PUBLIC ACCOUNTS COMMITTEE

FIFTHREPORT

THIRTEENTHLOKSABHA

DESIGN AND DEVELOPMENT OF MAIN BATTLE

TANK - ARJUN

MINISTRY OF DEFENCE

(DEPARTMENTS OF DEFENCE RESEARCH & DEVELOPMENT ORGANISATION AND DEFENCE PRODUCTION & SUPPLIES)

PRESENTED TO LOK SABHA ON:27.04.2000

LAID IN RAJYA SABHA ON : 27.04.2000

L O KS A B H AS E C R E T A R I A T

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April,2000/Vaisakha,1922

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*Ceased to be Member of the Committee on completion of his tenure in Rajya Sabha w.e.f. 27 January, 2000.
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INTRODUCTION

I, the Chairman, Public Accounts Committee having been authorised by the Committee to present the Report on their behalf, do present this Fifth Report on Paragraphs 26 & 29 of the report of the Comptroller and Auditor General of India for the year ended 31 March, 1997 (No.7 of 1998), Union Government (Defence Services) Army & Ordnance Factories relating to(i) Design and development of main battle tank – Arjun; and (ii) Abnormal delay in repair/overhaul of tanks

2.The Report of the C&AG for the year ended 31 March 1997 (No.7 of 1998), Union Government (Defence Services – Army & Ordnance Factories) was laid on the Table of the House on 9 June, 1998.

3.The Committee took evidence of the representatives of the Ministry of Defence (Departments of Defence, Defence Production & Supplies, Defence Research & Development Organisation and the Army) on the subject at their sittings held on 9 March, 1999.The Committee considered and finalised this Report at their sitting held on 20 April, 2000.Minutes of the sitting form Part II* of the Report.

4.For facility of reference and convenience, the observations and recommendations of the Committee have been printed in thick type in the body of the Report and have also been reproduced in a consolidated form in Appendix* to the Report.

5.The Committee place on record their appreciation of the commendable work done by the Public Accounts

Committee, 1998-99 for recording oral evidence of the representatives of the Ministry of Defence (Departments of Defence, Defence Production & Supplies, Defence Research & Development Organisation and the Army)and in obtaining informationfor this Report.

6.The Committee would like to express their thanks to the Officers of the Ministry of Defence (Departments of Defence, Defence Production & Supplies,Defence Research & Development Organisation and the Army) for cooperation extended by them in furnishing information and tendering evidence before the Committee.

7.The Committee place on record their appreciation of the assistance rendered to them in the matter by the Office of the Comptroller and Auditor General of India.

NEW DELHI;NARAYANDATTTIWARI,
*24 April, 2000*Chairman,
*4 Vaisakha, 1922(Saka)*Public Accounts Committee

REP O R T

Introductory

The Main Battle Tank(MBT) occupies a pivotal role in the present day battle field on account of its ability to provide accurate fire power with cross country mobility, reasonable protection from conventional and nuclear threats and flexible response to changing battle situations.With a view to eliminating dependence on foreign countries for design and manufacture of Armoured FightingVehicles (AFV) and to place the country on par with super powers with regard to quality of tanks and also to eliminate completely the requirement of foreign exchange (FE)in the production of tanks, the Government in May 1974 sanctioned a project for design and development of MBT-Arjun by Defence Research and Development Organisation (DRDO) at a total cost of Rs. 15.50 crore involving a foreign exchange component of Rs. 3.70 crore.The tanks were to be in service during 1985-2000 AD and were in replacement of existing tanks which were expected to be outdated beyond 1985.

Earlier Report of PAC

2.The progress made towards the design and development of MBT was examined by the Public Accounts Committee (1988-89) and their findings reported in 168th Report (Eighth Lok Sabha) was presented to Parliament on 28 April 1989.The action taken by Government on the recommendations contained in the Report was reviewed by the Committee (1991-92)in their 26th Report which was presented to Parliament on 30 April 1992.

Audit Paragraph

3.The present Report is based on Paragraphs 26 and 29 of the Report of the C&AG of India for the year ended 31 March 1997, No.7 of 1998, (Union Government, Defence Services) Army and Ordnance Factories relating to: (i) Design and Developemt of Main Battle Tank – Arjun and (ii) Abnormal delay in repair/overhaul of tanks.Paragraph 26 seeks a review of the development of the MBT project with reference to the production of prototypes, pre-production series, user assisted technical trials, user trials and action taken for limited series production during the period March 1997 to July 1997. Paragraph 29 deals with two cases where abnormal delay was noticed by the Audit in repair/overhaul of Vijayanta tanks/BMPs valued at Rs. 391 crore.The Audit Paragraphs have been reproduced as Appendix I.The various aspects arising out of the examination of the Audit Paragraphs and the representatives of the Ministry of Defence (MoD) by the Committee are dealt with in the succeeding paragraphs.

I.Design and development of MBT-Arjun

Scope of the project

4.Based on a General Staff Qualitative Requirement (GSQR) prepared by the Army in August 1972, the project Arjun was sanctioned by Government in May 1974 for design and development of MBT. According to Audit,

GSQR underwent several changes after mutual discussion between Army Headquarters (Hqrs.) and DRDO and the last major revision took place in November 1985.The project envisaged manufacture of 12 prototypes.The prototype plans and availability of sub-systems were reviewed in August 1984 and in order to try out individually the various components and sub-systems, to have them integrated with the major system and to evaluate their performance before finalising the design, the number ofprototypes were increased to 19.In addition, 23 pre-production series (PPS) tanks were to be manufactured and thereafter bulk production was to commence.

Delay indevelopment of Prototypes and pre-production series tanks

4.It is seen from the Audit Paragraph that as per time frame fixed in May 1974, four mild steel prototypes were to be offered for trials by April 1980 and eight armoured prototypes by April 1982.Trickle production was due to commence by April 1983and bulk production by April 1984.This schedule was revised from time to time. As per commitment made in May 1987,12 MK-I prototypes based on imported propulsion units, seven MK-II prototypes with indigenous propulsion units were to be delivered by June 1987 and June 1990 respectively, 23 MK-I PPS tanks by December 1988 and bulk productionwas to commence from 1990 onwards. However, the Audit had observed that even the revised time frame could not be adhered to.

5.The Committee enquired about the actual production of prototypesand pre-production series tanks including the reasons for production of only one MK-II prototypes and shortfall in PPS tanks.The Committee have been informed that 12 MK-I prototypes were built by January 1989 and 15 MK-I PPS tanks were produced by end of 1996. One MK-II proto-type featuring indigenous transmission was also got ready for technical levaluation during this period. According to the Ministry,the building of balance MK-II proto-types had to be abandoned both due to incomplete development of indigenous air cooled engine and for the reasons of Users preference for water cooled1400HP power pack.The shortfall in production of pre-production series tanks was stated to be due to the usage of major systems such as power pack,Gun Controland Fire Control hardwares as spares during exhaustive User evaluation of 15 pre-production tanks.

Evaluation of prototypes and pre-production series of MBT

6.According to Audit, the MBT was scheduled to undergo user assisted technical trials, and troops trials there after.On examination of two prototypes between November 1986 and February 1987, the User's evaluation team pointed out various deficiencies.These were then examined by five task forces constituted for optimising the prototypes built and finally two prototypes were made available for User'sautomotive evaluation till July 1989.The automotive system evaluation of two prototypes carried out till July 1989 by the Army revealed major deficiencies such as overheating of engine, excess weight, very low mission reliability etc.The Audit have pointed out that in the Steering Committee Meeting held on 26 July 1989, when the matter relating to the commencement of production of pre-production tanks came up, the Army emphasised that "since not a single fully integrated tank had as yet been evaluated by the User, they cannot recommend placement of orders forPPS tanks".However, according to Audit, within a week (31 July1989) it was decided by the Ministry to place orders for six PPS tanks (two each on Heavy Vehicle Factory and two Public Sector Undertakings).

7.It is further seen from the Audit Paragraph that two fully integrated prototypes were made available to the User in March 1990 and these were subjected to automotive and weapon trials.During the trials, a number of deficiencies had come to light, some were quite major. The Army, therefore, indicated in the Steering Committee Meeting held on 24 August 1990 that the major problems in areas like bogie wheels, suspension units, ammunition, fuel starvation etc. needed to be sorted out before PPS were taken up for manufacture. The Combat Vehicles Research & Development Establishment (CVRDE) then reportedly assured the Steering Committee that since orders for PPS had already been placed, all the deficiencies pointed out by the User would be resolved and modifications in corporated in the six PPS tanks ordered.

9.It is further pointed out by Audit that two PPS tanks were demonstrated in February 1993.The results of the demonstration which includedgunnery and automotive capabilities were stated to be satisfactory. Thereafter,

between June 1993 and July 1996, 14PPS tanks were handed over to a Field Regiment for trials.These PPS tankswere thereafter subjected to extensive User and troop trials in the desert/semi desert terrain, plains and river ineterrain. According to Audit,the trials carried out subsequent to June 1993revealed major deficiencies and failed to meet the requirement projected in the GSQR.The weapon system's performance was also well below the acceptable level and the mission reliability of the tank was alarmingly low and the tank was accordingly not acceptable to the User.Thereafter, in May 1994 the Chief of the Army Staff (COAS) spelt out the minimum `Bottom Line' parameters acceptable for the MBT. Following the summer 1994 trials, Army HQ. in consultation with DRDO laid down ten imperatives for acceptance of MBT, which were as follows:

- Improved accuracy of the gun at battle ranges;
- Establish accuracy in the dynamic mode to acceptable levels;
- Enhancement of overall mission reliability;
- Fielding of Nuclear, Biological, Chemical (NBC) and Medium Fording Capability;
- Containerisation of ammunition bin with blow-off panel,(new requirement added for the first time in 1994);
- ergonomics needs substantial attention;
- cruising range to be enhanced;
- firing in the rear arc at zero degree is a must;
- provision of an emergency power traverse and Auxiliary Power Unit(APU) ; and
- an all electric power traverse to obviate the problem of leaks that occur in the present system in our environmental conditions (new requirement added in 1994).

10.It is learnt from Audit Paragraph that the bottom line parameters, according to Army, represented a dilution of GSQR to a point below which no parameters could be allowed to fall and were considered to be of an interim nature based on a firm belief that the final product would meet the GSQR in full.

11.According to Audit, the 14 PPS tanks with modifications/improvements were again subjected to User trials during 1995 and 1996.The User trials carried out by the Army in 1996 established that except in a few areas, the performance of the PPS tanks fell far short of even the ten bottom line imperatives. Major deficiencies pointed out by the Army were:

-the accuracy level of the main gun in all modes of firing at different battle ranges was far below the levels laid down in GSQR,

-the lethality of ammunition was neither specified nor demonstrated,

-overheating of engines in desert conditions,

-mission reliability was far below the bottom line requirement,

-firing over engine deck with zero degree elevation could not be achieved,

-arrangement for emergency traverse was not satisfactory.

12.According to the Audit Paragraph, the summer trials carried out in April 1997on PPS-15, reference tank for bulk production indicated that though there was improvement over the previous years, it was still below the acceptable standards.The major deficiencies pointed out in the summer trials of 1996 i.e. accuracy of gun at battleranges, mission reliability, lethality of ammunition bin, emergency traverse etc. continued to persist.The Army reportedly indicated in July 1997 that in its present form, the overall reliability of MBT Arjun was far from satisfactory.

13.The Committee enquired as to why Army was not satisfied with the tank developed by DRDO even after carrying out modifications.Asked further, whether it was due to failure of DRDO to develop the tank as per GSQR or arising out of changes suggested by Army over and above the projections in the GSQR, the Ministry in a note stated:

"The MBT Arjun as brought out by DRDO is as per the last GSQR issued in 1985 .It must be appreciated that in a product of MBT Arjun's complexity, inspite of best efforts for a good design in each of the sub system, field

tests brought out the need for improvement in certain areas; while validating the general design feature.Each of the problem noticeddemanded a unique engineering solution and it did take time to design, manufacture and retest with improved hardwares.It is not fair to state therefore that Army was not satisfied with the tank developed by DRDO.They had a set of observations at the end of each trial that indeed got discussed in the Arjun Executive Board for necessary further action/direction for compliance."

Fire Control System

14.According to Audit, the MBT was designed around an imported Fire Control System (FCS).The firing results of the User trials carried out upto summer 1997 indicated that firing accuracy was erratic and unpredictable.The Army were of the view that the design was no longer responsive to any technical inputs and its performance was at its saturation level.The DRDO reportedly stated in November 1997 that by 1995 they had removed the causes for erratic firing accuracy and taken measures to control and improve it.However, according to Audit, the Army even in the joint approach meeting held from 20 October 1997 to 13 November 1997 reiterated their earlier stand that the imported FCS had reached its development limit.

15.The Committee enquired when was the FCS selected and what was the vintage of FCS used.The Committee also desired to know about its possible obsolescence and shortcomings with reference to the contemporary FCS available in the world.The Ministry in a note stated that though the design of hardwares dates back to 1988, the system employs state of the art digital signal processors,and60 element 4 : 1 interlace Thermalimager of very high quality standard.In its feature and performance, it compares favourably with state of the art FCS currently available with World class Tanks.According to the Ministry, the question of its having become obsolete therefore did not arise.

16.The Committee desired to know whether the FCS supplied had undergone any evaluation/performance trial before their acceptance and the erraticunpredictable firing accuracy noticed at the time of trial as well.The Ministry in a note stated;

"The FCS hardwares supplied as two prototype units were laboratory tested and field evaluated before their acceptance. Apart from the imported hardwares, the FCS featured ballistic computer and a variety of sensors that were obtained from other sources.During the integration process and the field evaluation thereof at times variations in performance got noticed.These cannot be attributed to FCS hardwares exclusively.Necessary corrective measures, based on a scientific assessment have already been incorporated to obtain consistent performance."

17.The Committee enquired whether DRDO expect FCS to perform on a par with a state of the art modern battle tank particularly when the Army had taken a stand that imported FCS had reached its development limit.The Ministry in a note furnished to the Committee clarified the position as follows:

"In DRDO's assessment, the FCS as incorporated in MBT- Arjun performs at par with contemporary world class MBTs.This is authenticated by the fact that we have consistently obtained the desired first round hit probability from a static tank on a static target even under harsh environmental conditions of Indian deserts and performance better than that stipulated in GSQR under dynamic modes of firing."

18.On being asked what plans are being contemplated for indigenous production of FCS, the Ministry stated that the initial production of certain tanks will feature imported hardwares.However, according to them, indigenous hardwares that are presently undergoing lab cum field evaluation on certification, will be progressively inducted.

Powerpack/Transmission system and Gun control system

19.According to the Audit Paragraph, as the indigenous efforts to develop a suitable engine and transmission system for the MBTwere be setwith problems, 42 power packs with transmission units were imported between November 1983and 1988 from Germany for use on the prototypes and PPS tanks.However, as the imported transmission system was designed to cater upto 60 tonne load as against all-up weight of 61.5 tonne for the

MBT, a mismatch had arisen between engine and transmission which had resulted in bulging of sidewalls of the hull.As a consequence, six transmission units failed before the stipulated life of 6000 Kms.Frequent overheating of transmission oil, noticed during User trials, clearly indicated that the transmission was working outside its design parameters. The DRDO intimated Audit in November 1997 that the weight will not be allowed to go beyond 60 tonne and that the failures of transmission units were traced as failure of externally mounted brazed tubes for pressure sensing and the same had since been corrected.The Army, however, reportedly pointed out in November 1997 that the transmission was working at its optimum peak when the weight of MBT Arjun was 58.5 tonne.

20.On being asked as to how apower pack for 60 tonne was selected for a 61.50 tank, the Ministry in a note stated:

"The power pack deliversa range of torque necessary to prope lthe 60 tonnes tank over the terrains envisaged.Since the all up weight of MBT Arjun is only 58.5 tonnes, under 60 tonnes, fully kited up, the performance cannot be contested.The all up weight of 61.5 tonnes is a projection of one of the User's requirement, when the tank if it gets fitted with mine trawl of vintage design weighing 3 tonnes.By its very nature the demining operation is carried out at a very slow speed, the requisite torque for which can be delivered by the transmission.This comparison is true of all tanks world over.This explains our selection."

21.To a specific query from theCommittee, when and how the power pack is designed to be indigenised, the Ministry stated that the manufacturing infrastructurefor power pack now exists with Ordnance Factories at Avadi and Bharat Earth Movers Limited(BEML), Mysore and Kolar plants.According to them, if the volumes justify, licence manufacture of power pack is contemplatedin these plants.

22.TheCommittee enquired about the problems associated with Gun Control System and steps taken to tackle them.The Ministry in a note stated;

"The MBT Arjun presently fields Electro hydraulic Gun Control System , that has performed as per requirements.The same system is planned to be fielded in the production tanks.The Users have expressed their new requirement (not stated in GSQR) to have an All Electric Drive Control System developed through a separate project as a possible replacement for the Electro-hydraulic system at a later date.This will be pursued as a development project."

Joint Action Plan for Production of MBT

23.During the course of evaluation of MBT Arjun from June 1993 to July 1997, Users had brought out various functionaland ergonomicrelatedobservations/ recommendations.DRDO had reportedly taken action to implement most of them during the manufacture of last batch of PPS tanks.(PPSX to XV).On conclusion of summer trials during 1997, all the outstanding user observations/recommendations were compiled with and discussed between Army and DRDO.As a result of this discussion, a time bound Joint Action Plan (JAP)for implementation of various observations/recommendations was evolved in November 1997.According to the Ministry, the contentious issues like accuracy at battle ranges, quality of fire control system etc.too got deliberated upon and explained to the Users as to how their requirements have been met substantially.These were illustrated through the ten imperatives laid down by COAS to be met for productionisation vis-à-vis the present status. Eight out of ten imperatives are stated to have been met so far.Out of the remaining two imperatives, `Accuracy at battle ranges'has been substantially achieved and is stated to be acceptable to User.As regards ` All electric Power Traverse', it is stated to be a new requirement and not linked with immediate production.This has to be pursued as a separate Project.

Limited Series Production

24.TheAudit Paragraph has brought out that sinceArmy was not satisfied with the performance and maintain ability of pre-productionSeries1 to 14, it was mutually decided between Army and DRDO in March 1996 that no design freeze would be made before commencement of production till a fully integrated PPS 15was made

available and successfully evaluated by the Army. The Ministry of Defence (Department of Defence Production & Supplies) sanctioned in August 1996 the manufacture of15 numbers of LSP tanks by Ordnance Factory Board using PPS-15 as reference tank after its successful evaluation by Army at an estimated cost of Rs. 162 crore.The Audit have pointed out that the sanction of Rs. 162 crore for the LSP was accorded without obtaining CCPA approval. However, subsequently in the Steering Committee meeting held on 27 August 1996 it was decided to commence limited series production work using PPS-12 as reference tank in place of PPS-15. The Committee thereforedesired to know the underlying reasons which promptedthe Department of Defence Production and Supplies to go ahead with LSPin the absence of due approval from CCPA.The Ministry in a note explained:

"CCPApaper seeking approvalfor production of 124 tanks had been initiated by the Department of Defence in 1995-96 based on the performance of PPS tanks.Pending CCPAapproval, a decisionwas taken in the 27th Steering Committee Meeting held on 10th April, 1996 to go ahead with the production of a limited number of 15 tanks, as the first batch of 124 tanks,in order to maintain continuity.

This parallel action was taken to overcome the long lead time required for the planning for bulk production, technology transfer by way of production drawings and documents, floating of enquiries for procurement, training of manpower etc. .

As the Government approval for induction of 124 tanks has now been accorded, all the committed expenditure so far for limited Series Production (LSP) tanks will now be transferred to the sanction for 124 tanks, as 15 LSP tanks is the part of 124 nos."

25.When PPS 1 to 14 was not found satisfactory as per performance and maintenance parameters by the Army, the Committee enquired on what basis the Steering Committeehad selected PPS-12 as reference tank before commencement of limited series production.The Ministry in a note stated that in a Steering Committee meeting held in August, 1996, it was suggested by DRDO that pending physical showing of PPS-15, PPS-12that had undergone evaluation might be taken as a reference tank for limited series production tanks, features to be additionally provided in PPS-15 could be added on after certification.This suggestion was made as there was no change in the major systems between PPS-12 and PPS-15.According to the Ministry, the Users later sent a note insisting that PPS-15 only be the reference tank for manufacture and this was accepted..

26.On being-enquired further as to when a fully integrated PPS-15 was evaluated by Army, the Ministry stated that PPS-15 with all additional features was evaluated by the Army during 1997 and the same has now become the reference tank for manufacture.

27.Asked whether it was a correct practice to go ahead with LSP even before reference tank meeting the bottom-line parameters, the Ministry in a note explained that it is quite usual in a major engineering Project like MBT Arjun that User's relevant observations are resolved in the course of stabilised production or upgrades. The DRDO agreed to incorporate the User's observations and suggestions as per the time bound Joint Action Plan.According to the Ministry, the PPS-15had been cleared by the users as the reference tank through the process of implementing Joint Action Plan points.The Committee have been informed that Army Headquarter has given clearance for manufacture of LSP tanks as per JAP in January1998.

28.According to the Ministry, a substantial number of modifications/improvements incorporated under the JAP have already been seen and cleared by the Users.The MBT Arjun has been brought ready for production.The Cabinet Committee on security (CCS) has accorded sanction on 16 February 1999 for the production of two regiments of MBT Arjun over the next 5 to 6 years.

29. Regarding commencement of production, Secretary DP&S deposed during evidence taken on 9 March, 1999:

"Preliminary steps for starting the production have been initiated by the Ordnance Factory Board and we are trying to see that the schedules of production that have been worked out are adhered to after completing the

formalities."

30.He further added :

"With regard to Arjun Tank, we have to acquire from abroad two-three major systems like the gun control system, the fire control system, power-pack and transmission system etc. Now after the Cabinet approved it, the technical negotiating Committees have been set up with representatives from the Ordnance Factories who really do the production. Since they are the production agencies, they have started negotiations with the concerned parties and in the negotiating committees, different interests are represented like the Army, DRDO and others.… … once these negotiation are completed, which is expected to be completed in the next about six months, it will take about 24 months or so for the first tanks to come out."

31.The Committee desiredto know by what time, it is planned to equip the regiment with the tank. According to the Ministry the first regiment is expected to be equippedwith this tank from 2002 and two regiments are planned to be equipped by 2007 i.e. around end of 10^{th} Plan.

32.Asked about the likely cost of MBT, the Ministry intimated that the estimated cost of MBT – Arjun in production is Rs. 14 crores and this compares favourably with Western MBTs costing in the range 16 to 22 crores.

33.Keeping in view the fact that two out of ten imperatives were yet to be fulfilled by DRDO, the Committee during evidence specifically desired to know from the User's representatives whether they are fully satisfied with the tanks which are now going to be produced and handed over to them as per sanction accorded by CCS.In response, the representative of the User Service inter-aliastated:

"The Army's concurrence to production of tanks was conditional, the DRDO is being able to achieve what we jointly agreed and called `Joint Action Plan', which included ten imperatives.The DRDO has committed to us that the tank that is fielded for us will not have any of the reservations that we have expressed in the Joint Action Plan…."

34.Considering the conditional acceptance of tanksby Army, the attention of the Ministry was drawnto the obvious concern of the Committee in a situation like DRDO failing to fully achieve the points raised by the Users.During evidence, the Secretary DRDO explained:

" When youdesign and develop any tank, it is a continuous process…… Now15 tanks of Mark-I had gone through nearly a fewyearsof User trial.We believe and the people involved in production believe that once you start production, you have jig fixtures and also all the quality control system.Quality assurance will be progressive. So, what we are saying is that some of the improvements that we could not meet in prototype would be met when we start the production.That is what we have agreed .Naturally, any tank that is developed does not just like that go to the Army.The first production version goes to trial.So, it is the process.Through out the world, nobody makes the tank meeting all the specifications as per the requirements.I would like to tell you that. Nobody makes it."

Cost Overrun

35.It is seen from the Audit Paragraph that the initial cost of the Project was estimated at Rs. 15.50 crore (FE Rs. 3.70 crore) in May 1974, which was revised to Rs. 56.55 crore (FE Rs. 12.96 crore) in October 1980.The cost was further revised to Rs. 280.80 crore (FE Rs. 102.32 crore)in May 1987.The total expenditur of the project at the time of closure of the project was Rs.294.70 crore (FE Rs. 97.87 crore).According to Audit, the actual expenditure at the time of closure of the project was Rs. 307.48 crore which was inclusive of Rs.12.78 crore spent on manpower during the years 1993-95.

36.The Committee specifically desired to know the factors responsible for escalation in the cost of the Project by twenty times i.e. from Rs. 15.50 crore to Rs. 307.48 crore.The various reasons given by the Ministry for increase in cost of the project included, changes in GSQR requirements, requirement of additional prototypes

and pre-production series tanks, setting up of AFV Evaluation centre, more realistic assessment of technical and user trials, Exchange rate variation, general escalation, etc..

37.As per Audit findings CVRDE did not book the expenditure amounting to Rs. 12.78 crore for manpower for the year 1993-95 as funds allocated to MBT Project had been exceeded. In this context, the Committee desired to know the status of this expenditure.The Ministry in a note clarified the position as follows:

"The expenditure in respect of manpower for the period 1993 to 1995 has been booked under the head "Wages & Salaries" of DRDO as the project did not have enough funds. Now that the Government approval has been accorded for induction of 124 tanks, approval of CCSwould be sought for formal closure of the project on "Design and Development of MBT Arjun' with revised expenditure of Rs. 307.48 crore which include manpower cost of Rs. 12.97 crore for the year 1993-95."

Sanctioning of Supplementary Projects withoutCCPA approval

Product Support

According to Audit, since the development activity on MBT Arjun hadbeen completed and the Project was closed by 31March 1995, the CVRDE initiated a separate Project for product support for extended user trial. The Project was sanctioned by the Ministryin September 1995 at a total cost of Rs. 16.98 crore (FE Rs. 6.50 crore).This cost comprised Rs. 9.98 crore (FE Rs. 6.50 crore) for provision of maintenance and product support and Rs. 7.00crore towards cost of manpower. Though the planned date of completion of the Project was 31 March 1996, this was extended upto 31 March 1997.

Modifications to MBT Arjun

It is seen from the Audit Paragraph that the Ministry in January 1997 sanctioned a Project for "improvements to systems of MBT" at a total cost ofRs. 25 crore by CVRDE. The PDC of the Project is 30 September 1999.

39.The Audit have observed that sanctioning of these two supplementary Projects by the Ministry was irregular and should have been done with the approval of CCPA, as the main Project of MBTArjun was still on.According to them, this had also resulted in underwriting the project cost of MBT Arjun to the extent of Rs. 41.98 crore.

40.On being asked whether CCPA approval was required for sanctioning of thesetwo supplementary Projects, the Ministry in a noteclarifiedthe position as follows:

" The Project for Product Support was to cater for extended and exhaustive field trials.This product support is to increase the life of tanks and keep them in running condition with the Army for their exploitation, training etc.This was not conceived as an extension of MBT Arjun project and the project cost was less than 20 crore.Hence it was not required to take the approval of CCPA.Similarly the second projectwas sanctioned at a cost of Rs. 25 crore for forwardlooking technologies and improvements which will be incorporated in phases to keep the tank the state-of-the-art.At the time of taking up this project the limit for obtaining CCPA approval had gone upto Rs. 50 crore and above.Hence CCPA approval was not required and not sought for this project.Thus these two projects are quite distinct and cannot be linked to the original main project on "Design and Development of MBT Arjun."

Foreign Exchange

41.A significant objective of MBT Project was to completely eliminate the requirement of foreign exchange in production.As per the estimatesmade in early 1987, the import content of MBT Arjun was 27 per cent and the expenditure in FE was 45per cent.Three major systems of MBT Arjun i.e. Power Pack, Gun Control and Fire Control systems are based on imported technology.According to Audit, the cost estimate made for 15 LSPs in December 1995 indicated that nearly60 per cent of the total cost estimate related to imported supplies.

42.In the aforesaid background, the Committee enquiredabout the extent of indigenisation contemplatedfor various components of the Project and the level of actual achievement realised there against and also the reasons for shortfall,The Ministry in a note stated:

"The MBT Arjun was to be a product by indigenous design.This objectivehas been fully achieved in that it is entirely system configured by Indian Engineers and Scientists.It is pertinent to state here that in a product of MBT Arjun's complexity even when the different sub-systems are configured/designed in India, they will have to necessarily feature some imported components.The percentage of imported components are dictated by absence of manufacturing infrastructure and the scales of economy.In our experience, typically in a mechanical system, the import content will be of the order of min. 20% and in hydraulic electronic and Opto-electronic systems the import content will be of order of minimum 40%.This is due to infrastructure constraints in the country.The percentage of import content is therefore bound to be around 60% overall for the prototypes and for small volume production."

43.The Committee enquired about the future plans contemplated by the Ministry to reduce import content in the production of MBT.According to the Ministry, the effort in the design and development of MBT Arjun indigenously is first to "system-configure" the Project indigenously.The reduction in import content is stated to be a planned effort in the production programme.Given the augmented infrastructure facilities with the ordnance Factories and PSUs and some select private sector plants in the recent times, they anticipate progressively increasing indigenous content. The Ministry have assured that the pace of indigenisation will however be dictated by production volumes. The Ministry reportedly hope to reduce import content from little under 60% in prototype phase to under 45%with the manufacture of first 300 Tanks and under 30% with the manufacture of about 500 Tanks.

Delay in development of MBT – Arjun

44.To a query from the Committee as to what led to the abnormal delay in the development of MBT- Arjun, the Ministry in a note explained:

"The MBT was to be designed around an imported power pack.The non-availability of power pack from import sources and inherent challenges in development of other technology intensive systems and modules, due to demanding design expertise and inadequate infrastructure for manufacture and testing, resulted in delays in development.The changing threat assessment by Army in the intervening period led to changes in GSQR.The cascading effect coupled with a more rigorous field evaluation than originally envisaged led to delays in the completion of development to latest GSQR, issued in November, 1985."

45.Theattention of Secretary, DRDO was drawn to the abnormal delay in the development of MBT – Arjun.The Secretary, during evidence deposed:

"For India, it was the first experience and it is a fact that our estimation, the time schedule and the technology challenges were not properly understood."

He further added that for the design and development leading to the production of an armour of the Main Battle Tank Class, with the experience of the developed world,it takes fifteen to twenty years.

46.To a specific query from the Committee, whether any responsibility has been fixed for delay in completion of the project, the Ministry explained:

"In a project of MBT-Arjun's complexity and technical intricacies, several agencies are responsible in an interwoven manner for development and completion of the project.It must be appreciated that in view of the magnitude of system engineering technology development and trial and evaluation and associated risks in each of the developmental tasks, certain amount of delay is inherent in projects of this magnitude as is well known with such developments world over. In view of this the delay in developmentcannot be attributed to any single agency."

Project Management

47.The Committee enquired about the Project management and monitoring mechanisms instituted by the Ministry for effective monitoring/review of the progress made in development of MBT.According to the Ministry, the MBT Arjun Project was monitored throughout its development and trial phase by (a) Steering Committee

chaired by Secretary (DP&S),(b) Working Group headed by VCOS, (c) Arjun Executive Board headed by DGCV.The Ministry have denied that the delay in development of MBT was attributable to deficient Project management and monitoring.

48.The attention of the Ministry was drawn to the fact that this is a story of development Project, where benefit has not been derived even after 26 years of its sanction.The schedule for commercial production has already overshot the original by 16 years and still the final product was not known.Further DRDO had closed the MBT Project in 1995 without achieving the intended objective.In the past also Audit had brought out cases of abnormal delays in development Projects by DRDO and in many cases the Project had been abandoned without realising the intended objectives.

The Ministry in a note submitted that the MBT – Arjun as configured to meet the latest GSQR issued in November 1985 was significantly different from that envisaged in the year 1974, both with regard to its system configuration and technology modules to meet with the requirements for a sea change in performance.The closure of the MBT project in 1995 only related to procedural requirements and cannot be construed as abandonment of project without realisation of the intended objective.They have further claimed that the tank PPS-15 presently cleared by the User as the reference tank for production with all the modifications listed in Joint Action Plan (1997) incorporated and certified by the Users, brings MBT-Arjun at par with State-of-the-ArtWestern MBTs.It has further been adduced by the Ministry that the development time of 24 years should be judged in relation to the time frame (15 to 18 years) for such developments in industrially advanced countires such as US and Germany, vis-à-vis inadequate design related infrastructure in our country in comparison.

II.Abnormal Delay in repair/overhaul of tanks

***Case I*:Vijayanta Tank**

49.According to the Audit Paragraph, Central Vehicle Depot (CVD) received415 Vijayanta tanks for feeding to Army Base Workshop for base overhaul between 1983 and 1989.Out of 415 tanks, 296 pre mark1A tanks were withdrawn from overhauling programme and thus only 119 were required to be overhauled. Of these only 39 were issued to Base Workshop for overhaul and 14 received back duly overhauled. Even these 14 were not issued for use as of August 1997.The balance 80 tanks were not fed to workshop as of March 1997.One tank was stated to be downgraded for disposal. Thus,according to Audit, 104 tanks valuedat Rs. 81.46 crore were awaiting overhauling by the workshop for the last 8 to 14 years.

50.The Committee desired to know when and on what grounds it was decided to discard use of 296 pre mark 1A tanks.According to the Ministry, in October 1997 a decision was taken to discard pre mark 1A Vijayanta tanks.These tanks have since been declared obsolete .The reasons given by the Ministry in this regard were as follows:

-Vijayanta tanks were lacking in capabilities to meet present day battle requirements due to negligible protection,low mission reliability and absence of night fighting capabilities.

-These tanks were scheduled to be completely phased out from service in second half of nineties.

-Production of tanks and its spares stopped in 1986 and 1989 respectively.

51.On being asked about the continuity of other marks of Vijayanta tanks in service, the Committee were informed that Mark 1A, Mark 1B and Mark 1C tanks have been held by different formations.The Ministry have added that repeated evaluation of Vijayanta fleet has been done several times in the recent years to check its operational effectiveness, the most recent being in 1997.According to them, field trials and statistical evidence clearly proved beyond doubt that the Vijayanta tank was no longer an operational asset as it has unacceptable levels of mission reliability and is not maintainable.Therefore, it has been decided by the Ministry to phase out the Vijayanta tanks and hold this equipment only till replacements are available.According to the Ministry, complete phasing out could not be carried out as scheduled due to slippages in production/procurement of T-72 tanks and in principle agreement existed on the necessity to import 310 tanks against the overall deficiency of the fleet.

52.To a related query from the Committee, the Defence Secretary stated during evidence."……The Main battle tank today is T-72 or Ajay which is supposed to replace the obsolete Vijayanta.Since the production of T-72 has not come upto the mark, it is felt it is betterto keepthem at the workshop.In case there is a need, we can send them."

53.On being asked about the reasons for delay in overhaul of Vijayanta tanks during the period April 1989 to March 1997, the Ministry stated that 210 tanks were overhauled as against the target of 298.Non-availability of critical spares was stated to be the main reason for shortfall in the target during this period. Replying to a related query during evidence, Defence Secretary deposed: ……. We had planned, during the period from April 1988 to March 1997, a overhaul of 298 tanks.But we could do only 210 tanks.To that extent, there is a shortfall, I concede it."Giving the latest position about the tanks awaiting overhaul, the Ministry stated that no tank was pending for overhaul as on 28 February 1999.According to them, overhauling of Vijayanta tanks was being discontinued from the production year 1999-2000 onwards as a result of approved deinduction plan.

***Case II:*Boyavayika Machino Pekoti (BMP)**

54.According to the Audit Paragraph, 33 BMPs of Russian origin valued at Rs. 66 crore introduced into service during 1982 and 1983, were received by a Mechanised unit during 1988 and 1989.During their periodic inspection from August 1990 to September 1993 the concerned workshop found the Image Converter (IC) tubes fitted had become defective and they were accordingly declared unserviceable .According to Audit, the unit had also been reflecting the deficiency of IC tubes regularly to the higher authorities in their monthly reports but the IC tubes had not been procured and replaced till January 1997.

55.The Committee enquiredas to why IC tubes had not been replaced for so long despite limitations on the operation of the BMPs.The Ministry in a note stated that the IC tubes which are used in Infra Red Night Vision Device (IR NVD) for gunner and commander were not replaced due to certain limitations, namely, very small shelf-life, detection by the enemy at lower ranges than it gives to the crew and rapid deterioration in performance that did not allow exploitation of the full potential of the weapon system.It was stated to be the technology of the sixties.According to the Ministry, it was decided to retain this outdated technology to the limit of new production since something was better than nothing at all.

56.Responding to a related query during evidence, the Defence Secretary deposed:

"By and large the decision that was taken not to equip BMPs fully with image converter tubes was dictated in terms of technological transformation that has been taking place and in terms of the need to strike a balance to equip them with obsolete technology and also the need for ensuring that we do not spend too much money on a technology that has to be phased out."

57.The Committee further enquired about the latest position of replacement of defective IC tubes.The Ministry stated that replacement of IC tubes is only being done for the driver sights and not contemplated for commander and gunner sight of the in-service fleet.The Army was in the process of trial evaluation of newer and latest Thermal Imager System which are non-detectable and give far longer ranges as also much greater shelf-life.The Committee have been informed that once the selection is made, investments will be made in the state-of-the-art technology.

Equipping of Regiments

58.The Main Battle Tanks were to be in service during 1985- 2000 A.D. and were in replacement of existing tanks which were expected to be phased out beyond 1985.However, the bulk production of MBT Arjun is yet to start.In this context, the Committee desired to know as to how the void created due to non-commencement of bulk production has so far been filled/proposed to be filled.The Ministry in a note stated that the decision by Government sometime in 1982, led to licence manufacture of T-72 tanks in the country to fill the replacement needs until commencement of production of proposed MBT.The T-72tanks are being produced at HVF, Avadi to this date.

59.As far as defence preparedness in terms of equipping of regiments is concerned the Defence Secretary intimated the Committee during evidenc ethat at no point of time have our regiments been given a tank complement lesser than their entitlement.All the regiments are stated to have been fully equipped with the requisite working number of tanks.

60.It is learnt that Government is contemplating to procure T-90 tanks from a foreign supplier.The Committee desired to know the reasons for procuring these tanks particularly when MBT Arjun is going to be productionised.They also sought clarification from the Ministry of Defence about the feasibility of upgradingT-72 tanks for the time being and avoid procurement of T-90s.

During evidence, the Committee were informed that with the acquisition of T-80 tanks by our adversary, the balance of Combat equation has been disturbed in recent times.The representative of the Ministry added that Vijayanta tanks are in the process of being phased out and a couple of years were needed before MBT Arjun could be made available. The need for importing T-90 tanks was stressed in the intregnum.He further deposed: "Our Forces cannot now cope up with T-72 technology with a few add-on features.T-80 has to be countered purely in terms of superior capabilites.T-90 incorporates the best features of T-72 and T-80 also.In some areas it exceeds T-80.On that there is no doubt.And we were going to demand performance.But add-on features to upgrade existingT-72s, will flow out of this, from negotiations which we are doing, because these are the people who built T-72 and upgraded it to T-90.And when we are going to negotiate T-90 from them, one of the important fall outs will be to manufacture the upgraded elements within these parameters and fit them to T-72 systems."

Recommendations and Observations

61. Based on the General StaffQualitative Requirement (GSQR) prepared by the Army in August 1972, the Government in May 1974 sanctioned the Project for design and development of MBT-Arjun by Defence Research & Development Organisation (DRDO) at a total cost of Rs. 15.50 crore involving a foreign exchange component of Rs. 3.70 crore.The Committee note that the Project Arjun was launched with the laudable objective of eliminating dependence on foreign countries for design and manufacture of Armoured Fighting Vehicles and to place the country on a par with super powers with regard to quality of tanks and also to eliminate completely the outgo of foreign exchange in the production of tanks. The progress made towards the design and development of MBT was examined by the Public Accounts Committee (1988-89) and their findings reported in 168th Report (8th Lok Sabha) presented to Parliament on 28 April 1989.In the aforesaid Report, while expressing their serious concern over inordinate delay in design and development of MBT and steep escalation in the cost of the Project, the Committee had inter-alia recommended the Government to keep unremitting vigil on the progress of the Project for its expeditious completion so that bulk production might commence at the earliest and also to ensure that the expenditure was contained within the sanctioned estimate of Rs. 280.80 crore.The Public Accounts Committee (1991-92) while reviewing the action taken by the Government in their 26th Report, (10th Lok Sabha) presented to Parliament on 30 April 1992, were pained to observe that the time by which the bulk production of such an important weapon system would commence could not be anticipated with any degree of certainty. In the final action taken notes furnished to the Committee on the aforesaid Report, the Ministry intimated the Committee that all out efforts were being made to complete the development activities by 1995 but were non-committal to the time schedule for the commencement of bulk production of MBT- Arjun.The facts brought out by the Audit and examination by the present Committee also reveal further delays at various stages of the development and productionisation of the MBT.

62. The Committee observe that the time frame fixed for the Project was never adhered to and was revised from time to time resulting in delays coupled with enjoined complications.This would be evident right from the stage of development of prototypes and pre-production series (PPS) tanks. As per time frame fixed in May 1974, four mild steel prototypes were to be offered for trials by April 1980 and eight armoured prototypes by April 1982.

This time schedule was revised and as per commitment made in May 1987, 12 MK-I prototypes based on imported propulsion units , seven MK-II prototypes with indigenous propulsion units were to be delivered by June 1987 and June 1990 respectively.23 MK-I PPS tanks were also to be produced by December1988.As against this, 12 MK-I prototypes with imported propulsion units were produced by February 1989 and 15 MK-I PPS tanks upto December 1996 indicating delays of about two years and eight years respectively.The Committee have been informed that building of MK-II prototypes had to be abandoned both due to incomplete development of indigenous engine and for the reasons of User's preference for water cooled 1400 HP power pack.The shortfall in production of PPS tanks was stated to be due to the usage of major systems as spares during User evaluation of 15pre-production tanks.Evidently, delay and shortfall in production of prototypes and PPS tanks was indicative of inadequacies in the Project planning right from the initial stage of the execution of the Project.

63. The Committee's examination reveals that the User evaluation of prototypes and PPS tanks offered for trials by DRDO from time to time was beset with numerous problems . To begin with, the automotive system evaluation of two prototypes carried out till July 1989 by the Army revealed major deficiencies such as overheating of engine, excess weight, very low mission reliability etc. In the Steering Committee Meeting held on 26 July 1989, the Army reportedly expressed their reservation about commencement of production of PPS tanks on the ground that a fully integrated tank was yet to be evaluated by them. Curiously enough, on 31 July 1989, the Ministry decided to place orders for six PPS tanks, two on Heavy Vehicle Factory and four on two Public Sector Undertakings. As the prototypes were not accepted by the User, the Committee wonder as to why the Government was in a tearing hurry to place orders for PPS tanks.Pertinently, automotive and weapon trials of two fully integrated prototypes by the Army in March 1990 also revealed major deficiencies, thus validating their reservations expressed prior to commencement of production of PPS tanks.The Army accordingly indicated in the Steering Committee Meeting held on 24 August, 1990 that deficiencies in areas like bogie wheels, suspension units, ammunition, fuel starvation etc. needed to be sorted out before PPS were taken up for manufacture.The Combat Vehicles Research & Development Establishment (CVRDE) then reportedly assured the Steering Committee that since orders for PPS tanks had already been placed, all the deficiencies pointed out by the User would be resolved and modifications incorporated in the six PPS tanks ordered.In this background of the matter, the Committee would like to know the reasons which prompted Government to go ahead with production o PPS tanks without successful evaluation and acceptance of prototypes by the User.

64. What is further disquieting to note is that summer trials of 14 PPS tanks carried out between June 1993 and July 1996 revealed major deficiencies and failed to meet the requirement projected in the GSQR.The weapon system's performance was reportedly well below the acceptable level and the mission reliability of the tank was alarmingly low so much so that the tank was not acceptable to the User. Consequent to summer trials on PPS tanks in 1994, the Army Headquarters in consultation with DRDO laid down ten bottom line parameters/ imperatives for acceptance of MBT. In the opinion of the Committee, persisting shortfalls in performance of tanks led to dilution of GSQR and laying down of ten imperatives. Significantly,despite carrying out modifications/improvements in the 14PPS tanks by DRDO, the User trials by Army in 1996 indicated that except in a few areas, the performance of PPS tanks fell far short of even the bottom line parameters/imperatives.Sincethesummer trials carried out in April 1997 on PPS-15 (reference tank for bulk production)also revealed that the major deficiencies pointed out in trials of 1996 still continued to persist, the Army, reportedly indicated in July 1997 that in its present form, the overall reliability of MBT Arjun was far from satisfactory.The Ministry contended that in a product of MBT Arjun's complexity, despite best efforts for a good design in each of the sub-system, field tests brought out the need for improvement in certain areas, while validating the general design feature.However,the inability to configure the tank as per the satisfaction of the User despite dilution in the Original GSQR has a definite bearing on our indigenous research capability which, needless

to reiterate, deserves to be given further fillip and stimulus.

65. The Committee note that after discussion between Army and DRDO, a time bound Joint Action Plan (JAP) was evolved in November, 1997 for implementation of the outstanding User observations/recommendations noticed during summer trials of 1997.According to the Ministry, the contentious issues like accuracy at battle ranges, quality of fire control system etc.too got deliberated as partof the discussion and those were illustrated through the ten imperatives laid down by Chief of the Army Staff (COAS)to be met for productionisationvis-à-vis the present status of MBT.Eight out of ten imperatives are stated to have been met so far.Out of the remaining two imperatives `Accuracy at battle ranges' has been substantially achieved and is stated to be acceptable to User.As regards the imperative relating to "All electric Power Traverse", the Ministry stated it to be a new requirement and was not linked with immediate production. According to them, this was to be pursued as a separate Project. Since Army kept on insisting that the tank fielded for them should not have any of the reservations expressed in the JAP, the Committee would like MoD to ensure that all such reservations of the Army are resolved.

66. The Committee observe that since Army was not satisfied with the performance of PPS tanks 1 to 14, it was mutually decided between Army and DRDO in March 1996 that no design freeze would be made before commencement of production till a fully integrated PPS-15 was made available and successfully evaluated by the Army.The Committee are perturbed to note that the Ministry in August 1996 sanctioned the manufacture of 15 number of LSP tanks by Ordnance Factory Board at an estimated cost of Rs. 162crore without CCPA's approval and also decided to commence LSP work using PPS-12 as reference tank for bulk production in place of PPS-15. According to the Ministry, pending CCPA approval, a decision was taken to go ahead with the production of a limited number of 15 tanks in order to maintain continuity.This parallel action was sought to be taken to overcome the long lead time required for the planning for bulk production, technology transfer, floating of enquiries for procurement, training of manpower etc.However, as would be seen from the succeeding paragraph, most of the related activities for commencement of bulk production started only after obtaining the approval of Cabinet Committee on Security (CCS).Further, the decision to use PPS-12 in place of PPS-15 for commencement of bulk production was stated to have been based on the suggestion by DRDO that there was no change in the major systems between PPS-12 and PPS-15 and features to be additionally provided in PPS-15 could be added on after certification.Subsequently,with insistence from Army, PPS-15 was accepted to be the reference tank for manufacture of bulk production after its successful evaluation during 1997. Taking note of the fact that Army Headquarters gave clearance for manufacture of LSPin January 1998 and sanction for production of tanks was accorded by CCS only on 16 February 1999, the Committee are inclined to conclude that the sanction for production of tanks accorded by the Ministry in August 1996 in the absence of approval from CCS was irregular and that the commencement of production of LSP even before reference tank meeting the imperatives stipulated by the User was questionable.

67. As per the latest estimates, some regiments are planned to be equipped with MBT–Arjun by 2007.Subsequent to Cabinet approval,a technical negotiating Committee is stated to have been set up to negotiate with the concerned parties for procurement of some major systems like the gun control system, fire control system, power-pack, transmission system etc. Considering the fact that the time frame fixed for this Project has never been adhered to so far and particularly when negotiations for procurement of critical systems are yet to be taken up, the Committee have serious apprehensions about implementation of the time-schedule planned for bulk production of MBT – Arjun. The need for early commencement of bulk production in the interest of defence preparedness of the country hardly need any reiteration.The Committee would like the Government to provide all essential wherewithal and stimulus to the concerned establishments and also to conduct constant and effective monitoring of production schedule so that adequate number of the state-of-the art modern MBTs, comparable to leading tanks of the World, become available to the country.

68. The Committee wish to point out that Army's concurrence to the Production of tanks wasconditional to the commitment made by DRDO that all the reservations expressed by User in the JAP would be resolved. The Secretary, DRDO, during evidence informed the Committee that some of the improvements that could not be met in the prototypes would be met when production starts, that quality assurance would be progressive and that "throughout the world, nobody makes the tank meeting all the specifications as per the requirements". The Committee desire that both DRDO and the Army through synergetic efforts should remove the technical or parametrical deficiencies which come up in the process of trials andprovide the Nation an indigenous MBT standing in comparison with the leading battle tanks of the world.

69. The Committee note that MBT-Arjun was designed around an imported Fire Control System (FCS).The Army were reportedly of the view that the design of FCS was no longer responsive to any technical inputs and its performance was at its saturation level.The DRDO, however, contended that the FCS as incorporated in MBT-Arjun performed at par with contemporary world class MBTs.In view of the fast pace of advancement of technology, the Committee feel that there is inherent danger of obsolescence of the technology planned if suchan enormous time is taken in the development of the MBT. The Committee would therefore like to be reassured that the tank finally fielded for Army, incorporates latest FCS. The Committee have been informed that efforts in the direction of indigenous production of FCS were under way and that the MBT would be progressively inducted after its successful trial evaluation. The Committee would like to be apprised of the progress made on this count.

70. The Committee observe that as the indigenous efforts to develop a suitable engine and transmission system for the MBT were beset with problems, 42 power packs with transmission units were imported for use on the prototypes and PPS tanks.As far as indigenisation of power pack is concerned, the Committee were given to understand that our ordnance factories are, equipped with, and, capable of manufacturing power pack and if volumes justify, license manufacture of power pack can be undertaken. The Committee would like to be apprised of the developments effected in this field.

71. The Committee note with dismay the steep increase in the estimated cost of the Project for design and development of MBT – Arjun.Theinitial cost of the MBT Project which was estimated at Rs. 15.50 crorein 1974 was revised to Rs. 56.55 crorein 1980 and to Rs. 280.80 crore in 1987.The actual expenditure was, however, Rs. 307.48 crorein March 1995, despite the fact that there was a shortfall in the production of 10 prototypes/PPS tanks. Thus, there has been an escalation of cost by twenty times compared to the initial estimated cost of the Project. Theincrease in the costof the Project has been attributed to changes in GSQR, requirements of additional prototypes and PPS tanks, setting up of AFV Evaluation centre, more realistic assessment of technical and User trials, Exchange rate variation, general escalation etc.The Committee are of the opinion that the manner in which cost estimates of the Project have been revised from time to time is indicative of a tendency of getting projects sanctioned by underestimation of costs generally and also by omission of several essential requirements which could be later incorporated without much trouble because of their essentiality.While escalation in cost may partly be due to revisions in the GSQR and addition of certain new features, the Committee are inclined to believ ethat abnormal delay in design and development of MBT also contributed immensely towardsescalation of cost. The Committee find that expenditure incurred by CVRDE on manpower for the years 1993-95 amounting to Rs. 12.78 crore was pending regularisation by the Ministry.They deprecate such unauthorised expenditure and recommend for its expeditious regularisation.The Committee urge upon the Ministry to ensure that the Project cost is not further inflated by any unauthorised expenditure and would like to know the quantum of expenditureactually spent till the formal closure of the Project on design and development of MBT Arjun.

72. The Committee observe that two supplementary Projects costing Rs. 41.98 crore were sanctioned by the Ministry in September 1995and January 1997 for product support and modifications to MBT Arjun with

planned dates of completion as 31 March 1996 and 30 September 1999.In the opinion of the Committee, this would also result in underestimating the Project cost of MBT- Arjun to the extent of Rs. 41.98 crore.Since the Main Project of MBT – Arjun was still on, the contention of the Ministry thatthese two Projects were quite distinct and could not be linked to the original Main Project appears untenable.The Committee would like to be apprised of the status of these Projects including the quantum of expenditure incurred so far in their implementation.

73. Another disquieting aspect is that theforeign exchange content of the Project estimate has increased phenomenally from Rs. 3.70 crorein the estimate sanctioned in May 1974 to Rs. 97.87 crore in the total expenditure of the Project till March 1995.The Committee note that three major systems of the MBT Arjun i.e. Power Pack, Gun control and Fire control systems are based on imported technology and as perthe cost estimate made for 15 LSPs in December 1995,nearly60 per cent of the total cost estimate related to imported supplies.The Ministry pleaded that in a product of MBT Arjun's complexity, even when the different sub-systems are configured/designed indigenously, they will have to feature necessarily some imported components, the percentage of which are dictated by absence of manufacturing infrastructure and the scales of economy. Disappointingly, the envisaged objective of developing MBT- Arjun entirely by indigenous effort, going by present indications, does not seem attainable. As regards future plan contemplated to reduce importcontent in the production of MBT, the Ministry hope to reduce the import content from little under 60% in prototypephase to under 45% with the manufacture of first 300 tanks and under 30% with the manufacture of about 500 tanks.The Committee trust that sustained endeavour wouldbe made by the Ministry in coming years to reduce the import content to the barest minimum in the production of MBT-Arjun.

74. The Committee are constrained to point out that even though 26 years elapsed since the sanction of the Project and the schedule for commercial production has already overshot the original by 16 years, the bulk production of MBT-Arjun is yet to commence. The various reasons adduced by the Ministry in this regard included, non-availability of power pack from import sources and inherent challenges in development of other technology intensive systems and modules, inadequate infrastructure for manufacture and testing, changes in GSQR etc. The Committee believe that in the case of a time taking developmental Project involving a fast developing technology, updating of requirements by the User from time to time is unavoidable to some extent and should have been aptly taken care of while planning the schedule of completion.However, such prudence on the part of the Ministry was conspicuous by its absence. In the hindsight, while the Ministry were well aware of the fact that it takes around 15 to 20 years for manufacture of an armour of MBT-Arjun class even by the industrially advanced countries,it is inconceivable that the Ministry initially set a target, hard to achieve without fully realising the technological complexities of MBT as well as the infrastructural inadequacies in our defence production units.

75. As per envisaged plan, MBT- Arjun was to be inducted into service during1985-2000 in replacement of existing tanks which were expected to be outdated beyond 1985. In this context, the Committee examined at some length the statusof Vijayanta tanks in terms of their battle worthiness. The Committee have been informed that overhauling of Vijayanta tanks was being discontinued from the production year 1999-2000 onwards as a result of approved deinduction plan. Based on repeated evaluation of Vijayanta fleet which proved that these tanks were no more an operational asset, it has been decided by the Ministry to phase them out and hold the equipment only till replacements are available. Distressingly, complete phasing out could not be carried out as scheduled, due to slippages in production/procurement of T-72 tanks.The Main Battle Tank today is stated to be T-72 or Ajay which is supposed to replace the obsolete Vijayanta. Evidently, the delay in production of MBT-Arjun has created such a precarious situation where there is no option but to retain obsolete Vijayanta tanks. While expressing their grave concern over the prevailing situation, the Committee recommend that immediate and effective measures be taken by the Ministry to ensure that obsolete Vijayanta tanks are replaced expeditiously to

strengthen our tank fleet.

76. The Committee are concerned that the balance of combat equation has been disturbed in recent times with the acquisition of T-80 tanks by our adversary. What adds to the anxiety of the Committee is the fact that the Vijayanta tanks are in the process of being phased out while it would take a couple of years before MBT- Arjun is made available.The Committee were given to understand that there was a move to procure T-90 tanks in the interregnum.Theywould like to be apprised of the factualposition about the import of tanks in question as also the safeguards being taken to ensure that indigenous R&D programme is not affected adversely.On the contrary efforts should be made to absorb latest technology and to build our R&D pool.

77. The Committee regret to point out that this is a story of developmental Project, where R&D benefit has not been derived even after 26 years of its sanction.The Committee need hardly emphasise that the efficiency of any developmental Project can be judged only in terms of real and concrete achievement, which still remains to be fulfilled in the present case.It would not be without basis therefore to conclude that the delay in development and productionisation of MBT-Arjun was attributable, to a considerable extent, to deficient Project management and monitoring. Underlining the need to review the existing institutional mechanism for management and monitoring of the Project, the Committee recommend appointment of a high level Committee with the following objectives:

To closely review and supervise the progress made towards bulk production of MBT-Arjun.

To ensure that MBT-Arjun being productionised would be the most modern in the world as per the promise made by Government from time to time.

78. The Committee's examination has revealed that 33 Boyavayika Machino Pekotis (BMPs) of Russian origin valued at Rs. 66 crore introduced into service during 1982 and 1983 were received in a mechanised unit with defective Image Converter (IC) tubes affecting their efficiency during night operations.Unfortunately, the defective IC tubes are yet to be replaced.The Ministry stated that IC tubes which are used in Infra Red Night Vision Device for gunner and commander were not replaced due to certain limitations like very small lshelf-life, detection by the enemy at lower ranges than it gives to the crew and rapid deterioration in performance that did not allow exploitation of the full potential of the weapon system.The Committee are constrained to point out that knowing fully well that the technology was of the sixties vintage, the Ministry decided to retain this outdated technology to the limit of new production under the pretext that `something was better than nothing at all'. This is unfortunate to say the least. The Committee have now been informed that the Army was in the process of trial evaluation of newer and latest Thermal Imager System in their pursuit for seeking replacement of defective IC tubes. Deploring the failure to take timely action in suitably replacing defective IC tubes, the Committee recommend that the matter should be looked into with a view to fixing responsibility and a status report on the proposed introduction of Thermal Imager System should be furnished to the Committee within a period of three months.

ACRONYM

1.CVD-Central Vehicle Depot
2.BMP-Boyavayika Machino Pekoti
3.IC-Image Converter
4.IR NVD-Infra Red NightVision Device
5.GSQR-General Staff Qualitative Requirement
6.DRDO-Defence Research & Development Organisation
7.PPS-Pre-Production Series
8.OFB-Ordnance Factory Board
9.CCPA-Cabinet Committee on Political Affairs
10.CCS-Cabinet Committee on Security

11. LSP-Limited Series Production
12. FCS -Fire Control System
13. JAP-Joint Action Plan
14. COAS-Chief of the Army Staff
15. CVRDE-Combat Vehicle Research & Development Establishment