RCC No. 73

RAILWAY CONVENTION COMMITTEE (1991)

(TENTH LOK SABHA)

SECOND REPORT

ON

PURCHASE OF ELECTRIC LOCOMOTIVES FROM M/S. ABB, SWITZERLAND BY THE INDIAN RAILWAYS

Presented in Lok Sabha on 24.11.1992
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LOK SABHA SECRETARIAT
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(1991)

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@Shri Lokanath Choudhury, M.P. nominated on 30 January, 1992 *vice* resignation of Shri Surya Narayan Singh w.e.f. 28 January, 1992.

$Shri Pramod Mahajan, M.P. renominated on 21 July, 1992.

INTRODUCTION

I, the Chairman of Railway Convention Committee (1991) having been authorized by the Committee to submit the Report on their behalf, present this Second Report on the subject of 'Purchase of 3-phase 6000 HP Electric Locomotives from M/s. ABB, Switzerland by Indian Railways.'

2. The Committee had taken up for examination of the subject of System of Railway Purchases and Contracts; Acquisition of Stores and Printing; Disposal of Scrap, Coal and Coal-Ash. During the course of examination of this subject the Committee took note of various press reports about the 'Purchase of 3-phase 6000 HP Electric Locomotives from M/s. ABB, Switzerland by Indian Railways' which also fell within the purview of the subject 'System of Purchases etc.' already taken up by them. The matter, however, assumed added importance when it was raised and later, discussed in both Houses of Parliament. The Committee, therefore, decided to examine this subject in-depth and present an exclusive report thereon.

3. The Committee took the evidence of representatives of the Ministry of Railways (Railway Board) on the 26th and 27th August, 1992 and 18th September, 1992. The Committee wish to express their thanks to the representatives of the Ministry for placing before them the material and information they desired in connection with the examination of the subject.

4. The Committee in this connection took further evidence on 8th and 9th September, 1992. Those who appeared before the Committee at this stage included Secretary, Finance; Secretary, Economic Affairs; Secretary, Planning Commission; Secretary, Heavy Industries; Adviser (Transport), Planning Commission; General Manager, South-Eastern Railway; Director-General, Research, Design and Standards Organisation; General Manager, Chittaranjan Locomotive Works and Chairman & Managing Director, Bharat Heavy Electricals Limited. The Committee wish to express their thanks to all of them for placing before them various facts and candidly sharing their views on the subject. This has enabled the Committee to come to right conclusions in the matter.

5. The Report was considered by the Committee at their sittings held on 28th and 29th September, 1992 and, thereupon, adopted.

6. The conclusions / recommendations of the Committee are contained in Chapter-V of the Report and have been printed in thick type.

NEW DELHI;
November 24, 1992

Agrahayana 3, 1914 (S)

M. BAGA REDDY,
Chairman,
Railway Convention Committee.

CHAPTER I

INTRODUCTORY

Growth of Traffic on Indian Railways

1.1 The growth of rail transport in India since Independence has been impressive as shown by the upsurge of two basic indices of service performance (i) number of originating passengers and passenger kilometres; and (ii) originating tonnage of freight and tonne kilometres of freight carried.

Sl. No.	Particulars	1950-51	1985-86	Multiplier Factor
		millions	millions	
1.	Passengers originating (suburban & Non-suburban)	1,284	3,434	2.7
2.	Passenger Kms	66,517	240,614	3.6
3.	Tonnes originating (Revenue)	73.2	258.5	3.5
4.	Tonnes orignating (Total traffic)	93.0	286.4	3.1
5.	Tonnes Kms (Revenue)	37,565	196.600	5.2
6.	Tonnes Kms (Total)	44,117	205,904	4.66

1.2 In this context it has been observed in the Report of the Steering Committee set up in Planning Commission on Perspective Planning for transport development:

> "This impressive growth has, however, not kept pace with the growing demands of national economy with the result that the growth of economy has frequently been impeded by the shortage of rail transport. If such shortages are to be avoided in future, it will be necessary for the Indian Railways to almost double their present (1985-86) lift of passenger and freight traffic by 2000 AD. To achieve this, the Railways will have to adopt new technologies of rail transport relevant to the needs of our economy as a whole."

The Sixth Plan Document had in this context stated:

> "There will have to be a major effort in the Railways to increase the out-put from the existing assets and improve substantially the utilisation indices which have shown a steep decline in 1978-79 and 1979-80."

1.3 The position in respect of procurement of rolling stock track renewal and electrification during the Sixth Plan was as under:

Sl. No.	Particulars	Target	Actuals
1.	Procurement of rolling stock:		
	(a) Wagons (Lakh in 4 wheeler equivalent)	0.77	0.73
	(b) Locomotives (Nos.)	780	927
	(c) Coaches (Nos.)	5680	5326
	(d) Electrical Multiple Units (Nos.)	606	707
2.	Track Renewals (Kms.)	10400	9541
3.	Electrification (Kms.)	2800	1522

1.4 The 7th Plan Document had observed that (i) the transport capacity of Railways had reached a plateau (ii) huge arrears of replacement of overaged assets had accumulated, and (iii) the rolling stock designs had become outmoded and maintenance practices in several areas are based on obsolete technology.

1.5 The following strategy was proposed in the document to move Railways away from this situation:—

(a) Replacement of overaged assets in a phased manner and modernisation thereof.

(b) Modernisation and technological up-gradation to make the railways faster, safer and cheaper to maintain.

(c) Traction Policy aimed at the conversion from steam to diesel/ electrical and to completely phase out steam locomotives latest by the year 2000.

1.6 The Steering Committee of Planning Commission in their Report (*ibid* August, 1988) have observed as follows:

> "The Indian Railways are not likely to face a slump in demand either for passenger or freight traffic by the turn of the century. On the contrary, they will have to create capacity to carry double the volume of both passenger and freight traffic then they do now. It, therefore, appears that in their search for new technologies to accomplish this task the Indian Railways do not have to adopt such technologies as TGV now *a'la mode* in some developed countries to recover some of their lost passenger traffic. Nor do they need to unusually increase freight train speeds to remain in business. They have actually to opt for such technologies as are appropriate for doubling their present lift of passenger and freight traffic on their existing network at the lowest capital and operating costs. This means that they should endeavour to remain the "beast of burden"

of national economy as hitherto and eschew all attempts to become its show piece instead since we do not have the resources to achieve both these goals.

However, we must caution against the temptation of increasing line capacity by raising the booked speed of freight trains from 75 kmph to 90 kmph with corresponding reduction in the differential between freight trains and passenger trains which have the booked speed of 100-130 kmph."

1.7 In regard to the technological up-gradation the Committee *inter-alia* observed "The basic strategies to increase the net carrying capacity of freight trains (by 50 per cent) on the one hand, and the capacity of the routes on which they run, on the other, are: (a) redesigning of BOX wagon fleet to raise its carrying capacity to 65 tonnes; (b) strengthening the track structure and bridges to raise the axle load of wagons from 20.3 tonnes to 22 tonnes; (c) upgrading of traction to carry heavier trains with 50 per cent higher net load."

Locomotive fleet in Indian Railways

1.8 As on 31st March, 1991 the Indian Railways had a total fleet of 8417 locomotives comprised of: 2915 steam, 3759 diesel and 1743 electric locomotives.

1.9 The Railways informed the Committee that steam locomotives are gradually being phased out of service and giving place to more power and efficient diesel and electric locos.

Locomotive Production capacity and performance

1.10 The Working Group Report on the 7th Plan taking into account the estimated fleet level of 350 million tonnes in the terminal year of the 7th Plan had projected a requirement of 700 electric locomotives. The requirement was proposed to be made by stepping up production capacity at Chittaranjan Locomotive Works to be supplemented by other sources such as D.L.W., Varanasi and Bharat Heavy Electrical Ltd.

Railway Reforms Committee

1.11 The Railway Reforms Committee (1982) had recommended that a corporate production programme should be immediately drawn up to ensure that there was no shortfall on the locomotive side for handling the additional traffic in the coming years and the cater to phasing out of steam as quickly as possible. They, therefore, suggested stepping up of the electric locomotive production capacity to 190 per year. This Committee further stated that in order to keep pace with the electrification effort, the production of electric locomotive at Chittaranjan needs to be maximised and the Government should consider the need for setting up another electric loco manufacturing unit seriously and take an early decision while doing so, electric locomotive technology should be updated to ensure full realisation of the potential of electric traction. According to the Committee

it was right time to develop the specifications and horse power ranges of locomotives for specific usages. This was particularly relevant for electric locomotives. The Committee added that electric locomotives production must definitely be stepped up to 100 by 1985-86 and to 190 by 1991-92.

1.12 The three major manufacturers of locomotives including electrical locomotives in India are Chittaranjan Locomotive Works (CLW), Diesel Locomotive Works, Varanasi and Bharat Heavy Electricals Limited. The production capacity and performance of these three units is briefly discussed below:

Chittaranjan Locomotive Works (CLW):

1.13 Chittaranjan Locomotive Works (CLW), the first production unit of Indian Railways, was set up in 1948. The first steam locomotive was produced by them in 1950.

1.14 CLW have manufactured 802 diesel locomotives till March, 1992. However, the production of Diesel Locomotives is proposed to be stopped after 1992-93 and available infrastructure is to be utilised for enhancing the electric locomotive production capacity.

1.15 Besides, CLW is also responsible, *inter-alia*, for supplying unit spares and components for heavy repair of different types of locomotives manufactured and supplied to Railways in the past. They are also producing a large percentage of electric traction equipments used in the production of electric locomotives such as traction motors, smoothing reactors, contractors, reversers, etc.

Electric Locomotives

1.16 Production of electric locomotives commended in the year 1961 and till March, 1992, a total of 1649 electric locomotives have been produced at CLW both AC and DC type. Currently, the following classes of electric locomotives are being manufactured in CLW:

Class of loco	Type of Service	Total no. manufactured upto 1.4.1992	Continuous rating in HP	Maximum speed in KMPH
(i) WAG-5 AC	Freight	717	3850	80
(ii) WAP-1-3	Passenger	32	3760	130-140
(iii) WAG-7 AC	Freight	1(proto-type)	5000	80

Diesel Locomotive Works, Varanasi

1.17 In order to modernise the motive power to cope up with the demand of increased traffic, Diesel Locomotive Works(DLW), was set up at Varanasi as a Production Unit of Indian Railways in 1961. The first locomotive was manufactured by them in 1963-64.

1.18 Diesel Locomotive Works was set up in collaboration with M/s. ALCO of USA for manufacture of diesel/electric locomotives of 2600 HP type WDM2 for BG Main Line and 1300 HP type for MG Main Line working.

1.19 In order to take up heavier shunting requirements 1400 HP WDS6 class of BG shunting locomotive was developed. A few 1950 HP Main line BG locomotives (WDM7/WDM6) were also manufactured. Till March, '92, 2939 diesel electric locomotives have been manufactured by DLW, Varanasi.

1.20 Currently, WDM2, YDM4 and WDM6 class of diesel electric locomotives are being manufactured in DLW, Varanasi.

Bharat Heavy Electricals Limited

1.21 Bharat Heavy Electricals Limited (BHEL) manufactures railway equipment in its units at Bhilai, Jhansi and Bangalore. The major assembly work is taking place in Jhansi. The Integral Coach Factory, Jessop, Chittaranjan and Varanasi factory receive from BHEL electric equipment for the railway system. The range of BHEL supplies to the Indian Railways includes total electrical system *viz.*, traction motors, traction controls, transformers and other switching systems and breakers.

1.22 BHEL also makes diesel locomotives of various range from 350 HP to 2500 HP. So far, it has manufactured about one hundred such locos.

1.23 The electric locomotives manufactured at Jhansi factory are upto 3900 HP. Till last year BHEL has supplied 35 such locos and an order of another 50 has been received by them from Railways. BHEL also supplies electrical equipment to Chittaranjan.

1.24 *Present day cost of indigenous locomotives*

1	Average transfer price of CLW built 3900 Horse power locomotive during 1991-92.	Rs.1.98 crores
2.	Estimated cost of 3900 Horse Power WAG-5 locomotives expected to be supplied by BHEL (including duties and taxes).	Rs.4.00 crores
3.	Cost of 5000 Horse Power proto-type loco (provisional since costing has not yet been completed)	Rs.3.00 crores
4.	Anticipated cost of 5000 Horse Power locos in the event of mass series production.	10% higher than the cost of 3900 HP WAG-5 locomotives.

NOTE: (a) Present day cost of CLW built 3900 HP loco is not available, since costing has not yet been completed.

(b) Cost in item 2 includes taxes and duties and it is the present day cost with Hitachi type motors, which are costlier than TAO type motors. Cost given in item 1 are 1991-92 average price when mostly TAO type motors have been used.

Electrification of Indian Railways

1.25 Electric traction on 1500 Volts DC was first intorduced in 1925 on a small section of the Bombay area and till 1957, it was confined to less than 400 kilometer, comprising mainly the suburban sections of Bombay and Madras. Electrification on the main line sections was, however, taken up towards the end of the Second Five Year Plan on 25 KV single phase AC system.

As on 1.4.1992 Indian Railways have an electrified network of 10809 route kms. representing 17.3% kms. of all guages and 30.51% of broad gauge network.

1.26 Electrification has been identified as a priority area in the context of energy conservation reducing dependence of Railways on petroleum based energy. It is a continuous process which is currently confined to only broad-guage routes.

The Railways programme for electrification during 8th Five Year Plan and beyond is under finalisation with the Planning Commission. Under the currently electrification works are in progress at 4204 routes kms.

Plan-wise progress of electrification:

1.27 The progress of electrification on Indian Railways in various plan period has been as under:

Plan	Route Kms. electrified
Prior to 1956	529
2nd Five Year Plan (1956—61)	216
3rd Five Year Plan (1961—66)	1,678
Inter Plan (3 Years) Period (1966—69)	814
4th Five Year Plan (1969—74)	953
Fifth Plan (5 Years) period (1974—78)	533
Rolling Plan (2 Years) period (1978—80)	195
Sixth Five Year Plan (1980—85)	1,522
Seventh Five Year Plan (1985—90)	2,812
1990-91	83
Total	10,083*

*Includes route kms. energised but not opened to traffic.

1.28 A detailed note on programme and progress on the electrification as furnished by Ministry of Railways is enclosed at Annexure-IV.

CHAPTER II

TECHNOLOGY OF ELECTRICAL LOCOMOTIVES IN INDIAN RAILWAYS

2.1 To keep pace with growing traffic in the Indian Railways and for optimising the utilisation of existing assets, the importance of uprating the motive power of electrical locos has been emphasised repeatedly by various Committees/Study Grops which have gone into the question of long term planning and modernisation in the Indian Railways.

2.2 For this purpose the Indian Railways have undertaken efforts to upgrade the existing WAG-5 3900 HP electrical loco being manufactured at Chittaranjan Locomotive Works (CLW) on the basis of French, SNCF technology to 5000 HP. The Bharat Heavy Electrical Limited (BHEL) have also undertaken a parallel exercise for the purpose. At the same time, Indian Railways have gone for import of 6000 HP electrical locomotives from different foreign manufacturers with option for transfer of technology. Offers had also been received from erstwhile USSR to supply 7000 HP electrical locos with 8 axles.

A. *Upgradation of WAG-5 3900 HP Electrical Locomotive*

2.3 On the basis of their enquiry into the matter regarding upgradation of 3900 HP WAG-5 type electrical locomotive the Railway Convention Committee of the 8th Lok Sabha in their 5th Report (1985) had observed as under:

"The current design of electric locomotive WAG-5 is being uprated by CLW to 5000 HP at its works within the existing equipment and marginal inputs and to 6000 HP by importing 18 prototypes 6000 HP engines of three types from Japan and Sweden. These prototypes are expected to be delivered in 1987-88, whereafter they would be subjected to field/service trials for one year and out of that one type will be selected for series manufacture at CLW by the end of the Seventh Plan or early in the Eight Plan. Meanwhile, efforts to improve the equipment, which go into the CLW locos (WAG-5) like traction motor, transformers, convertors and invertors are being carried out indigenously as well as by importing the latest technology of various sub-assemblies and balancing equipment."

The Committee had however recommended as under:

"CLW should be asked to go ahead with uprating of indigenous electric loco to 5000 or 6000 HP and the Railways should not attempt to go for manufacture of imported 6000 HP locos which would lead to a set-back to the Railways' indigenisation programme. The imports, already ordered, may be reviewed and cancelled, if possible".

2.4 Justifying the import of 18 prototypes of 6000 HP locos from foreign manufacturers, the Ministry of Railways in a note furnished to the Committee (1985) had stated:

"Current design of electric locomotives is for 3900 HP, with technology based on 1960 vintage. The technology is being uprated from 3900 HP to 5000 HP. An order for 18 prototypes 6000 HP locos has been placed for 3 types on two manufacturers. 2 types of 6 locos each on M/s. Sumitomo/Hitachi, Japan, and one type of 6 locomotives on M/s. ASEA, Sweden. These prototypes are expected to be delivered in 1987-88 subject to successful field/service trials for one year; one type will be selected for series manufacture at CLW by the end of VIIth Plan/by early Eight Plan."

2.5 However, in regard to import of 18 prototypes from abroad the Committee in the aforestated had sounded a note of caution.

2.6 During evidence before the Committee, the representatives of the Ministry of Railways had explained the dichotomous approach of the Railways in the matter as under:

"The methodology which we have adopted is two-fold: first, we are trying to see that we get a top notch electric loco design engineer from one of the European Railways where electric traction is predominant, say from West Germany, Sweden or France. We shall be writing to them and getting that particular individual if it is possible for us to arrange it and attach him with RDSO and CLW. Secondly, with the present specifications, the equipments going into the WAG-5 electric loco which we are manufacturing at CLW include traction motors, transformers, convertors and invertors. With the existing specifications, we are trying to float a global tender. Till indigenous capacity is available, we have to import some balancing items for additional locomotives, instead of importing complete electric locos. With this process, we hope we shall be able to get the particulars of the latest technology, and have the possibility of operating with that equipment".

2.7 However, contrary to the recommendations of the Committee, the Ministry of Railways went ahead with import of 18 prototypes 6000 HP electrical locos based on thyristor. These locos were received in India between March and October, 1988.

2.8 The Railway Convention Committee of 8th Lok Sabha in its Action Taken Report (11th Report) therefore made the following observations :

"The Committee cannot but express their strong disapproval of the decision of the Ministry of Railways to import these prototypes even

before the matter could be considered by the Committee. They would like to know why the Ministry of Railways have decided to flout the opinion of the Committee without even apprising the Committee of the reasons for going in for imports."

2.9 In a subsequent Action Taken Note furnished to the Committee, the Railway Board stated :

"This is in no way a set-back to indigenous efforts of optimising the existing WAG-5 class locomotives which would be continued to be manufactured in next 4-5 years. It is to be recognised here that development of WAG-5 to 5000 HP. with minimum foreign exchange is only an optimisation exercise, pending series bulk manufacture of the new generation 6000 HP locos".

2.10 However, in regard to procurement of 6000 HP thyristor type locomotives, the Railway Board justified their action as under :

"After careful consideration of the observations of the Committee procurement of 6000 HP as a long term measure, was considered essential to meet the expanding traffic needs by achieving greater throughput on very busy routes with limited line capacity. That is why an order for import of a few locomotives with technology transfer was placed, so that the system design on the same, further manufacture can be taken up indigenously. The inputs are thus for a limited number only with a view to selecting the type best suited for our operating conditions and thereafter undertaking indigenous manufacture of the same with transfer technology."

B. *Development efforts made by Bharat Heavy Electricals Limited*

2.11 The Chairman-cum-Managing Director of BHEL, appeared before the Committee and apprised them of the developmental efforts undertaken by BHEL in regard to 5000 HP locomotives.

2.12 The Chairman-cum-Managing Director of BHEL who appeared before the Committee stated in this regard as follows :

"Just now manufacture is going on about the 5000 HP locomotive. It is under trial, under assembling. We will hand it over to Railways for trial operation."

Asked to state wnether this model was different from the one manufactured by CLW. The witness stated :

"Ours is a different one. It is with thyristor technology. Our engine is in the final stage of production. We will hand it over to Railways for trial in December, 1992."

C. *The Choice of technology*

2.13 In the context of their examination of the proposed deal for purchase of thirty 6000 HP electric locomotives from M/s. ABB, Switzerland the Railway Convention Committee (1991) went into the entire question of importing state of art technologies, its compatiability with the general technological status of Indian Railways as also its impact on indigenous efforts to develop High Horse Power electric locomotives. The matter regarding earlier import of 18 thyristor type 6000 HP locos by the Railways was also examined, *de novo* in the light of later developments to ascertain to what extent assertions made earlier by the Railway Board about the critical importance of these locomotives for the smooth transportation of freight and passengers on Indian Railways had stood ground.

2.14 In this context, former Chairman, Railway Board made the following observations in his Note dated 21.8.1991 :

> "Since there is absolutely no doubt that Indian Railways must induct high horse power locomotives with the least possible delay, we have to explore the alternative avenues. Fortunately IR today have an affordable and viable alternative. The 6000 HP locomotives imported a few years ago with thyristor drive have already undergone service for about two years. Their technology is also available under the contract covering their purchase from two different countries. We must immediately take necessary steps to work out the foreign exchange and total costs that would be incurred by implementing technology transfer for thyristor locomotives. If the analysis shows a considerably lesser foreign exchange outgo per locomotive now and in the next few years, we should unhesitatingly adopt that route to high HP locomotives. These locomotives would meet the operational needs at exactly the same level as the proposed 6000 HP 3-phase AC locomotives. The technology would also be far superior to what we otherwise have or would have. No doubt the AC technology would have been even better but on account of economic compulsions, we have no option but to forego the edge this AC technology offers, and remain content with the next best option of thyristor technology. This option incidentally gives as the advantage of two to three year head-start over the AC technology because locomotives are already available and have undergone service trials over a two year period."

Role of CLW

2.15 The General Manager, CLW during evidence explained the role of his organisation as under :

> "CLW role as has been chalked out by the Ministry is to develop from the basic design given by the RDSO which comes in the present case from the French technology acquired about 25 years

back. The locomotive or the technology, at that time, permitted to make the locomotive to 3000 HP and CLW's first phase of upgradation was 3400 HP, second phase was to 3900 HP and the third phase was to 4400 HP and now, we have achieved 5000 HP. For this, whatever support needed within the real design for the CLW was always forthcoming".

Role of RDSO

2.16 Explaining the role of his organisation, DG, RDSO during evidence stated :

"The design for locomotives which are manufactured at Chittaranjan is provided by RDSO. The principle is that the basic work and the design will be worked out by the RDSO and for individual parts, the design and specifications will be worked out by the production units. For any locomotive which is decided to be manufactured, RDSO will have their role or working as a kind of a brain for any organisation to see that it is indigenous and meets the specifications."

Indigenous Technology

2.17 Explaining the status of indigenously available technology for manufacture of electric locomotives, Member (Electrical), Railway Board during evidence stated :

"The locomotive that we are manufacturing at Chittaranjan today is called tap-changer technology which is operated by air motor and the transformer taps are changed. The increase of voltage or power is in discreet stages and that vitiates the performance to some extent. This technology has become an obsolete thing. There is only one manufacturer today in the whole world, *i.e.* ABB (India). ABB, Switzerland has also given it up."

2.18 He further added :

"This equipment has got a certain limitations. It cannot give a horse power of more than 4000 HP. It has its physical limitations."

Present status of WAG-5 5000 HP loco

2.19 The Committee enquired the present status of the project to upgrade WAG-5 3900 HP locomotive to 5000 HP. The Member (Electrical), Railway Board in this connection stated :

"It is a fact that CLW has been trying to upgrade the locomotive design for quite some time. But it is also true that they could not do so till recently. CLW had to develop a transformer of higher capacity. They had to get traction motor of higher capacity and also a compressors of higher capacity. Luckily these developments have materialised but with all that, we could not do unless we had a bogie that could make use of 5000 HP. That bogie was not available

with us.....It so happened that out of 18 thyristor locomotives that we have purchased, a certain design of bogie was evolved by RDSO and only in this year *i.e.,* 1992 March, we could manufacture one 5000 HP locomotive prototype."

2.20 He further added :

"It (5000 HP locomotive) has been given the name 'Shanti Dan' by Mother Teresa. It is undergoing field trial. .....If everything goes well, then the 5000 HP locomotives of Chittaranjan-build may be available for bulk manufacture. But right now only one locomotive of 5000 HP could be manufactured by Chittaranjan and not by BHEL."

2.21 The witness also stated that :

"There is a big question mark whether the tapchanger will stand the test."

2.22 In this context, DG, RDSO informed the Committee :

"It has been developed according to our capability. A lot of research had to be done."

2.23 Asked whether prototype developed by CLW will serve the purpose, he stated :

"All the designs of the 5000 HP locomotive which has been manufactured at Chittaranjan, are prepared by RDSO. For this we have interacted with the manufacturers who supplied major parts of the equipment. We have suggested some changes to the manufacturers, based on which they have made their design. The present 5000 HP locomotive is a very old technology and it is the indigenous technology. The 5000 HP locomotive is better than our 3000 HP and 4000 HP locomotives."

5000 HP locomotives

2.24 Commenting about usefulness of 5000 HP locomotives, Director General, RDSO further added:

"It does not quite measure up to what we think we would need now and in the years to come when the traffic goes up."

2.25 Asked whether two engines of 5000 HP can get haulage of 10000 HP capacity, the DG, RDSO stated:

"Yes. That is how we do in some cases. We combine 3 engines of 3000 HP and get the capacity required. However, in this process, we are wasting that much dead weight, which is carried all through. We are not able to carry useful material to that extent. It reflects on the efficiency. If there is one

locomotive with that capacity, we can carry more weight. If we have all the power in one locomotive it will be useful.

2.26 Asked whether he agreed with the view that the new proto-type made by CLW with 5000 HP would serve the same purpose as the 6000 HP locomotives. DG, RDSO said:

"We have got today the coal train of 4770 tonnes, which is the standard unit today which we run. On the plain sections we can haul that with one of our 5000 HP locomotives. But most of the sections are not that plain. We need two of our even 5000 HP locomotives to haul 4770 tonnes train".

2.27 Asked what was the extent coordination in the country to bring about technological progress in this area, GM, CLW stated.

"Things in this country are now moving on the right track. It will not take many years for us to be almost on par with most of the developed countries in electrical industry."

2.28 Asked whether necessary infrastructure had been provided to CLW for upgrading locomotives, GM, CLW stated:

"Some of the functions which were earlier performed by the RDSO were to be transferred to Chittaranjan and the wherewithal of Chittaranjan for development of products as per the available technology, were to be augmented. These facilities were never meant to deveop a totally new technology for electrical locomotives. Some facilities were sanctioned. The building has come up. Equipment, instruments, etc., have been purchased and we have also posted the staff".

2.29 He further added:

"We have developed service engineering. It is functional since last two years. As regards product development also, 80 per cent of the work is done. With the help of this unit only, we were able to upgrade the locomotive to 5000 HP."

2.30 Asked what was the cost of development of 5000 HP engine, he stated:

"that he did not have the figures available".

D. *Thyristor Technology*

Need and status

2.31 Asked if the intention was to adopt thyristor technology, why CLW went in for upgrading SNCF technology to 5000 HP level. GM, CLW stated:

"The thyristor technology was in our plans for upgradation. We called the tenders from abroad. The cost was quite high. The, indigenous firms like the ECIL, Hyderabad, BHEL were also developing thyristor converters and we were in liaison with them

and seeing that they may be successful in developing a thyristor converter."

2.32 Explaining the present position regarding thyristor technology the witness said:

"We re-tendered and the tenders have been opened and they are under examination for putting the thyristor on the existing locomotives.

We are holding discussions with the BHEL regarding tenders for converters. They have not yet manufactured any, in India. I have gone and seen in the BHEL who are slightly ahead or higher than their laboratory model. The test results are quite encouraging."

2.33 In the same context, Member (Electrical), Railway Board added:

"We want an alternative for the tapchanger.....5000 HP locomotive being developed by CLW has got a very distinct limitation because of the tapchanger technology being obsolete. Therefore, all the time, we had been toying with the idea of having thyristor technology. Elsewhere in the world, it has already become a proven technology. ..... In 1983 it was thought that the 4000 HP locomotives would not serve the purpose because we have to run the trains for long distance whether it is goods train or passenger train. Therefore we had to look for highpower locomotive. We found that the 6000 HP locomotive would be the ideal HP locomotive. This was the conclusion of the various technical study groups set up by the Planning Commission as well as our own assessment. Therefore, we have advertised for the purchase of 18 thyristor type locomotives of 6000 HP."

2.34 In this context, the GM, CLW stated:

"Presently, we are manufacturing locomotives using the technology contracted with the SNCF consortium. Using the same technology, we have been able to upgrade these locomotives to 5000 HP. With the technology, it is not possible to regenerate power and pump it into the system..... I can also not say definitely whether it will enable us to solve the telecommunication and S&T problems.

2.35 Asked whether it would make any significant difference if 6000 HP engine were used instead of 5000 HP. He stated:

"With the present wagons, rails, etc. optimum utilisation of 5000 HP locomotives is not possible."

Research and Development Capability

2.36 The Committee enquired why the 5000 HP locomotive under development at CLW could not be uprated to 6000 HP. In this context, the Member (Electrical), Railway Board stated:

> "We have a very poor R&D base at RDSO. At CLW also we are trying to set up a design and development centre but our R&D base is not up to the mark."

2.37 The Committee enquired how CLW had mentioned in 1985 that it would take a decade to upgrade 5000 HP locomotive to 6000 HP. In this context, GM, CLW stated:

> "I have a copy of the 1985 Report with me. You may please see that the plan was for 5000 HP only."

2.38 He also quoted the following paragraphs from the CLW document titled 'CLW-Blue Print for 21 Century', Chapter on "Product Upgradation":

> "The Technology adopted at present is nearly 20 years old. The need to modernise technology and improve performance parameters and reliability of the equipment has been recognised. In addition to the prototype trials on eighteen 6000 HP locomotives being imported, CLW have also planned to modernise the technology in the current series of locomotive as detailed below:
>
> i) 840 hp traction motor
>
> ii) 5000 kva transformer and matching smoothing reactor with a common cooling circuit.
>
> iii) Static 3 phase converter for auxiliary drives
>
> iv) Vacuum circuit breaker
>
> v) Thyristor power converter with associated new transformer, smoothing reactor etc.

2.39 Explaining the progress achieved so far GM, CLW stated:

> "We have achieved four out of the six items. The remaining two items in which our attempts have not become fruitful are the thyristor converter and static converter.

2.40 Committee enquired whether in view of the slow progress made it could be inferred that the technology was beyond the competence of CLW. The GM, CLW replied:

> "I will be the last person to say that our people are incompetent. We are the second biggest manufacturers of locomotives in the world and now if we leave out Russia, we will be number one. We have done upgradation with remarkable achievement. With this technology, even the French have not upgraded upto 5000 HP. If

our aim is to develop a 6000 HP loco with thyristor or AC Drive technology, as I said earlier, it cannot be done by the Railways alone. It requires research efforts on the part of universities, national research institutions and the expenses being spent by the entire public and private sector on research activities."

2.41 Asked whether in view of the inadequate technological base in CLW, RDSO and the industry in general, in regard to development of 6000 HP electrical locomotive, CLW are in a position to receive indigenous latest technology. In his reply GM, CLW said.

"I would like to clarify that the development of a locomotive using a particular technology is one thing and developing a total technology is a completely different thing. Using present technology, we have been able to upgrade upto 5000 HP and for this, the Railways, RDSO and the CLW are primarily responsible. When it comes to the development of a new technology, alongwith the Railways, research done in universities, in national research institutions and in public and private sector also has to play an important role.

As regards developing a 6000 HP locomotive with thyristor technology, whatever be the resources given to the Railways, I don't think the Railways alone will be able to achieve it.

2.42 In the context of statement of DG, RDSO that Railway Board had found it cheaper to go ahead with the imported technology *vis-a-vis* the Indian technology, the Committee enquired whether this was an admission of the fact that the RDSO were not in a position to give R&D support to the indigenous development of electric locomotive technology.

DG, RDSO in his reply said:

"So far as locomotives are concerned, the R&D base must be provided from all sides. Indian Railways do not manufacture many of the very important parts that go into the locomotives. For example, the transformer thyristor, control gear, many electric equipments etc. are not manufactured here. When we try to make a new design of a locomotive we must carry all the people together. We have the in-house capability at RDSO, Lucknow. When we know about the state of industry which supplies these parts, it is not proper for us to take big jumps and to entirely new type of drivers unless they are willing to invest money. R&D capability will not come very fast. When Railway Board says that our back-up is poor, they do not mean that RDSO's part is very poor. It is largely in the system."

2.43 Asked how an organisation which is meant for indigenous developments of technology whose support has been supporting import of

foreign technology continuously one after another and whether this did not negate the purpose for which the organisation has been set-up. DG, RDSO said:

> "The development is not a one-sided affair. Even in respect of these electric locomotives, we started electrification with imported locomotives on roughly 3000 HP and it was in Sixties this very organisation developed the design for 3600 HP locomotives. Later on, as things grew further, the organisation uprated and evolve design of 3900 HP. Thereafter it came to 5000 HP. If we continue with this, we can also come to 6000 HP, but it takes time"

2.44 Asked how much time it would take provided sufficient funds were given, DG, RDSO said:

> *"I understand that there have been interactions with the industries* for the past two to three years about the development of 6000 HP 3-phase AC equipment. All the companies like the ECIL, BHEL, Bhaba Atomic Research Institute etc., have felt shy of taking the plunge to 6000 HP. They want some more time. For 5000 HP thyristor, we are continuing with our further work. When we talked to BHEL, they were not agreeing for totally indigenous technology."

2.45 Pressed to indicate the time frame, he said:

> "It may be a decade. It is only my guess today".
>
> He further clarified:
>
> "First of all, I can do with 120 tonnes, but I must have 160 tonnes. I can put 40 tonnes of deadweight and do the same work, but that is not worthy by a technology of that kind. That is not the correct thing to do. The other big objection is the interaction with the RAILS. We have got a specification laid down and that should not exceed that limit. The Russian offer gave us far above the limit. The Russians have very strong rails, but we are not having strong lines. There are some other minor points also."

2.46 Member (Electrical), Railway Board further stated:

> "It is not that the efforts for indigenous development of thyristor equipment have been given up. The ECIL could not do it. So also the BHEL and NGEF."

Cost factor

2.47 Asked what is the cost of 5000 HP locomotive developed by CLW with the help of RDSO, DG, RDSO said:

> "The cost of the first locomotive was something like Rs.2.5 crores or 2.8 crores or something less than Rs.3 crores."

2.48 The Committee desired to know whether imported technology would not be costlier than the indigenously upgraded technology. DG, RDSO replied:

> "Definitely the cost of import is more. It will take years to import the parts. This kind of evaluation has to be done while working out the cost."

In this context, he further clarified:

2.49 "In total economics, it involves not only the cost of locomotives but other things also. The cost can be the energy cost, day-to-day maintenance cost etc. When all these things are put together, then the result has to be seen."

2.50 Asked whether RDSO had made any such evaluation he added:

"RDSO had not made any such evaluation. I think it is done by the Railway Board, and they have done it. They found it would be cheaper to go ahead with the imported technology *vis-a-vis* the Indian technology."

Interaction with the Industry

2.51 The Committee observed that BHEL were on record about having informed the Railways of the progress made by them in developing 5000 HP locomotive. In this connection, Member (Electrical) said:

> "Having said that they can do it. But, they have not manufactured any locomotives. We did bring from BHEL thyristor equipment for conversion for South Eastern Railway for a much smaller HP rating that is 3000 & 4000 respectively. But, this is not proved to be a very successful equipment. It is still under the state of development for a number of years. They have not informed us officially."

In this context, he further stated:

"About 5000 HP locomotive we have been able to make one prototype only so far at CLW. The Committee have informed us that BHEL has also development it. But BHEL have not informed us. We will get in touch with them."

2.52 Asked to explain the extent of interaction between the Railways and the industry for development of High Horse Power locomotives, Member (Electrical) stated:

> "I would submit that we advertised for this locomotive on a global tender basis and indigenous industries were also invited. We received only one quotation of BHEL and that too in combination with Hitachi of Japan. Indigenous industry does not have a base for this technology of a magnitude of AC three-phase would require 6000 HP locomotives. There was, therefore, no chance of going ahead with interaction."

2.53 Asked during the subsequent evidence whether economics of 5000 HP locomotive had been worked, Member (Electrical) said:

> "We can work out the relative economics of 5000 HP locomotives. We have not really worked out. It has been done for 6000 HP locomotives alone and not *vis-a-vis*."

CHAPTER III

ACQUISITION OF 3-PHASE ELECTRIC LOCOMOTIVES TECHNOLOGY

Background

3.1 On 9th February, 1992 a news item appearing in the Press with a caption 'Locomotive Purchase-Railways in a hurry to favour MNC' *inter alia* stated that an unseemly hurry by the Railway Minister to place an order worth US $200 million for outright purchase of electric locos from Swedish-German firm, Asea Brown Bovery (ABB) has raised eyebrows in the Government. The Purchase is against two loans from the Asian Development Bank and the EXIM Bank of Japan.

3.2 The Railway Convention Committee took note of this news item and desired the Ministry of Railways (Railway Board) to furnish a factual Note vide their O.M.No.4/10/RCC-91 dated 13th February, 1992. The Ministry of Railways vide their O.M. No.91/RCC/205/1 dated 23 March, 1992 furnished the note on the subject which is reproduced in the Appendix.

3.3 In the meanwhile the matter had also been raised/discussed in both the Houses of Parliament.

APPENDIX

NOTE ON PURCHASE OF ELECTRIC LOCOMOTIVES

(Enclosure to Ministry of Railway's (Railway Board O.M. No.91/RCC/ 205/1 dated 28.3.1992)

1. *Background of Purchase:*

In the manufacture of electric locomotives, utilisation of 3-phase AC Asynehronus motors driven through GTO Thyristor is the latest state-of-Art Technology and Indian Railways had taken a decision to go in for this technology in 1987. The intention was to purchase a certain number of locomotives alongwith the technology for eventual manufacture of these locomotives in India at Chittaranjan Locomotive Works. After the project was evaluated and cleared by ADB, the tender documents were got approved by ADB with DGTD clearance and the tenders were opened in two parts—technical portion in February, '88 and Commercial portion in August, '89 after the technical bids were evaluated. This tender was issued for import of 40 A.C. locomotives comprising 30 freight locomotives (10 nos. fully assembled, 10 nos. semi-knocked down and 10 nos. completely knocked down) & 10 passenger locomotive (fully assembled) alongwith Technology Transfer for subsequent manufacture in India. While the freight locomotives and Technology Transfer were to be financed by Asian Development Bank as a part of the upgradation of Gaya-Ghaziabad Route, the passenger locomotives were to be financed by EXIM Bank/ Japan. While the Tender Committee deliberations in the Ministry of Railways were finalised well in time in October, '89 recommending the lowest evaluated offer of M/s ABB, the acceptance of the same could not be processed further since the Planning Commission set up an Expert Group to review the total requirements of Indian Railways for the High horse power locomotives and desired that ordering of the high horse power locomotives may pend till basic policy issues are settled. However, the study by the Expert Group of the Planning Commission and settlement of the basic policy issues are settled. However, the study by the Expert of the Planning Commission and settlement of the basic policy issues were finalised too late for processing the offers within the period of validity of offer.

Since none of the bidders who were technically cleared agreed to extend the validity of their offers, the invitation of fresh bids became inescapable. While doing so, the scope for purchase of freight locomotives was reduced from 30 Nos. to 20 Nos. (10 Nos. fully assembled plus 5 CKD and 5 SKD), as the Expert Group of the Planning Commission, while accepting the need for technology, had suggested that the scope of purchase of

locomotives could be reduced. While making the changes as above, technology for AC/DC locomotives—a locomotive suitable for operation in the AC Traction as also DC Traction in areas near Bombay was included both for freight and passenger locomotives and the quantity to be purchased included one AC/DC freight and one AC/DC passenger locomotive.

The Second set of tenders limited to the 4 technically evaluated bidders were issued and the revised scope (both technical and commercial was approved by ADB. The Technical bids were opened in October '90 and all the 4 offers were found to be technically responsive. The commercial bids of all the tenders were thereafter opened in December '90. The prices offered were, *prime facie* very high. While the tender Committee did not favour purchase at that cost, it was decided by the Board to make an earnest attempt to see if technical knowhow could be acquired by negotiating for a more reasonable price. During this second round of tendering BHEL had submitted an offer in collaboration with their Japanese Associates, M/s. Hitachi for supply of locomotives with 3-phase technology. M/s. BHEL had also contended that they would ensure the required domestic value addition to qualify for a price preference as per ADB guidelines. Accordingly, they were asked to attend negotiations after obtaining ADB's approval. While calling BHEL for negotiations they were asked to furnish details of items with prices to substantiate their claim regarding indigenous value addition and also to reconsider their rates which were considered unreasonably high. Although M/s. BHEL attended the negotiations and discussions were held at length, they neither submitted any data to substantiate their claim about value addition in India nor did they agree to reduce their rates.

Thereupon it was decided to issue fresh tenders. The scope of supply and technology was revised by deleting the AC/DC locomotives both on freight and passenger side expecting that this would result in substantial saving in the cost of technology. The scope for supply of 20 freight locomotives was further adjusted marginally to six fully assembled, 7 semi-knocked down, 7 completely knocked down in lieu of 10, 5 and 5 respectively during the third round of tendering. Since the technical specifications remained unchanged (except for deletion of AC/DC portion), only fresh commercial offers were sought, alongwith re-confirmation of their technical specification. This set of commercial tender was opened in June, 1991.

2.*Status of Offers:*

M/s. BHEL:

M/s. BHEL claimed that they were entitled to price preference as an indigenous bidder in all the 3 bids of tenders. Against the first bid of

tenders their claim was considered and rejected by Tender Committee and Railway Board. On the Second occasion M/s. BHEL's claim was considered and they were accordingly called for negotiations. While doing so, they were asked to furnish further details regarding value addition to satisfy the purchaser and ADB about the correctness of their claim as Category I bidder entitling them to 15% price preference ever fully import tender. M/s. BHEL failed to f .rnish these details. On the 3rd occasion the data furnished by M/s. BHEL was on the same lines as furnished during the second round of bidding and they did not incorporate further data which was sought while inviting them for negotiations against 2nd round of tendering regarding details of value addition to justify price preference.

M/s. ABB.

M/s. ABB's offer was technically acceptable in all the three bids of tenders. Against the first set of tendering, ABB's offer was considered lowest technically acceptable offer and was also the lowest evaluated offer since BHEL's claim for price preference was rejected as stated above. In the second round also M/s. ABB's offer was the lowest offer but since BHEL's claim for price preference was considered they were taken as the lowest evaluated tenderer and hence M/s. ABB were not called for negotiations. During the third round ABB's offer was the lowest and since M/s. BHEL failed to furnish complete data as mentioned above BHEL's claim for price preference has not been found acceptable and this view has met the approval of ADB.

3. *Whether there is any departure in observing rules and regulations?*

The acquisition of technology and freight locomotives are to be financed by ADB and the purchase of passenger locomotives is to be financed by EXIM Bank/Japan. Drafting of tender documents as also evaluation of various offers has to be done strictly as a per ADB guidelines which is acceptable to EXIM Bank also. This has been done all through as would be evident from the fact that ADB had accepted the stand taken by Ministry of Railways.

4. *Present Status of the case:*

In the latest round of tenders opened in June, 1991 Ministry of Railways evaluated the tenders and recommended negotiations being held with the lowest evaluated bidder, i.e. ABB/Switzerland as the claims of BHEL on rounds of 15% price preference was not conclusively proven. ADB agreed with this proposal and negotiations were held accordingly with the said firm in November, 1991. Final recommendations for ordering the locomotives with acquisition of technology were cleared by

ADB in December, 1991. The case has been under examination by Ministry of Finance. On the basis of discussions in an inter-ministerial meeting consisting of Secretary, Economic Affairs, Secretary, Ministry of Industries and Financial Commissioner Railways, the proposal to place order on ABB has been cleared by Ministry of Finance on 14.3.92.

5. *Choice of Technology*

When it comes to a question of choice of technology for series production in the country, it is or paramount importance that the country goes in for the right technology. Hitachi technology is not proven technology. There are no AC 3-phase locomotives produced by Hitachi which are in commercial operation, whereas in the case of ABB, 3-phase locomotives are in operation in many continental railways. Further, British Channel Tunnel as well as Spain have placed orders on ABB for supply of AC 3-phase locomotives. Since AC 3-phase locomotives is going to be the mainstay of the Indian Railways in the decades to come, it is important that Indian does not become an experimental ground for up-proven technology. Under the circumstances, the Railway Ministry's decision to go in for AC 3-phase locomotives from ABB is based on sound consideration.

Significance of 3-phase Technology

3.4 During evidence of the representatives of the Ministry of Railways (Railway Board) the Committee desired to know the circumstances under which decision was taken to import 3-phase 6000 Hp locos and introduce this technology in India. The Member (Electrical) of the Railway Board explained the position as follows:

> "The Indian Railways have been thinking to upgrade the available locomotives. What we are having now or what we are manufacturing now at CLW is a locomotive based on old technology which we imported from European group some time in sixties. Now this technology has reached almost the optimum level and we are able to produce today a locomotive called WAG 5 which has 4.000 HP. It has its limitations in hauling the loads which the Indian Railways would like to both for freight and passenger transportation to meet the requirements. So, it was thought that we will go for something which is more powerful and which will be based on the 'State of the Art' technology which will be more energy efficient and which will be able to run through the length and breadth of this country without need for very frequent maintenance. With these objectives in view, the Railways have been exploring the possibility of getting new technology and it was a very conacious decision taken sometime in January, 1987 by the Board that the 3-phase locomotives will be purchased which by this time has been perfected in Europe."

3.5 Explaining the merits of the 3-phase technology, the witness further stated:

> "Why we have been looking for the three-phase technology is because of the various advantages it offers. It has got in induction type traction motor. It is practically maintenance free.
>
> It can run at very higher speeds. It has got excellent traction characteristics. It is 5.7 per cent more efficient. So, there are so many number of technological advantages in this."

3.6 Further, during evidence, the Committee were informed that 3-phase AC 6000 H.P. Locomotives could attain the speed of 200 Km p.h. for passenger trains and 100 km ph for goods trains. In this context the Committee enquired the speed of Rajdhani and Shatabdi Express trains which the Committee were told was at the maximum 130 km ph respectively. According to Member (Traffic) the average speed of Rajdhani is 70 km ph.

3.7 Enquiry whether even with 6000 H.P. locomotive the average speed today was only 35kms, the witness stated:-

> "One is the maximum permissible speed and the other is attainable speed."

3.8 The Committee then enquired whether taking into account the track conditions and absence and rather impracticability of any fencing on both sides of the tracks even speed of 160 to 180 km ph can possible be achieved by 3-phase AC 6000 HP locomotives. In this connection Member (Traffic) admitted that such high speed trains can operate only in corridors. He further stated that goods trains cannot attain such high speed as are possible with a 3-phase engine.

3.9 In this context he further added:-

> "What will happen is that 6000 H.P. will attain only 120 km ph. Therefore the existing conditions which are prevailing will obtain. Against 18 coaches I am to run 26."

Comperison with Thyristor Locomotive

3.10 The Committee desired to know why the Indian Railways were opting for yet another set of locomotives when 6000 HP Thyristor locomotives, 18 prototypes of which had been acquired in 1988 and, since then, subject to trial, and found sastisfactory. In this context it was also recalled that when R.C.C. of 8th Lok Sabha had cautioned against the purchase in preference to efforts to indigenously upgrade WAG 5 3900 HP locomotive the Railways had, as now, argued that they wanted to have access to latest technology in this field.

3.11 Responding to the observation of the Committee Member (L) Railway Board said:

> "All the 18 locomotives have been under trial have not yet passed a very crucial test, that is, the Harmonic content test. These thyristors have a special disadvantagous feature in that. They create harmonics or currents. These currents have a tendecy to interfere with the track circuits. Therefore, there are certain specifications stipulated for restricting the harmonic content. Out of the 18 locomotives, six have been supplied by ASEA. These six have passed one of the tests, that is, the second harmonic test. But the other two tests, that is, AF & HF have not passed. Some modification was required to be carried out. Whereas, the 12 locomotives of Hitachi have passed none of the harmonic content tests. They have to do further modifications, that is, designing a suitable filter to filter out the harmonic current and leave the locomotive free from harmonics.....ECIL and BHEL and NGEF could also not develop a suitable thyristor equipment as yet. Therefore, we decided that we would go in for the thyristor part of technology which we have not been able to develop indigenously. So far. If at all we have to manufacture a 5000 HP loco, we will require an alternative to tap-changer. On the other hand why we have been looking for the three-phase technology is because of various advantages it offers. It has got an Induction traction motor which is practically maintenance free. It can run at very high speeds. It has got excellent traction characteristics. It is 5.7 per cent more efficient. So, there are so many number of technological advantages. This is the latest 'state of art' for locomotives."

3.12 He further added:

> "A question may arise: whether the thyristors will suffice or not. In spite of thyristors it is worth-while to look for this as a technology for future adoption so that we can upgrade our locomotive and manufacturing processes to the 'state of art' which will eventually have some demand outside India also. It will not deprive either the CLW or the other indigenous industries of the opportunity."

3.13 Explaining the difference between the thyristor technology contracted in 1985 and the 3-phase AC technology now proposed to be acquired, GM, CLW stated:

> "The AC drive technology can regenerate power when we are wasting energy. But that is not possible with the thyristor technology. In some situations, the AC drive technology go up to 30 per cent saving whereas the normal figure will be around 15 per cent. The other main advantage of AC drive technology would be regarding the power factor which is around .75 to .85. At present, it is on the lower side. If we want to run the trains as they are today, then the over-head equipment need not be as heavy as it is today."

In this connection GM, CLM stated as under:

"With SNCF technology

"it is not possible to regenerate power and pump it back into the system. Nor is it possible.....with the thyristor technology though they give botterbetter performance with less downtime and less maintenance cost. It also cannot regenerate power and I cannot say definitely whether it will enable us to solve the telecommunications and S&T problems and whether thyristor technology will not have interference with our present signalling and S&T system. Only in the AC Drive system it is definitely proved that it can regenerate power and pump it back into the system. Their power factor is unity."

3.14 Asked what was the saving in energy by regeneration, he stated:

"I do not have the figures of the Indian Railways. I have read reports that on some sections as much as 30 per cent is possible to be pumped back.

With varying terrain, traffic and load factors, I do not think it is possible to give accurate figures with regard to Indian Railway network. May be, there would be around 10 to 15 per cent saving in energy."

3.15 In a subsequent sitting with the Railway Board the Committee enquired as to what were specific advantages in going for 3-phase technology in comparison with Thyristor Type and WAG 5 Locomotives in terms of speed, maintenance and consumption of power. The Member electrical in his reply stated:—

"...the present locomotives which we are manufacturing and which we call them WAG 5 for goods and WAP 1/3 for passengers, they are of 3900 H.P. For WAG-5 locomotives, the maximum speed that it can attain or it can be run is 80 KMPH. So far as WAP 1/3 locomotive is concerned which is also of 3900 H.P., its maximum speed is 130/140 KMPH. Thyristor locomotives are procured only for freight operation. They have the H.P. of 6000 and the maximum speed potential is 100 KMPH. The 3-phase locomotives which we have planned to procure will have 6000 H.P. for freight and the speed will be 100 KMPH and for passenger, its speed will be 160 KMPH with potential of 200 KMPH. So far as efficieny in terms of power consumption for haulage, the present WAG-5 locomotives have got an efficiency of the order of 75 per cent to 80 per cent. The Thyristor locomotives will have an efficiency of 85% to 90%. The 3-phase locomotive has got regenerative braking. That means, when the train is to be stopped, its energy can be made use of by converting it and feeding it back into the power system. This is a very special feature of the 3-phase locomotives because the

arrangement available is easily reversible from the state of drawing power. It can get converted to a state of sending back power and because of this feature and the feature of higher efficiency we have preferred this. There is also another feature which is called power factor. This 3-phase technology can give unity power factor so that the current taken or any amount of power from or the grid is minimum that can reduce the transmission system losses. With these advantages, the locomotives based on 3-phase technology are able to consume 30 per cent at the least or by most conservative assessment 30 per cent less power than a thyristor locomotive and little more than, as compared to a WAG-5 locomotive which we are producing. It is because that is least efficient."

3.16 In this context the Committee also had aksed the Ministry of Railways to furnish a comparative statement of operating cost of Haulage by indigenous/imported ABB Thyristor type and ABB 3-phase locomotives.

3.17 The Ministry in their reply stated that in this connection a large number of factors like energy consumption and saving due to regenerative braking, line losses, maintenance, reliability, availability, on line failures, impact on line capacity, increased wagon turn round would have to be taken into account for this purpose. The Ministry further stated that *since there is no experience yet with working of 3-phase locos in Indian Railways in such comparison will necessarily call for a large number of assumptions.*

3.18 It was also stated that based such comparisons on a limited fleet procured mainly for securing new technology would lead to erroneous conclusions. However according to the evaluation made by Railways on the basis of various assumptions the expected internal rate of return of investment in 3-phase locomotive with transfer of technology to enable indigenous production made in October 1990-91, was assesed as 14.76 per cent.

2. *Performance of thyristor type locomotives*

3.19 The Ministry of Railways in a written note submitted to the Committee indicated the latest status of 18 prototype thyristor locomotives procured from M/s. ABB and M/s Hitachi as under:

"These locomotives are under-going tests and field trials on the graded Waltain-Kirandul section of South Eastern Railway and Mughal Sarai-Ghaziabad main line section of Northern Railway. In the meantime, the manufacturers are carrying out some modifications to achieve the specified performances level in the existing Indian Railways' environment."

3.20 The order for 18 thyristor type 6000 HP Electrical locomotives was placed in 1985.

Views of GM, South Eastern Railway

3.21 In this connection, the Committee also called General Manager, South Eastern Railway to tender evidence in regard to performance and evaluation of these locomotives during trials. He stated:

> "As soon as the locomotives were received between March and October 1988, they were commissioned within two months. In some cases, period of commissioning varies but almost all of them were commissioned within two months. Right from the beginning of commissioing, these locomotives have been hauling full freight load which they were intended to haul mainly on the Waltair-Kirandul section. It has got a grade of one in 60 for 60 KM at a stretch and the traffic carried is iron ore.
>
> In between trials were also carried out on flater sections of South-Eastern Railways like Korba-Champa, Bilaspur-Durg Sections. Of these locos, 12 have been drawn from Hitachi and 6 from ABB. The prototype locomotives are called WAG-6A, WAG-6B and WAG-6C. WAG-6B and WAG-6C are from Hitachi and WAG-6A are ASEA locomotives. They were procured with the same specifications."

3.22 He further added:

> "The trials were of two types. One being the technical trial, called the instrumented trial, it was done with coordination of RDSO. The other one is service trial in which the South-Eastern administration comes in, that means running of trains with full load... Performance-wise we can report that the performance of these locomotives on the Waltair-Kirandul graded section has been quite satisfactory. They were also tried in the main line but we did not have many trains running on those sections. The main thrust was on the Kirandul-Waltair section and the performance was quite satisfactory."

3.23 He further added:

> "After the drivers got themselves familiarised with these locos, the service parameters have been quite good. For the running of these locos on these tracks, we have not encountered any problem."

Track condition and Tonnage

3.24 Asked whether the Indian tracks can withstand 6000 HP locomotives, GM, South Eastern Railway stated:

> "Existing tracks on the K.K. line are strong enough to take these locomotives and for hauling. We have not encountered any problem."

3.25 In regard to tonnage, he stated:

> "For this gross load, we use three locomotives of indigenous type. As far as these locomotives are concerned, because they are 6000 HP locomotives, we are using two locomotives. Their load factor and power factor is also the same. Judging by the power consumption also, we found that these locomotives have been giving satisfactory performance. The reliability and the availability for traffic on both these indices are quite good. We have not had any major problems."

Modifications

3.26 Asked whether the modifications necessary for all the three types of locomotives had been completed, GM, SER replied in affirmative.

3.27 Asked about nature of these modifications, GM, SER stated:

> "that since these were of technical nature, he may note be able to give any reply. he confirmed that from service abgle, the locos had performed very satisfactorily."

Grading of Locomotives

3.28 Asked whether he had been asked to select any one of the 3 types of locos for series manufacture in CLW, GM, SER replied in negative.

3.29 He further stated that:

> "the Report in the matter had gone to the Government in 1991 and a decision was awaited."

3.30 In this context, he further confirmed that on the basis of his own experience, locos designated as A and B were comparatively superior to "C."

3.31 Asked about the maintenance factor, GM, SER said:

> "These 18 locomotives compared to our locomotives need less maintenance."

Asked whether any one of the three was more troublesome in respect of maintenance, he said:

> "Our experience is that they are more or less the same. There is not much of difference."

3.32 Asked finally whether the performance of A and B locomotives was same as Hitachi and whether all the 3 were satisfactory. GM, SER replied in the affirmative.

3.33 Asked whether any Report had been given about the performance of these 6000 HP thyristor locos to the Railway Board, as they were also coordinating with the trial runs, the GM, South Eastern Railway stated before the Committee:

> "There is an Evaluation Report given jointly. The RDSO had co-ordinated it. The Evaluation Report expressed satisfaction on the performance."

Views of DG. RDSO

3.34 Explaining the role of RDSO in the import of 18 prototype 6000 HP thyristor type locomotives, DG, RDSO stated:

> "These locomotives are imported based on a technical specification and tests specifications prepared by my organisation, RDSO. In fact, before their arrival, inspection was done by RDSO in the factories where they were manufactured. When they came here, commissioning was also done by people from my organisation. After that, there were certain tests according to the specifications which had to be done. They were also done by RDSO. Finally, the evaluation of performance over a period of time was done by a Committee of a number of officers of which one member was from RDSO and it provided quite a lot of data information. RDSO had done the evaluation and the assessment."

3.35 Asked to give the final assessment of RDSO regarding 18 prototypes of 6000 HP thyristor locomotives, DG, RDSO said:

> "These locomotives, by and large, meet the specifications and are suitable for indigenous manufacture. The Report was submitted to the Board and they have to take the final view. There were some minor points in which it has been stated in the Evaluation Report that they did not meet the specifications."

3.36 According to him the Report was sent to the Ministry in October, 1991. The witness, further, admitted that his was the same Report as referred to by GM. South Eastern Railways.

3.37 A gist of the Evaluation Committee report is at Appendix-B

3.38 Asked whether RDSO had been consulted before the purchase of 18 prototypes of thyristor locomotives, DG, RDSO replied in the affirmative.

3.39 He, further, stated that specifications were made in such a manner as to suit the directions of the Railway Board.

3.40 Asked whether RDSO had measured the specifications of the locomotives, DG, RDSO said:

> "We have measured them against the specifications and have come to the conclusion that they meet the specifications, by and large. On some minor issues there are variations. Two of the three locomotives are found equally suitable. They are called RDSO type.

The third one is known as COCO. It is a different bogie arrangement and has no potential of increasing the speed. Any of the two BOBOs is good enough."

GIST OF REPORT OF THE EVALUATION COMMITTEE ON 6000 HP THYRISTOR ELECTRIC LOCOS

Railway Board on 21.11.88 constituted a Committee for evaluation of 18 proto-type electric locomotives of 6000 HP of 3 different designs *viz.* 6 numbers each of WAG-6B and WAG-6C ordered on M / s. Sumitome Corporation (Hitachi) and 6 number WAG-6A on M / s ABB in 1985.

The Committee recommended that the final choice for technology transfer should be confined only to the two designs *viz.* WAG-6A and WAG-6B as WAG-6C was not found at par with the other two.

The Evaluation Committee stated that both WAG-6A & 6B designs have met the performance requirement of the specification. These locomotives have potential power upgradation from 100 KMPH to 160 KMPH on high speed routes and can meet the future requirements of Indian Railways from the point of view of minimum fleet size with least maintenance cost. They further stated that both these designs can be indigenously manufactured at CLW with total investment of about Rs. 45 crores including initial investment of Rs. 27 crore (without price escalation) for WAG-6A (ABB Locos) and a total investment of 27 crores including initial investment of 15 crores (without price escalation) for WAG-6B. It was pointed but by the Evaluation Committee that though the cost of indigenous loco is expected to be higher for WAG-6A design but this design has got superior technological features. Final recommendation of the Evaluation Committee:—

WAG-6A locos with suitable change in compressor and pneumatic system and pantograph be adopted for use in Indian Railways for indigenous manufacture after transfer of technology.

WAG-6B locos with the use of microprocessor control, intertial filters, air dryers and change in parts of pneumatic circuits and pantographs be adopted for use in Indian Railways for indigenous manufacture of transfer of technology. If WAG-6B is chosen for manufacture, technology of machanical parts, bogies etc. of WAG-6C will also be available as part of technology transfer. This may be explored for retcofitting or upgrading the existing WAG-5 locomotives.

Views about 3-phase Locomotive Technology

3.41 Since GM, South Eastern Railways was satisfied with the thyristor converter and was supposed to select one out of the three prototype, the Committee asked him whether he knew the reason why the Railways are switching over to 3-phase locomotives from the thyristor converter and whether at any point of time, he had been consulted by the Railway Board about the need to go in for new model, the witness stated:

> "Firstly, I was not consulted. Secondly, I won't be able to comment on the reason for going in for another technology. I shall repeat that the service performance of Thyristor type locomotives has been quite satisfactory and we have been reporting this all the time."

x x x x x x

3.42 However in the regard, DG, RDSO stated as under:—

> "I would like to state before the Committee that before the order was placed for 18 prototypes of Thyristor type of locomotives, the Railway Board finally asked us—it was in 1985—would you still like to recommend that we go ahead with this or not. Our reply was that 3-phase technology was still in 'infancy' and we wanted only proven equipments and nothing which is experimental. We said that Thyristor is a proven technology and not an obsolete one. So, that was in nutshell the advice given to the Railway Board. We are a part of the Railway Board and they have a right to consult us internally as and when they like. So, the reply is, yes, there was a specific consultation even before the order was placed."

3.43 The Committee asked whether RDSO had advised the Ministry of Railways to go for 3-phase Thyristor Locomotive and if not what were the reasons. DG, RDSO replied:

> "As regards the three-phase locomotives, the three-phase technology has been growing for quite some time. RDSO being the eyes and ears of the Ministry of Railways on such matters, are all the time aware of all these new technologies. But when the time came to prepare specifications, EDSO has not written any specific letter saying that now you go in for this and buy the 6000 H.P. locomotives."

3.44 Asked what would have been his advice, to the Ministry in regard to choosing 3-phase technology, DG, RDSO stated:

> "It is very difficult at this point of time, six-seven years later, to try to project backwards as to what would have been stated. The situation today is that the three-phase technology is definitely so

well proven that speaking purely from technical point of view, I would say that we should go in for the three-phase technology."

3.45 Asked to specify the role played by RDSO in the proposal to acquire 3-phase 6000 HP Electrical Locomotives the DG, RDSO said:

"For a 6000 HP 3-phase A.C. electric locomotive to be imported by global tender we made the specification. The technical specification was prepared by R.D.S.O. in 1986-87 on the direction of Railway Board. After the bids were received, they were evaluated technically by a Committee and that Committee consisted of two officers from RDSO, and one officer from Chittaranjan Locomotive Works. That was a nominated Committee."

3.46 Asked what was the basis of this statement, DG, RDSO stated:

"Three-phase technology, as we learnt earlier, offered many technical advantages. One is that it has got a three phase traction matter."

3.47 Asked whether he was in favour of throwing away the experience gained over the past 6-7 years in respect of 18-Thyristor type locomotive in favour of yet another technology and whether it was the right approach on the part of Railways, the witness said:

"Six years ago I do not know what my predecessors would have said. But what I mean is if a choice was to be made between technologies, purely on technical grounds, I would have preferred the three-phase technology because we in RDSO go by technology."

3.48 In this context the witness further asserted that 3-phase technology was well known by now and that the advantages offered by it had been well documented.

3.49 Asked how could it be vouched that after developing a prototype of 3-phase type locomotive Railways would not again change their mind, the GM, Chittaranjan Locomotive Works said:

"This is inherent in locomotive manufacture."

3.50 He further added that it would not be in the interest of Chittaranjan or the Indian Railways to fight for continuation of the obsolete technology.

3.51 The Committee then enquired from GM, CLW whether the investment made so far in trying, testing and acquiring Thyristor technology would be wasted now and why Railways would not go for 3-phase technology in 1985 itself. In his reply he said:

"I beg to differ. At that point of time, the technology available was only the thyristor technology. The AC Drive technology, which happened to be just an idea in manuals, went into fast evolution primarily because of an invention called GTO and in 1986 its commercial application locomotives were manufactured."

3.52 During evidence Member (Electrical) Railway Board had informed the Committee as under:

> "When he had advertised for purchase of 18 thyristor type locomotives of 6000 HP (in 1983) we had also given to bidders an option for three-phase technology or the thyristor type. But at that point of time, when the question came up, nobody offered the three-phase technology. It was at the experimental stage at that point of time."

In this context the Committee also took note of the contents of a letter addressed on 27.5.1986 by the then GM, CLW to the Chairman, Railway Board. The relevant extracts are reproduced below.

> "As you are aware, the designs of our present AC locomotives are more than 15 years old. Their technology has become very old, and there is urgent need for modernisation. The locomotive bogie is completely inadequate for the present locomotive and is faring very poorly in maintenance. While 18 new proto-type Thyristor phase control locomotives have been ordered for upgradation of technology. The potential of the 3-phase AC locomotives with GTO invertors does not seem to have received proper attention even though several hundred locomotives of this type have been built and were under commercial use."

3.54 The Committee further enquired how in absence of any tests of trials 3-phase technology had been adjudged to be suitable for Indian Railways, the GM, CLW stated:

> "...engineers on the Indian Railways have access to the test results on foreign railways. The technical magazines carry those reports. One need not depend only on a particular firm's version."

3.55 In view of the statement of Member(L) that in the notice inviting global tenders in 1983 purchase of 18 prototype of thyristor type 6000 HP locomotives offers had also beel called for 3. phase AC 6000 HP locos. The Committee enquired how tenders could be invited for a technology which was stated to be at an experimental stage or in its 'infancy'. Member(L) stated:

> "It was in the air and articles were being written in journals, etc. Since we wanted only a proven technology, nobody quoted 3-phase because it was not a proven technology in 1983.
>
> From the given facts, I can only infer that there was a sincere desire to have the latest technology and 3-phase was being talked about in journals and various technical documents. On the face of it, it had potenical. But we wanted only a proven technology and at that point of time, manufacturers who quoted the tender felt that they could not call the 3-phase technology a proven one. That is why, they might have quoted only, the thyristor technology."

3.56 Asked whether the position was same in 1985 when orders for 18 prototype of thyristor type locos were placed, the witness said:

> "There were only two technologies that were available but since our desire was to get a proven technology, we made that specification."

3.57 Asked if it is a practice that you include in your tender the technologies which are not proven or this was the only case, the witness replied:

> "Generally, when technologies are considered to be proven then they are called but in this particular case, at that point of time there was a talk or three-phase technology and two alternatives were given. But, we did stipulate the proven technology and that word 'proven' was perhaps not coming up."

3.58 Asked if the Railway were aware that 3-phase technology was in use in some countries the witness said:

> "They were developing a public opinion but they were not a proven thing."

3.59 Asked how 'provability' of technology could be ascertained the witness stated that, if a technology is not proven the manufacturers may find it difficult to give 5-year performance guarantee.

3.60 In a subsequent sitting with the Railway Board the Committee enquired whether the decision to acquire 3-phase technology had been taken after taking the full Board into confidence.

Chairman, Railway board in his reply stated:—

> "As far as I can recollect, in 1987, in the Board Meeting, this issue of AC 3-phase technology was discussed and agreed to. The Works Machinery and Rolling Stock Programme is submitted by the Board as a whole goes to the Parliament for approval. This AC 3-phase technology and the 40 H.P. 3-phase Asynchenous Drive electric locos, etc. ex abroad were approved in 1987-88 in the Rolling Stock Programme of the railways."

3.61 Asked whether the full Board was involved in the decision, Chairman, Railway Board stated that he will have to go through the records.

3.62 Enquired whether Member, Traffic, as head of the user department had concurred with the decision and whether Member, Traffic himself had sought introduction of 3-phase technology in the Indian Railways, Member (Traffic) Railway Board stated:—

> "But so far as the AC 3-phase locos are concerned, this was discussed in a Board Meeting in 1987 where Member (Traffic) was also present. I take it that the various aspects were taken into consideration by the Board while taking the decision."

3.63 Asked whether his predecessor as the user had asked for introduction of 3-phase technology, Member (Traffic) said:—

> "I will have to look into it."

3.64 In this context, both Chairman, Railway Board as well as Member (Traffic) were not able to readily confirm whether the decision to invite tenders for 3-phase technology along with thyristor technology in 1983 was taken with the full backing of the then Railway Board.

3.65 Asked why DG, RDSO had not been cosulted before floating the Global tenders for 3-phase technology, Member (Electrical) Railway Board stated :—

> "RDSO is subordinate officer of the Railway Board. RDSO is giving us the technology back-up to the extent we need. It is not that we will move in the matter with RDSO. After all, the Board has got technically very competent officers who have been in the field and who know the field conditions, sometimes better then RDSO. In this case, the decision was taken by the Railway Board on their own, by a full-Board that it would go in for 3-phase technology."

3.66 He further added :—

> "RDSO was Associated with the decision making process of course at a later stage. It is true that the RDSO is our eyes and ears."

3.67 It was pointed out by the Committee that since RDSO has to be brought into the picture for indigenisation and adoption of the technology. In this connection, Member (Electrical) stated :—

> "Had there been anything adverse they (RDSO) would have told us about that. But they did not. They did subscribe to it (3-phase technology).

Transfer of Technology

3.68 In a written note, the Ministry of Railways informed the Committee:

> "The contract for import of these 18 locomotives provide for an option by Indian Railways for transfer of technology, if considered necessary. The question of taking up indigenous manufacture alongwith transfer of technology will be decided based on final evaluation on the performance of these locomotives and keeping in view the recent decision for procurement of locomotives with state of the art, 3-phase technology, alongwith simultaneous transfer of technology."

3.69 Asked if BHEL or ECIL were to supply thyristor convertors how much time CLW would take to come up with a prototype of 6000 HP 3-phase model, GM, CLW said :

> "It was never a blue print. It was 5000 HP blue print. It is not only a thyristor but the box and other equipments are to be matched."

3.70 Asked whether GM, CLW was consulted by Railway Board before deciding to go for 3-phase technology in order to ascertain if CLW can adopt this technology and manufacture a prototype, GM in his reply stated :

> "My Chief Electrical Engineer was not there in the Tender Committee. But he was a Member of the Technical Evaluation Committee in order to see whether this technology can be gainfully employed and the locomotives, as per this technology, can be manufactured in CLW without major changes to the present set up."

3.71 Asked how then he was able to say that 6000 HP 3-phase locomotive was not blue-printed by CLW the GM replied :

> "Whatever technologies that I am manufacturing today, on all these technologies, my chief Electrical Engineer was consulted by the Railway Board when they were evaluating the tenders for the AC drive technology to get his opinion whether this technology will cause any problem for CLW if they go and sign up for this technology and whether this will cause any problems in the manufacture of locomotives."

3.72 He further added :

> "If CLW is supplied with the manufacturing drawings, the personnel is trained in new manufacturing methods, the quality central manuals and testing procedures are given, the CLW will be able to manufacture the first locomotives within two years' time."

3.73 In the same context be stated further :

> "Even a manufacturer abroad, if he is given order for manufacturing locomotives—as the gauge is different, as the track is different and many other parameters are different which they have not used in their current production he will take a minimum of 18 months for making the basic designs, the key design, drawings and so on. After that, he will take about 18 months for manufacturing it. I will take two years. If the key and manufacturing drawings are available, I need not extend the time. If I have to manufacture in the country one or more locomotives or series manufacturer, if the Ministry says, you go ahead, I can straightway go in for the manufacturing of these locomotives or series manufacturer. Generally, the practice all round the world is that, first the prototypes are manufactured, they

are tested to work under the local conditions and so on, then we go ahead with series production."

3.74 Asked what would happen if he cannot go in for production in the next seven years, GM said :

"Generally, they manufacture for 2 or three years and then, the later part of the locomotives, they will supply on the knock down conditions. Everything will be available. The screw driver technology is needed. Then the further indigenisation of 30 per cent. On the locomotives, 30 per cent cost is on the wiring, for which my people are already ready. They know these things. They have not to learn anything on the wiring. Similarly for making the shelves, box and so on, except for designs, the manufacturing technique will not be radically difficult. The indigenisation of these commodities take place very fast."

3.75 Asked if you can switch straight away to 3-phase technology, he said :

"Only training of the staff is needed. The existing machinary and plant will be fully utilised."

3.76 Asked how many Locomotives were required by CLW to prepare a prototype he said :

"I do not need more than one."

3.77 Asked if he would justify acquisition of 30 locomotives he said :

"They (Railway Board) have the problem of number."

3.78 During evidence before the Committee, DG, RDSO observed :

"If we buy any equipment with collaboration, we are going to make sure that enough design information is available for every part that comes with it to enable its duplication in the country and where ever patent rights are there, they will have to pass it on to us specifically. The technology transfer condition includes that they must give us complete knowhow and information. They will have to give us manufacturing details. They will have to give that information which enables us to buy components properly. If there is a specific item where if big patent other than the local seller, that may be a different issue."

3.79 Asked how long it would take to import spares as far the transfer of technology he said :

"I believe for most items, at least for four years, we will have to do that. But there are one or two very critical items which will have to be imported for much longer time. For the first two years, we normally import along with the locomotive".

3.80 He asked whether imports would be required for five or six years he said :

"It will take four years to manufacture indigenously. Most of the spare parts are mechanical in nature and they are connected with the under-frame bogie etc. and these can be made from the very first day. But when it comes to electronic equipment, it takes time to study and start manufacturing ourselves."

3.81 Asked what has been the experience in CLW he said :

"It is approximately five per cent which is imported. They have got various components from BHEL and others."

CHAPTER IV

HIGH HORSE POWER AC 3-PHASE LOCOMOTIVE PROJECT

Funding of the project

4.1 The project to acquire 6000 HP AC 3-phase locomotives is being financed by two financial institutions *i.e.*, the acquisition of technology and freight locos are to be financed by Asian Development Bank, Manila and the purchase of passenger locomotives is to be financed by the Exim Bank, Japan.

4.2 A loan of 190 million dollars was offered by ADB sometime in December, 1987 and simultaneously Exim Bank, Japan also offered a loan of 110 million dollars.

4.3 Out of the total allocation of $ 190 million under ADB Loan No. 857-IND, the original allocation for Freight locos was $ 114.50 million. This has now been assessed to become $ 144.05 million and the said increase is proposed to be met by re-allocation between different categories under the said loan.

Commitment charges

4.4 As per the figures made available by Asian Development Bank, upto 15th December, 91 US $ 3.066 million had been debited to Loan by ADB towards Commitment charges. This along with another US $ 1.553 million towards interest charges makes a total debit of approximately US $ 4.619 million under the head 'Interest and other charges'.

Exemption of Custom Duty

4.5 The Ministry of Railways in their written replies furnished to the Committee stated that Railways have approached Ministry of Finance for exemption from Custom Duty.

4.6 During the course of evidence of the Finance Secretary when asked by the Committee whether Custom Duty could be exempted on the import of 3-phase locomotives from M/s ABB, proposed to be purchased by the Railways from M/s ABB, Switzerland, he stated as follows :

"The Railways wanted duty exemption which I have refused. But we had reduced it marginally at the time of over-all general reduction because we are duty bound to reduce auxliaries."

4.7 He added further :

> "I can tell the Committee as a matter of general information that the Finance Minister has already announced in Parliament that Customs tariff was being reduced to the lower rate to be in consonance with what obtained in South-East Asia. Last year, the general rate was reduced from 150 to 110. If anything, this process will be continued. The question of taking any rate at high level does not arise. Previously, it was 104. Now it is 87. If we take it in the context of the Finance Minister's assurance, it can only come down. It cannot go up."

4.8 Asked whether the Ministry of Railways made the request for reduction in custom duty on AC 3-phase electric locomotives, the Finance Secretary stated :

> "The proposal referred was for reduction of Customs duty. My Officer said we cannot consider any reduction. Normally, we do not entertain such proposal where foreign exchange allocation is limited for the total imports. Any reduction in Customs duty means loss of revenue. When I look at it as Revenue Secretary, I am bound to protect the revenue."

Process of tendering

4.9 The Committee received detailed background note explaining the entire process of tendering for procurement of 6000 HP 3-Phase electric locomotives. The relevant extracts of the note are reproduced below :

> "Global tenders were floated in October, 1987 after getting clearance from ADB as well as other Ministries/Departments involved (DGTD, DOE). Technical offers for 40 locos (30 freight and 10 passengers), with technology transfer were opened on 29th February, 1988. 4 bidders *viz.* ABB, Switzerland, GEC-Alsthom, France, Sumitomo Corporation, Japan (for Hitachi locos) & BHEL, New Delhi (for Hitachi Locos) participated in the tender. After technical evaluation of these offers (Feb. 89), recommendations of the Tender Committee on technical offers (March, 1989), approval of ADB (August, 89-several back references were received, based on report of consultants appointed by ADB), the Commercial offers of these bidders (excepting that of GEC. Alsthom whose technical offer was considered unresponsive) were opened on 28th August, 1989."*

* * * *

4.10 However, after considering all aspects of the case a decision was taken by Board, with the approval of MR, that it was very necessary to

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* The full background from the stage of evaluating the first bid to the closing of the third bid is given in Appendix - to para 3.2 in Chapter III.

bring this latest "State of Art" technology to India to get the maximum benefits at the earliest and if the same was done later, the costs may also go up further. It was also decided to hold negotiations with M/s. ABB, whose offer was considered as the lowest evaluated, so as to explore the possibilities of getting reduction in prices, speedier indigenisation and to get their acceptance of terms and conditions as per the bid documents.

4.11 On receipt of the approval from ADB, negotiations were held with M/s ABB from 14th to 16th of November, 1991. After the negotiations, Tender Committee recommendations were submitted to the Board on 26.11.1991, wherein the Tender Committee mentioned that they were unable to recommend acceptance of the negotiated offer basically owing to high price. Ministry of Railways, however, weighing the overall implications took a decision to go ahead with this procurement involving technology transfer and also took a view that the deviations be accepted as there appeared to be no option; but with the proviso that deviations will have to be pursued with the firm before placement of the contract. The recommendations of the Board were approved by MR on 2.12.1991 and a memorandum accordingly sent to ADB for obtaining their approval for awarding the contract to M/s ABB. The approval of the ADB was received on 12.12.1991.

4.12 In the meantime, as desired by the Ministry of Finance, the file was sent to them (MOF). On receipt of certain querries from the Ministry of Finance on 24.12.1991, the Tender Committee was asked to examine the issue raised. Tender Committee submitted their recommendations on those issues on 31.12.1991 and after obtaining the approval of MR the case was again sent to Ministry of Finance and was received by Ministry of Railways on 14.3.1992. After obtaining foreign exchange release, the letter of acceptance was issued on 18.3.1992. In this letter, the firm was asked to accept/withdraw certain conditions as per Board's earlier decision to pursue the deviations with the firm. ABB's final response has been received on 16.7.1992 which has since been accepted by Ministry of Railways. Detailed contracts are under finalisation.

Negotiations

4.13 In the context of the first bid the witness added :

> "In the first instance, it was thought to have a dialogue with all the parties, but this course was not approved by the ADB and accordingly, Indian Railway called for a second round of bidding.....This second stage of biddings were opened on 11.12.90. There was a general price hike by all the bidders. The ADB approved the negotiations with the BHEL subject to the condition that they would clearly establish that 20 per cent value addition would take place. It would mean that if a locomotive cost about Rs. 15 crores roughly Rs. 3 crores worth of work will be done in India."

4.14 BHEL could neither prove that they would make 20 per cent value addition, but they did not agree to reduce the price. At that point of time, it was decided to close this second round of bidding. There was a feeling that there could have been escalation on account of Gulf War which was around that period of time and also it was felt that addition of AC-DC locomotive for which the second round of bidding had been called could have involved additional amount of design effort and could have escalated the price. So, it was then decided to go for a third round of bidding and while going in for that, the number of locomotives was kept at 30.

4.15 The witness further added :

> "The third round of bidding was opened on 24.6.91 and the prices were more or less the same as in the second round of bidding and in this round of bidding, the offer of ABB was the lowest, because BHEL was not in a position to be Category-I bidder."

4.16 Explaining the reasons for negotiating with M/s ABB Ltd. inspite of the Tender Committee, opinion that Indian Railway should not purchase AC-3 phase locomotives, the witness stated :

> "The Ministry of Railways weighing the pros and cons of the situation and being guided by the fact that it was primarily to see technology transfer of a new technology, it cleared the proposal since it has a very distinct advantage for our situation.....It was the decision of the Ministry to go in for some more negotiation and see if the price could be reduced and the ideal could be finalised. Based on these negotiations, there was some reduction of prices."

4.17 Asked what is the present position of the project, the witness said:

> "The position is that the letter of acceptance has been issued and the reply or response of ABB to that has been found acceptable. The ground is set for concluding the detailed contract."

3. BIDS-AT A GLANCE (based on noting page. 348 of tender file after para 4.17)

		1st	2nd	3rd
1.	Date of invitation of Tenders	1.10.87	28.8.90	9.5.91
2.	Date of Tender Committee recommendation	28.10.89	20.12.90	7.8.91
3.	Number of locomotives	40	30	30
4.	Lowest Evaluated Bidder	ABB	BHEL (HITACHI as Collaborator)	BHEL (HITACHI as Collaborator)

1	2	3	4	5
5.	Price per locomotive (As per exchange rate on 24.6.91) (Rs./crores)			
Freight				
(a)	Fully Assembled	13.2 (6.6 CIF)	15.4*	16.1*
(b)	CKD/SKD	12.4 (6.2 CIF)	10.96*	11.0*
	Passenger	13.2 (6.6 CIF)	14.9*	13.6*
6.	Cost of transfer of technology (As per exchange rate on 24.6.91) (Rs. crores)	10.6	19.6	25.6
7.	Total cost including spare & other charges (As per exchange rate on 24.6.91) (Rs./crores)	567.00 (289 CIF)	497.9*	486.4* (558.6)**
7(c)	Total cost (As per exchange rate then obtaining) crores)	435.00 (227.3 CIF)	457.00*	
8.	Tender Committee recommendations	Place order on ABB with TOT	Discharge the tender	Discharge the tender
9.	Date of Validity	31.3.90	30.6.91	20.12.91

NB: * No custom duty applicable to BHEL offer.
** As per exchange rate on 2.8.91

Negotiation with ABB

4.18 Details of issues that cropped up during negotiations with ABB are given in the Appendix.

NOTINGS ON THE RAILWAY BOARD FILE RELATING TO PURCHASE OF 3-PHASE AC 6000 HP LOCOMOTIVES

Notings of the Tender Committee

Discussions were held with the representatives of the firm in terms of instructions of the Board at Pages 435-436/n. Sarvashri Markus J. Roffer, manager Export Mainline Railways, Renato W. Vogt, contract Manager from M/s ABB Switzerland Office and Shri P. Sekhar and Shri S. Prayaga from Delhi office of M/s ABB attended the discussions. For the sake of continuity, EDRS(P) and EDF(S) were also associated.

2. It was made clear to the representatives of M/s ABB that the discussions were being held to prevail upon them to agree to the stipulations made in the Advance Acceptance Letter. In respons to these discussions, M/s ABB have now submitted a letter which is placed at S.No. 488 and may kindly be seen.

3. A summary of M/s ABB's latest response to various conditions stipulated in our advance acceptance letter is placed at S.No. 489.

4. Adviser(L) felt that there are certain related and pertinent facts, as mentioned below, which should be brought to the notice of the Board to enable a decision being arrived at.

4.1 While M/s ABB have agreed to comply with most of the conditions stipulated in the Advance Letter of Acceptance [No. 87/RSF/P. 459/1(GP-140) dated 18.3.92], the following are the areas where full agreement could not be arrived at.

4.1.1 *Additional Costs resulting from delay in supplies-liquidated damages etc. etc.*

As per provision of bid documents, in the event of contractor's failure to ship the stores within the stipulated delivery period for reasons atributable to the contractor, the purchaser has the right to recover liquidated damages and also retains right to recover extra expenditure which might have been incurred by the purchaser on account of increase in customs duty and freight charges directly related to the delay in supply of stores.

M/s ABB have agreed for liquidated damages upto 10% to be levied as per terms and conditions of contract. M/s ABB have also now agreed to bear the additional freight and L.C. charges. They have, however, not agreed to bear the additional customs duties.

In this connection it may be mentioned that in the orders placed on M/s Sumitomo, Japan and M/s ASEA, Sweden for supply of thyristor

locomotives which have identical provisions in the bid documents in this regard, the Board have accepted to liquidated damages being limited to only 5% and with a further stipulation that the payment of liquidated damages as agreed to in the contract shall be in full satisfaction of the contractor's liability for the delay. Any increase in customs duty, ocean freight, exchange rate varition etc. is not be contractor's account. (Ref. Purchase Order Nos. 85/RSF/459/1(LT-33) dated 9.9.85 and 85/RSF/459/2/LT-33 dated 6.9.85 for purchase of thyristor locomotives).

4.1.2 Basis for ordering future spares for purpose of indigenous manufacture—prices of unit exchange spares along with price variation formula.

M/s ABB were asked to furnish itemwise prices of components constituting the C.K.D. freight locomotive, and fully assembled passenger locomotive. M/s ABB have furnished the required breakup, but the individual prices of components not covered by unit exchange spares have been given as lumpsum. The price break-up is such that the sum total of the cost of components constituting a complete locomotive adds to 123% for freight and 127% for passenger locomotives.

It is seen that the scheme contemplated for indigenous manufacture of 3-Phase locomotives does not perhaps envisage import of unit exchange spares in any substantial measures as will be clear from the following:

(i) In the financial evaluation of procurement/manufacture of 3-phase electric locomotives referred to by FC at pp. 397 it is seen that while making the assessment of likely foreign exchange requirement for production at CLW, the requirement of foreign exchange has been envisaged as under* S.No. 418/1:

96-97	Rs. 2.75 crores per loco
97-98	Rs. 2.0
98-99	Rs. 1.5
2000-2001	Rs 1.1
2001-2002	Rs 0.9
2002-2003	Rs 0.75

From the above, it will be seen that while establishing the financial viability of series production at CLW, it has been envisaged that the locomotive will be by and large indigenised before series production is taken up at CLW. The need for fast indigenisation has also been emphasised in ML's note at PP-395/n where M.L. has pointed out that

'from a long term point, the attempt will have to be towards faster indigenisation to reduce the impact of imported component prices.' From the above, it is obvious that import of unit exchange spares as such are not envisaged in the series production at CLW.

(ii) DSE/RDSO/LKO was also requested to indicate the scenerio contemplated for indigenous production of 3-phase locomotives at CLW. In his D.O. dated 15.7.92—placed at S.No. 490—DSE/RDSO has brought out:

(i) that it is expected that most of the items which are being procured by M/s ABB from sub-suppliers will be developed indigenously and if there is any failure in timely development these will be obtained directly from suppliers and not through ABB.

(ii) That even for items manufactured by M/s ABB such as power and control electronics only knowcked down components will be obtained.

The above view also supports that the contingency of import of unit exchange spares has not been envisaged in the scenerio for indigenous manufacture of 3-phase Locomotives.

In the case of the contract for supply of the thyristor locomotives on M/s Sumitomo, Japan which also has provision for TOT, there are only 11 components of power and control electronics for which a price break-up along with price variation formula has been accepted in context for future supply of components for indigenous production at CLW.

From the above, it will be seen that the exercise of fixing unit exchange spare prices along with price variation formula do not perhaps have much relevance in context of indigenous production as a loco produced with import of unit exchange spares will not be a financially viable proposition.

4.1.3 Additional costs due to change of law

M/s ABB in their offer have stipulated that additional cost incurred by them due to change of law or new legislation after the date of signing of contract will be reimbursed to the contractor by the purchaser. M/s ABB have pointed out that the contractor cannot be held liable for changes in the Indian Law after signature of the contract and have indicated that they would like to discuss the necessary details in order to arrive at mutual agreement with respect to a provision concerning change of law to be incorporated in the final contract. The tender Committee in their proceedings at PP-380/n have held that the implications of any changes in existing law or new law in respect of environmental and safety regulations have to be accepted by the contractor.

In this context, it may be pointed out that ADB guidelines on 'Policy Relating to Procurement under ADB Loans' vide Para 14 Sl.No. 191, do provide for adjustment of price due to change of law or statute. It may be incidentally pointed out that in the tender for supply and installation of

optic fibre cable floated by Railway Board and awarded to a consortium of M/s TCIL, NDK & HCL, provision exists that the costs arising due to subsequent legislation are to be paid/recovered from the contractor depending on increase/decrease occasioned due to new legislation.

4.1.4 Scope of Force Majeure Clause

In the Advance Letter of Acceptance, M/s ABB were asked to furnish the details of proprietory items and their suppliers which may also qualify to be covered under the scope of Force Majeure Clause. The stand of M/s ABB in this regard has been that only trade goods from sub-suppliers shall not be covered under the clause if available from other suppliers. The list of such trade goods will be available along with the documents for TOT since by that time all suppliers including those for raw materials would have been selected by them. It is pertinent to mention that in case of Thyristor locomotive contract placed on M/s ASEA Sweden and Sumitomo, Japan, the scope of Force Majeure Clause also extends to the works of sub-contractors/suppliers.

4.1.5 Transfer of Technology

In the Advance Letter of Acceptance, M/s ABB were requested to furnish the list of their Indian competitors who are proposed to be excluded from the scope of TOT for any particular equipment. It was also insisted upon that the Indian Railways shall have the right to transfer the technology to any public sector unit of the country. M/s ABB are now agreeable to transfer TOT to any of the public sector undertakings where Government of India holds equity of 51% or more. They have specifically excluded M/s NGEF for transfer of TOT as they have technical collaboration with their overseas competitor M/s AEG.

It is felt that the above arrangement will perhaps substantially meet our requirements.

5. The comments of Adviser (Budget) and Adviser (RS) on the above aspects are as under:

Noting of Committee of Advisors

5.1 The Tender Committee (comprising Sh. Anantakrishnan-Adviser (L) Shri P.S. Kapur-Adviser(PU), Shri A.P. Chopra-Adviser(Budget) and Shri A.D. Mohile-Adviser(RS), did not recommend acceptance of the offer of M/s ABB *inter alia*, pointing out:

> "The increase in the negotiated prices for unit exchange spares is quite steep, 106% for freight locos and 178% for the passenger locomotives. These increased prices will have long term implications for series production of HHP 3-phase AC locos in IR's unit". (389/n).

5.2 The higher authorities while deciding to accept the offer of M/s ABB, took note of this and Advance Acceptance letter which was issued with the approval of the then M.L. and F.C., *inter alia*, stipulated the

condition about unit exchange spares which is discussed as Point No. 2 of the statement at S. No. 489. The then M.L.'s remarks on this issue may be seen at para 7, 394-395/n. M.L.'s views also tallied with the approach of the Tender Committee indicated in Para 9 of p. 372/n.

5.3 It is seen from the above, that the unit exchange spares will be needed during the indigenous manufacture of locos. The prices of vital assemblies/sub-assemblies/components would also get correlated with the unit exchange spares prices.

5.4 M/s ABB have, however, not accepted I.R.'s stipulation and have given a PV Clause without fixed element and with base date as June, 1991 in an otherwise firm price contract with delivery extending to 28/36 months from the date of the contract. M/s ABB have further stated that the validity for spares purchase order is upto 2 years from the locomotive supply contract, but at the latest until December, 1994.

5.5 Regarding Point No. 7—Additional costs resulting from delay in supplies—each contract is to be seen on its merits.

5.6 Regarding additional costs due to change of law, there is no difference in the approach. During the discussions, it was brought to the notice of M/s ABB, that Sec. 64-A of the Sale of Goods Act as applicable in India should take care of their apprehensions.

5.7 As regards the scope of application of force majeure clause each contract is to be seen on its merit. The position in this regard is given in the remarks column against Point No. 6 in the statement at S. No. 489.

5.8 As regards transfer of technology, M/s ABB have not agreed to transfer of technology for power converters, electronic control equipment and system engineering to M/s Seimens Ltd. and M/s NSEF (A Karnataka State Government Undertaking). They have further stated that for these items Crompton Greaves Ltd (CGL) is eligible as on date but the position will be reviewed based on development from now to the actual date of passing on TOT to IR/CGL. M/s ABB had earlier objected even to BHEL being given the technology for these items but later clarified that IR shall have the right to transfer the technology to any public sector unit in India provided these companies are having 51% equity control by the Government of India and IR shall guarantee the confidentiality of technology transferred to such parties. Thus if equity control of Government on M/s BHEL becomes less than 51%, even BHEL will get excluded.

5.9 Now that M/s ABB have reacted to our persuasive efforts, Board may kindly decide whether or not to accept deviations from the conditions in the Advance Acceptance Letter, as some of them have substantial financial implications.

6. The case is submitted to the Board for taking a view in the matter.

Sd/-	Sd/-	Sd/-
(A.D. Mohile)	(K.K. Sharma)	(A.P. Chopra)
Adv(RS)	Adv(L)	Adv(B)

Note of Member (Electrical)
M.L.

F.C. based on the observation of M.R. dated 25.6.92 (PP-435/n) a Committee of Advisers was nominated in consultation with FC to hold further discussions with ABB regarding acceptance of the various conditions/counter offers contained in Railway's letter of acceptance. The Committee have furnished the outcome of these negotiations and other detailed observations at PP-437/n to PP-444/n.

2. From a close look at Advisers Committee's observations, it would appear that though ABB have agreed to most of the issues, there are certain residual areas of difference emerging after the discussion as indicated in ABB's letter dated 15.7.92 (S. No. 488).

3. The comparison made by Adv.(L) with similar contracts signed by IR in the recent past in respect of two major areas of difference *viz.* break up cost of unit exchange spares/CKD components and additional cost resulting from delay in supplies, are relevant.

3.1 I endorse the view that the two clauses where the differences still persist may not have significant repercussions in the over-all context due to the following reasons:

(i) Acceptance of 10% Liquidated Damages (LD) plus freight variation and L.C. extension charges should be adequate to safeguard Railway's interest, in the event of possible delay in supplies on contractor's account.

(ii) The concept of Unit exchange spares is basically linked to maintenance and not manufacture. For further manufacture at CLW, it may not be necessary to import major sub-assemblies of the locomotive but the smaller constituent components which could be bought through competitive bidding on the basis of details that would be available through TOT. Hence unit exchange spares already listed and proposed to be itemised alongwith price variation formula have limited significance.

4. In view of the foregoing, the undersigned is of the considered view that the terms and conditions as accepted by ABB may form the basis of finalising the details contract. M. R. may consider for approval.

(J. Upadhyay)
Member Electrical
24.7.92

F.C.
C.R.B.
M.R.

Note of Financial Commissioner (Railway Board)

Despite several rounds of discussions, M/s ABB have not agreed to some important conditions stipulated in the Advance Acceptance Letter.

2. One important condition having serious financial implications is regarding Unit Exchange Spares. It was indicated in the Advance Acceptance Letter that itemwise prices of components constituting CKD freight and fully assembled passenger locos shall be furnished and the price break up should be such as will total up to the price of the locomotives and shall form the basis for purchase of future spares and assemblies by IR for purpose of indigenous manufacture of HHP locos. M/s. ABB were also asked to give details of Price Variation Clause to be applied to the itemwise prices for future purchases. The T.C. of which Adv. (Elect) and Adv(PU) were also members had mentioned to M/s. ABB during negotiations that Unit Exchanges Spares would also be ordered during the indigenous phase of manufacture and as such any unreasonable increase in their prices would bind the IR to high prices for a long time. The T.C. had also *inter alia* brought out that increase in the negotiated prices *vis-a-vis* earlier prices was quite steep i.e. 106% for freight locomotives and 178% for passenger locomotives and that these increases in prices will have long term implications for series production of HHP-3 phase locos. This aspect was commented upon by the then ML who suggested that the firm should be asked to give the break up of prices of freight and passenger locos so that those can serve as reference for further purchase. A condition was accordingly stipulated in the Advance Acceptance Letter, which was duly approved by the then ML, and FC.

2.1 M/s. ABB have not accepted this condition. The break up of prices given by them adds upto 123% of the cost of the freight loco and 127% of the cost of passenger locos. In this break up while they have kept the price for the 26 unit exchange spares the same as given by them at the time of negotiation of the balance items, they have quoted lump sum prices. Moreover, they have indicated that this

break up is only for information. Thus the unit exchange prices have not been reduced by the firm and as they have not indicated itemised rates for the balance items, it will not be possible also to order the balance items. They have however, now given a PVC with June 1991 as the base date. The validity for spares purchase orders is upto 2 years from the locomotive supply contract or latest upto Dec. 94. It would not be possible to assess the requirements of the series manufacture by that date. The base date of June. 91 in an otherwise firm price contract where the deliveries extend upto 26 months, from the date of contract, would lead to a further increase in prices.

2.2 I am unable to agree with Paras 3 & 4 of the observations of ML. His approach is at complete variance with the approach of the T.C. and then ML. the GTP 3 phase technology is an extremely complex technology. It will be long before Indian Railways are able to absorb the same. The Unit Exchange Spares, especially the power convertor and invertor and micro-processor based control equipment would continue to be required for a long time during indigenous manufacture which has to commence simultaneously with TOT of HHP locos. Even if some components of the spares can be locally manufactured the prices of the balance components which have to be imported will get co-related to the unit exchange prices. In the circumstances, no deviation on this point should be allowed.

3. On the issue of transfer of technology the stand taken by M/s. ABB is somewhat restrictive. They have not agreed to transfer of technology for power convertors, electronic control equipment and system engineering to M/s. Siemens Ltd. and M/s. NGEF (A Karnataka State Govt. Undertaking). They have further stated that for these items Crompton Greaves Ltd. (CGL) is eligible as on date but the position will be reviewed based on development from now to the actual date of passing on TOT to IR/CGL. M/s. ABB had earlier objected even to BHEL being given the technology for these items but clarified that IR shall have the right to transfer the technology to any Public Sector unit in India provided these companies are having 51% equity control by the Govt. of India and IR shall guarantee the confidentiality of technology transferred to such parties. Thus if equity control of Govt. on M/s. BHEL becomes less than 51% even BHEL will get excluded.

3.1 It may be recalled that M/s. ABB had earlier indicated (in their letter of 27.5.91 as S.No. 384) that with the knowhow and facilities available with M/s. ABB India, it might be possible to do domestic value addition to the extent of at least 20% of the F.O.B. price of the supply of contract. When this was pointed out to them during negotiations by the TC, they had resiled from this. This

again reflects their restrictive approach towards indigenisation. In this background the indigenisation especially of high value critical items will be a long drawn process.

4. Regarding delay in shipment of supplies even though M/s. ABB have now agreed to bear increase in the freight charges due to delays in shipment of supplies, they have still not agreed to bear the increase in the custom duty. As already indicated this deviation cannot be accepted.

5. M/s. ABB have also not accepted our condition about 'force majeure'. This is not acceptable.

6. Each contract is distinct from any other and is to be viewed as a package of rates and other terms and conditions. Merely because of provision was not made in one contract does not mean that we cannot make it in another if found to be desirable to safeguard the interests of the Railways.

7. As mentioned in my earlier note, the financial viability has already been adversely affected because of foreign exchange having to be procured at market rate. Further concessions to the firm will only push up the cost of locos to be manufactured under the transfer of technology and make the purchase still less viable.

8. The VIII Plan size has been fixed at Rs. 27,202 crores at 1991-92 prices which is much below the requirements projected by the Indian Railways. Out of this the outlay for the rolling stock has been kept at Rs.10,630 crores for the five year period. The purchase price (CIF) of these locos long with TOT as per current exchange rate will be about Rs.717 crores. Though we have requested MOF to exempt these locos from payment of custom duty in case this is not accepted by them, our liability will further go up by about Rs.690 crores (105% of tender price less TOT). The average cost (CIF) of each loco now comes to about 22 crores which will become about 45 crores in case custom duty is not waived. The CIF price at the time of the first offer in 1988 when the Planning Commission had approved the introduction of this technology was about Rs.5.2 crores.

9. Since M/s. ABB have not accepted our conditions, despite their having been given sufficient opportunities it is recommended that the Advance Acceptance Letter may be cancelled. This course of action was also suggested by the then M.L. at page 421 N. In our letter dated 29.5.92 at S.No. 485, which has been issued after being shown to M.R., the firm has been advised to give their unqualified acceptance to the points and conditions brought out in the Advance Acceptance letter within 15 days and that no further time would be given for the purpose.

10. The Advance Acceptance letter was issued on 18.3.92 and since then a commitment fee of about Rs.1.5 crores has been paid till date

because of the delay on the part of ABB in accepting conditions stipulated in the Advance Acceptance letter. It may not be justified to keep this issue pending any further and keep incurring the heavy commitment fee liability.

Sd./-
F.C.
28.7.92.

Chairman, Railway Board

CRB From the report put up by the Adviser's Committee on p.437-444/n it is seen that there has been no substantive change in the position regarding the acceptance by M/s. ABB of the conditions in the Advance letter.

MR Under the circumstances, I would reiterate my observations made on p.434/n.

Sd./-
C.R.B.
31.7.92

Minister for Railways

In this case conscious decision was taken by the Government taking into account all the relevant aspects and in full and final consultation with the Finance Minister and the clearance of the ADB. The decision cannot be recersed or changed.

Since the Tender Committee had earlier recommended rejection of the offers, the stand taken by the Adviser's Committee during and after negotiations carried out by them is only in line with the earlier stand. The Adviser (Budget) had also the advantage of leading direction by the FC, he had stated that the negotiations should be only in terms of the Letter of Intent.

The points raised by FC are neither new nor the total financial picture has undergone any significant change after the decision was taken by the Government.

There is no point in wasting further time in fruitless negotiations. I agree with the points made by the M(L). The contract should be processed and finalised accordingly.

(M.R.)
5.8.1992

4.18 In this context, Committee, during evidence, asked to state whether there were some conditions which ABB also did not fulfil and are stated to be under negotiation, Member (Electrical) Railway Board stated:

"The position is that we have furnished all the conditions that we have stipulated. They have accepted all except two conditions where they have had some variation. But the gap is narrowed down."

4.19 Elaborating upon the unresolved issued he continued:

"They have to pay for the delay beyond the stipulated period. They are required to pay any additional charge which really would have to be paid. There were three elements of the additional charge. One was about the charge for the letter of credit extension, that is, the banking charges; the other was for the freight charges; the third was about the increase in customs duty".

4.20 He further added:

They have agreed to pay the banking charges and the charges for freight. So far as the customs duty is concerned, they have said that there is a Liquidated Damages (LD) Clause. "We impose a penalty of one percent for every two weeks' delay subject to a total of 10 per cent. They have said: "You can recover if there is any change in customs duty but it is your own internal matter." There may not be any change in customs duty also. If there is any then the LD clause is all that we can apply.....The point is all the parts will make a locomotive. They had given quotation for certain spare components. They were primarily meant for manufacture. When we wanted to improve this clause they did not agree. The prices of spares are generally higher than the total price of the locomotive. They have made a submission. We also went in depth.

We came to the conclusion that if we had already ordered the spares, if there is a total manufacture going to be undertaken, then we would rather go for small components on a competitive basis from the global market on the basis of technological details that they will give rather than going in for buying in a big way. So, in these two areas, there were some gaps. But we did narrow them down. We felt that the overall objective must be to get technology and have a collaboration with them for technology transfer and new technology. If we do not get it today, tomorrow it will not be cheaper. Prices are escalating. We have taken all these factors into account. We came to the conclusion that it is not a bad idea to accept things to the extent we have been able to benefit by that. It does not really harm our interest in the long run."

4.21 Asked that on 22nd August the Committee gave in writing to the Ministry advising them not to take further action, which they had promised to do before the end of this month. Whether the Ministry have taken action in pursuance thereof Chairman, Railway Board stated:

"After this decision that RCC would like to take time up to 20th September and it was said up to 30th September and till then we should not take any action, we have stopped any further action in this process. Whatever the Paper or information is required by the RCC, we are trying to make it available as and when it is asked".

4.22 Asked whether the Company was asked to hold the witness added:

"The Company has nothing to do because the present position is that there is a letter of acceptance, there was some discussion between the two parties because as Member (Electrical) has explained, there are two conditions on which there are certain substantial differences as we asked for. Now the decision has been taken to accept what they would like to have. So, on that basis now the agreement has to be entered into. For entering into the agreement we have not started with the formal process because in the mean time we have got now the instructions to hold on and not to proceed."

BHEL Bid

4.23 The Committee invited Chairman and Managing Director of BHEL to explain as to how they were eliminated during the last bid and the circumstances under which they allowed the contract to slip out of their hands. In there opening remarks the Committee observed as follows:

"The opening point I would like to mention is that as members of this Committee, we are concerned about this huge purchase of heavy locomotives from a foreign land. We are also concerned whether these locomotives could have been manufactured in our country or not. We are also concerned whether due consideration was given to the indigenous manufacturers in public sector or not and whether the BHEL presented its case properly or not."

4.24 Explaining the position and answering the questions posed by the Committee the witness stated as follows:

"We have collaboration with Hitachi. We are manufacturing electric traction motors for them. That is one of the important things. We are now supplying them to Railways. It is the same configuration of system. Therefore, we negotiated with Hitachi, and we joined together to bid for this latest locomotive. Therefore, we submitted the tenders in early, 1988. The first bid was taken and called in February, 1988. That was technical bid. The commercial bid, was opened in August, 1989. There was a revised bid in November, 1990. This was opened in December, 1990. They called us for negotiation after the second bid. This was held on 28.2.1991.

The revised bids were called again in May, 1991 and were opened in June, 1991."

4.25 Asked how the BHEL view their failure to obtain the order, General Manager, BHEL said:

* * *

"We felt that we had a good case. Although we have been bidding for this contract because we are one of the important manufacturers of the electricals for locomotives and are suppliers of locomotives. Our capacity is more. We have proven record of high technology production. We thought that we must not miss this opportunity because once Railways introduces this engine, they will be in the usage for the next 25 years in the country. We are the premier public sector undertaking in the field and we thought that if we get the contract the company, the Railways and the country itself will be benefited."

4.26 He further added,

"After the evaluation of tenders, we thought we will be L-1. But afterwards we do not know how they have evaluated the tenders and what were the considerations which went against us because afterwards there was no correspondence of any type between us. Informally we have been checking up with the Railways. In the last three months, in March this year, we came to know that probably we are not in the picture."

4.27 Asked whether BHEL made any efforts to find out how they had been eliminated at the last bid, the witness stated:

"Before the final decision, nobody will show the file. The evaluation is the final stage."

* * *

During negotiations held after the second bid there were two major points. One, they were saying that 'you hold your prices firm'. The prices are very high. We said, whereas a rupee is firm, but when it comes to foreign exchange operation without collaborators. I will be able to confirm that because my collaborator has not yet confirmed. While his portion of yen is confirmed, but who will take care of rupee-to-yen fluctuation? So, on that one they were asking, 'why don't you be firm and take care of the price?' It was totally unacceptable."

4.28 In this context Committee enquired why BHEL neither reduced their rates nor furnished the desired data.

4.29 The witness thereon stated:

"Since we have to receive the technology from Hitachi, the price level between Hitachi and ourselves, that is, indigenous portion and

import portion, varies and we sat together and discussed how we indigenised it, based on that we evaluated the prices were very firm. Therefore, I could not give the price levels lower than what we have quoted.

In the same price level discussions we said that because of the rupee devaluation we cannot be responsible for the price, we cannot absorb this money.

So far as the data of 20 per cent value addition issue is concerned, there is a format. We had given the details completely except the detailed item-wise indigenous content-labour, materials and value added. He did not want to give it because of our commercial interests. Because of my cost structure, of my commercial intelligence, information, I would be divulged into the hands of the foreigners also."

4.30 When pointed out that while submitting the quotation, the BHEL did not furnish the details in the prescribed proforma, the witness stated:

"We have decided the sale price in our tender minus our CIF value that is equal to value added in India."

4.31 Subsequently Chairman & Managing Director, BHEL submitted to the Committed an extract from the contract secured by BHEL in Farakka Super Thermal Power Project, a World Bank aided project where such a break up as desired by Railways was not insisted upon—(Annexure III).

4.32 In his forwarding remarks CMD, BHEL stated:

"The extracts illustrate the point, that Purchaser's price schedule formats could be different from that of Railways, even though the bank/s guidelines are similar. It would also be noted that, even though BHEL have furnished only unit/total price/s and the foreign exchange components, the tender was decided in favour of BHEL. In this specific case it is believed that a price preference was also given. In sum, such lack of details has not resulted in any impediment to the decision making.

As mentioned in my oral evidence, giving structure break up of details to Purchaser at that stage is exposing classified commercial information to competitors."

4.33 Asked by the Committee whether the fact that BHEL had been overlooked in favour of a foreign party was brought to the notice of higher authorities in the Ministry to the Minister of State for Industry the witness confirmed that:

"The matter had been taken up with the Minister also."

4.34 In this context, Secretary, Heavy Industries who was called by the Committee to tender evidence in the matter stated:

> "This matter was taken up by the Minister of State, Shri Thungon with the Railway Minister and also with the Finance Minister. In fact, a meeting was held to discuss this under the Chairmanship of the Secretary (Economic Affairs) on the 10th February, 1992. In that, this point was brought up that the information being asked for by the Railways was such that it would create problem for BHEL as it is against the interest of confidentiality of information. It might be used against the BHEL in subsequent dealings. It was orally mentioned in the meeting. It was also mentioned that the information which was asked for was unusual."

4.35 Committee drew attention to the concluding para of the Minutes of the Inter-Ministerial Meeting held on 10.2.92, where it was decided that FM's orders will be obtained and a Note thereof to be sent to PMO through Cabinet Secretary and asked whether this was done.

4.36 Secretary, Heavy Industries stated:

> "The Finance Minister was to do this. After that I am not aware of what developments took place because as Ministry of Industry we have no role in it."

Categorisation of BHEL

4.37 In a subsequent sitting with the Railway Board, Committee pointed out that according to BHEL, the break-up of commercial information to be provided in Form 'C' was never insisted upon by Railways in other contracts with BHEL. It was also pointed out that in a World Bank aided project of NTPC, BHEL had quoted without giving the break up of costs as desired by Railways and that even the Secretary, Economic Affairs could not recollect any case where an Indian bidder had lost a bid because of failure to give cost-break up of domestic value addition. The Committee, therefore, asked as to how the Railway Board could justify that the break-up cost details were essential.

4.38 The Member (Electrical) Railway Board stated as follows:

> "The break up of the value addition cost as part of the information was asked for from the BHEL at the specific instance of the funding agency, that is, ADB. It was not available; we could not really make a compromise on that".

4.39 The Committee pointed out that in the Memorandum dt. 26.8.92 furnished to them by the Ministry of Railways, it had been stated that while conveying the approval for negotiations with the Asian Development Bank, the ADB had advised the Ministry of Railways that they must satisfy themselves and that for BHEL, it should have been

20 per cent of the domestic value addition and asked whether the insistence on the break-up was stipulated by the ADB.

4.40 The witness said:

> "They (ADB) have given the format which should be filled up. Pertaining to the break-up, there was no other information from them, so we could not fill it up... The format was approved as part of the bid document...ADB in their letter dated 17.9.87, in para 34, had stipulated.
>
> In category 1, domestic value added, 20 per cent should be given as labour value added in India. It is noted that under value added components in India, labour, overheads and others are included. This leads to confusion and should be corrected".

4.41 The witness further added:

> "Of course, there was a change in this. We had a dialogue. Later on they said differently. But, I do know they have specifically asked for the break-up. But, BHEL could not provide the break-up. This is how, they got rejected in the second round of bidding".

4.42 At this point the Committee drew attention to para 2.23 of the Tender Evaluation Committee's Report on 3rd bid (Noting on page-404 of the relevant file) which read as follows:

> "On this basis, the classification as category-I bidder claimed by BHEL is acceptable."

4.43 The Committee wanted to know whether Tender Committee was over-ruled by whom and why it was so.

4.44 The witness said:

> "They (BHEL) could not give the information and we were obliged to give the information to the funding agency in the format they wanted... TEC decision was over-ruled".

4.45 In this context, the Committee took note of a copy of the letter dt. 21 November, 1991 from Chief, CPSO, Asian Development Bank written to GM, Sumitomo Corporation furnished by the Railway Board. An extract of the letter is reporduced hereunder:

> ..."The Purchaser accordingly advised the Bank that it was not satisfied by the claim of BHEL in respect of 20 per cent domestic value added and considered that in terms of the bidding documents BHEL's offer would qualify only for Category II and not for Category I. Then Bank agree with this position taken by the Purchaser."

4.46 Asked if the Railways could consider dividing the order equally between M/s. ABB Ltd. The witness stated:

> "The point is the lowest bidder will get it. In ADB, the orders are not divided. We give the order to the lowest bidder."

Role of Ministry of Finance

4.47 The Ministry of Railways had taken the stand that the matter was referred to the Ministry of Finance from time to time and the letter of acceptance to ABB was issued after obtaining clearance from them.

4.48 The Committee not being clear about the role of the Ministry of Finance or the Department of Economic Affairs, invited both Finance Secretary and Secretary, Department of Economic Affairs to seek some clarification in the matter.

4.49 Asked to state whether the advance letter of acceptance given to M/s. ABB, Switzerland by the Railways for purchase of 3-phase 6000 HP locomotives was issued with the concurrence of the Ministry of Finance, Secretary, Economic Affairs stated:

> "It was not issued after obtaining our concurrence because under the procedure the Railway Ministry did not require the concurrence of the Finance Ministry to issue this letter in this kind of situation. The basic decision on this project was taken some time ago by the multilateral financing agency, ADB. Once the Project is passed for financing by the ADB, there are very well prescribed rules under which contract bids have to be invited and bids have to be evaluated. Under the procedure that exists in this process of determining who is the preferred contractor, the executing agency negotiating with the lower bidder for a better price is entitled to communicate direct with the multilateral agency. They issue letter without getting the concurrence of the Finance Ministry."

4.50 The Secretary, Economic Affairs further added:

*** *** *** ***

> "Railways have a special autonomy in all these matters. There is much less of consultation that goes on even in the design of projects, the approval of projects, the various procedures like PIB and so on which are followed for other Ministries. Procedures are different for Railways."

4.51 Asked whether in a contract involving such large funds besides heavy foreign exchange, the Finance Ministry have no responsibility. The witness added:

> "The Railways were not coming to us for approval regarding the release of foreign exchange because the financing of this Project was in any case being done by the ADB. The concurrence of the Finance Ministry was certainly needed in order to negotiate the original arrangement that this Project will be passed on to the ADB. They cannot tie-up this source of financing for the Project, without getting the approval and concurrence of the Department of Economic Affairs in the Ministry of Finance. Once that is done, the

procedural matter of processing the bids does not require the involvement of the Ministry of Finance."

4.52 The witness further added:

"...In the case of the Railways, the Board itself is empowered to decide. The procedure is different because the Railways have their own budget and so on... This Project, it is a very old one, was originally posed to the ADB way back in 1987... The terms and conditions, when they were negotiated for posing the project, involved the Department of Economic Affairs... The ADB lays down specific procedure in the inter-action between the executing agency and the ADB."

4.53 Taking up the point regarding the desirability of going in for this project, Secretary, Economic Affairs stated:

"That question of whether it is a good project and whether these locomotives are necessary, this is part of the formulation of the Railway's plan. The Ministry of Finance is not involved. We do not have the technical competence to go into this question in the case of the Railways... It is entirely internal to the Railways because the established procedure is that once it forms part of the Railway's plans and it is within the Planning Commission norms, as far as the Finance Ministry is concerned, it is an approved project."

4.54 The witness further stated:

"As long as there is no difference of opinion between the Railways and the ADB and no other problem comes up, they do not have to consult us. Giving the advance letter, that they told us later on. What they did was they evaluated the tender and they informed the ADB of their decision without having our concurrence."

Intervention by the Ministry of Finance

4.55 In regard to the intervention of Ministry of Finance and queries made by that Ministry Member (Elec) said:

"The issues were examined by a Committee of Secretaries. They came to the conclusion that the procedures adopted and the approach were in order. They gave final clearance on 14.3.1992 to the Ministry of Railways to go ahead with the deal. Accordingly, a letter of acceptance was placed on ABB on 18.3.1992. In the letter of acceptance, we have been made certain counter-conditions where the earlier conditions were not acceptable. To that, they have given a final reply on 16.7.1992. There was a round of dialogue in between. The reply given on 16.7.92 narrowed down the gap between what we wanted and what they have to offer and the position was found acceptable."

4.56 The Committee asked the Secretary, Economic Affairs to explain the circumstances under which the project was referred back to Ministry of Finance after the third round of bidding. The Secretary stated as under:

"...certain developments took place which I want to bring to the Committee's notice and because of which the project was referred back to us.

..."What happened in this particular case is that in the third bid the Railways came to a conclusion and they were procedurally right to come to that conclusion and gave an advance letter of acceptance to M/s. ABB were the lowest bidders and informed ADB that they are negotiating with them.

It came to us because, separately, the Department of Heavy Industries, Ministry of Industry represented to the effect that they were not satisfied with the method of selection. So it became a controversial issue. It came to us because we are supposed to check whether the method is all right. I believe they also represented this matter separately to the Cabinet Secretary. Then a meeting was held."

4.57 Asked whether BHEL had represented to them, the witness stated:

"Yes Sir. The Department had officially said that they were not happy with the way the contract choice was made. There was an internal discussion and we were looking at these papers. The matter was also considered in the Committee of Secretaries. We were asked by the Cabinet Secretary to determine whether it is correct that the ADB procedure has been followed or not. Then we undertook a series of discussions and inter-ministerial meetings. On 17th January a meeting was taken by the Secretary, Expenditure in the Ministry of Finance. We were also represented, Secretary, Heavy Industries was there and the Finance Commissioner Railways was also there. The point made by them was under the ADB procedures you have to make a comparison of two bids by exclusing the Customs Duty because then it would be unfair on foreign bidders and it is an agreed procedure that all comparisons between the international bidders and the Indian bidders will be made free of duty. So, in order to make our domestic bidding competitive, we offer all the incentives given to an exporter to our bidders and we treat them as exporters. It is done at our insistence thought the developed countries do not like it. Then there will be a 15% price preference to the domestic bidders. Under the ADB procedure, in order to qualify for the price preference you must prove that at least 20% of the value is domestic value added. This is to avoid a situation where a domestic firm having a tie-up with a foreign company imports everything and claims duty-free imports and a price preference of 15%. So if it is less than 20% value-addition,

you do not get the price preference because that is treated like an import.

What happened here is that the Railways made an evaluation of this project and they came to the conculsion that the bidding given by BHEL does not qualify as a domestic bid because according to them the BHEL had not proved the 20% value-addition in accordance with the procedures laid down by the ADB. Because of that they did not get the price preference. So the Railway Ministry's view was that since BHEL did not qualify for the price preference, the lowest bid was from M/s. ABB. What came to us was a representation saying that price preference denial was not fair. In other words the Railways should have treated it as a domestic issue. So this was the issue we had to resolve. We had a meeting and the first outcome of the meeting held in Secretary, Expenditure room was that the Railways and the Secretary agreed to get together to see whether they can come to a satisfactory conculusion. But we were told that they were not able to come to any satisfactory conclusion.

A second meeting was than fixed on the 10th of February chaired by me in the Department of Economic Affairs where the representatives from Heavy Industries and Railways were present (Annexure I). Just before this meeting took place the other bidders perhaps addressed the ADB. We told ADB in January that we are now going to process the issue to see whether this evaluation is in line with ADB procedures.

We received a telex on the 5th of February 1992 from the ADB saying that they had gone through the procedures and in their view the Railways had followed the ADB procedure. According to the ADB the bidding put in by BHEL is invalid for consideration of price preference — not that the bidding is invalid otherwise — because it did not contain the information needed and required under the tender document. They had not proved the 20% value-addition as is required."

4.58 The Secretary, Economic Affairs further clarified:

"In the meeting that I took with the Ministry of Heavy Industry on 10.2.1992, it was accepted that the tender clearly specified that this information should be provided. Had the Ministry of Industry, at that time, objected to the term or condition and raised it at that time saying that condition was unreasonable, we could then persuade the Railway Ministry. But once the tender is issued with certain conditions, it becomes difficult for a Department to argue that the conditions specified in the tender are inappropriate. In accordance with the tender document, BHEL would not be eligible for price preference.

The Finance Ministry got it confirmed from the Ministry of Heavy Industry that their bid did not provide information actually required in the tender.

...The telex sent by the ADB on 5th February, i.e. five days before the meeting that I took in the Ministry, stated that in the invitation to rebid in the third round, the bidders were specifically advised to provide information on each of the items giving details of domestic value addition, if they desire to be qualified in category (1) and become eligible for price preference. These details were not provided in the BHEL offer and they did not qualify for category (1) and could only be considered for category (2)."

4.59 Asked whether in view of the past experience of BHEL in regard to World Bank aided projects and the railway projects as well the view taken by Railways/ADB was fair, the Secretary said:

"In the meeting that I took, one of the conclusions was that we accepted the point of view that we should go back to the ADB and consult with other Ministries also to see whether the procedures that are laid down by the ADB in determining the value addition can be changed, if they are unreasonable. It is a different matter whether procedures need to be revised or whether BHEL should have given more information or whether the Railways should have come to a different conclusion and so on and so forth. We cannot go before the ADB and nullify this particular tender on the ground that BHEL have been denied the offer."

4.60 Asked what happened later, the Secretary stated:

"We then reported back to the Cabinet Secretary that on the information available with us and the facts as ascertained, we cannot say that ADB procedures have not been followed and it has been followed and they have certified it. That was the only role of the Finance Ministry in this whole affair."

4.61 Asked to comment why BHEL was not called in third bid, the witness stated:

"I can only help the Committee by giving you the perspective from the ADB procedure side. Once you have a bidding procedure, it is not easy. The procedure is very transparent where it is an internationally competitive bid and the procedure quite clearly says that where the Railways choose the lowest bidder, they do not have to tell the next highest bidder as to why they are rejecting them. But, of course, through the process of departmental consultation it came out that they might not have been informed at that time.

...From our perspective the Railways have found that there is some fault in this bid, that is, with the lowest bid, they can go to the next highest bid."

4.62 In this connection, the Ministry of Railways have furnished a copy of the list of correspondence between Ministry of Railways and Ministry of Finance. In all 22 letters were exchanged between 22.7.91 and 16.3.92.

4.63 In this regard, the Committee took note of the following portions/ points:

(i) On 24.10.91 vide D.O. Letter No. 13/3/87-FB, VI, the Secretary, Department of Economic Affairs informed the Chairman, Railway Board that as per-day commitment charges being paid for this Project is US $3447, a decision on the 3rd round bid may be communicated to the Ministry of Finance within a week and if the decision is not received by them, Ministry of Finance will be compelled to advice ADB to cancel the relevant portion of First ADB Railway loan.

(ii) On 29.10.91, the Finance Commissioner, Ministry of Railways informed the Department of Economic Affairs that the Minister of Railways has decided that the Indian Railways should go in for 3-phaselocomotives.and a Memorandum in this regard is being sent to ADB seeking approval for awarding the contract.

(iii) Minister of State for Heavy Industries took up the matter regarding rejection by the Railways of the BHEL's claim of 20% domestic value addition with the Prime Minister & Cabinet Secretary.

(iv) Secretary Department of Economic Affairs informed Chairman, Railway Board vide letter dt. 18.11.91, that PMO has sought information regarding the matter.

(v) Cabinet Secretary directed Ministry of Finance on 27.1.92 to ensure that ADB guidelines have been strictly followed by the Ministry of Railways.

(vi) Ministry of Finance reported to the Cabinet Secretary that the conclusions arising from the meeting held on 10.2.92 (Annexure-I) is that the decision of Ministry of Railways technically conforms with the requirements of ADB.

(vii) Cabinet Secretary, however, directed that in view of the representation received from Department of Heavy Industries a meeting to be chaired by him may be fixed on 10.3.1992 but this could not take place.

(viii) In this context, an extract of a D.O. Letter No. 87/F(F.FX) 115/1/ ADB. dt. 12 March, 1992 from Minister of Railways to Finance Minister is reproduced below:

"I Understand from Shri Naresh Chandra, Cabinet Secretary, that he has no role to play regarding placement of order for AC 3-phase locomotives in as much as the guidelines of Asian Development Bank have been fully complied with. The offer of ABB is valid only upto 14th March, 1992. I am now proceeding on the basis of the understanding that there are no further hurdles for placement of order and Minister of Finance is fully satisfied. I request you to send the file expeditiously. Incidentally, in the light of unfounded scurrilous reports in the newspapers, I would like to cover this aspect of placement of order in my reply to the debate on Railway budget..."

Role of Planning Commission

4.64 The Committee was informed by the Railways at various stages of the examination of subject as also during evidence that the proposed deal of purchase of 3-phase electric locos from M/s. ABB, Switzerland had the approval/concurrence of Planning Commission. The Committee, therefore, felt the need for having the views of Secretary and Advisor (Transport) in the Planning Commission.

4.65 Explaining the role of Planning Commission in matter Secretary, Planning Commission stated before the Committee:

"The Planning Commission constituted two groups in 1986-87 and thereafter in 1990. The 1986-87 group recommended certain broad parameters about the technology, which is appropriate to the condition of the Indian Railways. Now, on that basis, another Committee was appointed. That Committee consists of Railway experts, headed by Shri Gujral and it was constituted in 1990. That Committee submitted three part reports—first part in March, second part in June and the third part in November, For our purposes, first part is a relevant part."

Comments of the Expert Group.

4.66 The first in March, 1990 covered the question of choice of technology of electric and diesel locomotives. The second part in July, 1990 was mainly on the question of acquisition of technology of the diesel and electric locomotives and on the development of maintenance back-up including human resource development. The third part in November, 1990 on the number of locomotives that may be required for passenger and freight services on both diesel and electric traction in the long range perspective.

In the first part of the Report which is germane to the issues under examination, the salient findings with regard to choice of technology were:

(i) The existing AC electric locomotives technology would not be able adequately and appropriately to serve the future needs of the Indian Railways.

(ii) The existing technology does not lend itself to upgradation to any significant level;

(iii) Adoption of the AC-AC locomotive technology would be the most appropriate for the future needs of the Indian Railways;

(iv) The existing horsepower ratings of the Goods and Passenger locomotives need to be increased to the proposed level of 6000 HP."

4.67 The Secretary further stated:

"After the reports were submitted, the Planning Commission is not in the knowledge as to how the actual purchase decision was taken by the Railways. The Planning Commission approved the investment decision earlier and had given the broad technology parameters."

4.68 On being asked by the Committee whether it was a fact that the Planning Commission Group on Technology for Railways had in April 1986 concurred decision to clear 6000 HP "State of the Art" 3-phase drive electric locomotives for the Indian Railways? The Secretary, Planning Commission stated:

"Yes, the Planning Group on Technology Progression on Railways was constituted by the Planning Commission in April, 1986. At that time Planning Commission constituted a series of Groups, the assess the situation of the industry or the activity and to forecast for the year 2000. This was a part of the exercise and a Group was constituted for Railways. The Group which went into the traction technologies considered the options between 6000 HP AC thyristor three phase AC locomotives with synchronous or Asynchronous traction motors. The Group had noted that 18 thyristor DC motor locos of the former type were then on order and were tried out under Indian service conditions for about a year to evaluate suitable designs for manufacture after technology transfer to India. The Group had not advocated immediate adoption of 3-phase AC locomotives for simultaneous trials. It had suggested that a final decision in regard to 6000 HP AC freight locomotives could be judicially taken only after evaluating the results with regard to the thyristor controlled (DC) freight locos and 3-phase passenger locos at least for one year."

4.69 Secretary, Planning Commission submitted the following when asked on what considerations the Planning Commission had given its concurrence to this decision:

"The Planning Group on Technology Progression on Railways had been set up with a view to making an assessment of the existing technologies and technological development forecasts in the next 15 to 20 years in the Railways. Sector in relation to its adoption and considered their applicability and adaptability to Indian conditions

with long-term options. The report of the Group is purely a technical one and a decision as to the applicability of such recommendations having long-term impact would appropriately lie within the sphere of influence of the Ministry of Indian Railways."

4.70 Asked to what extent the aforestated locomotives were considered energy efficient and what will be the larger implications for energy conservation in the Railways, Secretary, Planning Commission stated:

"This is also a technical issue and appropriately the Ministry of Railways would be in a better position to give accurate decision. According to the Report (Annexure) of the another Expert Technical Group constituted by the Planning Commission, and consisting of ex-Railwaymen, the annual saving in energy was assessed of the order of Rs. 24 lakhs for a thyristor loco to Rs. 37 lakhs for a Asynchronocus motor locomotives.

4.71 When asked as to how critical is the requirement of such high horse power 6 axle electric locomotives for optimum utilisation of the track capacity in the country and what kind of technological benefits would flow out of such a step, the witness submitted as follows:

"Our broad appreciation is that there are certain routes on Indian Railways in which the density of both the freight nad passenger traffic is very high and it is on these routes that further increase in traffic requirements is being projected. The capacity of these routes can be increased substantially by having locomotives which are capable of high acceleration and high average speed with, at the same time having heairer trailing loads. As to whether locomotives should be six axle or four axle this is purely a technical issue. The Ministry of Railways would be the better judge on this particular issue."

4.72 Asked to clarify as to what promoted the Planning Commission to re-examine the issue in January, 1990 when an Expert Group was set-up to go *de-novo* into the need of high horsepower locomotives in the context of Indian Railways total requirement of additional locomotives during the next 10 years, Secretary, Planning Commission stated:

"The Planning Commission constituted the Expert Group on January 9, 1990 to consider certain basic policy issues with regard to type and capacity of locomotives on which there were certain doubts. The issues which prompted the Planning Commission to constitute the Group to re-examine the need for introduction of high horse powered diesel and electric locomotives were:

(i) The Indian Railways will continue to operate many sections and

services which will require much lower haulage capacity than that provided by the proposed 4600 HP. diesel 6000 HP. electric locomotives; *e.g.* branch line services, short haul passenger trains, etc.;

(ii) even on the main trunk routes, the required haulage capacity varies considerably from region to region due to gradients, speeds etc. There is also the universal feature of empty haulage in one direction;

(iii) One of the merits of diesel and electric locomotives is the case with which a number of units can be coupled together to provide the much higher power capacities required for different types of services. This has for long been an essential element in the approach to diesel motive power sizing in USA and for electric motive-power in Europe; and

(iv) the existing diesel locomotives in India are outdated; and modern locomotives being used abroad incorporate technological features and elements which have improved performance and reliability characteristics.

4.73 The Committee desired to know who were the Members of the Expert Group of the Planning Commission and what were their main findings, the representative of the Planning Commission submitted before the Committee as follows:

"The first group was constituted by the Planning Commission by an order of 21st April, 1986. The Members were Shri M. Menezes, Chairman of the Group and a former Chairman, Railway Board; Dr. Jagjit Singh—a former Railway General Manager: Dr. V.K. Sinha, Controller, Defence Research and Development, Ministry of Defence; Dr. P.B.S. Rao of the Tata Institute of Fundamental Research; Dr. S.V. Kasargode of ECIL, Dr. A.O. Kakodakar of BARC; Shri Balram Murthy of Nuclear Fuel Complex; Dr. Sukhartone of IIT Bombay; Dr. Anand Narayan of DSO, Lucknow; Dr. G.P. Dodeja of BHEL; Shri A.N. Wanchoo, Secretary, Railway Board; Dr. B. Bovender of ACSI, Hyderabad; Shri G.S. Dang, OSD, Railway Coach Factory, Kapurthala; Shri R. Parthasarthy, MD, RITES. This is the first 1986 Group.

The Second Group was constituted on 9 January, 1990. Shri M.S. Gujral was the Chairman. S / Shri G.K. Keswani, A.N. Wanchoo, A.A. Hatangadi, R.K. Sethi were the members. The second Group entirely was railwaymen. The First Group had experts from outside also.

4.74 It was admitted by the representatives of Planning Commission that as the Planning Commission does not have any technical expert to

assist the suitability of any particular locomotive or technology or anything, they had to depend on these outside experts.

Eighth Plan Allocation

4.75 About the Eighth Plan allocation for Railways, Advisor (Transport), Planning Commission stated as follows:

> "The total allocation for the entire plan for the Railways as a whole is Rs. 27,202 crores. Originally the requirement was of the order of Rs. 45,000 crores but the final figure is Rs. 27,202 crores. We are still awaiting a final break up from them. For the rolling stock it will be roughly of the order of Rs. 12,000 crores or so."

4.76 Subsequently, vide their letter No. T&C / 7(22) / 89 dated 16 September, 1992 submitted to the Committee Advisor (Transport) Planning Commission stated as follows:

> "Railways had while proposing a plan of Rs. 45,600 crores indicated the requirement of Rs. 13,000 crores for rolling stock. They have now indicated a reduced requirement of Rs. 10,630 crores in the approved outlay of Rs. 27,202 crores. A detailed break-up of this requirement according to locos, both diesel and electric, coaches and wagons are still being awaited from the Railways. It would be seen that no specific amount has been agreed to *as yet* for locomotives in the final approved plan outlay."

Financial Viability

4.77 The Ministry of Railway *vide* their O.M.No.91/RCC/212/1 dt. 16.9.92 had furnished a statement showing the cost of the 3 phase AC 6000 HP electric locos (Freight/Passenger). The price quotations have been converted on the basis of SBI market rate prevailing on 31.8.1992.

4.78 According to exchange rate the cost of 30 locomotives was worked out to Rs. 621 crores. This is exclusive of duty which at present is 87% Unit Exchange spares and TOT.

4.79 The Committee also enquired whether by using two 6000 H.P. locomotives in place of 3 WAG 5 locomotive which would make the cost ratio 90 crores to 9 crores *i.e.* 10:1 besides taking the account higher interest burden, depreciation, 3 phase technology would be cost effective. Reacting to this observation Member (Traffic) stated that "there would be corresponding saving in maintenance as fewer loco sheds would be required besides which it would be possible to add more boxes/coaches to the goods/passenger trains".

4.80 In this connection, Committee also studies the notings in regard to

contract for purchase of 3 phase 6000 H.P. Electric locomotives from M/s ABB. It has been ovserved that Financial Commissioner, Ministry of Railways had stated in his noting:

"It may incidentally be mentioned that as it is the financial viability of the purchase of these locomotives has been adversely affected by the recent decision that the Railways have to buy foreign exchange at the market rate. The liberalisation of import procedures has made it immaterial whether the purchases are financed under tied up loans/credites or through free foreign exchange. Any further concession to the firm will push up the cost of the locomotives to be manufactured under the transfer of technology and make the purchase even less viable. We have therefore, to see that the purchase is in the best interest of the railways."

4.81 In case M/s. ABB do not accept the conditions stipulated in our letter of advance acceptance. We can consider if we should utilise to provision of TOT for thyristor locos for which provision was made while purchasing the thyristor locos. The tender committee, as also ML contemplated this as an alternative when the prices in the second bid were found to be too high (pages 279/n and 302/n). This could be a first step and further advancements made as we go along.

4.82 The Plan size has been reduced, the market borrowing has become difficult, the budgetary support has been reduced and steel prices have substantially gone up with decontrol. All these will put Railway finances under heavy strain. We have, therefore, to be cautious in our approach.

4.83 During evidence, the Financial Commissioner confirmed before the Committee that the still stood by his above view.

4.84 Interestingly the Railway Board in its memorandum submitted to ADB had expressed somewhat similar views in the context on BHEL offer. In this connection an extract of the Memorandum dated 30.10.1991 is reproduced below:

" To qualify as a Category I bidder so as to be eligible for domestic price preference, it is necessary to establish beyond all doubts to the satisfaction of the purchaser that the domestic value added is at least 20% of the ex-factory bid price. While BHEL has furnished a descriptive list of componets to be manufactured indigenously, the value addition against each has not been quantified and, to that extent, the offer is flawed and imputation of values can at best be subjective and uncertain. It may not be out of place to point out that at the stage of second rebidding, negotiations were held with BHEL after ADB's clearance and despite prolonged discussions, nothing could fructify to the satisfaction of the Indian Railways Incidentally the sea, change as a result of the new industrial policy of the Government, devaluation of rupee, severe balance of payment position, high interest rates and managerial changes in the public sector, as yet unforeseen, would undoubtedly vitiate *inter-se* appraisal which is the corner stone of decision further, it is feared that IR may be in the long

run saddled with heavier financial burden and hurdles in absorption of technology. This is not just a one-time purchase of locomotives but transfer and absorption of technology with call for long-range vision rather than a short-term view. Under the circumstances, IR is of the firm opinion that BHEL would now, at best, qualify only as a Category II bidder and not a Category I Bidder."

4.85 In view of Ministry of Finance's submission before the Committee that there will be no special relation custom duty on the import of locos from M/s. ABB the Committee enquired during evidence from Financial Commissioner Railways what impact this would have on the financial viability of the project to acquire 3-phase 6000 HP locos and the technology and whether it will not adversely affect the passenger and freight rates and the capacity of Railways to generate internal resources.

4.86. The Financial Commissioner, Ministry of Railways in his reply stated:

"If we have to pay import duty as has been indicated by the Finance Ministry, obviously, it will adversely affect the financial viability of the project. The financial evaluation which has been done earlier, does not take import duty into account. This requires more resources. Whether we do it by raising the fares or by getting more money from the Government or by raising bonds, etc. would be a decision to be taken after considering various aspects."

4.87 When pointed out that the response of Railway was poor.

4.88 The witness added "we have to get this money from other resources."

4.89 The Committee pointed out that a major part of Railways allocation for the rolling stock in the plan will be spent for procuring these 3-phase locomotives and enquired whether the Ministry of Railways had given a serious thought to this matter and the extent to which other programme of Railways would suffer as consequence.

4.90 The Financial Commissioner, Ministry of Railways in his reply stated:-

"The allocation of resources for the rolling stock is decided collectively by the Board. Ways will have to be found to mobilize additional resources that can be allocated for various programmes."

4.91 In this connection, former Chairman, Railways Board made the following observation in a note dated 21.8.91:-

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"The Foreign exchange situation that the country is facing now is the worst this country has ever faced since independence. Both, the total price to be paid at a level of about Rs.558 crores excluding sales tax and other local taxes etc., as also the exceedingly high foreign exchange content, which might have been found acceptable under more

comfortable economic and foreign exchange situations, definitely appear unaffordable today. Much as we would like to adopt the latest 3.phase technology, there appears to be no option but to forego its benefits for some time because of serious economic difficulties that we are facing.

Today's 3900 HP locomotive is manufactured at a cost of less than Rs.2 crores per locomotive and in this tender we are considering a 6000 HP freight locomotive that will cost approximately Rs.19 crores fully assembled, and approximately Rs.13 crores in knocked-down condition. We also have no indication as to what will be the cost of manufacture later and what will be the import content. As time and again proved in the past, attempts at re-tendering/negotiations have only resulted in higher prices to pay. Under the circumstances, I have to *reluctantly* recommend that the Tender Committee's recommendations be accepted and the tender be discharged."

4.92 In this connection, the Committee came across an important document namely a note from the former Chairman, Railway Board (Who was in position till March, 1992), addressed to the Cabinet Secretary and Finance Secretary giving his detailed assessment and opinion on the whole matter relating to the proposed purchase of AC 3-phase locomotives from M/s. ABB, Switzerland by Indian Railways which is reproduced hereunder:—

Sub: Procurement of AC 3–phase electric locomotives.

It is my considered opinion, which I have also recorded on the concerned file, that while Indian Railways must *repeat* in the shortest possible time acquire and use 6000 high horse power advanced technology electric locomotives, this should only be at an affordable price and we cannot buy technology merely for technology sake. Through a World Bank loan we procured in 1988, 18 Nos. of 6000 high horse power locomotives of an advanced technology (compared to the existing fleet of Indian Railways' electric locomotives being manufactured at Chittaranjan Locomotive Works). These locomotives are much cheaper and the Thyristor technology is capable of retrofit on existing locomotives to upgrade them along with the regenerating aspects which we are looking for. These 18 locomotives have proved their worth in both the hilly terrain in the iron ore circuit between Kirandul and Visakhapatnam, and on the high density flat circuit between Mughalsarai and Ghaziabad. In due course of time, if and when the 3-phase AC technology establishes itself not only in the continent but elsewhere, the technology package would fall into our lap at a much cheaper and affordable price and then we would be in a better position to absorb it. As you perhaps, may be aware, when we speak of speeds much higher than 160 kmph, ie, in the vicinity of 200 to 400 kmph which advanced railways are contemplating (and have), there will then be no alternative *repeat* no alternative but to go in for 3-phase AC traction technology. It would be inescapable at that point of time, we however, are

very very far away from this speed range, because it involves grade separation of all level crossings and complete fencing of the track apart from coach, OHF and track improvements. At this point of time it is not an inescapable need and, therefore, I am unable to accept the price we must pay for the 3 phase technology and have indicated that we should go along with the Thyristor technology and pick up 3-phase AC technology later.

Under the 19 different Plan Heads we allocate anywhere between 35 to 40% on rolling stock acquisition which covers locos, carriages and wagons to a 100% capacity utilisation of our manufacturing units, and some capital spares including costly track machine, spares for diesel and electric locomotives, and for rebuilding locomotives; We are woefully short of locomotives, wagons and coaches which is precisely why we are unable to meet the growing demand of trade and industry to move more coal, cement and fertilizer which today stands at a shortage of 2000 wagons a day implying anything upto 25 to 40 thousand wagons to be to our fleet, Rakes are sometimes held up for upto 72 hours wating for locomotives. These two factors are precisely the reasons why we are unable to improve our turnaround. There are other factors such as dealys at terminals by the users, accidents and derailments, and equipment failure but the single biggest fact is what has been mentioned above. With this scenario we are unable to allocate or find allocation out of our resources for anything upto Rs.1.4-15 crores for one locomotive and if customs duty is added it will be in the neighbourhood of nearly Rs. 28-30 crores against Rs.1.8 to 2 crores per locomotive that we presently manufacture at Chittaranjan Locomotive Works, or perhaps Rs. 6-7 crores from the Thyristor 6000 high horse power locos

Incidentally, the World Bank has been critical of the Indian Railways approach to the manner in which we are procuring the 3-phase AC locomotives and they intend to review the Indian Railways decision when we negotiate our next World Bank loan. An extract of para 8 of their letter dated 5th December, 1991.

Selection of New Design for Electric Locomotives, IR indicated to the mission that they are pursing the purchase of three phase AC electric locomotives. The mission reiterated the Bank concern regarding the adoption of a still largely untested technology with demanding maintenance requirements by IR as an alternative to the successfully tested standard thyristor-controlled electric locomotives, which is included in the envisaged project. With a view to limiting the risk, IR officials indicated that the three-phase locomotives would be first tested before a decision is made to proceed with the transfer of technology for the manufacture of these locomotives in India. Thus, the provision for a transfer of technology for the manufacture of these locomotives in India would be conditional upon the satisfactory testing of the first batch of locomotives. The mission requests IR to confirm this understanding before negotiations and agree to a joint review with the bank of the results, of the testing.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Perspective

5.1 The Indian Railways have registered impressive growth during the last 40 years. The Committee note that passenger kilometers, which in 1950-51 were 66,517 had by 1990-91 grown by a factor of 2,95,644. Similarly tonne kilometers (revenue) had grown from the level of 37,565 by a factor of 5.2 during the same period. Notwithstanding this, growth has not kept pace with the growing demands of the national economy. Consequently, growth of economy has frequently been impaired by the shortage of rail transport. The Railways have, therefore, set a target of almost doubling their lift of passenger and freight traffic as it existed in 1990-91 by the year 2000 AD.

5.2 The Committee, however, note that even as Sixth and Seventh Plan documents recognised the importance of three thrust areas *viz.* track renewals, procurement of rolling stock and electrification of Railway routes involving *inter alia* replacement of overaged assets and modernisation thereof and technological upgradation, the actual performance, particularly during the Sixth Plan period, has been unimpressive. In this context, the Comittee, however, also note that the electrification programme, which upto the Sixth Five Year Plan had progressed at an uneven pace picked up tempo thereafter. Although the electrification programme during Eighth Five Year Plan is still under finalisation, the Committee are informed that currently electrification works are in progress on 4204 kilometers.

Plan Strategy

5.3 The Committee note that alongside electrification of more route kilometres the question of augmenting the present lift of passenger and freight from the existing network at the lowest capital and operative costs has been engaging the attention of Planning Commission as well as the Railways for the last several years. In this context, the latest view of the Planning Commission is that in their search for new technologies to accomplish this task, the Indian Railways do not have to adopt technologies which have been accepted in the developed countries to win back traffic from faster modes of transport and, therefore, aim at achieving higher speeds. The Steering Committee of Planning Commission of Transport have underlined the need for the Railways to endeavour to remain the 'beast of burden' of the national economy, as hitherto, and to eschew all attempts to become its showpiece. They have, therefore, cautioned Indian Railways against the temptation to increase line capacity by raising the booked speed of freight trains from 75 KMPH to 90 KMPH, with corresponding reduction

in the differential between the freight trains and passenger trains which have the booked speed of 100-130 KMPH.

High Horse Power Locos

5.4 The Railways have, however, been making endeavours to upgrade the haulage capacity to electric locomotives. Since the Railways are committed to phasing out steam locomotives and in view of rising costs of fossil fuels, the Railways have been making efforts to augment the supply and modernize the manufacture of electric locomotives in the country. In this context, the Railway Convention Committee (1985). In their Fifth Report had taken note of the project to upgrade existing WAG-5 electric locomotives of 3900 HP to 5000 HP by CLW and other manufacturers of electric locos. A parallel action had been initiated in 1983 to float tenders to acquire 18 prototypes of thyristor 6000 HP locomotives from M/s. Hitachi, Japan and M/s. Asea (now ABB), Sweden. An order to this effect was placed in 1985. These locomotives, received in 1988, have been undergoing trial runs since then on the Waltair-Kirandul Section of the South Eastern Railway. However, in 1987 itself, the Railways floated another global tender for acquisition of 50 nos. of 3-phase AC 6000 HP electric locomotives even before the 18 thyristor converter locomotives were received and given a fair trial. The Committee note that for this project the tenders were invited in three rounds by the Railways. The third round was concluded in March, 1992 and an Advance Letter of Acceptance was issued in favour of M/s. ABB, Switzerland for procuring 30 nos. of 3-phase AC 6000 HP electric locomotives at a total cost of Rs. 621 crores exclusive of the element of customs duty, which at present rate of 87% works out to Rs. 540 crores, besides this the cost of spares and charges for transfer of technology are also excluded from this amount.

Question of Technology

5.5 The Committee note that the quest for high horse power electric locomotives has become a contentious issue within the Railways where opinions about the desirability of one or the other route are sharply divided. While there is a school of thought which favours for 'state of art' technology there is also another line of thinking which has argued for a more cautious approach in the matter. The former have emphasised the advantages which could accrue by going for the 'state of art' technology *i.e.* 3-phase AC 6000 HP electric locomotives and these are, *inter alia* increased line capacity through attainment of higher speed of both passenger and goods traffic and greater power consumption, estimates of which range between 10 to 30 per cent, lesser maintenance and, therefore, greater lift of passengers and freight. On the other hand, the latter have been drawing

attention to high differential in the cost between 3-phase technology and other technologies available/developed in the country and its adverse consequences on investment planning in regard to other vital areas in the Railways, non-compatibility with the available infrastructure in the Railways, particularly the track conditions, and adverse impact on technologies already developed/under trial and the resultant wastage of resources, the setback to indigenous technological developments, and on the R&D capability in regard to electric locomotives. It has also been pointed out that Railways are woefully short of locomotives as a result of which they are unable to meet the growing demand of traffic, which today stands at a shortage of 2000 wagons a day, implying an addition of 25,000 to 40,000 wagons to the existing fleet. The Committee, moreover, note that rakes are held up for sometime more than 72 hours waiting for availability of locomotives. They also note that under these circumstances, a strong case has been made for augmenting the supply of electric locomotives on the basis of technologies which are within an immediately attainable range, instead of waiting for the latest technology to be absorbed, indigenised and brought to production stage which may take anything from 5 to 10 years. In this context, the Committee also take note of the concern expressed by the World Bank regarding adoption of a still largely untested technology as an alternative to successfully tested standard thyristor control electric locomotives. They also find that the Indian Railways have told the World Bank that with a view to limiting the risk, the 3-phase electric locomotives would first be tested before a decision is made to proceed with the transfer of technology for manufacture of these locomotives in India. The Committee further understand that the ultimate decision of the Indian Railways would impinge on the negotiations for the next World Bank loan that the Railways may seek.

5.6 The Committee further note that perception differs also in regard to the cost effectiveness of different technologies. While there is a view that acquiring 3-phase technology today may be cheaper, another view contrary to this is that the modern 3-phase AC technology, though desirable, can be opted for at a later stage when it has established itself in Europe and elsewhere and by which time the whole technology package is expected to become much cheaper and affordable for the country.

5.7 While the Committee appreciate the importance of high horse power technology for the overall economic development of the country as also the health of the Railways, at the same time, they cannot but be guided by a sturdy sense of realism which must underpin all decisions of public import. In order to take a balanced view of the matter, the Committee have examined various issues thrown up by the decision of Railway Ministry to purchase 3-phase AC 6000 HP locos from M/s. ABB Ltd. While doing so, they have considered not only the views of Ministries of Railways, Finance, Heavy Industry and Planning Commission and various individuals

associated therewith, but have also studied various reports, papers, correspondence and internal file notings, as furnished by the concerned Ministries.

5000 HP Locomotives

5.8 The Committee note that at present all the manufacturers of electric locomotives in the country, including Chittaranjan Locomotive Works (CLW), are manufacturing WAG-5 and WAP-5 type electric locomotives of horse power up to 3900 which is based on tap changer technology obtained from SNCF in sixties. The Committee note that efforts of the CLW, in association with Research, Design and Standard Organisation (RDSO), to upgrade these locomotives up to 5000 HP mark have reached a critical stage as one prototype christened by Mother Teresa as 'Shanti Dan', has already been developed and is undergoing field trial. Further, it is expected to be available for bulk manufacture within a couple of years. The Committee, however, note that while the user services in the Railways would welcome a locomotive of 5000 HP which, in any case, is being acknowledged by all concerned to be a better locomotive than the existing 3000 HP and 3900 HP locomotives, the Member (Electrical), GM, RDSO and GM, CLW, more or less, share the view that from a long term point of view, tap changer technology, even after upgradation of 5000 HP mark, would not answer the problem of doubling the lift capacity of the Railways. They have further expressed scepticism about the possibility of upgrading these locomotives to 6000 HP level. The Committee also take note of the statement *made before the Committee by GM, CLW that with the present wagons, rails, etc. optimum utilisation of even 5000 HP locomotives is not possible.*

5.9 The Committee welcome the parallel efforts undertaken by BHEL to develop 5000 HP electric locomotives with thyristor technology which they hope to deliver to Railways by December, 1992. The Committee, however, regret to note that the Railway Board have not bothered to know the details of these efforts on the part of BHEL. They also deprecate the lack of enthusiasm on the part of on the higher echelons in the Railways in regard to efforts within and outside the Railways to develop high horse power locomotives on the basis indigenous know-how which, according to DG, RDSO, though within the realm of possibility, is likely to take some more time. The Committee also note that it is possible to retrofit the existing locomotives with the thyristor technology in order to upgrade and incorporate power regenerative features, which the Railways desire to have from a long term point of view. The Committee are informed that cost of 5000 HP locomotives developed by CLW is likely to be less than Rs. 3 crores. An improved version being developed by BHEL is likely to cost about Rs. 4 crores. During the evidence, the Railway Board representatives and the GM, South Eastern Railways, have conceded that two indigenously produced 5000 HP locomotives of SNCF technology or based on thyristor technology, would adequately meet the requirements of Indian Railways, keeping in view the track condition on most of the sections and impediments

of achieving higher speeds or hauling heavier trains. A classic example is hauling of 4700 tonne trains on Kirandul-Waltair Section by two 6000 HP thyristor locos, replacing three 3900 HP CLW locomotives. Two or three CLW or BHEL made 5000 HP locos would cost the Railways 8 to 15 crores, as against Rs. 90 crores in case of two 3-phase electric locomotives. In this context, the Committee deprecate the fact that Railways have not evaluated the total economics of 5000 HP locomotives vis-a-vis the locomotives already imported or proposed to be imported. In this context, the Committee are not surprised by the fact that CLW are to take longer than expected to deliver a prototype of 5000 HP electric locomotive.

5.10 The Committee were informed that R&D base at RDSO and CLW is not up to the mark. This has been attributed not so much to the absence of scientific and technical man power or even to efforts on the part of RDSO/ CLW as to poor back-up which is there largely in the system. It has been argued by the Railways that the required research efforts call for greater involvement of Universities, National Research Institutions and the Industry, both in public and private sector. They have, however, stated that Railways alone could not make the required investment on R&D.

5.11 The Committee find that RDSO has essentially become an organisation devoted to absorption of technology and not to its development. In this context, the Committee find the statement of DG, RDSO that Railways had found it cheaper to go for imported technology, significant. In such a situation, the Committee cannot fully accept the statement that RDSO plays the role of a brain for the Railways. They are also convinced that much greater attention is required to be paid to RDSO in terms of resources and importance to be given, if this organisation is to serve any real purpose.

5.12 The Committee also wish to underline the importance of greater coordination between the efforts of RDSO and CLW. As a corollary to this, the R&D component of the CLW also requires to be strengthened further.

5.13 In this context, the Committee are constrained to infer from the statements made during evidence that presently no integrated effort has been undertaken by the Railways to involve Universities, Research Institutions and the Industry for a coordinated effort to develop a strong R&D base in the country for manufacture of electric locomotives and other improved typed of rolling stock. This, the Committee feel, is highly desirable in view of the fact that ours is one of the largest railway networks in the world and that the economy of no other country depends on the efficiency of the Railways as much as ours.

5.14 The Committee note that already a period of 9 years (1983-1992) has elapsed since the global tenders for thyristor locos were floated. The trial runs have more or less been completed and BoBo type locomotives from both suppliers i.e., Hitachi, Japan and ABB, Sweden, have been identified as equally appropriate for indigenous manufacture, except for minor

modifications which have since been completed. The Committee find that there is no difference of opinion, between the users and technical experts in regard to operational performance, as well as technical aspects of these locomotives, which, on both these counts, are satisfactory.

5.15 During their examination of this subject the Committee went at length into the suitability of thyristor technology vis-a-vis 3-phase technology. However, taking into account all arguments for and against AC 3-phase type locomotives the Commitee are convinced that at the present juncture and keeping in view comparative costs of thyristor type locomotives which have passed a crucial stage of trial and test is the appropriate answer to the needs of the Railways in the years to come. In this context, the Committee are also mindful of the fact that, in absence of any experience of running 3-phase AC locomotives in Indian conditions, the entire economics of 3-phase technology as projected by the Railways is based on large number of assumptions. The Committee are, however, also of the view that the possibilities of further improving upon this technology to incorporate in it some of the distinct features of 3-phase technology such as regeneration of power should be earnestly explored.

5.16 In this context, the Committee also note that although 3-phase AC locomotives can attain a speed of 200 Kmph for passenger trains and 100 kmph for goods trains, the actual attainable speed under the existing conditions may not exceed the speed of Rajdhani and Shatabdi Express trains which are running with the help of WAG-5 3900 HP locomotives. The Committee also note that the advantages which may accrue from larger number of coaches/wagons with the help of 3-phase AC 6000 HP locomotives at existing speeds have not been fully evaluated against higher financial burden including cost of loan and cost of spares that may be entailed.

5.17 In this context, the Committee fully agree the views of previous Chairman, Railway Board, that in due course of time if and when 3-phase technology establishes itself, not only in the continent but also elsewhere, the technology package would fall into our lap at much cheaper and affordable price and that at that stage Indian Railways should be in a better position to absorb it. In the meanwhile, the Railways should go alongwith the thyristor technology'. CLW's effort to produce 5000 HP locos with the existing technology within the infrastructure available and with perhaps a minimum additional input of money and technology, should also be encouraged. The Committee considers it unfortunate that a balanced view taken by the previous Chairman, Railway Board, in the matter was ignored.

5.18 The Committee, therefore, strongly feel that the Railways should resist the temptation of going for the 'state of art' locomotives of unproven utility, in preference to thyristor technology, which not only is a great improvement over the existing locomotives in use but is well proven and affordable.

5.19 In this context, it has surprised the Committee that contrary to the usual practices and norms, the decision of the Railways to acquire 3-phase AC locomotives was taken in 1987 without consultations with RDSO and CLW and without a demand from the user department i.e. Traffic Department. In fact, the Chairman and Members of the Railway Board were not aware whether or not the decision had the backing of the full Board. During evidence a peculiar fact which emerged was that although Railways have been making repeated assertions that 3-phase AC technology was still in its 'infancy', in 1983, the global tenders which were floated in that year for purchase of 18 prototype thyristor locomotives, had also invited offers for supplying 3-phase AC locomotives, which was not insisted upon. The Committee are, indeed, intrigued by the fact that tenders had ben floated for an 'unproven technology' based on reports in journals, as the Member, Electrical, has stated before the Committee. They are further intrigued by the fact that GM, CLW had in a letter to Chairman, Railway Board in 1986 bemoaned the fact that AC 3-phase technology had been over-looked while going for 18 prototype thyristor locomotives. He had also pointed out that hundreds of 3-phase locomotives were under commercial use at that time in foreign railway. From this the Committee further find that 3-phase technology for which the Railways had floated tenders even in 1983 was neither offered by the foreign suppliers nor seriously considered by the Railways. From this, the Committee gained the conviction that 3-phase technology was at that stage considered to be unsuitable for Indian conditions and therefore not taken seriously. Although the Railways have tried to explain away most of these contradictions, to the eagerness on their part to obtain the 'state of art' technology for reasons unsubstantiated, the Committee remain unconvinced about the maturity of judgement on the part of higher Railway authorities. In this context, the Committee deplore the tendency on the part of Railways to shop for technologies without due seriousness or consideration of its impact on the already precarious railway finances due to which Railways are continuously throwing heavier and heavier burdens on the rail-users in the form of abnormal increases in fares and freight rates. It is deplorable that such decisions are being taken ignoring the demands in other sectors like improved coaches, more wagons, track renewals, railway electrification and passenger amenities, and giving scant attention to the Plan allocations.

High Horse Power AC 3-phase Project

5.20 The Committee note that as a result of delay in placing orders for purchase of 3-phase electric locomotives caused by protracted tendering process, the Railways have incurred a loss of $ 4.619 million upto 15th December, 1991 on account of commitment charges and interest payable to ADB. In fact, the Railways are incurring a liability of $ 4000 per day on account of commitment charges alone. This has not only diminished the over all size of the funds available for actual purchase of 3-phase

locomotives but also acted as the pressure point on the decision making authorities.

5.21 The Committee has gone into the entire tendering process extensively. They find it disconserting that tenders should have been invited on three consecutive occasions, thus postponing a decision which could have been taken long time back. The Committee regret to note that not only the Railways have incurred a definite and significant financial loss, even the question of deciding the appropriate technology for future manufacture of electric locomotives has been hanging in the balance for too long thus affecting the lift capability as well as profitability of Railways. Moreover, this has also the potential of causing emabrrasment and loss of credibility for the country in the eyes of multilateral financial institutions.

5.22 In this context, the Committee note that the Planning Commission intervened in the matter just before the first bid was to be finalised. However, since the Planning Commission ultimately neither differed with its earlier assessment nor went specifically into the question of identifying as to which of the technologies under consideration was appropriate, the Committee find that this last minute intervention was unnecessary and devoid of any rationale. Moreover, unlike the earlier Expert Group constituted in 1985-86 for the purpose, the Expert Group appointed this time was constituted entirely by former and serving Railwaymen. Since the Planning Commission did not associate any of its own experts or experts drawn from other relevant disciplines, in the opinion of the Committee, the views of the latest Expert Group had little additional value in deciding the specific matter under consideration of the Railways. Had the Railways gone ahead with the finalisation of the bid, the contract would have been awarded at a time when financial viability of the new type of locomotives was not being seriously doubted.

5.23 Similarly, tenders, considered during the second bid, were discharged with the implied assumption that in a subsequent bid the price that might be quoted would be lower than this. The Committee however note that actually the prices quoted in the third bid by different parties are marginally higher. This obviously puts a question mark against the wisom of discharging tenders in the second bid when the BHEL had been more or less accepted as the lowest bidder and could have bagged the contract.

Financial Viability

5.24 The Committee are apprised that unit cost of 3-phase AC locomotive, when fully assembled was Rs. 13.2 crores CIF during the first round of bidding (1989). However, as per latest calculation, the unit cost of the same locomotive, after the third bid, will be around Rs. 45 crores which compares too unfavourably with the cost of indigenously built 5000 HP locomotives that is expected to cost less than Rs. 3 crores a piece. In fact between the first bid and second bid many important developments, like general escalation of prices during the Gulf War, devalation of rupee and

partial convertibility of rupee took place which have, together, adversely, affected the comparability of 3-phase AC locomotive vis-a-vis other available locomotives. The Committee are also concerned to note that the deal for purchase of these locomotives, if put through, would ultimately involve expenditure exceeding Rs. 1200 crores, not taking into account other long term financial liabilities, which will arise during the period of transfer of technology and purchase of spare parts. This would, put together bring in serious distortions in the allocation of resources during the Eighth Five Year Plan.

The Committee note with concern the candid admission of Financial Commissioner that Railways had no funds to accept such a huge liability without raising revenues through public issue of bonds (which in any case are not very attractive in the market) or by raising the Railway tarrif. On the other hand, the entire investment planning of Railways during the Eighth Plan would also be seriously jeopardised. From the internal notings of the Railway Board on the subject, as furnished to the Committee, there is no evidence to suggest that these vital issues have been adequately addressed to before going ahead in the matter.

5.25 The Committee further note that while evaluating M/s. ABB as the lowest bidder in the third round some crucial aspects relating to transfer of technology; cost of spares that will have to be imported till the technology is fully indigenised and the additional costs arising as a result of changes in the customs duty and attributable to delay in the delivery of locomotives etc. have remained unresolved even months after the issue of 'Advance Letter of Acceptance'. In fact, the Committee have taken a serious note of the sharp difference of opinion within the Railway Board itself on these issues. They also regret to note that these issues were not fully threshed out before issuing the Advance Letter of Acceptance. They are of the firm opinion that had the Ministry of Railways persisted, the foreign bidder could have been pressurised to accept the conditions as were set in the tender documents issued to various parties and as also insisted upon by the Tender Committee. In their opinion, an Advance Letter of Acceptance which, according to Chairman, Railway Board, is nothing but a 'letter of intent' would not tantamount to a contract in view of substantive issues still remaining wide open and in absence of full and final acceptance by one party or the offer made by the other party.

5.26 In this context, the Committee perceive para-15 of the Advance Letter of Acceptance, which states that "the contract stands concluded with the issue of this Letter of Acceptance" to be of preemptive nature. The Committee further regret the fact that, while finalising the contract, valid and serious objections made by the present Financial Commissioner of Railways as well as two successive Chairman of the Railway Board were over-ruled.

BHEL Bid

5.27 BHEL, after having come close to winning the contract in the second bid, finally lost it in the third round. The Committee find that throughout the process of evaluating different tenders in all the three rounds of bidding, the only issue which has gone against BHEL is the veracity of their claim of being able to achieve 20 per cent domestic value addition on the basis of which they could qualify for 15% price preference and win the contract. On perusal of the reports of the Tender Evaluation Committees and other related papers, the Committee find that the Railways have consistently doubted this claim of BHEL. The Railways have, in their submissions before the Committee, expessed helplessness keeping in view of the conditions incorporated by Asian Development Bank (ADB) in the loan agreement which obliged the Railways to fully convince themselves about the genuineness of BHEL's claim of achieving 20% domestic value addition. However, the Committee find that ADB had, for all practical purposes, placed the entire onus in this regard on the Indian Railways. On their part, ADB have, in the matter, fully relied upon the opinion of the Indian Railways. One of the specific issues, which became a point of deadlock between the Railways and the BHEL, was the former's insistence that the prices quoted in the tender documents should disclose the break-up into the labour costs etc. so that the actual level of domestic value addition could be verified.

The Committee also note that during the third round the Tender Committee of the Railways itself, having been convinced about the genuineness of BHEL's claim of 20% domestic value addition, had recommended treatment of BHEL offer as category-I. This recommendation was overruled by the Railway Board. It is, however, pertinent to note here that negotiations between. BHEL and the Railways during the second bid had essentially broken down due to the reluctance of BHEL to give break-up of their costs as per ADB stipluation and as per the conditions of tender document. During the third bid also BHEL lost the contract on the same issue. Further efforts to reconcile this knotty issue to the inter-ministerial level also resulted in a dead-lock. The Committee feel that in this entire exercise BHEL also have not acquitted themselves well. It would seem that they were prepared to risk the contract rather than share information which Railways were procedurally entitled to receive. In fact the indifference of BHEL in this entire process baffles the Committee.

Role of Finance Ministry and Planning Commission

5.28 Under the present conditions, the Ministry of Railways enjoy a certain degree of autonomy in sanctioning projects, subject to their inclusion in the Railway Plan and the Railway Budget. From the notes submitted by the Railways to the Committee, the correspondence relating to the project between Ministry of Finance and the Railways, as also from the newspaper reports, the Committee had gained an impression that the project, as also the issue of Advance Letter of Acceptance in favour of ABB, Switzerland

had been cleared by the Ministry of Finance. During evidence, however, it became evident that the expression 'clearance' had been misconstrued. The Secretary, Economic Affairs, stoutly disclaimed any responsibility for techno-economic as well as financial viability of the project. In fact, in his evidence before the Committee, he almost laboured on the point that the matter was referred to the Ministry of Finance for resolving a limited issue viz. whether or not Railways in classifying BHEL's offer as category-I bid, had acted within the guidelines issued by the ADB. He also admitted the Ministry of Finance were not competent to judge the viability of the Railways' project of the present kind and that if such a responsibility were to be cast upon that Ministry, it will approach the matter in a different manner. The Committee also note that, notwithstanding, the limited role of Finance Ministry in regard to Railway projects, that Ministry in the meeting convened by the Secretary, Economic Affairs himself on 10 February, 1992 did raise some very serious questions about the financial viability as well as future implementability of the contract. Moreover, the correspondence between the Ministry of Finance and the Railways on the subject shows that the former were not a ware of the development in regard to this project.

Aithough, procedurally, the Secretary, Economic Affairs, has been well within his brief, the Committee find it hard to accept that a project, which affects the entire Railways' Fifth Five Year Plan and therefore, affects, vitally, the entire national, economy, and was within the knowledge of the Ministry should have been viewed by the constodian of nation's economy and financial health with such nonchalance. As it is abvious to the Committee this highlights of holistic functioning of the economy in the Ministry of Finance.

5.29 In this context, the Committee strongly deprecate the view expressed by Financial Commissioner, Railways that, his own serious doubt about the overall viability of the project notwithstanding, he did not think it to a matter important enough to be brought to the notice of Finance Minister which, he admitted, he could have done as per power conferred on him had be recognised the importance of the project.

5.30 In the same context, the Committee are also unhappy at the manner in which the Planning Commission, after having stalled the tendering process during the first bid, should, at the later stage, take the stand that they had neither the competence nor any role to take a view as to the choice of technology being made by the Railways or its financial implications. The Committee are deeply disturbed by the helplessness as well as lack of concern shown by these two very important segments of the Government in watching the interests of the tex-payer. The Committee are of the firm view that this calls for

serious thinking on the part of the Government as to the resonability and effectiveness of existing allocation as well as transaction of business within the Government and grant of autonomy for Railways such matters out-side the purview of PIB.

Recommendations

The Committee make the following recommendations:

1. The existing WAG-5 and WAP-5 locomotives based on SNCF technology as upgraded to 5000 HP mark by CLW and the locomotives of similar horse power based on thyristor technology being developed by BHEL may be expeditiously productionised to meet the short term and medium term requirements of the Railways.

2. In order to achieve the objective of doubling lift of passenger and freight traffic, the thyristor technology already tried and tested under Indian conditions may be indigenised for series manufacture at CLW as well as by other manufacturers including BHEL.

3. Efforts should be stepped up to provide a credible R&D back up to Indian Railways which is one of the largest in the world and for this purpose the role and wherewithal, including orgnisational structure, powers and investments, in regard to RDSO may be reviewed and redefined to enable it to become a dynamic core of R&D effort which should spill outside RDSO into universities, research institutions and the industry at large. Towards the same end the level of interaction between the Railways, RDSO and CLW at the one end and between all these together and industry, both in public and private sector at the other end may be stepped up. Immediate action should be taken by the Railways to provide and improve the infrastructure necessary for the use of high horse power locomotives like strengthening the track, fencing, modernisation of signalling and repair facilities in workshops and locosheds.

4. Notwithstanding the Advance Letter of Acceptance issued to M/s. ABB, Switzerland on 18.3.1992, which itself is under further discussion, the Government may give serious consideration to the views expressed by the Committee as enunciated in paras 5.25 and 5.26 before taking a final decision.

5. The payment of commitment charges totalling to $4 million should not be an inhibitive factor in taking a correct decision in the matter.

24 November, 1992
3 Agrahayana, 1914(S)

M. BAGA REDDY,
Chairman,
Railway Convention Committee.

MINUTES OF THE INTER-MINISTERIAL MEETING CHAIRED BY SECY. (EA) ON 10.2.92 AT 5.00 PM IN COMMITTEE ROOM NO. 131-A, NORTH BLOCK.

By FM's orders dated 7th January, 1992, a Committee of Secretaries comprising of Secy. (Expr.), FC (Rlys.), Secy. (EA) and Secy. (HI) had been constituted to go into the question of Ministry of Railways' decision in the ADB First Railways Project. Secy. (E) had chaired the meeting of this Committee held on 17th January, 1992. At that meeting, it was agreed that as part of the Government examination of the issue, the Secretary, Deptt. of Heavy Industries would discuss with the Railway Ministry to see whether details regarding domestic value addition by BHEL are now available. This was to be done within around one week's time. It was later learnt that no decision had been taken in the meeting held between MOR and Heavy Industries, and that exchange of information had been unsatisfactory, and the issue could not be resolved.

2. On 29th January, 1992, Mr. E.A. Nonis, Deputy Director, Infrastructure Deptt., ADB had met Director (ADB) and JS (FB), and had tried to elicit information about the status of GOI's response to the two telexes sent by Mr. N. Morita of ADB. Accordingly, JS (FB) sent an interim reply by FAX dated 31.1.1992, informing ADB that the issue of BHEL's eligibility of price preference was still under consideration. ADB has, by their telex dated 6.1.92, reiterated their position that the issue of 20% domestic value addition by BHEL in terms of their response to the MOR bid documents had been examined in detail in ADB, and that ADB was satisfied that there are no valid grounds for the Bank to reverse its earlier endorsement of the recommendation of the Project Executing Agency regarding the rejection BHEL's claim of 20% domestic value addition at the time of evaluation of the bid.

3. The over all issues in this project were, therefore, once again discussed in the Inter-Ministerial meeting. The outcome of the discussion was as follows·

(a) Secy. (HI) accepted that the break-up of information as required by MOR could not be supplied by BHEL in the interest of

confidentiality of information, as such information had never earlier been asked or supplied in any World Bank or ADB project by BHEL or any other domestic bidder to any purchaser. Secy. (HI), however, insisted that in the past such break-up of information had never been asked by even MOR and that even in the second round of bidding, with similar information having been supplied by BHEL, both MOR and ADB had accepted BHEL's claim for 20% domestic value addition. FC (Railways) however maintained that Railways did ask for this break-up of information during II round's price negotiations, and BHEL did not supply this information.

(b) Secy. (EA) and other officers of DEA agreed that the requirement of break-up of information, as insisted in this case by MOR, is a slight deviation from the standard tender formats prescribed for international Competitive Bidding under similar World Bank/ADB tenders. However, since MOR did prescribe in tender documents for this break-up to be provided, and since BHEL could not and cannot furnish this information, MOR's stand in rejecting the claim of 20% domestic value addition by BHEL is technically correct under ADB guidelines.

(c) Since ADB has categorically stated that on account of failure of BHEL to provide the information as required under tender documents, and in view of the MOR decision as a purchaser to reject BHEL's claim of 20% domestic value addition, BHEL cannot be considered as a Category I bidder, this interpretation of MOR and ADB, being technically correct, would have to be accepted.

(d) Secretary (EA) accepted that irrespective of the decision in this matter, the issue raised by Department of Heavy Industries as to whether such break-up of information should be asked for by any purchaser in the Government of India under any ICB under any World Bank/ADB project, for the purpose of establishment of 20% domestic value addition, would have to be taken up separately. DEA would pursue this issue separately as requested by Deptt. of H.I. to establish future practice. Other Ministries would be consulted on this subject as also World Bank/ADB to clarify the position for the future.

(e) Apart from the merits of the BHEL case, the merits of the M/s ABB bid were also discussed during discussions. It was pointed out that it

was apparent from Tender Committee's recommendations that th M/s ABB request for placement of three separate contracts for:

(i) Supply of material and equipment
(ii) Transfer of technology

} Contracts to be with M/s ABB, Switzerland.

(iii) Locally executed services for supervisions of assembly, testing and commissioning of locomotives etc.—contract to be with M/s ABB, New Delhi.

was not in accordance with the original tender documents, and ADB guidelines, and that this arrangement would leave interests of IR unprotected, since in the event of a default in this third contract with M/s ABB, India, it would not be legally possible for IR to recover any loss through the bank guarantees against the other two contracts with M/s ABB, Switzerland. It was also pointed out that in terms of the original tender documents and ADB guidelines all disputes in the single contract which should be awarded should be settled by arbiteration according to the rules of Indian Council of Arbiteration as required in the tender documents. Also, it was pointed out that ADB Procurements Rules do not provide for any relaxation from the requirement of contract Performance Bond of 10% of contract value and a Warranty Bank Guarantee of 10% of contract value, which have been offered at only 2% of the contract value against both by M/s ABB. Also, similar deviations from tender conditions regarding bank guarantees also were not permissible under ADB's Procurement Guidelines. It was noted that these infirmities in the ABB bid, should have been taken into account for the purpose of evaluation of ABB bid, and which may have even rendered ABB bid commercially non-responsive, and which apper to have been overlooked by MOR, and not communicated even to the ADB. Secy. (EA) and officers of DEA felt that these deviations from tender conditions in ABB bid were most material, and should have been communicated to ADB. It was clarified that Ministry of Finance could not approve the ABB tender as presently negotiated, without these deviations from the original tender conditions being rectified in accordance with ADB Guidelines. FC (Rly.) however, maintained that these were issues for MOR as the purchaser to look into, and that subsequent clarifications by M/s ABB were sufficient protection against deviations from the ADB Procurement Guidelines' requirements of a single tender. It was pointed out that since such an assurance or undertaking would not be legally enforceable, unless and until there was only a single contract under the tender, in accordance with the tender conditions and Procurement Guidelines, such a deviation was not permissible.

Two alternative courses of action were discussed. Since both PMO and Cabinet Sectt. had referred this case to be commented upon by the DEA and a Note to be sent, DEA (and not MOR) would pursue this matter by sending a Note to (A) PMO, or (B) to the Committee of Secretaries, since Cabinet Sectt. had asked for such a Note. FC (Rlys.), however, stated that this issue cannot be sent to the Committee of Secretaries since MOR are themselves competent to decide such issues, and the Railway Board does not come under the purview of the Committee of Secretaries.

Finally, taking into account the urgency of the matter, (since FC (Rlys.) mentioned that while BHEL bid was valid upto 31.3.1992, ABB bid was valid only upto 15.2.92), it was decided that the appropriate course of action would be obtained FM's orders and to send a Note to PMO through Cabinet Secretary. (Draft Note for submission to PMO/Cabinet Secretary placed below).

Sd./-
(Sudhir Kumar)
Director (ADB)
13.2.1992

ANNEXURE II

GIST OF REPORT OF EXPERT GROUP APPOINTED BY PLANNING COMMISSION IN JANUARY, 1990

Executive Summary in regard to the acquisition of high Horsepower Diesel and Electric Locomotives of Advanced Technologies

THE NEED

001 This note covers a part of item (ii) of the terms of reference contained in the Planning Commission's Notification number T&C/ 7(22)/89 dated January 9, 1990 regarding the proposed acquisition by the Indian Railways of high horsepower B.G., diesel (4,000 hp) and electric (6,000 hp) locomotives.

002 We consider that some initial import of modern high horsepower locos, and the development of expertise and indigenous manufacturing capability in 2-3 years are absolutely necessary to be able to carry the burgeoning traffic in the years 1990-2000. The relevant traffic projections for B.G. are:

GOODS				PASSENGER			
End of Year(s)	NTKM (Billions)		By Electrics	Endol Year(s)	GTKM (P-KM) (Billions)		By Electrics
1989-90	230	increase	43%	1989-90	147.7	increase	36%
1990-95	306	of	58%	1990-95	164	of	44%
1995-2000	406	76.5%	62.5%	1995-2000	192	30%	49%

003 To carry 76.5% more freight and to provide 30% higher capacity for passenger traffic will require major changes in Motive Power, with diesel and electric with the latter mode carrying nearly two-thirds of the freight traffic.

STUDY BY THE GROUP

004 To determine the future pattern of motive power, the Group met the Railway Board, visited RDSO for a 2-day technical presentation on modern high horsepower locos, and studied the operational experience with the 6000 HP WAG6 locos (a forerunner with D.C. traction motors) working on Waltair Kirandul section of S.E. Railway and Allahabad Division of Northern Railway.

Since 4000 hp diesel locomotives are not running on the Indian Railways at present a computer simulation of freight and passenger train operation with this diesel locomotive was undertaken at RDSO.

THE LIMITATIONS

005 The transportation strategy for the future has to take into account the available fixed and physical features of the system the track, permissible axle loads and dynamic forces, track-layouts such as loop lengths and platforms, signalling etc.

006 Considering all these limitations, the Railways have developed freight stock which will give the optimum throughput.

007 The unit train concept, which has already been adopted, consists of 3660 t BOX and 4700 t BOXN wagon formations. These are now moving mainly on the electrified routes of SE, E and N Railways. The unit train concept of 4700 t is expected to be extended to these remaining routes and lengths to be electrified and to some of the non-electrified routes in the next 10 years.

008 The unit trains must run at reasonable speeds even on sections having ruling gradients upto 1 to 200 which constitute about 50.6% of the electrified routes.

009 While the weight of the proposed high horsepower locomotives is to be about the same as that of their predecessors, they should have a substantially higher starting effort to pull the heavier trains on these gradients.

010 Long sections of the electrified routes are working near the saturation level of the sectional capacities. A survey team constituted by the Railway Board found in 1988 that the effective claculated line capacity on Ghaziabad-Sonnagar Section was about the same as the number of trains then being run, viz. 50, each way.

011 Hence the new locomotives should be capable of increasing the sectional line capacities, and this is only possible if the accelerations are substantially higher than those provided by the existing locomotives. This will reduce the running time, increase the average speed and significantly reduce the differential between the speeds of fast passenger carrying trains and goods trains. This calls for a higher tractive effort and higher horse-power within the constraints of the permissible moving dimensions and axle-leads.

THE WAY

012 The Railways' Corporate Plan for 1985—2000 approved by the Government saw these things clearly; reduction in speed differential; point-to-point bulk movement in unit trains; higher horsepower locomotives; modern technologies; increase in average speed of freight trains. All these are essential for higher sectional capacity and throughout.

013 To meet burgeening passenger traffic which will increase by about 30% in the next 10 years, trains upto 26 coaches at speeds upto 160 kmph will have to be run over the trunk & other important routes. High accelerations are essential for achieving higher average speed. Higher tractive efforts and higher horsepower is the only answer for meeting these requirements.

014 It is necessary to examine whether multiple motivepower units per train, of the present diesel and electric locos, could serve the purpose, (Apropes paragraphs 1(i) and 1(ii) of the Planning Commission's notification). The fact is that the modern high horsepower locos have many advantages. These are:

— more energy efficient;

— more weight efficient;

— high power to weight ratio;—more efficient in utilization of stock;—higher availability as they need less time for servicing and maintenance;

— higher reliability in use;

— less severe on track since they exert less dynamic forces; —time-saving for passangers;

— Constituting a smaller fleet requiring less infrastructure and manpower;

— marginal increase in the trailing load due to reduction in the number of locomotives in the train.

In view of these benefits, it is preferable to have high horsepower single locomotive instead of multiple operation.

OVERALL ECONOMICS

015 ADB have calculated the financial rate of return of 13.1% and economic rate of return of 24.4%, assuming increase in output per loco to 520 km per day with the high horsepower instead of 450 km. per day with WAG5. An increase of 70 km per day for the new loco is quite a modest assumption. In a study by this Group, of the performance of two 6000 hp electric locos during a sample period of 20 days (from 8.1.90 to 27.1.90), it was seen that compared to WAG5, the high horsepower electric loco had an average speed

which was 50% higher and a daily kilometrage, which was 40% higher.

016 These considerations would apply *mutatis mutandis* to the proposed 4000hp diesel locomotive in relation to the WDM2.

CAPITAL COSTS OF LOCOS

017 No attemp is made here to make a detailed comparison of costs and economics but a rough comparison could be made. Two WDM2 diesels (each 2600 hp) cost about Rs.3.2 crores, the price of one 4000 high horsepower diesel locomotive being approximately Rs.3.3 crores CIF (customs duty not being counted). After indigenous development the cost, it may reasonably be assumed, would not be more than Rs.3.0 crores per high horsepower diesel locomotive.

018 One WAG5 electric locomotive (3900 hp) costs Rs.1.65 crores at present. The cost of an imported 6000 hp electric will be approx Rs.5.0 crores CIF. It is estimated that the indigenous cost would not be more than Rs.3 crores per locomotive. The cost of technology transfer is not included in the above figures as it should be spread over the large number of locomotives to be manufactured in India, and not the number initially proposed for import. The technology transfer fee for the diesels is Rs.40 crores and for the electrics, Rs.14 crores. Even when these costs and the cost of machinery and plant and other assets required for manufacture are taken into consideration, the proposal for the import of the new technology is economical in the long run.

NEW TECHNOLOGIES

019 Something may now be said about the new technologies offered. More has been said in the main body of the Report.

DIESELS

020 WDM2 (2600 hp) has been the workhorse of the B.G. system of the Indian Railways for over 30 years. Its indigenous manuous manufacture was taken up in DLW in 1963. Apart from the development of fuel-efficient kits, giving an improvement of about 3% in fuel consumption, there has been no significant indigenous development. It is, technologically speaking, an obsolete machine. It is recommended that an indigenous locomotive of a horsepower comparable to the WDM2 and based on the technology desired from the high horsepower locomotive to be imported, should be developed since locomotives of this horsepower would continue to be needed.

021 The following benefits of the 4000 horsepower locomotives have

been estimated by the Indian Railways based on claims by the manufacturers, on similar locomotives which are in operation in other countries:

i. Improvements in fuel-combusion system super-charging, etc. 18% savings in fuel comprising lower specific fuel consumption (9%) and reduction of perasitic load and higher transmission efficiency (9%) corresponding savings per loco per year. Rs.8.70 lacs

ii. Savings in lub oil 50% corresponding savings per loco per year Rs.2.02 lacs

iii. Reduced maintenance. Corresponding savings per loco per year Rs.2.37 lacs

Total savings per loco per year Rs.13.09 lacs

As mentioned earlier much the greater benefit is the increased productivity of the high horsepower locomotives.

ELECTRICS

022 The WAG5, locomotive is an indigenous product and it has served the Indian Railways well. So also the electric locomotive class WAPI for the Rajdhani (15 coaches at 130 kmph) and the WAP3 for Shatabdi (9 coaches at 140 kmph).

However, during the last decade some significant technological developments have completely changed the situation. Thyrister controlled locos came first and the Indian Railways have recently acquired 18 such locomotives rated at 6000 hp and these are already undergoing trials. Service trials on the N. Rly with 4700t BOXN loads have established that on the Mughalsarai - Ghaziabad section a single 6000 hp electric achieves an average speed of 60 kmph, compared to 40 kmph with the WAG5. Computer simulations have confirmed these results. It is basically, the high rate of acceleration which gives the superior performance, since the tractive force upto 50 kmph of WAG6 is about 45t as against 24t of WAG5.

Next came the successful application of asynchronous A.C. motors in place of DC series motors which increased the power output of locomotives from 37.5 KW/tonne to 50KW/tonne. This was made possible by Variable Voltage Variable Frequency (VVVF) drive, perfected through pulse-width modulation techniques.

Other significant features of the operation and technology of the proposed 6000 hp electric locomotives are:

i. Thyristor control with Gate Off (GTO).

ii. Microprocessor based fault diagnostic and indication system.

iii. Regenerative braking system resulting in energy savings.

iv. Increase in starting adhension (upto 40% of the weight) due to sensitive control of initial movement of the wheel, arresting it at the instant when the friction is maximum.

v. Attaining a power factor which is almost unity.

vi. Reduced maintenance, increased availability, and higher reliability.

vii. Reduced interference with signalling and telecommunication circuits.

The ultimate test of any new technology apart from its performance, is savings in working expenses. The saving due to higher productivity has already been mentioned. The saving in energy along will amount to about Rs.24 lacs per loco per year. This is based on actual performance of 6000 hp electric locomotives available on the Indian Railways, and confirmed by simulation in a computer study undertaken by RDSO. The simulation for the proposed 6000 hp electric locomotive with asynchronous motor indicates a yearly saving in energy cost of about Rs.37 lacs per loco.

RECOMMENDATIONS

023 The Expert Group is of the view that the need for introducing the high horsepower diesel and electric locomotives incorporating state-of-the-art technologies is established beyond doubt on technological, operational and economic considerations. However, the Expert Group recommends that the number of fully assembled locomotives to be imported be limited to ten passenger and ten goods locos of each type (diesel and electric). The Group believes that indigenous development is, and should be made, possible in 2 to 3 years from the time these locomotives are received.

AN EXTRACT OF CONTRACT BETWEEN NATIONAL THERMAL POWER CORPORATION LIMITED AND BHARAT HEAVY ELECTRICALS LIMITED ON TURBINE GENERATOR PACKAGE FOR

The price for Supply Portion of Contract is inclusive of all taxes and duties such as sales tax, octroi, excise duties and all other taxes/duties/ levies payable by you on all the transactions between you and your suppliers/vendors on the purchase of raw-materials, components sub-assemblies and other bought out items. In addition to the above, any custom duties & levies which may be payable by you for any imports made for this Contract, NTPC will not bear any liability whatsoever. With regard to the transactions between you and us, we shall pay sales tax on the ex-works price of the equipment and spares and octroi charges as applicable under the law and shall issue the requisite sales tax declaration forms in order to get the benefit of any concession in the rate of sales tax. Further, in respect of the bought out items that may be consigned directely from your subvendors works to our project site, you shall effect sale in transit as per the provision of the sales tax law and in all such cases no central sales tax shall be payable by us although we will furnish the relevant declarations forms.....

Summary of Price Proposal for Indian Bidders

Bidder's Name & Address
BHEL — INDIA

To
Corporate Contract Services,
National Thermal Power
Corporation Ltd.
New Delhi-110019

Dear Sirs,

We are an Indian Bidder and declare that in terms of clause 18.3 Section INB Vol. 1 of Bid documents, the following are our lumpsum Price in Indian Rupees for the entire scope of works as specified in the specifications documents. Further, in terms of aforesaid clause, we have indicated details of expected expenditure in currencies other than Indian Rupees which are already included in the lumpsum price:

A. Lumpsum Price : Indian Rupees *473,000,000,00*
(In figures)

(Indian Rupees Four Hundred and Seventy Three Million only)
in words)

B. Details of expected expenditure in currencies other than Indian Rupees (included in 'A' above)

Sl. No.	Name of Currency	Amount in Figures	% of Bid Price	Exchange Rate used	Details of Equipment under the currency
1.	DEUSTCH MARK	40,380,000.00	35	IDM=Rs.4.1	Various Turbine, Generator and condenser components.

Date : 18.6. 1985 Signd. —
Place : New Delhi

DETAILED PROGRAMME AND PROGRESS OF ELECTRIFICATION ON THE INDIAN RAILWAYS

1. *Policy of Electrification of Railway Lines*

Electrification has been indentified as a priority area in the context of energy conservation and reducing dependence of Railways on Petroleum based energy. Electrification of railway tracks on Indian Railways is a continuous process. Electrification projects are undertaken on techno-economic merit and operational requirements on a section to section basis. As electrification projects are capital intensive, only high traffic density B.G. routes qualify for electrification within the prescribed guidelines.

2. *Process of Electrification*

Electric traction on Indian Railways was first introduced in 1925 when a 16 km section of Central Railway (then GIP Railway) from Bombay V.T. to Kurla (*Via* Harbour Branch) was electrified at 1500 V.D.C. This was extended to thane-Kalyan-Pune and Igatpuri. This was followed by electrification of Churchgate-Andheri-Borivilli section of Western Railway then BB&CI Railway) later extended upto Virar. In the Madras area, electric traction was introduced in 1929 on Madras Beach-Tamoram Metre Gauge section of Southern Railway (then South Indian Railway) By 1936 about 388 route km has been electrified. These were mainly suburban sections. However, on the Kalyan-Pune and Kalyan-Igatpuri main lines of Central Railway, introduction of electrification was found necessary because of the heavy gradients existing in the Ghat section.

The electrification of Howrah-Burdwan suburban section of Calcutta on the Eastern Railway at 3000 V. D.C. was taken up during the First Five Year Plan (1951—56) and completed in 1958.

In 1959, based on the experience gained by French Railways (SNCF), a decision was taken to adopt 25 KV. a.c. 50 Hz single phase system as the standard for future electrification schemes on the Indian Railways.

The suburban sections, Howrah-Burdwan; Madras (Beach)-Tambaram were subsequently converted KV AC standard system of electrification.

Since then electrification progressed steadily. In the decade 1960-70, about 320 route km per annum were electrified. Owing to paucity of funds, electrification slowed down a bit to about 200 route km per annum in the decade 1970-80. It picked up during the period 1980-81 to 1984-85, working out to about 300 route km per annum. This was further stepped

up to energisation to a record of 2812 km during the Seventh Five Year Plan 1985-90 i.e. 600 route km per annum.

3. *Pace of Electrification*

Owing to the inherent advantages of electric traction over other modes compounded with the rise in prices of oil required for diesel traction, electric traction has been extended to the busy main line sections to cater for the requirements of growing industrial infrastructure. The progress of electrification on Indian Railways in various Plan periods has been as under:

Plan Period	*RKMs energised*
Prior to 1956	529
Second Five Year Plan (1956-61)	216
Third Five Year Plan (1961-66)	1,678
Inter Plan (3 years) period (1966-69)	814
Fourth Five year Plan (1969-74)	953
Fifth Plan (4 years) Period (1974-78)	533
Rolling Plan (2 years) period (1978-80)	195
Sixth Five Year Plan (1980-85)	1,522
Seventh Five Year Plan (1985-90)	2,812
Annual Plan (1990-92)	1,557
Total	10,809

As on 1.4.1992, Indian Railways have an electrified network of 10809 Route Kms. representing 17.3% of the total Route Kms. of all gauges and 30.51% of the Broad Gauge network.

4. *Railway's Electrification Programme during the VIII Plan.*

Railway's Programme for electrification during the VIII Five year Plan and beyond has been is under finalisation with the Planning Commission. Electrification works are currently in progress on 4242 route Kms.

(i) Details of electrification works at present in progress are given below:

	Section	*Total KM*
1.	Sabarmati-Gandhinagar included as a material modification	28
2.	Bina-Katni	263
3.	Katni-Bilaspur and Anuppur-Bishrampur/Chirimiri.	502
4.	Kazipet-Sanatnagar	68
5.	Sitarampur-Jhajha	154
6.	Sonnagar-Ratratu	291
7.	Gumia-Patratu	72
8.	Delhi-Ambala-Ludhiana	314

	Section	*Total KM*
9.	Bokaro Steel City-Muri Hatia-Bondamunda-Barsuan and Bimlagarh/Kiriburn	398
10.	Ambala-Moradabad	274
11.	Vijayawada-Visakhapatnam including Samalkot-Kakinada Port	366
12.	Erode-Palghat-Ernakulam including Cochin Harbour terminus	324
13.	Renigunta-Guntakal-Hospet and Tornagallu-Ranjitpura Branch line	448
14.	Chandil-Muri-Barkakana	119
15.	Jamadoba-Mohuca	22
16.	Jhajha-Mughal sarai including Rampur Durma Garhare/Barauni	448
17.	Bandel-katwa	105
18.	Branch line	
	(a) Manikgarh-Chandur	29
	(b) Mottumari-Jagyapet	31
	(c) Dornakal-Sigerani	26
		4242

The pace of electrification is being speeded up. It is planned to electrify 3500 route kms during the 8th Five Year Plan out of 4242 RKms on which works are in progress at present against electrification of 2812 route kms achieved in 7th Plan and 1522 RKms in the 6th Plan and 1557 route kms and during the Inter Plan 1990—92.