88-89 as per targets set in consultation with the Services; for ensuring suitability to the Defence Plans."

2.114 The Committee note that as on 1st April, 1985 the pending orders with the Company were of the order of Rs. 41,937 lakhs out of which as much as Rs. 34,151 lakhs related to Defence Departments and Defence Undertakings. These orders, according to the Company, are expected to be liquidated in a period of 2-3 years.

...2.115. The Committee also find that as on 1st April, 1982 the cases of slippages in delivery ranging upto 4 years has taken place in respect of orders valued at Rs. 1,509 lakhs, as brought out in the Audit Report. The Committee feel that slippages in the delivery of equipments to the Defence services will not only affect their present sensitive Defence Plans but will also have adverse affect on the future delivery of equipments. Similarly, for other civilian Government customers also, the slippage will affect the implementation of their plan programmes for commissioning of equipments. The Committee, therefore, recommend that the Company should make all out efforts to keep up the delivery schedules of the equipments especially those relating to defence and other Government Departments.

F. Growth Rate

2.116 According to the Corporate objectives BEL was expected to achieve a growth rate of 10 per cent to 12 per cent per annum with the diversified product and technology base and to strengthen necessary organisational structure to support the planned growth. The Committee pointed out that the planned growth rate of 10 per cent to 12 per cent appeared to be very low, as cost escalation would contribute to an increase of about 7 per cent to 8 per cent. When enquired whether it was not desirable for the Company to have a

planned and higher growth rate, the Department of Defence Production in their written reply furnished to the Committee have stated:—

> "In preparing its Corporate Plan, the Company has adopted a uniform cost and price level throughout the Plan period and hence the growth rate of 10 per cent to 12 per cent planned is exclusive of effects due to price escalation. The Company should have and has planned for higher growth rate. The Company's growth rate during the period 1979-80 to 1984-85, has been at an annual compounded rate of 16 per cent. With the sanctioning of new projects, which are under implementation, the Company has plans for a compounded growth rate of 28% per year during the 7th Plan period 1985—90."

2.117 As reported by Audit, the growth rate in turnover achieved by BEL and KELTRON another leading Electronics Company in Public Sector during the six years from 1978-79 to 1983-84 was as follows:—

(Rs. in crores)

	B.E.L.	KELTRON	KELTRON Group of Cos.
(i) Sales in 1978-79.	76·38	2·62	5·50
(ii) Sales in 1983-84	154.93	25.46	33·92
(iii) Increase	78·55	22·84	28·42
(iv) Percentage of increase in 6 years	103·00	872·00	516
(v) Average growth in a year (per cent)	17	145·00	86

2.118 The Audit has also stated that the growth rate in BEL appeared to be stunted as it was neither catering to the requirement of the Army, Navy and Airforce in the field of electronic equipment nor had it entered consumer electronics in a big way.

2.119 When enquired about the precise plans of the Government to build up the BEL to a position of strength, the Ministry stated in their written reply:—

> "The comparison relating to percentage growth as given above

cannot be considered as one to one in view of the following factors:—

(a) The product lines manufactured by BEL and KELTRON are different. BEL's products are mostly in the high technology area and do not cater to the entertainment electronics which KELTRON does to a major measure;

(b) BEL has been an established company for nearly 30 years, while KELTRON was established in mid seventies;

(c) The overall growth must take into account not purely sales turnover but other aspects such as investments, gross blocks, the profit related to capital employed etc.

2.120 The Ministry have further added that the growth rate in BEL is not stunted. The Company's growth is already 16 per cent compounded so far and the Company is planning for an average compounded growth rate of 28 per cent per year for the years 1985—90. The Company will also be meeting to a large measure the requirements of the Army, the Navy and the Air Force, besides the requirement of the Civilian Government Departments. The Government will continue to render the required support to BEL in its plans to increase its turnover from Rs. 186 crores in 1984-85 to the planned figure of Rs. 640 crores by 1989-90 as presented in its perspective plan (Figures at current levels of costs).

2.121 According to the Corporate Objective of the Company, with its diversified products and technology base, BEL was expected to achieve a growth rate of 10 to 12 per cent per annum so as to strengthen necessary organisational structure to support the planned growth. In Committee's view, the planned growth rate of 10 per cent to 12 per cent is very slow as the cost escalation itself would contribute to an increase of about 7 to 8 per cent annually.

2.122 According to the Department of Defence Production and Supplies the Company has already achieved a compounded growth rate of 16% and is also planning for an average compounded growth rate of 28 per cent for the years 1985—90. However, from the information furnished to the Committee, it is seen that the growth rate in turnover achieved by BEL was only 17 per cent during the six years (1978-79 to 1983-84) as against 145 per cent achieved by KELTRON, another leading Electronic Company in Public Sector, during the same period.

2.123 Even though the comparison of growth rate of KELTRON with that of BEL may not be relevant as the product lines manufactured by them are different, but taking into account the gross block investments and other differences, the growth rate of 145% in KELTRON is quite significant especially when it is catering to the needs of lakhs of consumers as against a few captive customers in the case of BEL. The only plausible reason for the stunted growth rate of BEL, according to the Committee, is that the BEL is neither made responsible to cater fully to the Defence needs of electronic equipments nor it is allowed to enter the consumer electronics in a big way. The Committee, therefore, recommend that the Government should lay down precise objectives for BEL in this regard and also to draw a plan to enable BEL to built up a position of strength.

CHAPTER III

RESEARCH AND DEVELOPMENT

The Research and Development (R&D) activities of Bharat Electronics Limited commenced at Bangalore in 1956 for which a separate department was constituted; these were further augmented in 1966. The R&D work at Ghaziabad Unit commenced in 1974. To cope up with the expanding R&D programmes, separate departments were formed at Bangalore in 1979 for work relating to communication receivers, composite communication systems for naval ships and new high power broadcast transmitters for All India Radio. In addition, R&D work on components was also done in small cells attached to the production lines. Besides design and development of new products, R&D efforts were also directed towards modifications and improvements of products of Collaborators design. In 1966, the Board agreed to an expenditure of 3 per cent of turnover on R&D, which was increased to 5 per cent from 1971-72.

3.2 According to audit, in order to examine in depth, delays in design finalisation modification, difficulties encountered in translating the design to production, technical problems to be resolved at the production stage based on trial report from users, initial teething troubles etc., the Board constituted a Special Committee of Directors in March 1977 to examine and report on all aspects of the problems relating to development, engineering, proto-type fabrication and transfer of technology to production. In August 1977, the Board also constituted an R&D Committee to examine from all angles, including commercial, all the projects costing over Rs. 10 lakhs to be taken up for development, before submission to the Board for approval.

3.3 The Special Committee of Directors, in their report submitted to the Board in May 1978 pointed out, *inter alia* the following deficiencies in the R&D organisation:—

(a) Incompleteness of design due to lack of detailed analysis of the sub-systems and specifications, leading to delays in understanding and rectifying the problems in production.

(b) Hustled submission of project reports before in depth study.

(c) Communication gap amongst the various R&D groups in sharing the benefits or lessons of achievements or failure.

(d) Poorly equipped proto-type shop in terms of machines and manpower and its use more as a jobbing shop.

(e) Manpower shortages and turnover of R&D engineers.

3.4 The Ministry stated in March 1983 that:

"Points (a), (b), (c) and (e) above need only changes in the methods of functioning and necessary action has been taken in these matters. As regards point (d), the prototype shops for both BG Complex and GAD Unit have been sanctioned and the setting up of BG Complex proto-type shop has already been completed. Design Manual & Quality Manual have been issued and brought into operation."

3.5 It is reported by audit that only in April 1982, the Board had laid down a detailed policy on the R&D activities to be undertaken in the Company. During discussions in the above meeting the Chairman emphasised the need for adequate development of components and appointment of outside Consultants for creating necessary R&D atmosphere as well as for helping in specific assignments. He also stated that a detailed R&D projects profile for next 7—10 years, would be submitted to the Board. In addition, the Committee on Public Undertakings (1971-72) Fifth Lok Sabha in their Third Report had suggested "that a perspective plan for R&D be drawn up for next 10—15 years. This plan should be reviewed every year in the light of performance and demand projections. In particular, concerted efforts should be made to achieve break-through in know-how and manufacture of electronic components of vital importance in achieving self-reliance in Defence supplies and of meeting indigenously as far as possible the requiremnts of industry".

3.6 According to Audit no action had been taken till April, 1983 either to prepare a 10—15 years perspective plan as suggested by the Committee on Public Undertakings or to submit to the Board a 7—10 years detailed R&D projects profile. However, a detailed R&D Project Profile Plan covering major R&D proposals for the next 3-4 years was approved by the Board in September 1983.

3.7 According to BEL the framing of a R&D policy is a matter that requires the prior building up of inhouse R&D strengths so as to foresee the proper direction to be given to the activity as well as to state the policies with a reasonable amount of confidence that they can in fact be implemented. By nature, the building up of R&D strength in an organisation is one based on the self-help principle since this expertise cannot be purchased or transferred under a licence agreement as is possible in the case of production know-how. Accordingly, BEL had to first go through the process of gaining considerable expertise in production of high technology equipments and to develop side by side the R&D strengths for such high technology and thereafter frame policies taking into account the strengths achieved in the Company. Therefore, roughly in the first ten years of the Company (up to around 1965) basic production techniques were being absorbed and developed and the next 10 years (upto 1975), the R&D strengths were being built up. The period 1975 to 1985 could be deemed a period of consolidation and further advancement of R&D strengths and also period appropriate for framing long term policies.

3.8 The Committee have been informed that the Perspective Plan for BEL's R&D has been tied up with the Defence Plans of requirement for equipments. Major Defence Plans which were used for guiding the perspective were the Plan AREN and Plan ADGES. The initial requirements projected for the ADGES Plan were taken up for planning the Ghaziabad facilities and the D&E requirements, but had to be changed when there was a sudden change of the requirements of the High Power Static Radars and Mobile Radars as well as of the Communication Equipments. However, BEL has maintained close coordination with the Defence Services and paced its R&D Plans to match with the projected requirements.

3.9 According to Audit, complete information regarding the total number of R&D projects taken up since inception and the number of products successfully developed and productionised was not readily available from the records furnished to Audit. However, in the written reply furnished to the Committee, the BEL has stated that in Ghaziabad Unit, the record shows that 138 projects were taken upto 1984-85. In respect of Bangalore Unit, the information is being collected regarding the number of projects taken up during recent years.

3.10 The products developed and productionised as given in the audit report, were broadly as follows:

(i) Equipments: Apart from several equipments required for Defence purposes, some of the high value equipments developed and productionised for civilian purposes included HF and VHF communication equipment and console and Portable Tape Recorders and other studio equipment for All India Radio, TV transmitters for Doordarshan, VHF omni-range system for Civil Aviation Department, UHF Radio Relay equipment for Posts and Telegraph Department/Railways, etc. and Multimet/Cyclone Warning Radars for Meteorological Department.

(ii) In the Components, area, the overwhelming R&D emphasis was on active devices comprising some types of professional grade Vacuum discs and entertainment grade Semi-conductors. In the area of passive components, the R&D efforts had been restricted to a few types of Vacuum Capacitors, Crystals/TCXOs, feed-through/high voltage/reactive power Ceramic Capacitors etc.

3.11 According to Audit the following are the details of capital and revenue expenditure incurred, the value of production of developed products and other particulars relating to R&D activities in the Company since inception upto 31st March 1984:

	Bangalore Unit	Ghaziabad Unit
	(Rs. in lakhs)	
Capital expenditure	* 1,225·04	
Revenue expenditure	* 5,423·87	1,251·68**
Value production of :		
Wholly Company-developed products	30,619·00	8,086·25
Partially Company-developed products.	11,583·00	2,730·05
Total :	42,202·00	10,816·30
Total including Collaborotors' products.	92,975·00	14,1340.01
Percentage of value of production of wholly/partially Company developed products to total production.	45·39	76·53
Staff engaged on R&D as on 31st March 1984	958	236

*Includes capital expenditure of Rs. 199.65 lakhs and revenue expenditure of Rs. 252.94 lakhs financed by Department of Electronics.

**Includes Rs. 576.23 lakhs financed by the Ministry of Defence

3.12 It will be seen that even after incurring a revenue expenditure of Rs. 5423.87 lakhs and a capital expenditure of Rs. 1225.04 lakhs upto 31 March 1984 in the Bangalore Unit, the value of production of wholly|partially company developed products worked out to 45.39 per cent of the total production. Further, in the case of production at Ghaziabad Unit, the share of products wholly and partially developed by the company was much more than Bangalore Unit.

3.13 The position as on 31 March 1985 is as follows:—

	Bangalore Unit	Ghaziabad Unit
(i) *Comulative Position*		
Percentage of value of production of wholly/partially company developed products to total production . .	49·72%	75·26%
(ii) *Current Position*		
For the year 1984-85 only the percentage were :—	80·88%	70·20%

3.14 Explaining the reasons for percentage share of products being much more than in Ghaziabad unit than Bangalore unit, BEL has informed the Committee in a written reply:—

> "The Bangalore Unit was established in the 1950s (1954) when professional electronics industry in the country was practically non-existent. For items required by customers licence agreements with foreign firms had to be entered into by the Government and|or BEL (depending on the specific item) and development activities could start only after the building up, of technological infrastructure in the Company. For these historical reasons, statistics taken from the inception of the factory in respect of production would definitely show a comparatively less percentage in the case of Bangalore Unit related to the GAD Unit which Unit was established in 1972 and most of the products taken up for production were of indigenous development. (This was largely due to orders for the ADGES Plan not materialising to the extent envisaged when this Unit was set up). For a proper application, the date regarding the current period is more relevant than the historical data of past periods".

3.15 During evidence of BEL the Committee were informed that 80 percent of the requirements of Company for raw materials and stores for production was being met by imports. When asked about the step taken to develop indigenous substitutes through R&D efforts to reduce dependence on imports, the Deptt. of Defence Supplies have stated in their written reply that:

> "Approximately 70 per cent of the value of equipment produced by BEL are being supplied to the Defence Services. The specification required to be met by these equipments are very stringent and the components and raw materials used have to be made especially to meet these requirements. The requirements of such components and raw materials are limited and these are being produced mostly by USA and Japan. The obsolescene factor in the components field requires major efforts to keep upto the state of the art technology. Capital investments are generally high and economic production is possible only with large scale of production. The judicious choice relating to investment and technology acquisition and types to be produced is required to be made. Due to these the indigenous development and production of special raw materials and components will have to be tackled at national level and the Department of Electronics is engaged on this task."

Projects given up

3.16 According to the Company, 34 projects taken up for development upto 31st March 1982 on which an expenditure of Rs. 68.20 lakhs was incurred, were abandoned for reasons, such as non-materialisation of expected orders, lack of conformity to specifications, change in requirements by users, etc. and 29 projects although successfully developed, on which an expenditure of Rs. 44.49 lakhs was incurred, were not productionsied at all or only small batches of equipment were produced, for which reasons were not available.

3.17 In addition to the above, 5 more equipments sucessfully developed at a cost of Rs. 156.53 lakhs (Development expenditure Rs. 66.01 lakhs, Pre-production expenditure—Rs. 4.23 lakhs, value of

materials work-in-progress/finished goods and overheads-Rs. 86.29 lakhs) were abandoned for various reasons given below:

Particulars of equipment	Expenditure incurred (Rs. in lakhs)	Reasons for abandonment as furnished by the Ministry in March 1983
BEL CAL Desk Calculator .	41·20	Not taken up for production due to competition from equiments produced through imported kits by other manufacturers.
BEL COM Mini-computer (civil version)	58·46	
Computer Peripherals		
GH 351 VHF Trans receiver LVP 315 VHF Trans receiver	56·87	Marketing decision by the Company to give up the line as cheaper sets with foreign know-how, though with lower specifications, were offered by other undertakings.
TOTAL	156·53	

3.18 In the case of BELCOM Mini Computer (civil version) and Computer Peripherals the Ministry stated in March 1983 that "the development has been the first step enabling BEL to develop and manufacture the ruggedised versions" Regarding Computer Peripherals, the Company further stated in April 1983 as follows:

> "The Company will place before the Board of Directors its latest assessments regarding the demand potential, competitive situation etc., for deciding whether to take up production for the civilian market. The possibilities for transferring the know-how to other suitable companies in India will also be explored in case the Company decides not to enter the civilian lines."

3.19 According to audit no project was taken up for development in 1982-83. 4 projects taken up for development on which expenditure of Rs. 32.68 lakhs was, incurred were abandoned during 1983-84. Further 37 Projects although successfully developed upto 31st March 1984 on which an expenditure of Rs. 87.27 lakhs was incurred, were not productionised at all or only small batches of equipment were produced, for reasons such as:

——anticipated orders not materialised;

——no further requirement; and

——device obsolescence, etc.

3.20 In June 1981 the Department of Electronics offered funds and support for setting up a joint venture of DOE and BEL to produce Computer Peripherals based on the development done in BEL and import of know-how where necessary. As the Company did not hear from DOE after September 1981, it was decided by the Board in May 1982 to offer the knowledge gained to Department of Electronics for possible use by them and close the Project.

3.21 According to audit there appears to be laxity in taking action at all levels to keep abreast of technological advance, as a result, a developed product most essential for Computers remained unproductionised.

3.22 It is reported by audit that by the end of March, 1984 development work on 38 projects was abandoned after incurring an expenditure of Rs. 100.88 lakhs, due to reasons such as non-materialisation of expected order, lack of conformity to specifications, change in requirement by users, etc. Similarly, upto March, 1984, 42 projects successfully developed at a cost of Rs. 243.80 lakhs, were not brought under production for reasons such as non-materialisation of anticipated orders device obsolescence, competition from other equipments manufacturers, no further requirement, etc.

3.23 When asked to give comments on the reasons given by Company for giving up certain successfully developed projects and delay in productionisation and non-productionisation of certain developed projects, the Ministry of Defence Production and Supplies stated in their written reply:

> "Ministry have no comments, since BEL, as a commercial Company has to react to situations as they emerge. Considering the scale of operations of BEL such instances of non-productionisation etc. have been relatively small and also unavoidable considering the fast changing nature of the electronics industry.
>
> The Company has pointed out that as against a revenue expenditure of around Rs. 80 crores incurred since inception till end of March 1985, the value of production of such developed products has been of the order Rs. 660 crores so far. The R&D expenditure incurred on a few abandoned projects referred to in the question should be reviewed in the total perspective of the benefits accrued if the Company is to retain its strength and succeed in pioneering R&D activities."

Delays in development

3.24 The Committee on Public Undertakings (1971-72—Fifth Lok Sabha) in their Third Report had stated:

> "In an industry like electronics, where the pace of obsolescence is faster than the pace for acceptance, time is the essence of the matter" (Vide Para 7.17, Recommendation No. 23).

3.25 In the course of deliberations of the R&D Committee's meeting held in August 1982, it was stated *inter alia* that while the normal R&D cycle for a state-of-art communication equipment would be about 4 years, some simple equipment like HF Receivers and HS-419 were developed in lesser periods. It was also stated that there was considerable scope for reducing the cycle time if the User trials were planned, organised and conducted in a better way.

3.26 As on 31st March 1982, there were 139 projects which were under development (100 in Bangalore and 39 in Ghaziabad). An analysis of the progress of the projects revealed the following:—

(i) Out of 139 cases, there were cost over-runs of more than 10 per cent in 83 cases.

(ii) Out of 83 cases in which cost over-run was in excess of 10 per cent, in 35 cases involving large amounts, the cost over-run was upto 967 per cent involving an amount of Rs. 220.69 lakhs. It was stated by the Ministry (March 1983) that reasons for cost over-runs were reported to Management and additional sanctions taken only after completion of development work.

(iii) In 14 out of the 35 cases there were also time over-runs of more than 4 years, the work having been taken up during October 1973 to October 1977, in respect of which an expenditure of Rs. 436.64 lakhs had been incurred upto 31st March, 1982. In view of the inordinate time over-runs that have already taken place, the utility of the equipment under development would appear to be doubtful in view of the high obsolescence rate in the Electronics Industry.

3.27 It has been reported that as on 31st March 1984, 161 projects (99 in Bangalore and 65 in Ghaziabad) were under development. An analysis of the Progress of the projects revealed the following:

(i) Out of 99 cases, there was cost over-run of more than 10 per cent in 16 cases; in one case the cost over-run was upto 524 per cent involving an amount of Rs. 228.11 lakhs.

(ii) In 23 cases, there was also time over-runs of more than 4 years, the work having been taken up during October 1973 to March 1980, in respect of which an expenditure of Rs. 462.06 lakhs had been incurred upto 31st March, 1984.

3.28 A detailed analysis of the sequence of events from the time of 'go-ahead' till bulk production clearance was obtained, in respect of 4 equipments developed for Defence, revealed the following position:—

	Product A	Product B	Product C	Product D
Date of go-ahead .	January 1973	January 1973	May 1975	August 1970
Issue of bulk Production clearance .	November 1979	November 1979	September 1979	May 1980
Total time taken .	82 months	82 months	52 months	116 months
Time taken by the Company in finalisation of specifications, submission of prototypes, modifications, etc.	36 months	36 months	39 months	57 months
Time taken by the Users for approval of specifications, conducting of trials etc.	46 months	46 months	13 months	59 months

It will be seen that there were inordinate delays on the part of the Company as well as the Users which contributed to over all delays in the commencement of bulk production for the equipment.

3.29 When asked as to why time over-runs could not be avoided especially in view of emergent conditions in electronics industry, the BEL in its written reply has stated:

"BEL is engaged primarily in developing State-of-the-art equipments for Indian Defence forces for some of which

the technology or sub-systems will not be made available by any other country. This calls for high conceptual skills, design abilities and technical competence. Experimentation is important. Technical problems arise during the course of development necessitating circuit changes, component changes etc., besides the changes that get occasioned due to change in perception of requirements by the customers. All these contributes to time overruns. In recent years a detailed presentation of the state of R&D projects was made by all the R&D groups before the Board of Directors. After the Director (R&D) was positioned he is personally taking up review of the state of progress on the projects of each R&D group. An annual review by the CMD of the R&D projects is also done."

3.30 The Committee have also been informed by BEL that barring the urgent import of Tank Communication sets is limited quantities, the entire requirements of Indian Army for communication equipment is met by BEL's R&D products. The very sophisticated Microwave Equipment and Systems have been developed by BEL's R&D in the face of US Embargo and later in the face of US competition. Some highly sophisticated Broadcast Transmitters and TV Satellite Receivers are products of BEL R&D.

3.31 On enquiry as to what was the system followed to monitor and watch the progress of R&D Projects of BEL, the Department of Defence Production and Supplies have stated in their written reply that—

"The progress Report on all the projects is sent by BEL on quarterly basis in the form of the Agenda for Quarterly performance Review Meeting held under the Chairmanship of Secy. (DP&S). Itemwise progress of all the projects is discussed at the meeting and remedial measures suggested wherever considered necessary. In addition, supplies made by BEL to the Defence Services are reviewed on half yearly basis by the Secy. (DP&S) where users, Defence Services and maintenance agencies are also represented. Quarterly targets for the current year and yearly targets for the following three years are set at these meetings. The performance is reviewed against the targets set for the Company. R&D activities of BEL are reviewed at the Board of Directors Meeting where the Government is represented by J8(Projects) and Addl. FA (M). In addition, important developmental projects are

reviewed in the Electronic Development Panel (EDP) meetings on yearly basis. Remedial measures wherever necessary are suggested at these forums itself."

3.32 As regards steps taken to avoid|minimise delays in getting bulk production cleared from customers for production of developed products, the Department of Defence Production and Supplies have stated in their written reply that a Technical Coordinating Authority with its Advisory Committee is appointed to progress each development project against Qualitative Requirement issued by Service Headquarters. The Technical Coordinating Authority meets as and when required like user trials, technical evaluation, maintenance evaluation till the free flow production is achieved. The responsibility of bulk production clearance has also now been entrusted to the Committee. The procedure has thus been streamlined to minimise delays at various stages.

3.33 The production Agencies are identified at an early stage of development and are associated with the Design Authority right from the beginning. Wherever the item is developed by BEL they are automatically entrusted with the responsibility of Production Agencies as well. It is also being ensured that the proper QR is received for the commencement of the project and no mid streams changes are made to it.

3.34 According to Audit, Government has established an R&D organisation for development of Electronics & Radars (LRDE) at Bangalore. The major public sector production agency for Radar and Electronics items is BEL. But so far only 2 Radar equipment developed by LRDE were entrusted to BEL for productionisation that too way back in 1965-66 to 1973-74. Presently three LRDE developed products are under production in BEL.

3.35 The Ministry is also reported to have stated that 22 other items developed by LRDE were entrusted for production to other Government and private agencies and 17 other items were productionised in the Pilot Plant of LRDE itself.

3.36 Asked whether any perspective plan for R&D has been drawn up and if so, have the areas in which the research would be undertaken been identified, the Director, R&D stated during evidence:—

"The perspective plan of the Company has always been tied up and linked with the plans that have been available.... Our plan for R&D is always thrusted towards defence requiremets. I am talking of equipment which is our main

function and in equipment our main function again is for the defence forces. 80 to 90 per cent is for Defence Forces only. Thus, the Defence Forces can make a projection which is not an order. You are asking about the R&D plans of the company. Of necessity, the R&D of the company is tied to the apron strings of the plans of the Defence Forces. That is basically the position and it continues to be so.....We do not have any equipment. We may take up occasionally components for TV sets or ICs, etc. All these are collaborator projects for components and all these form just a very small segment of our operations."

3.37 As regards technological collaboration with the Company, the Committee enquired whether any research programme for further development of the technology has been taken up by the Company, the CMD then stated:—

"It is mere of adaptation of a product and then improving upon it. It is part of the production process. They make use of some facilities existing in some selected areas. But the main thrust of our R&D is towards equipment for defence forces, and that is to their plans for defence forces and that is tied to their plans for defence forces as are drawn up. In this particular case, they have two major projects from which the entire radar and equipment flow....The Projects were awarded to us not fro production; it is for getting designs crystalised. Once that is done, then only the orders flow. Some agencies have not been able to process their orders. But we were given a range of communication equipments which has to be developed. Only when the Army accepts a prototype then only the order comes. We have 18 divisions of R&D which do these R&D projects. Then the transfer of technology takes place....Let me suggest that you cannot go R&D effort in a manufacturing organisation sitting in an ivory tower. It has to be related to the end project....while developing an equipment; development efforts has to be made in such a way that it must be developed properly. Otherwise, it is not accepted. Suppose inefficiency crops up, we cannot develop any equipment. Then the situation may come that they will resort to import."

3.38 Asked as to what steps have been taken up to update constantly the technology obtained, the Director R&D stated:—

"We are quite aware of the fact that unless we update ourselves constantly, we would not be able to comply with the demands of our users. It is not only a question of the infrastructure of the organisation but it is a question of educating the engineers and keeping them trim with regard to the available technologies the world over. This is a very important aspect. In this connection, we have got two or three general matters, and approaches to the question.

We have got a continuing programme of giving education for engineers. We have got a system of separate Department set up for this purpose. The main job of it is to undertake and to see that the engineers, young as well as experienced and at the managerial level, are all exposed to the training programmes though video courses which we get from professional bodies from abroad which go into the various aspects of design technologies, system engineering, system technologies as also managerial techniques. This is the one system which is particularly directed towards the engineers of the company both R&D and Production but mainly biased towards R&D.

Secondly, there are a number of Seminars both within and outside the country to which we send our engineers. They present their papers there as well as their translations. There is the symposium of IITs. In fact, one of the International Symposiums on Radar took place in 1983 and there we have received contributions from our engineers which were very well appreciated by the entire International Symposium. Even our own engineers highly appreciated them. This is the method of keeping our engineers uptodate. We are aware of this need. We have not only taken this step. We are able to disseminate the expertise which has been developed within the company. We have got BEL Engineers House Journal. It is a rather professional House Journal which brings out major contributions by the various RD Departments and which has also been well-connected with one another. We send some of our collaborators and people whom we know and they are very well received there. The material is good. For example, there is one radar which has been talked

about earlier. There is the development of antenna. It is one of the very modern antennas. There are only a very few engineers in the world with similar expertise and it is very vital. It is one of our defence radars. We except orders for it very shortly.

All these things appear in journals and this is one way how we propagate the knowledge."

3.39 The Committee pointed out that the BEL at present was catering to the requirements of three types of customers viz. the defence services, the professional services, like the telephone industries and other services. When asked by the Committee as to in what proportion BEL was serving these three and has any planning been made in conjunction with them, the CMD explained:—

"In the case of defence customers who are our primary customers for euqipment, there is constant interaction. When they draw up the technical specifications of equipment, the interaction starts; the interaction starts even before the project is assigned. After all, they themselves are looking for information and knowledge. The boys in our company who are involved in the process of developing equipment will be able to help the users in formulating even their plans. What has happened is this. They have, in the Defence forces, for various projects, a Group called the Technical Advisory Committee. Between this Committee and the major manufacturers like BEL and ITI, there is interaction. There is interaction with the users from the start, from the formulation of the plans upto the end of the project itself, before it goes into production. The point you have mentioned is whether in isolation also we carry out certain developmental activities apart from the projections made by the defence forces. It has to be a mixed one. It is mostly an evolving process..... So, basically it is an evolutionary process, it is true that in isolation no equipment has been designed as such for the defence forces without taking their requirement into account. In fact, anything and everything that they require is made in the company. We cannot think of something outside this sphere unless we were an export-oriented company which we are not. We have to meet the requirements of our defence forces primarily."

3.40 As regards filling up the gap in technology between our country and the more advanced countries, the Director RD stated:—

> "There are two areas which we have to consider for filling up the gaps. One is the expertise we have within the country to build at a system level or equipment level so that a particular function which is required by the Services can be properly implemented. The other area is availability of components which enter into these designs. The first part of it is something where we are capable of filling up the gap conceptually and in the design of the equipment. As far as the second area is concerned, there is going to be this gap for quite some time because the infrastructure for building the vital components is something which is stupendous. But what can be done is to see that the gap is not in those areas which may critically affect development of the equipment which are required by the defence forces."

3.41 The Committee pointed out that the main reasons given for abandonment of projects are (i) where customers have not shown interest and (ii) where even after trials, customers have not shown further interest. The Committee enquired as to how did the Company ascertain customers' interest on the basis of which it planned production of equipment. Further, when the Company had developed a particular technology on the basis of specifications given by the customers, why did the customers back out after result of the trial was shown to them. The Director (R&D) of BEL then stated:

> "The first type of case is where, after it is developed, shown and evaluated, the customer has not shown interest. There have been 1 or 2 examples e.g. the 300-Channel system for the Railways. I am quoting this just to illustrate, and not to indicate for whom it was meant, and for which particular project. We developed it according to their requirements and specifications. After it was developed and evaluated, suddenly they lost interest, saying that they wanted to change their requirements or to import systems similar to it, but having probably certain characteristics in addition to what they had originally in mind. So, when the question of buying comes, the party changes his mind.
>
> Secondly, even after the equipment is evaluated and the results of field trial and performance are intimated to his satisfaction, when development work is taken, the customer

talks about another requirement. So, we have to produce again, according to that requirement. In the meantime, the customer has his own method of trial and evaluation. By the time he comes to have a successful trial, he changes his mind, because due to time-lag, he wants something better which he feels can be obtained by import. So, he does not show the same interest as previously, in respect of the original item. For example, the UHF digital systems are fully meeting our requirements. But we are required to go out and import technology when it is already available with us. This is the second type of case where the customer loses interest even though the equipment fully meets his specifications."

3.42 In this connection, the CMD also added:—

"Even after a certain amount of credibility in the product is established, a long time cycle is required for the customer to try out an item..... During trials, more often then not it happens that certain types of difficulties come up. The idea of a trial is to see whether there is any problem with the equipment or there is room for improving or concretizing that equipment. It always happens that important and relevant points emerge, which might or might not have been foreseen at the time of initial development of the equipment. Because of this, you have to go through a further improvement of the product and have a fresh cycle or trials, which have to be done again, unless the type of improvement required is merely marginal and the environment does not impinge on that development. So, the total time cycle becomes rather long. One of our very successful items today is one the order for which we were almost going to lose, and which was going to be imported. It is the radio relay equipment. In 1977, it ran into a temperature problem in the desert area. The Army's requirement was that it should function from plus ss°C. to minus 20°C. But it functioned only upto plus 43°C. Since that equipment was based on the West German, *viz.* Slemens design and tripped at 43°C., further orders had to be cancelled. So, we had this problem. It took us three years to concretize just this problem. The Army had become terribly impatient. They were thinking of importing it. When import was being seriously considered, we got this breakthrough. Today it is a success story. This particular

equipment is a free flow item, and we are making it for the Army. Contrary to this, we have the present picture where such success does not take place. We have certain inabilities which get elongated in the process. Because the equipment has been concieved in the way it has been, that equipment has become out of date. It happens after the trial, for the reason that events have moved in the technological world so fast that during the intervening period something superior has come through in the world. For that reason, they perhaps decided to foreclose the order. This is way it goes; it is a normal part of our game and we have to take it in the normal stride. I don't think anything exceptional has happened in regard to this project. Perhaps you noted that commencement took place on the low level detection radar. This is first time, even the Prime Minister commented in the United States that there are certain areas where we have gone ahead of the United States and this item is being discussed. That was also near amiss. We have been toiling to get that equipment perfected. It is now that we expect the order comes through. Suppose due to sense of urgency if this ought to be imported, there would have been huge loss to the company and the organisation for this project. Similar to that we have many other projects. I am happy to say that the balance of advantage rests with the Company."

4.43 The Committee enquired as to what are the circumstances in which the company takes up the projects which are not funded by the customers—apart from the technology research or study. The CMD stated:—

"Normally, what happens is finishing products are needed for the Army, Air Force and Navy. Even they have an overall plan like the AREN or ADGES of the Air Force, some classified products for the Navy. These items are funded normally by them. That is the way it is normally getting divided. On the one hand the Company takes up a product and had to supply them. For example, SFCS (simplified Fire Control System) was obtained for the Army in 1977 by the Company, eight years back. At that time when this was being obtained, they did not have a fire control system in India and the Company which produced it, Marconi Company displayed this. They asked us to take up this as a developmental

item. They said, "All right, do it at your own risk". Because, they wanted to know how quickly it can be manufactured and what would be the price. We are happy to say that we brought about a Tank Fire Control System which is now with the Army. It took us quite some time 1977 to 1985—after which we could secure the orders from the Army for the production of this item. But the type of items that are now being made has completely changed, because the technology has changed. In the simple fire control system there was no night see capacity. Today it is a must."

3.44 The Committee enquired that when the customer does not show interest even after successful trial and performance of the equipment developed, how is the interaction drawn. The CMD then stated:—

"The customer's interest is right from the conception of an equipment. There are certain interactions with the services. So, abandoning of the project may well sometimes happen before our project has been taken on. At the time of discussion, we think in terms of a product like this. Then the second stage takes place when we have carried out a certain amount of paper design, and customer is all the time with us. We have got a cell available from the services who are watching and seeing it at that stage and know in certain other cases the expectations ..... Then there is a chance of, even after post trial, abandoning equipment and this happens. This is continuously happening and this does not stop. It happens even today and I am sure even day after tomorrow it will happen in every country of the world."

3.45 The Committee enquired that when the project is not funded by the customers, on what basis the Company decides to take up the project. The representative of BEL then stated:—

"There are requirements of customers which come to our knowledge during our discussions. We have twice a year meeting with the services, Directorate of Artillery, etc. They say that there is a requirement of a particular type of communication set or radar. They are not in a position to place orders because they have not budgeted for that and secondly, unless they are satisfied

with the product, they do not commit themselves to purchase that. They mention a figure which we also can work out as to what is likely to be the requirement. We roughly estimate the investment requirement of R&D. Suppose, it costs Rs. 5 lakhs to Rs. 10 lakhs. If that is going to give us continuity for six or seven years and a turnover of Rs. 5 crores to Rs. 6 crores, we consider it worthwhile to develop with our own funds. The next question is: if you come out successful, why should there be a change of mind on the part of the customer? There are various reasons for that. Ideas in the customers themselves change. What they perceived two or three years ago, may not remain fixed. It also happens with the change of personality. Secondly, we may have taken longer than we expected. Therefore, they may have met their requirements by imports. Therefore, in a few cases even though we have come out successful, it may not result in any order. Now, the amount of money that we have spent should not be taken as loss because what we will recover from some other customer."

3.46 When enquired about the specific achievements made by BEL after the appointment of Director, R&D, the MCD stated:—

"Now we have got a central coordinating agency. This is one of the positive results. Earlier this was not necessary when it was a practically single-unit type of company. Now there is this up-dating of the R&D task within the overall basis of the R&D policy as a whole. It has become a central task for the corporate office. Another point is this. Now there is another detailed review carried out by the R&D Director in respect of various units. With the detailed deliberations of these, he has to come up before the Government, before the Board. He has to give annual report and an R&D review..... ..... A detailed R&D policy initiated after the Director took over. The Company has got a certain guideline about the R&D policy as a whole. Centrally various schemes can be worked out keeping that broad R&D policy in mind. You said about concrete example of what benefits we got. I can tell you the example of the project for coverage of TV upto 70 per cent. This was achieved in record time. It was

due to Director's intervention and control. The whole thing started from the highest level and we are able to produce equipments for the 70 per cent coverage within 7-8 months of the order placed by the Government. Honourable Members are aware of the difficult task taken over by BEL and how this was implemented so successfully by us. TV equipments, micro-wave receivers and antennas were supplied in a very short time. Low-power transmitters were supplied. They were developed specially for this and supplied within a short time."

3.47 When Committee enquired about the reasons for not drawing up R&D Perspective Plan by BEL as recommended by COPU (1971-72), the Secretary, Department of Defence Production and Supplies stated:—

"The Company has informed the Government that it is not feasible for them to prepare an R&D Plan for a period of 10 to 15 years. Further, it is because of the fact that the users plan is not to that period and the production planning and the development planning is linked up to a considerable extent to the users' requirements. Therefore, it is not feasible for them to have such a long term plan. I am supplementing this by saying that now the mechanism is under the consideration of the Government where I think 10—15 years perspective plan may be possible after a year or so. The users are coming up with a long term perspective plan. After this is discussed at the appropriate level as to how much is to be designed indigenously and how much is to be imported and how much is to be produced indigenously that whole link will be established. It has been discussed at high level and certain decisions have been taken. There is a plan to implement this from a certain period and if that goes through, I don't see any reason why it should not be possible to have it. After a year or so it should be possible for a Company like BEL to think in terms of 10 to 15 years perspective plan..... I personally feel that for a company like BEL this type of assessment is not difficult at all. What they can do for a long term perspective plan is that if they are producing an equipment which can remain in use for ten to

fifteen years, then they may consider having a programme of production in regard to that equipment.

The technology knowledge would also change from time to time. Say if the performance is X, one can go for X+1, and then X+2 and so on. It will be a step by step exercise depending on the success of the previous exercise. And in the process of product improvement, there are certain areas and certainly certain technological improvement is also to be done. But in terms of the definition which we understand in the Research and Design we do not know whether they are competent nor it is expected of them nor it is desirable."

3.48 The Committee desired to know about the time bound research undertaken by R&D and to what extent the research made in various fields has proved useful for cost control and quality consciousness especially when 80 per cent of the components are imported and only assembling is done in the Company. The Secretary, Defence Production & Supplies then stated:—

"We are conscious of the fact that in the public sector I am talking of public sector—in regard to the extent of cost-consciousness or the extent of cost-control maxims, the existing position is not satisfactory. In a highly efficient company, what ought to be the cost control maxim? I would concede there is a lot of scope. We looked into it. We wrote to them. I personally wrote to them and I think it was in August last year that I wrote to them about the quality-consicousness, cost-consciousness and the cost-control maxims. In all these areas, we have written to them. We are pursuing the matter and we are emphasising on the system which will automatically ensure the results, not by human being or by particular management. We are emphasising more on systems and control maxims.

As regards the import of 80 per cent components and assembling them here, there are two aspects on this. Development of materials which go into the finished products in areas like electronics is neither the responsibility of BEL nor a company like BEL can be entrusted with the responsibility of development of material. If I am an engineer, I do not think, I would be expected to

develop steel of various grades, and types. The industrial system as a whole, the Government policy as a whole is to ensure growth of the materials industry and the availability of material to the users..... As regards assembly, when they say that 80 per cent of the material is imported, it does not mean that the import amounts to eighty per cent of the cost to the consumer. It is only 80 per cent of the cost of material in a communication equipment, if the price of the equipment is Rs. 100, the material cost may be Rs. 40—50. It is 80 per cent of Rs. 40. Unless the materials industry develops, our dependence on import in sophisticated equipment would be there."

3.49 When asked about the mechanism followed in the Ministry to monitor and watch R&D Project of the Company the witness stated:—

"I have found that the mechanism for monitoring the progress of the project has not been satisfactory. Certain steps have already been taken to improve the monitoring and supervision both in the company as well as at the Governmental level."

3.50 The Committee regret to note that although the R&D activities of Bharat Electronics Limited commenced at the Company's Bangalore Unit in 1956 and at Ghaziabad Unit in 1974 and that the Committee on Public Undertakings had recommended as far back as in 1972 that a perspective plan for R&D should be drawn up for the next 10—15 years, no serious action was taken by the Company on the recommendations of the Committee. The Committee find that only in April, 1982, the Board of Directors formulated the first detailed policy on R&D activities and in September, 1983, a R&D project profile plan for only 3-4 years (as against 10—15 years plan as suggested by the Committee on Public Undertakings or 7—10 years plan as considered by the Board at its meeting held in April, 1982) was approved by the Board. The Committee are also constrained to observe that the Company did not maintain any proper record of the R&D projects taken up, successfully developed and productionised. The Committee have a definite feeling that R&D activities of the Company lacked proper directions for over two decades and were carried on in an ad hoc if not perfunctory manner, The Committee take a

serious note of this neglect in the vital area of the R&D activities of a Company like BEL has been primarily set up for meeting the defence needs of the country.

3.51 The Committee have also observed that by the end of March, 1984, 38 projects were abandoned after incurring an expenditure of Rs. 100.88 lakhs for reasons like lack of conformity to specifications, changes in Users' requirements and non-materialisation of expected orders etc. Similarly, upto March, 1984, 42 projects successfully developed at a cost of Rs. 243.80 lakhs could not be productionised because of technical obsolescence, non-materialisation of anticipated orders and competition from other manufacturers of equipment. The Committee express their serious concern about this seemingly infructuous expenditure in the face of the fact that R&D activities of BEL have been of limited use and the progress for the development of R&D Unit has been tardy and far from satisfactory.

3.52 The Committee have also noticed that the total time taken from 'go ahead' to the date of receipt of the bulk production clearance ranged from 52 to 116 months and the time taken by the Company for the submission of prototypes, modifications, etc. ranged from 36 to 57 months and the time taken by users for approval of specifications, conducting of trials etc. ranged from 13 to 59 months. This, according to audit has resulted in huge cost over-runs ranging from 10 to 967 per cent in 35 cases and inordinate time over-run of more than 4 years in 14 cases. In view of this inordinate time over-run that has taken place in the development of the certain products, the utility of the equipment under development has obviously bcome doubtful because of high obsolescence rate in the Electronics industry. The Committee deplore this huge cost and time over-runs and are of the view that this could have been close and regular monitoring both at the Company and Ministry levels. In this connection the Defence Production Secretary has also admitted during his evidence that 'the mechanism of monitoring of R&D Projects was not satisfactory". The Committee wish to stress that R&D problems should be attended to promptly and tackled promptly to achieve self reliance in technology especially when BEL is entrusted with the responsibility of meeting almost the entire requirements of defence services for communication equipment and some highly sophisticated Broadcast Transmitters, TV Satellite Receivers and Microwave Equipment and Systems. The Committee therefore, recommended that R&D Department of BEL should be strengthened adequately and its work monitored closely at the highest level so that it becomes a more effective instrument of progress. In this connection, the Committee would also like to reiterate the recommendation of the Committee on Public Undertakings (1971-72) that R&D of BEL should work in close coordination with CSIR,

Electronic Commission, R&D Organisation for development of Electronics & Radars and other related research laboratories in the country so that a concerted and coordinated approach could be made so as to avoid duplication of research effort, reduce cost of production .and above all lay a sound technological base for the electronic industry in India.

. 3.53. From the material furnished, the Committee have noticed that as against a revenue expenditure of around Rs. 80 crores incurred on R&D by the end of 1985, the value of the developed products has been of the order of Rs. 660 crores. Further, the cumulative position of the value of production of wholly|partially Company developed projects to the total production in the case of Bangalore Unit was 49.72 per cent and for Ghaziabad Unit it was 75.20 per cent. Explaining the reasons for the percentage share of products being much more in Ghaziabad Unit than Bangalore Unit, the Company has informed that the Ghaziabad Unit was established in 1972 and most of the products taken up for production were of indigenous development whereas the Bangalore Unit was established in 1954 and development activities could start there only after the building up of a technological infrastructure in the Company. However, the production in Bangalore Unit has since picked up and the percentage of the value of production for the year 1984-85 only was 80.88 per cent. The Committee are of the view that R&D activity being vital for the healthy growth of Electronic Industry in India, a reasonably adequate amount must be spent for its proper development. However, the success of any R&D project does not depend alone on how much expenditure is incurred on it but the performance of specific tasks related to production and solution of practical problems posed by the industry. The Committee, therefore, recommend that there should be close and constant interaction between the production and research wings of the industry so that the problems of crucial importance are tackled in an effective and conclusive manner. The Committee desire that the Company should intensify R&D activities to develop new products and to keep itself uptodate with the latest available technology all the world over so as to build up its strength and confidence and minimise the foreign dependence of defence forces with regard to the supply of essential raw materials and components. For this purpose, the Company should also consider the feasibility of conducting seminar workshop and for arranging training programmes and orientation courses to educate its engineers with regard to the latest design technology, system engineerings and management technology, etc.

3.54 The Committee learn that Government have established an R&D Organisation at Bangalore for the development of electronics and radars (LRDE). So far only two radar equipments have been deve-

loped by LRDE and these were entrusted to BEL for productionisation as far back as in 1965-66 to 1973-74. Three more LRDE development products are at present under-production in BEL. The Committee have also been informed by audit that 22 items developed by agencies and 17 items were productionised in the plans of LRDE itself. The Committee are of the view the BEL which is the premier public sector production agency for radar and electronic equipments, it should get a greater share in the production of LRDE's developed products in respect of radar and electronics items. The Committee, therefore, recommend that the Government should formulate a specific policy in this regard.

3.55 According to the Company, its perspective plans are intimately related to the defence plans and due the inherently changing nature of the defence requirements, 10 to 15 years perspective plan in the field of electronics equipments is beset with difficulties. The R&D plans of the Company would therefore, have to be lesser time frame. However, during evidence, Secretary of Defence Production informed the Committee that "now the mechanism is under consideration of the Government whereby 10 to 15 years perspective plan may be possible after a year or so as Users are coming up with their long term perspective plans." Keeping this in view, the Committee reiterate recommendation of the previous Committee (1971-72) that a perspective plan for research and development be drawn up for the next 10—15 years which should be reviewed every year in the light of performance and demand projections. In particular, concerted efforts should be made to achieve break through in know-how and manufacture of electronic components of vital importance so that self reliance is achieved in meeting of the Defence supplies needs indigenously as far as possible, as also the requirements of electronics Industry as a whole.

3.56 The analysis of the Company's production profile shows that approximately 70 per cent of the BEL's production is for meeting the defence needs and the remaining for civil requirements. Therefore, the Committee desire that the Company should prepare R&D Schemes covering both civilian and defence requirements. In doing so the Company should fully safeguard the interest of the Users and at the same time it should not try on uncertainties and obsolete technology at the cost of exchequer.

NEW DELHI;
November, 26, 1986
Agrahayana 5, 1908(S)

K. RAMAMURTHY,
Chairman,
Committee on Public Undertakings.

APPENDIX

Statement of Conclusions/Recommendations of the Committee on Public Undertakings contained in the Report.

Sl. No.	Reference to paragraph No. in the Report	Conclusions/Recommendations
1	2	3
1	1.60 1.65	The Committee on Public Undertakings (1971-72) in their Third Report on the working of BEL recommended that rated capacity of plant could be fixed in terms of physical output as the value of production was liable to change. The Committee also reiterated the recommendation in their Twenty-fifth Report (1972-73). In spite of this, the Committee are sorry to note that the rated capacity in terms of physical output has not so far been fixed by the Company in respect of Low Power and High Power Equipment Divisions in Bangalore and also in Ghaziabad Unit, though the Company is reported to have fixed production capacities in terms of physical output for the products manufactured in the Components and the Radar Divisions at Bangalore and for the opto-electronic devices produced at Pune Unit.. The Committee also find that in Ghaziabad Unit the production capacity has been fixed only in terms of value. The Committee do not consider it as a reliable yardstick for measuring the capacity utilisation in view of inflationary trend in prices. The Committee are informed that in response to the instructions of the Ministry to define production capacity in terms of "available standard hours output" the Company wor-

1	2	3

ked out in April, 1982 the production capacities of Equipments and Components Divisions at Bangalore to 34,00,800 hours and 43,58,818 hours, respectively. While estimating the capacity in terms of "available standard hours output" the Company took into account the availability of only 1200 hours per direct worker per annum as against 2400 effective hours. On this basis the capacity utilisation during 1981-82 worked out to 72 per cent and 76 per cent respectively for the said two Divisions. The Committee are also informed by the Company that because of peculiar situation obtaining in the Divisions, 1200 hours per operator per annum was the maximum attainable standard hours. The Company has further maintained that these 1200 standard hours are only the bench-mark for production and planning and were not to be treated as norms for rated capacity and in the event of product mix factor being adverse in a particular year, it may be difficult to achieve even the 1200 hours bench mark. In this connection, the Department of Defence Production have also supported the position maintained by the Company that "for the present utilisation capacity on the basis of standard hours per worker per annum adopted by the Company are considered realistic and matter can be reviewed later as and when better para meters become available."

During evidence, the representative of the Company contended before the Committee that it was not possible to fix rated capacity in terms of physical quantities of different types of equipments and that assessment of rated capacities in terms of single unit was fraught with inherent difficulties in equivalents for various products. The witness further stated that "it was not possible to do it in an Engineering Industry of BEL's nature due to changing pattern

1	2	3

of production and improvements and modifications needed from time to time". As regards the suggestion whether the question of fixing the rated capacity could be referred to some reputed Management Institute for advice, the Defence Production Secretary while agreeing in principle stated in his oral evidence "if there is any one who can suggest about the expert or the Committee can tell us, in principle I for one would be prepared to recommend to the Government that this exercise is worth-while and let us have the capacity assessed". He further added "I am prepared for its being referred to anyone anywhere in India who can be trusted for secrecy".

To another suggestion that if the rated capacity in terms of physical output could not be fixed, could it be fixed in terms of standard man hours by taking into account the established production facilities. To this also the representative of the Company did not agree saying "rated capacity cannot be arrived at by simple arithmetic". The Chairman, Audit Board, however, has cited before the Committee the example of another similar major undertaking operating at Bangalore viz. Bharat Earth Mover Ltd. whose product mix envisaged originally was no longer the current product mix and the question arose how the rated capacity of that plant could be compared with reference to actual performance. For that purpose they first calculated the standard man hours required for original product mix i.e. 890 pieces of equipment for which that particular plant was originally set up. On that basis the rated capacity of plant was worked out into standard man-hours. Then the time required for the current product-mix per piece was worked out and on that basis the current rated capacity was fixed. In short the capacity of the plant was first worked out

1	2	3
		into standard man hours to assess the current production and then it was related to actual performance. While reiterating their earlier recommendation, the Committee stress that BEL should immediately undertake an assessment of the rated capacity either in terms of physical output or in terms of standard man hours on the lines of the example cited by Audit. The Committee are of the view that in the absence of the fixation of rated capacity on the basis of correct norms it is not possible to assess the capacity utilisation in the right perspective. The Committee also feel that the deduction of 50 per cent of the total effective available hours for purpose of working out the available standard man-hours per operator per annum is *prima facie* on the high side and is not acceptable as this is not based on any detailed and independent work studies. The Committee therefore recommend that the Government should appoint suitable Consultants or Expert Authority to determine the capacities for Companies such as BEL which could determine a yard-stick for assessing the capacity utilisation on scientific basis. The Committee also suggest that Government may also review the whole question of deduction of 50 per cent of the total effective hours for purpose of working out the available standard man-hours per operator per year with a view to arriving at a better parameter for the meaningful assessment of the production performance of the Companv. While doing so, the Government may keep in view the experience of similar concerns elsewhere in India and abroad.
2	1.66	According to BPE guidelines issued in 1970-71, every undertaking was free to fix annual target of production so long as it was equal or near

1	2	3
		about to the rated capacity. However, if some undertaking wanted to lower the rated capacity it had to get prior approval of the Government therefor. This provides an opportunity to Government to satisfy itself whether the deviation from the rated capacity was justified. On enquiry whether the rated capacity of 2400 hours fixed by BEL was lowered to 1200 hours with the prior specific approval of Government, the Finance Director of the Company informed the Committee that "1200 hours fixed were agreed to by the Government... It was done only once. Once it was agreed to by Government we are adopting it year after year". As per BPE instructions the Company had to seek prior permission of the Government. Again to a pointed question, whether the Company got approval of Government prior to reducing the standard man-hours capacity, the witness did not give an unequivocal reply. The Committee are therefore constrained to conclude that the Company has clearly violated BPE's instructions on the subject to which the administrative Ministry have also acquiesced by according approval subsequently without any deliberations or indepth study. The Committee consider it a clear case of lapse both on the part of Company and also the Ministry and express their displeasure for not following the BPE's guidelines by the Company as well as the Ministry in a vital matter.
		In order to obviate recurrence of such lapses the Committee desire that BPE's guideline on subject may be circulated by the Ministry again to all public undertakings under their control for their guidance and strict observance and any case of lapse coming to the notice of the Ministry should be appropriately dealt with.
3	1.67—1.69	The Committee are concerned to note that the percentage utilisation of machinery in the Low Power Equipment Division and Radar Divi-

1	2	3

sion at Bangalore has been declining steadily. The percentage utilisation in Low Power Equipment Division came down from 71 per cent in 1979-80 to 65 per cent in 1983-84. The position in the Radar Division is still dismal. There, the percentage utilisation of machinery has come down from 61 per cent in 1979-80 to 52 per cent in 1983-84. Though the utilisation of machinery is reported to have improved in Radar Division during the last two years by transferring certain projects from other two Divisions, the Committee have found that in spite of transfer of some projects from other Divisions to these Divisions, the machinery utilisation has not improved but has come down from 54 per cent to 52 per cent. In this connection, the representative of the Company also admitted that "in spite of the fact that project transferred from other Divisions were able to utilise some of the machines, the average was pulled down by the fact that certain machines were practically idle." It was also admitted by the representative of BEL that "as long as FC Radar Production was not utilising something like 12 major machines to the full extent, the percentage utilisation of machinery will continue to be low."

In the Ghaziabad Unit, the position is somewhat better but there also the utilisation of machinery has come down from 65 per cent in 1979-80 to 63 per cent in 1983-84. It was 68 per cent in 1981-82 and 66 per cent in 1982-83. The idleness of machinery in the Equipment Division at Bangalore and Ghaziabad Unit is reported by audit to have ranged from 35 to 48 per cent in 1983-84 and the main reasons advanced therefor are want of work, want of operator and electricity/mechanical break down. Till the end of March, 1984, 8 machines costing Rs. 11.84 lakhs were idle for varying periods of six months and

1	2	3
		above in Bangalore and Ghaziabad Units. In the Components Division, at Bangalore, the utilisation of machinery had not been ascertained so far. The Committee have observed from the Audit Report that in the Components Division, for 7 out of 14 products, the targets fixed were lower than the capacity established. The Committee, therefore, recommend that the Company should take immediate action to ascertain the extent of utilisation of machinery in the Components Division and take concerted and effective measures for utilisation of all the machines fully to their established capacity and in no case the machines be allowed to remain idle, partly or fully.
4	1.70—1.72	The Committee are also informed by the Company that the machinery utilisation with the Radar Division has been going down from 1978-79 because FC Radar production started tapering off from that year onward. Even though the Company has established capacity in terms of plant and machinery for an annual production of certain quantity of 'X' type Radars, the manpower engaged was restricted to an annual production of 75 per cent of the quantity leaving the machine capacities unutilised. The Committee also note that in Radar Division, the capacity set up initially in 1967-68 for production of 'X' type Radars was increased to double the original quantity in 1971-72, at the instance of the Government, by installing additional facilities at estimated cost of Rs. 58 lakhs. However, the expected orders for 'X' type products did not materialise. The additional man power required for production was not deployed and production capacity was restricted to original quantity. In this connection, the Company has also stated in April 1983 that apart from continuing the certain existing production line,

1	2	3

non-radar item required for defence were proposed to be taken for production from 1983-84 onwards. While this will engage fully the Assembly capacity in the Division, some fabrication capacity upto 25 per cent might not be utilised because of non-utilisation of some of the high cost machinery specially meant for production of 'X' Type Radars. It is also reported that the Company could not take up the development of a successor to Radar 'X', as the issue was engaging attention of Defence Services, since 1968. The production of 'X' Type Radar at BEL ceased from January 1983.

The Committee take a serious view of a large number of machines lying idle in which a huge capital has been invested which cannot be allowed to remain blocked. Further, if the machines are kept idle it will have its own reflection on the prices, production and also on the payment to labour for the working hours. On the one hand the cost per man hour would go up, on the other the value of the machines depreciates with the passing of each day. The Committee therefore; recommend that financial loss suffered by the Company during the last 5 years in terms of production due to the machinery remaining idle, should be quantified and the Committee may be apprised of it. The Committee may also be informed of the steps proposed to be taken to minimise the idle capacity of machines. In this connection, the Company|Government should also examine the feasibility of disposing of such of the machines as are not going to be made use of in future. The Committee would like to be informed of the action taken in this regard within next six months.

During evidence, when enquired whether the idleness of the machinery and established capa-

1	2	3
		city were being reported to the Board, the representative of the Company admitted that "we are not reporting down the idle capacity in each work centre. We informed the Board about the Radar Division". The Committee recommend that the idle capacity of machines in all the units of BEL should be quantified and reported to the Board regularly after every six months alongwith the reasons therefor and also the measures taken to improve the utilisation of machinery etc. so that the Board should have the opportunity to look into the problem in all its ramifications and take suitable action where necessary. The Committee also desire that the Ministry should also specially monitor the utilisation of machinery in the Company so as to ensure that there is no slackening of efforts at any time at any level. Concerted efforts should also be made for utilisation of the idle machine capacity to alternative uses. The information with regard to idle capacity should also be drought out in the Annual Report of the Company.
5	2.12—2.13	The Committee are unhappy to note the dismal production performance of BEL. Audit has reported shortfalls in the production targets fixed in the Low Power and High Power Equipment Divisions and Radar Division at Bangalore during 1977-78 to 1982-83. In 1980-81, the shortfall in production targets was as high as 51.2 per cent in Low Power Equipment Division, 42 per cent in High Power Equipment Division and 47.4 per cent in Radar Division. However, in the subsequent two years *i.e.* in 1983-84 and 1984-85 actual production in the Low Power and High Power Equipment Divisions exceeded the fixed targets. It was only in Radar Division that the shortfall continued and it increased from 2 per cent in 1983-84 to 6 per cent in 1984-85. The production performance of Ghaziabad

1	2	3
		Unit has also been far from satisfactory upto 1980-81. The percentage of shortfall varied from 7 per cent in 1980-81 to as high as 38 per cent in 1977-78.
		The Committee are also informed that BEL was to produce and despatch two Radars in 1984. Although, the Company completed all the work, their despatch was held up as one IC obtained from the collaborators misbehaved. The Company was not able to get over the problem and ultimately the entire batch of ICs was returned to the collaborators and a fresh batch was received from them after a year. In this connection, the representatives of the BEL also admitted in evidence "it is laughable matter that we could not get over it. One IC which was obtained from our collaborator absolutely misbehaved and there was no way to get over that." The Committee are surprised that in spite of technological advancement claimed by the company it was completely helpless in rectifying an IC procured from collaborators and it resulted in considerable delay in production and delivery of the vital equipment to the Armed Forces, etc. The Committee desire that the whole matter should be probed thoroughly with a view to fixing responsibility as to why the ICs were not properly tested in the Company when received from the collaborator and why the defect in the IC could not be got over by the Company itself and the consequent loss suffered by BEL on this account. The Committee also desire to be apprised of the extent of the collaborator's responsibility involved in this regard and what action has been taken by the Company to realise damages from the collaborator on this account.

1	2	3
6	2.14 2.15	The Committee have also observed that the targets fixed for the year 1978-79 to 1980-81 were less than the targets fixed for the year 1977-78 leaving thereby a lot of unutilised capacity. Even these derated targets could not be achieved by the Company. According to the Company, some of the common reasons for the shortfall in production during all these years were delays in development of product, delays in obtaining bulk production clearance, initial teething trouble in productionisation of newly developed products, delays in obtaining supply of components from indigenous/foreign suppliers, etc. The Committee do agree that some of the factors could not be predicted with any degree of certainty but a few of them could have been foreseen by the Company at the time of fixing the targets. The shortfall in targets could have been avoided had the Company made adequate arrangements for proper monitoring and follow up of production. Therefore, in Committee's view the preliminary factor responsible for the shortfall in production targets year after year was that the Management did not fix up realistic targets after assessing all relevant factors. The Committee suggest that the Company should streamline their machinery for target setting so that the production targets set for various Divisions are more realistic than what they have been in the past. The Company should also ensure that once the targets are fixed every effort should be made to achieve them.
7	2.16	The Committee note that to minimise the gap between the targets and achievements, the Company has taken certain important steps

1	2	3
		which include in-house power generation, better planning at the developmental stage, bifurcation of large divisions into small compact divisions, decentralisation of computer facilities to provide each division its own data based unit etc. The Committee hope that with these steps the Company will not only be able to maintain the progress achieved in 1984-85 by Low Power and High Power Divisions at Bangalore but will bring about a marked improvement in the production performance of all other divisions of the company.
8	2.44 2.47	The Committee have noticed that in the Equipment Divisions no norms were laid down by BEL for rejections so as to assess the quality of performance and to fix responsibility for defective work. Reasons for rejections have also not been analysed with a view to taking remedial measures. No monthly reports were submitted to the higher Management on the quantum of rejections, the labour and material costs involved therein, etc. The BEL has admitted in their written reply that "while no norms as such have been laid down for rejections but a review is undertaken during the course of production to ensure that there are no rejections of equipments as such at the end of production process." In the Component Divisions also, the norms were fixed only for 6 out of 14 products and that too for the assembly stage of manufacture. Even for fabrication of parts required for assembly of components no norms were fixed. In the case of other two important components viz. Germanium Semi-conductor and Ceramic capacitors, the actual rejections were also more than the norms fixed by the Company.

1	2	3
		The Committee are also informed that the high process rejections compared to the collaborators' works levels were due to inefficient manual method of dispensing chemicals, manual handling of job and adoption of higher quality of levels whereby the Company markets only Grade 'A' quality type as against lower 'B' & 'C' grades passed and marketed by collaborators.
		The Committee are not convinced of the reasons now advanced by the Company for high rejections of raw bulbs and tube processing. The Committee feel that while fixing the norms the Company must have taken into account all the relevant factors and as such there can be no justification for the actual rejections being higher than the norms fixed. The Committee desire that the exact reasons for excess rejections should be identified by an expert independent body within six months of the presentation of this report and suitable remedial measures taken to bring down the rate of rejections within the permissible limits.
9	2.48 2.49	The Committee have also found that the process rejections of raw bulbs came down from 11.06 per cent in 1978-79 to 5.41 per cent in 1979-80. It started rising gradually thereafter and in the year 1983-84 it was as much as 6.52 per cent. To a specific question as to why the Company was not able to maintain even the level of 5.4 per cent which the Company had reached with certain drawbacks like manual handling, inefficient method of dispensing chemicals, quality problems, etc. the CMD admitted during evidence that "this happens due to inefficiency and we are trying to improve to the best of our ability."

1	2	3
		To another question that even in tube processing actual rejections rates were higher than the norms fixed by the Company, the representative of the BEL stated that "norms fixed in that area were rather ambitious." He also admitted that "rejections levels are higher in our case compared to other countries " The Committee feel that while fixing the norms the Company has not taken into consideration the reality. The Committee see no reasons why the Company should not be able to sustain even the level of rejections achieved in 1978-79 in spite of certain drawbacks. The Committee recommend that on the basis of experience of working and with reference to norms obtaining in other enterprises producing similar products BEL should fix appropriate norms based on realities and also tighten its control measures to see that the percentage of rejections does not exceed the norms.
10	2.50	In this connection, the Committee would like to draw the attention of BEL|Government to the recommendations of the earlier Committee on Public Undertakings contained in the 67th Report (4th Lok Sabha) on Production Management in Public Undertakings emphasising that the public sector enterprises should evolve some permissible limits for rejections so that whenever rejections go beyond that limit causes should be analysed and remedial measures taken. The Committee had also recommended then that all public undertakings should lay down norms for actual rejections of each item or category of items so that the Management becomes aware of the categories of rejections well in time and devise remedial measures before it is too late. The Committee desire that in pursuance of this recommendation, the Company should also fix norms for all its products produced in Equipment Divisions, Component Divisions and other Divisions.

1	2	3
11	2.51	The Committee have also noticed that the cost of re-work in the Equipment Division at Bangalore Unit from 1977-78 to 1983-84 worked out to Rs. 940.81 lakhs but the analysis of the reasons for rework has not been made by the Company. In the Component Divisions, also, the major rework activity relate to inprocess rejections of TV Picture Tube including reclamation of parts from the defective TV guns. The extent of expenditure on rework has also not been assessed and reported to the higher Management. The Committee recommend that BEL should immediately analyse the reasons for the high cost rework involving about Rs. 940.81 lakhs in Equipment Division and also to assess the extent of the expenditure incurred on rework in the TV Picture Tubes. The outcome thereof should be reported to the Committee.
12	2.63 2.65	As far back as in April, 1972, the Committee on Public Undertakings (5th Lok Sabha) has recommended in their 3rd Report that BEL should introduce standard costing so that the performance of the Company could be judged against the set standards. In pursuance of this recommendation, the Company is reported to have introduced standard costing for two products *viz.* Receiving Valves and Germanium Semi-conductor from April, 1973 with the eventual extension of the system to other items to be considered after assessing the results. The standard costing was discontinued in 1974-75 "temporarily till the prices returned to reasonable suitable levels." The standard costing have neither been re-introduced nor the approval of Government has been obtained by BEL for its permanent discontinuation. The Company is also reported to have informed Audit in December, 1979 that the practical utility of standard costing was doubtful in an environment of erratically changing prices. The

1	2	3
		Company has advanced two main reasons for the discontinuation of costing system just after one year of its introduction and there were steep and violent hike in oil prices from April, 1973 to 1983-84 and fluctuation in rupee value of foreign currencies which adversely affected BEL's operations as Company uses 80 per cent imported materials as against only 20 per cent indigenous materials. These factors therefore, rendered the operation of standard costing in monetary terms difficult and the Company had thus no option but to limit it to qualitative aspect only. The environment of erractically changing prices being a universal phenomenon, the Committee see no justification for BEL to discontinue the system of standard costing just one year after its introduction in Components Division, especially when other public undertakings have not given it up on the plea of changing prices. Moreover, standard costing is not vitiated by large price variations which could be explained as such. On the other hand, the system of standard costing brings out other controllable variances which are very useful for management control.
		The Committee are also informed that the Company is examining afresh the question of re-introducing the standard costing taking into account the price situation. In this connection, the representative of BEL during his oral evidence also admitted that "since last year, things are slightly better and we may be able to attempt it once again. We have every intention of trying it and if it is feasible we will try to expand it." The Committee, therefore, recommend that BEL should take urgent steps to reintroduce the standard costing so that performance of the Company could be watched against the set standards.
13	2.66	The Committee are distressed to point out that whereas the Company took the vital decision

1	2	3
		to discontinue the standard costing system they had not bothered to obtain prior approval of the Government in this regard. In fact, the Finance Director of BEL admitted during evidence that "we intimated to them (Government) only when it came out in the Audit Report and not earlier .....frankly speaking it was not brought to the notice of the Government." The Committee feel that when the costing system was specifically introduced in the Company at the instance of the Government, the Company ought to have taken approval of the Government before its discontinuation. The Committee, therefore, desire that Government should issue specific instructions and guidelines to the Company in this regard so as to avoid the recurrence of such a lapse in future. The Govt. may also direct the Company to implement and see that these recommendations are implemented in letter and in spirit.
14	2.81 2.83	The Committee find that in the manufacture of various components, the Company uses precious metals like gold, platinum, silver nickle, etc. either in the pure form or in the form of alloys, powder, suspension, solution, salts, wires, strips etc. Gold pottassium cyanide used in gold plating was being manufactured and supplied by sub-contractor out of gold issued by Reserve Bank of India on Gold Control permits as well as out of gold recovered by the Company from waste solutions/scraps and issued to sub-contractor. The value of the gold pottassium cyanide for gold plating of semi-conductor and during the years 1980-81 to 1983-84 worked out to more than Rs. 410 lakhs (at the average price of Rs. 145 per gram). Similarly, the value of the other precious metals used in the manufacture of components during 1980-81 to 1983-84 was about Rs. 71 lakhs. The Committee have also been informed by Audit that the Company is not conducting any

1	2	3
		reconciliation between the total input of precious metals issued for production with the output i.e. actual contents in parts produced/plated and the quantity recovered from the waste solution, rejected parts, whereby the Company is not ensuring against excessive use of metals, abnormal wastage, etc. In this connection, the Committee would like to draw the attention of the BEL/Government to the instructions issued by BPE to all public sector undertakings in August, 1974 emphasising that in the matter of use of precious metals and chemicals, adequate care must be taken for laying down norms for consumption and process wastage. There should also be proper management control to ensure that important data about consumption/wastage of precious metals and chemicals is reported to the higher Management.
15	2.84	During oral evidence of Development of Defence Production and Supplies, the Committee pointed out to the that when the Committee desired to know from the Company with regard to the standards or scientific method evolved bys them to ascertain consumption of gold in production process, they could not satisfy the Committee. The Defence Production Secretary then stated that "I entirely agree with you that we should be satisfied that reasonable care is being taken to see that there is no unnecessary wastage, pilferage etc." He also added "I suggest for consideration of the Committee that I can direct them to prepare a stock position every month or whatever time is convenient to know whether the process followed is within the improved norms or not. If no norms have been prescribed whether they need be prescribed and they should be prescribed within the fixed time." The Committee recommend that the Government should issue immediate instructions to the Company to prepare and submit to the Board/Ministry a

1	2	3
		reconciliation statement of input of precious metals used for production with the output at periodical intervals. While issuing instructions the procedure being followed in similar enterprises in India or abroad or by the appointment of Consultants may also be taken into account, if considered necessary.
16	2.101 2.106	The Committee note that the major items of equipments produced by BEL in which the Company enjoys almost a monopoly are sold to Defence and other Government Departments. In the sale of components produced by the Company it faces competition from private sector and imports. The Committee have also noticed that so far the Board of Directors of the Company have not formulated any pricing policy for their products. The pricing policy followed by BEL is on fixed quotations and not on cost plus basis. The selling prices are reviewed and revised by BEL from time to time in the light of new developments but no set periodicity for this purpose has been prescribed. During evidence, the Committee were informed by the Defence Production Secretary that the Government guidelines on pricing were being followed by BEL who have not felt any need to lay down different policies in this regard. The BEL has also not sought any special concession or relaxation from the Government guidelines. On enquiry whether BEL has been charging a reasonable price for its products supplied to Defence and other Government Departments, the Department of Defence Production and Supplies have informed the Committee that the prices quoted are reasonable and are also subject to

1	2	3

negotiations by the concerned Indenting Department. In the case of components supplied to Civilian Departments, the Company faces stiff competition from private sector|imports and prices are fixed from time to time on the basis of cost of production, capacity of the market to bear, competition from the private sector, imports etc. In so far as supplies to Defence Services are concerned, all those items which are still under development, the selling prices of BEL compare favourably with the landed cost of similar equipments to be imported. The Company generally quotes fixed price based on estimates|actual cost experience etc. which includes an *ad hoc* provision for escalation in the cost of material and labour during the projected delivery period. Therefore for this purpose the Company initially submits a rough estimated cost through the budgetary quotations which are later firmed up after scrutiny and negotiations by the Price Negotiations Committee.

The Committee are also informed that when under-selling (*i.e.* quoting at less than international price) is resorted to by BEL, it is done in the overall interest of the country's Defence budget after ensuring an adequate return on investment and a payment of 12 per cent dividend to Government on its capital.

On being pointed out that BEL suffers huge losses on some of the consumer electronics products sold in the open market but the loss is more than made good through the profits on products supplied to Defence and other Government Departments, the Defence Production Secretary then promised that "I will look into this aspect myself." As the Defence allocations do not come under the budget review, the Committee desire

1	2	3
		that a special care should be taken by the Ministry to ensure that they are not being over-charged by BEL.
17	2.107	The Committee also recommend that the Government should conduct a detailed study of supplies made by BEL to Defence and other Government Departments during the last 3 years with a view to finding out as to how much profits or losses the Company has incurred on each of these contracts and also to find out that the Company had not made any unreasonable high profits as monopoly supplier of equipments. The Committee may be apprised of the result of the study within six months of the date of presentation of their report.
18	2.108	The Committee do agree that keeping in view the different classes of customers or the products to be sold it may not be possible to lay down any uniform method on the basis of which the BEL could be asked to determine the price of its products. The Committee are, however, not convinced of the arguments advanced by the Company and also by the Government that 'since Company is following in general the guidelines of the Government there is no need to lay down any detailed price policy.' The Committee feel that as per objectives of the Company a sound and rational pricing policy has to be formulated for its products so as to ensure that the customers get quality products of international standard at reasonable price. The Committee, therefore, recommend that the Government should consider the feasibility of determining the pricing policy for its products which may take into account different selling conditions such as competitive selling, partial or total monopoly selling, selling only to Government Departments in the public interest, etc.

1	2	3
19	2.114	The Committee note that as on 1st April, 1985 the pending orders with the Company were of the order of Rs. 41,937 lakhs out of which as much as Rs. 34,151 lakhs related to Defence Departments and Defence Undertakings. These orders according to the Company, are expected to be liquidated in a period of 2-3 years.
	2.115	The Committee also find that as on 1st April, 1982 the cases of slippages in delivery ranging upto 4 years has taken place in respect of orders valued at Rs. 1,509 lakhs, as brought out in the Audit Report. The Committee feel that slippages in the delivery of equipments to the Defence services will not only affect their present sensitive Defence Plans but will also have adverse affect on the future delivery of equipments. Similarly, for other civilian Government customers also, the slippage will affect the implementation of their plan programmes for commissioning of equipments. The Committee, therefore, recommend that the Company should make all out efforts to keep up the delivery schedules of the equipments especially those relating to defence and other Government Departments.
20	2.121 2.123	According to the Corporate Objective of the Company, with its diversified products & technology base, BEL was expected to achieve a growth rate of 10 to 12 per cent per annum so as to strengthen necessary organisational structure to support the planned growth. In Committee's view, the planned growth rate of 10 per cent to 12 per cent is very slow as the cost escalation itself would contribute to an increase of about 7 to 8 per cent annually. According to the Department of Defence Production and Supplies, the Company has already achieved a compounded growth rate of

1	2	3
		16 per cent and is also planning for an average compounded growth rate of 28 per cent for the years 1985—90. However, from the information furnished to the Committee, it is seen that the growth rate in turnover achieved by BEL was only 17 per cent during the six years (1978-79 to 1983-84) as against 145 per cent achieved by KELTRON, another leading Electronic Company in Public Sector, during the same period. Even though the comparison of growth rate of KELTRON with that of BEL may not be relevant as the product lines manufactured by them are different, but taking into account the gross block/investments and other differences, the growth rate of 145 per cent in KELTRON is quite significant especially when it is catering to the needs of lakhs of consumers as against a few captive customers in the case of BEL. The only plausible reason for the stunted growth rate of BEL, according to the Committee, is that the BEL is neither made responsible to cater fully to the Defence needs of electronic equipments nor it is allowed to enter the consumer electronics in a big way. The Committee, therefore, recommend that the Government should lay down precise objectives for BEL in this regard and also to draw a plan to enable BEL to build up a position of strength.
21	3.50 3.52	The Committee regret to note that although the R&D activities of Bharat Electronics Limited commenced at the Company's Bangalore Unit in 1956 and at Ghaziabad Unit in 1974 and that the Committee on Public Undertakings had recommended as far back as in 1972 that a perspective plan for R&D should be drawn up for the next 10—15 years, no serious action was taken by the Company on the recommendations of the Committee. The Committee find that only in April,

1	2	3

1982, the Board of Directors formulated the first detailed policy on R&D activities and in September, 1983, an R&D project profile plan for only 3-4 years (as against 10—15 years plan as suggested by the Committee on Public Undertakings or 7—10 years plan as considered by the Board at its meeting held in April, 1982) was approved by the Board. The Committee are also constrained to observe that the Company did not maintain any proper record of the R&D projects taken up, successfully developed and productionised. The Committee have a definite feeling that R&D activities of the Company lacked proper directions for over two decades and were carried on in an ad hoc if not perfunctory manner. The Committee take a serious note of this neglect in the vital area of the R&D activities of a Company like BEL has been primarily set up for meeting the defence needs of the country.

The Committee have also observed that by the end of March, 1984, 38 projects were abanoned after incurring an expenditure of Rs. 100.88 lakhs for reasons like lack of conformity to specifications, changes in Users' requirements and non-materialisation of expected orders etc. Similarly, upto March, 1984, 42 projects successfully developed at a cost of Rs. 243.80 lakhs could not be productionised because of technical obsolescence, non-materialisation of anticipated orders and competition from other manufacturers of equipment. The Committee express their serious concern about this seemingly infructuous expenditure in the face of the fact that R&D activities of BEL have been of limited use and the progress for the development of R & D Unit has been tardy and far from satisfactory.

The Committee have also noticed that the total time taken from 'go ahead' to the date of

1	2	3
		receipt of the bulk production clearance ranged from 52 to 116 months and the time taken by the Company for the submission of prototypes, modifications, etc. ranged from 36 to 57 months and the time taken by users for approval of specifications, conducting of trials etc. ranged from 13 to 59 months. This, according to audit has resulted in huge cost over-runs ranging from 10 to 967 per cent in 35 cases and inordinate time over-run of more than 4 years in 14 cases. In view of this inordinate time over-run that has taken place in the development of the certain products, the utility of the equipment under development has obviously become doubtful because of high obsolescence rate in the Electronics industry. The Committee deplore this huge cost and time over-runs and are of the view that this could have been avoided or drastically minimised if there had been close and regular monitoring both at the Company and Ministry levels. In this connection the Defence Production Secretary has also admitted during his evidence that "the mechanism of monitoring of R&D Projects was not satisfactory". The Committee wish to stress that R&D problems should be attended to promptly and tackled promptly to achieve self reliance in technology especially when BEL is entrusted with the responsibility of meeting almost the entire requirements of defence services for communication equipment and some highly sophisticated Broadcast Transmitters, TV Satellite Receivers and Microwave Equipment and Systems. The Committee therefore, recommend that R&D Department of BEL should be strengthened adequately and its work monitored closely at the highest level so that it becomes a more effective instrument of progress. In this connection, the Committee would also like to reiterate the recommendation of the Committee on Public Undertakings (1971-72)

1	2	3
		that R & D of BEL should work in close coordination with CSIR, Electronic Commission, R & D Organisation for development of Electronics & Radars and other related research laboratories in the country so that a concerted and coordinated approach could be made so as to avoid duplication of research effort, reduce cost of production and above all lay a sound technological base for the electronic industry in India.
22	3.53	From the material furnished, the Committee have noticed that as against a revenue expenditure of around Rs. 80 crores incurred on R&D by the end of 1985, the value of the developed products has been of the order of Rs. 660 crores. Further, the cumulative position of the value of production of wholly/partially Company developed projects to the total production in the case of Bangalore Unit was 49.72 per cent and for Ghaziabad Unit it was 75.20 per cent. Explaining the reasons for the percentage share of products being much more in Ghaziabad Unit than Bangalore Unit, the Company has informed that the Ghaziabad Unit was established in 1972 and most of the products taken up for production were of indigenous development whereas the Bangalore Unit was established in 1954 and development activities could start there only after the building up of a technological infrastructure in the Company. However, the production in Bangalore Unit has since picked up and the percentage of the value of production for the year 1984-85 only was 80.88 per cent. The Committee are of the view that R & D activity being vital for the healthy growth of Electronic Industry in India, a reasonably adequate amount must be spent for its proper development. However, the success of any R & D project does not depend alone on how much expenditure is incurred on it but the performance of specific tasks

1	2	3
		related to production and solution of practical problems posed by the industry. The Committee, therefore, recommend that there should be close and constant interaction between the production and research wings of the industry so that the problems of crucial importance are tackled in an effective and conclusive manner. The Committee desire that the Company should intensify R & D activities to develop new products and to keep itself uptodate with the latest available technology all the world over so as to build up its strength and confidence and minimise the foreign dependence of defence forces with regard to the supply of essential raw materials and components. For this purpose, the Company should also consider the feasiblity of conducting Seminar workshop and for arranging training programmes and orientation courses to educate its engineers with regard to the latest design technology, system engineering and management technology, etc.
23	3.54	The Committee learn that Government have established an R & D Organisation at Bangalore for the development of electronics and radars (LRDE). So far only two radar equipments have been developed by LRDE and these were entrusted to BEL for productionisation as far back as in 1965-66 to 1973-74. Three more LRDE development products are at present under production in BEL. The Committee have also been informed by audit that 22 items developed by LRDE were entrusted for production to other Government and private agencies and 17 items were productionised in the plans of LRDE itself. The Committee are of the view the BEL which is the premier public sector production agency for radar and electronic equipments it should

1	2	3
		get a greater share in the production of LRDE's developed products in respect of radar and electronics items. The Committee, therefore, recommend that the Government should formulate a specific policy in this regard.
24	3.55	According to the Company, its perspective plans are intimately related to the defence plans and due to the inherently changing nature of defence requirements 10 to 15 years perspective plan in the field of electronics equipments is beset with difficulties. The R & D plans of the Company would therefore, have to be lesser time frame. However, during evidence, Secretary of Defence Production informed the Committee that "now the mechanism is under consideration of the Government whereby 10 to 15 years perspective plan may be possible after a year or so as Users are coming up with their long term perspective plans." Keeping this in view, the Committee reiterate recommendation of the previous Committee (1971-72) that a perspective plan for research and development be drawn up for the next 10—15 years which should be reviewed every year in the light of performance and demand projections. In particular, concerted efforts should be made to achieve break through in know-how and manufacture of electronic components of vital importance so that self reliance is achieved in meeting of the Defence supplies needs indigenously as far as possible, as also the requirements of electronics Industry as a whole.
25	3.56	The analysis of the Company's production profile shows that approximately 70 per cent of the BEL's production is for meeting the defence needs and the remaining for civil requirements.

1	2	3
		Therefore, the Committee desire that the Company should prepare R & D Schemes covering both civilian and defence requirements. In doing so the Company should fully safeguard the interest of the Users and at the same time it should not try on uncertainties and obsolete technology at the cost of exchequer.

MGIPMRND—LS II—(Letter Unit) 2541 LS—5-3-87—1100.