12

RESEARCH REACTOR DHRUVA

DEPARTMENT OF ATOMIC ENERGY

PUBLIC ACCOUNTS COMMITTEE 1991-92

TENTH LOK SABHA

LOK SABHA SECRETARIAT
NEW DELHI

TWELFTH REPORT

PUBLIC ACCOUNTS COMMITTEE (1991-92)

(TENTH LOK SABHA)

RESEARCH REACTOR DHRUVA

DEPARTMENT OF ATOMIC ENERGY

[Action taken on 163rd Report of Public Accounts Committee (8th Lok Sabha)]

Presented in Lok Sabha on .....
Laid in Rajya Sabha on.....

LOK SABHA SECRETARIAT
NEW DELHI

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Page	Para	Line	For	Read
Inner cover page	-	below Seal	Presented in Lok Sabha___ Laid in Rajya Sabha on_____	Presented in Lok Sabha on 18.3.1992 Laid in Rajya Sabha on 18.3.1992
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26	Appendix	12	absorved that	observed that

CONTENTS

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(1991-92)

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INTRODUCTION

I, the Chairman of the Public Accounts Committee as authorised by the Committee do present on their behalf this twelfth Report on action taken by Government on the recommendations of the Public Accounts Committee contained in their 163rd Report (8th Lok Sabha) on Research Reactor Dhruva.

2. In their earlier Report, the Committee had observed that there were avoidable delays in various sectors during execution of the project. The Committee had also expressed the view that the Department did not properly analyse the progress of work at the time of revising the date of commissioning of the Reactor in 1977. The facts stated in the action taken notes furnished by the Department of Atomic Energy, have not convinced the Committee to revise their impressions that the Department did not make serious and time bound efforts from the initial stages itself not only in meeting the time schedules originally envisaged but also those revised in June, 1977. The Committee have expressed distress over the fact that the Department did not pay adequate care on planning the project in 1977 when the dates of completion of various activities for commissioning the reactor by December 1981 were decided. The Committee have expressed their strong displeasure on the lack of proper care and planning on the part of the concerned authorities in such an important national project. The Committee have stressed that the Department should take all corrective steps to ensure that the delays/difficulties experienced in this project do not recur in such projects in future and be apprised of the concrete steps taken in this regard.

3. The Report was considered and adopted by the Public Accounts Committee at their sitting held on 24 January, 1992. Minutes of sitting from Part II of the Report.

4. For facility of reference and convenience the 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 assistance rendered to them in the matter by the office of the Comptroller and Auditor General of India.

ATAL BIHARI VAJPAYEE,
Chairman,
Public Accounts Committee.

NEW DELHI ;
12 February, 1992

23 Magha, 1913 (Saka)

CHAPTER I

REPORT

This Report of the Committee deals with the action taken by Government on the Committee's observations/recommendations contained in their 163rd Report (8th Lok Sabha) on Paragraph 3 of the Report of the Comptroller and Auditor General of India for the year ended 31 March, 1987 No. 7 of 1988, Union Government (Scientific Departments) regarding Research Reactor, Dhruva.

2. The 163rd Report, which was presented to Lok Sabha on 28 April, 1989 contained 13 recommendations/observations. Action taken notes on all these recommendations have been received from the Department of Atomic energy. The action taken notes have been broadly categorised as under :

(i) Recommendations and observations which have been accepted by Government;

Sl. Nos. 5, 6, 7, and 13.

(ii) Recommendations and observations which the Committee do not desire to pursue in the light of the replies received from Government;

Sl. Nos. 8—12.

(iii) Recommendations and observations replies to which have not been accepted by Government and which require reiteration ;

Sl. Nos. 1—4

(iv) Recommendations and observations in respect of which Government have furnished interim replies.

—NIL—

Delay in the commissioning of the project criticised
(Sl. Nos. 1—4 — Paragraphs 1.29 to 1.32)

3. Research Reactor, Dhruva was indigenously built and commissioned by the Bhabha Atomic Research Centre in about 13 years with an expenditure of Rs. 106.85 crores upto the end of September, 1988. Based on the information made available by the Department of Atomic Energy, the following table shows the completion of some of the major activities in project Dhruva.

Sl. No.	Description of Major activity in Project ,Dhruva	Initial target date proposed in 1972	Revised target date envisaged in 1977	Actual date of completion
1.	Reactor Building	Dec. 75	Nov. 77	April,82
2.	Service Building	Dec. 75	Aug. 78	April, 80
3.	Reactor Annexe, Attached Lab. and G.T. Lab	Dec. 75	June, 79	Jan. 82
4.	Calandria and Shields	June, 76	April, 81	Nov. 83
5.	Ventilation and A.C. Works	Aug. 76	March, 80	July, 85
6.	Commissioning	Nov. 76	Dec.81	Aug. 85

4. Due to the aforesaid delay, the cost of the project Dhruva which was estimated as Rs. 49.88 crores in 1974 had to be revised to Rs. 76.30 crores in 1977 and again to Rs. 107.88 crores in May, 1988.

5. There was a delay of more than a year in the preparation of the project report. Commenting upon this delay, the Committee had in paragraph 1.29 of their 163rd Report observed as follows :

> "The Committee note that the Department of Atomic Energy in their note submitted to the Cabinet in 1972 for seeking approval for setting up of a 100 MW Thermal Research Reactor at Trombay, had expected the proposed reactor to be commissioned by the end of 1976 on the premise that the project report would be ready by early 1973. The Committee, however, find that the project report could be completed only in May 1974 with changes stated to have been necessitated by refinements, plant lay—out, etc., on the basis of the feed back obtained from the utilisation experience of CIRUS reactor. Considering the fact that the Department had been operating the CIRUS reactor since 1960 and thus had utilisation experience available instantly, the committee feel convinced that the Department did not make serious and time bound efforts from the initial stages itself in meeting the time schedules envisaged in the original note furnished to the Cabinet. The Committee find no justification for this delay of more than a year in preparing the project report."

6. In the action taken note furnished by the Department of Atomic Energy, it has been stated as follows :—

> "The Conceptual Report on the Project was prepared in July 1972. It was envisaged at that time that the Project would be ready by April

1973. The Centre (BARC) had been operating the Cirus Reactor since 1960 and had acquired experience in that. Dhruva was the first major project taken up by the Department indigenously. Inputs were required from a large number of specialists with expertise in various fields such as materials, engineering, fuelling, physics, chemisty, instrumentation, etc. Results of the experience gained with the Cirus experimental facilities had to be pooled for incorporation of the facilities in an improved version, in consultation with the various officers in the field. Because of all these factors the Project Report could not be got ready by April 1973 as had been envisaged. It was completed in May 1974 after incorporation of the changes necessitated in Design, Plant Lay-out etc.; among these changes, the most important one was the change in the Reactor Building from the cylindrical structure to the rectangular one (based on the feed back from the Cirus Research Reactor experimental facilities). In view of these circumstances, the Committee may be inclined to agree that the additional time taken for the preparation of the Project Report was not due to want of serious and time—bound efforts in the Department."

7. According to the initial target date envisaged in 1972 the project was proposed to be commissioned in November, 1976. As there were delays in the completion of the various facets of the project, the targets envisaged in 1972 were revised in 1977, according to which the project was to be commissioned in December, 1981. As the revised targets fixed in 1977 could not be adhered to, the Committee in paragraph 1.30 of their 163rd Report observed as follows :

"The Committee further note that while the conceptual design for the new reactor was finalised in 1974, the detailed design parameters were completed only in 1978. The Committee have been informed that the design and development of the sub-systems for the reactor took a longer time as several changes were made in order to provide for facilities under the changed nuclear situation after Pokhran explosion in 1974 when it was realised that the Department would not be able to buy sub-systems and equipments from many of the developed countries. It has also been stated that the Department had a limited scope for an NRU type of reactor when the proposal was submitted to the Cabinet in 1972 but the Department, under the changed nuclear situation, decided to go on their own for building a facility incorporating latest research capabilities. The Committee, however, feel that the Department did not bestow proper care and attention on planning the project even in 1977 when the dates of completion of various activities for commissioning the reactor by December 1981 were revised. It is obvious that the Department did not properly analyse the progress of work at the time of revising the date of commissioning of the reactor in 1977 as is borne out by the

fact that there were substantial delays even against the revised target dates in completion of both the civil works and the manufacture of nuclear equipments for the project."

8. The action taken note furnished by the Department of Atomic Energy reads as follows:—

"All the relevant factors had been carefully considered at the time of proposing the revision of the date of commissioning of the Reactor from 1977 to 1981. This covered inter-alia the progress made in the works in major areas, for which Bar Charts were also prepared. These included the progress made in regard to the Reactor Building, Service Building, Calandria, End Shields, Electrical Power Supply, Fuelling Machines, etc. Bar Charts were revised in respect of 24 items in 1977. However, the revised date of December 1981 could not be adhered to, not due to lack of proper care and attention on planning the Project, but it was due to various factors which could not be visualised or foreseen (in 1977), as indicated below briefly:

(i) Longer time taken (about 12 months) for the finalisation of tender specifications, preparation of tender documents etc. (by Consultants), for the issue of the tender notices and placement of Work Orders.

(ii) The time lost by the contractor (about 8 months) for starting the work, after mobilising the labour force and putting up the labour camp within the Security Zone, and due to the onset of monsoon.

(iii) Longer time taken for completion of the Service Building (about 12 months) because of the high level of precision involved in the construction and the proximity of the Building to the existing Cirus Reactor.

(iv) Longer time (about 12 months) taken in the fabrication work because of the intricacy of the work and the stringent requirements of quality control and testing, which included 100% radiography testing of all welding jobs, and also partly because of the prolonged labour strike in the works of the fabricators.

(v) Longer time (of about 20 months) taken for the completion of the Service Building due to the presence of hard rock in the northern section as well as due to the complicated nature of the work involved.

(vi) Longer time (of about 49 months) taken for the Fabrication of calandria due to:—

(a) Delay in the supply of Stainless Steel Plates by the foreign manufacturers.

(b) Longer time taken for the manufacture of the large diameter zircaloy re-entrant cans, which needed extensive R&D efforts.

(c) Slippage in the delivery of various equipments by the vendors.

(d) Longer time taken on the commissioning activities, as certain deficiencies were observed (during precommissioning checks), which needed correction.

(e) Prolonged flushing operations for the moderator and the main Coolant System became necessary for removing the large volume of the debris from the fabrication operations.

(f) There was interruption in the light water commissioning checks, due to unforeseen repairs which had to be carried out for the main Coolant Pumps (in consultation with the foreign vendors); some problems were encountered in the light water commissioning tests, which had to be solved, and some of the tests had to be repeated.

Because of the various factors indicated above briefly, the target dates as revised in 1977 could not be kept."

9. Commenting upon the delay in the completion of civil works, the Committee in paragraphs 1.31 and 1.32 of their 163rd Report, had observed as follows:—

"Among the important reasons which were advanced for the delay in completion of the civil work are delay in formulation of tender specification and issuing of the same; changes in design and increase in scope of work during construction, inadequate sub-soil investigations and complexity of the nature of the job to be executed.

Para 1.32: As regards delay in tender formulation etc., the Committee have been informed that the detailed design parameters could not be supplied to the consultants at a time to enable them to formulate tender specification completely as the design parameters had to be finalised by the engineers and scientists of various disciplines and some hold-ups had occurred in the course of critical examination of problems which could not be finalised in advance. Yet another reason advanced by the Department for delay on this count is that the tenders were for a large magnitude with many conditions to be stipulated therein and it took time to process the tenders and obtain final approval of the competent authority. The Committee are not convinced by the reasons advanced to explain delay in completing the stage prior to commencing and during execution. On the other hand, the committee feel convinced that the work on this project was undertaken in a casual manner and the project languished for want of coordination among various project authorities involved in its execution."

10. The action taken note furnished by the Department of Atomic Energy reads as follows:—

"**Para 1.31 & 1.32:** The work on the project started soon after the receipt of Government's approval in 1972, and preliminary works such as site preparation establishment and manning of the Project Office, invitation of tenders for long delivery items etc., were taken up. The excavation for the Reactor building was commenced in May 1974 (Based on an adhoc sanction accorded for the same). Thus, there was no delay between the sanctioning of the Project and the commencement of the construction.

So far as co-ordination among the various Project Authorities involved in the execution of the Project was concerned, the Project was managed by a Project Manager under whom there were various Project Groups responsible for design, construction and commissioning. The project cost estimates and other inputs were prepared by the Civil Engineering Division, Reactor Operations Division, Technical Services Division, etc., of BARC. The Project Manager was guided by a Project Design and Review Committee (later known as Project Implementation Committee), consisting of Directors of Groups and other Officers of BARC. This Committee was responsible for the Project Progress review on a weekly basis and for preparing quarterly physical and financial progress reports. These reports were reviewed by the Department of Atomic Energy as well as the Atomic Energy Commission periodically. It would be relevant to emphasise in this connection that the Project Management was always under the scrutiny of the professionally experienced staff, as a matter of fact, many of the technical problems that were caused by the policy of indigenisation were successfully solved only because of such professional expertise.

These circumstances would show that the work was not undertaken in a casual manner and that the Project did not languish for want of co-ordination among the Project Authorities. The various delays occurred because of the circumstances indicated above."

11. In the note of the Department of Atomic Energy submitted to the Cabinet in 1972 seeking approval for setting up of a 100 MW Thermal Research Reactor at Trombay, it was anticipated that the research reactor would be commissioned by December, 1976. In June 1977, the dates of completion of various, activities were revised for commissioning the reactor by December, 1981. But the project was eventually commissioned only in August, 1985. In their earlier Report, the Committee had observed that there was avoidable delays in various sectors during execution of the project. The Committee had also expressed the view that the Department did not properly analyse the progress of work at the time of revising the date of commissioning of the Reactor in 1977. From the Scrutiny of the

action taken notes furnished by the Department of Atomic Energy, the Committee are unable to revise their impressions that the Department did not make serious and time bound efforts from the initial stages itself not only in meeting the time schedules originally envisaged but also those revised in June, 1977. What distresses the Committee more is the fact that the Department did not pay adequate care on planning the project in 1977 when the dates of completion of various activities for commissioning the reactor by December 1981 were decided. The utter lack of planning is borne out by the fact that there was delay on each and every facet of the project. For instance the project report which was expected to be prepared by early 1973 was completed only in May 1974. There was a delay of 12 months for the issue of the tender notices and placement of work orders. Longer time of 12 months and 20 months was taken in the fabrication work and completion of the Service Building respectively. Delay of about 49 months had occurred in the fabrication of calendria. From these delays, the Committee gather an irrefutable impression that the design parameters were not adequately taken care of at the pro-construction stage with the result that the project schedule was badly thrown out of gear.

Further, the cost of project Dhruva which was estimated at Rs. 49.88 crores in 1974 had to be revised to Rs. 76.30 crores in 1977 and again to Rs. 107.88 crores in May 1988. Obviously, the long delays in different activities of the project were to a large extent responsible for this huge escalation in costs. The Committee have also no doubt that the subsequent changes in the design as also the increase in scope of work during execution of the project highlight another facet of poor planning on the part of the project authorities. The Committee cannot but express their strong displeasure on the lack of proper care and planning on the part of the concerned authorities in such an important national project. The Committee stress that the Department should take all corrective steps to ensure that the delays/difficulties experienced in this project do not recur in such projects in future. Concrete steps taken in this regard should be intimated to the Committee within six months.

CHAPTER II

RECOMMENDATIONS AND OBSERVATIONS WHICH HAVE BEEN ACCEPTED BY GOVERNMENT

Recommendation

The Committee note that the completion of reactor building was delayed mainly due to the changes in the design of the roof and of girder and ducting systems and also because of the time taken for deciding on the location of the cut outs in basements etc. Similarly, the spent fuel storage building was delayed because the location of the emergency storage tank had to be revised on the basis of subsequent studies. The Committee feel convinced that the subsequent changes in the design as also the increase in scope of work during execution of the project highlight another facet of poor planning on the part of the project authorities. It is clear that design parameters were not adequately taken care of at the pre-construction stage with the result that the project schedule was thrown out of gear. At this stage, the committee can only hope that Department of Atomic Energy would draw procedures for working out the details of the projects, to be taken in hand, well in advance by ensuring proper coordination among the project authorities so as to obviate delays in the execution of the projects due to in-house failures.

[S.No. 5 (Para 1.33) of Appendix II to 163rd Report of PAC (8th Lok Sabha)].

Action Taken

The circumstances under which the changes in the design of the roof and girder were made have been explained in the reply to Question Nos. (i) & (ii) and 6 (ii) forwarded with the I.D. Note No. 11/40/89-Parl dt. 24.2.89. The arrangements for close co-ordination among various Project authorities involved in the execution of the project, the methodology adopted for preparation of designs, cost estimates and other inputs have also been set forth in the reply to paras 1.32 and 1.33 above. As this was the first major Project undertaken in this sophisticated field, without any previous data or experience to go by, and there were restrictions even on exchange of information from the few countries who had set up similar Research Reactors, certain design changes became inevitable during the execution of the project, as it was not possible to foresee all the contingencies or to freeze the design parameters even at the planning or pre-construction stage. In view of these factors and circumstances, some of the changes in the design had to be made subsequently; many of these were necessitated by the evolving safety requirements and may not be

attributed *expost* to poor planning on the part of the project authorities. However, the observations of the Committee that the Department should draw up procedures for working out the details of the projects taken on hand, by ensuring proper coordination among the Project authorities, are noted, and efforts will be made to introduce further improvements and refinements in the systems and procedures.

[Department of Atomic Energy D.O. No. PrAo/Control/2/1(23)/PAC/89/Dhruva/146 dated 25 July, 1990].

Recommendation

The Committee are distressed to note the substantial delay in completion of the service building mainly due to the presence of hard/soft rock at the site which was not revealed by the random bore holes taken during the site investigations.

Considering the fact that foundation soil problems were also encountered during the execution of Madras Atomic Power Project, the Committee are of the view that the geological investigations carried out by the Department of Atomic Energy appear to be inadequate. They believe that the Department should pay serious attention to this aspect and would also ensure in future that adequate geological investigations of the project sites are made at the pre-construction stages.

[S.No. 6 (Para 1.34) of Appendix II to 163rd Report of PAC (8th Lok Sabha)].

Action Taken

As regards the geological investigations on the site conditions which had been carried out, it may be mentioned that random surveys of the project site prior to the commencement of the work were carried out according to the accepted engineering practices. However, hard rock (which had not been disclosed by the site investigations) was encountered at some places; it required careful blasting because of the proximity of the place to the Building of the Cirus Reactor. The observations of the Committee that serious attention should be paid to this aspect so that adequate geological investigations of the project site are ensured have been noted and necessary action will be taken in this regard.

[Department of Atomic Energy D.O. No. PrAo/Control/2/1 (23)/PAC/89/Dhruva/146 dated 25 July, 1990].

Recommendation

The Committee note that the calandria for Dhruva reactor was fabricated departmentally. However, the fabrication of calandria was delayed

by 49 months mainly due to slippages in delivery of various equipments by vendors and development efforts required for fabricating zircaloy re-entrant cans. The Committee understand that while certain amount of development work becomes inevitable in manufacture of certain items, the Department must draw up a realistic time bound package for such activities having due regard to the existing technological competence so that the project schedules may not go away subsequently.

[S.N. 7 (Para 1.35) of Appendix II to 163rd Report of PAC (8th Lok Sabha)].

Action Taken

The Calandria of the Dhruva Reactor is a high precision complex nuclear component and the expertise needed for its fabrication was available only within the Department. While drawing up the schedule for fabrication of the Calandria, it was recognised that adherence to the time schedule was dependent on the timely availability of various inputs such as Stainless Steel Plates, Forgings, Electron Beam Welding Machine, etc. The Stainless Steel Plates were not available indigenously and had to be imported; however, the supply by the French manufacturer got delayed, apparantly because of the uncertainty prevailing in the international scene regarding supply of equipment, materials etc. for the Indian Nuclear Power Programme, after the peaceful nuclear experiment conducted in 1974. The order for some of the Foregings was placed on an indigenous vendor (after due assessment of his capability); however, the forgings could not meet the rigid specifications and, therefore, the nuclear components had to be imported subsequently. Similarly, Electron Beam Welding Machine had to be imported ultimately, as the machine developed indigenously could not achieve the penetration depth for welding as required. The time schedule for the activitities had been drawn after proper assessment of the existing technological competence; as this was the first time that the work was being done in the sophisticated field, a certain element of risk was unavoidable and the expectations were not met in all cases.

The observations of the Committee are noted and will be kept in view.

[Department of Atomic Energy D.O. No. PrAO/Control/2/1(23)/PAC/89/Dhruva/146 dated 25 July, 1990]

Remarks of Audit

Has the cost Adjustment of the electronic beam welding machine developed indigenously, which could not achieve the penetration depth for welding been done after it was transferred to other division?

Further Comments of Department

Yes, It has been done.

[Department of Atomic Energy D.O. No. PrAO/Control/2/1(23)/PAC/89/Dhruva/146 dated 25 July, 1990]

Recommendation

The Committee also note that the research reactor Dhruva which was commissioned in August 1985, had to be shut down in February 1986 on account of vibrational problems. Although the reactor is stated to be working at the rated power level of 100 MW from January 1988, the Committee regret that it took the Department two years to remove the defects and achieve the desired power level with the result that the facility could not be utilised for about two years. The Committee trust that concerted efforts would be made to keep the closure of the reactor to the barest minimum and full advantage is taken of the reactor.

[S.N. 13 (Para 1.68) of Appendix II to 163rd Report of PAC (8th Lok Sabha)].

Action Taken

The vibrational problems referred to here have already been explained in page 18 of the "Notes on Point raised during proceedings of PAC sitting on 12.1.189". In a high technology area such as nuclear plants there is nothing unusual in encountering such problems; as a matter of interest it may be recalled that during commissioning of the adjacent Cirus Reactor in 1960 by the Canadians, technical problems arose which delayed full power operation of the reactor by more than 3 years. The factor, however, remains that these technical problems (including that of Cirus) were successfully solved by Indian Scientists and Engineers and the reactors brought to regular full power operation. However, as has been rightly pointed out by the Committee, concerted efforts would be made and are being made on a continuing basis to keep the shut-down time of the reactor to the barest minimum, there by taking full advantage of the reactor. The Department is happy to say that the reactor has been operating satisfactorily at rated power since January 1988.

[Department of Atomic Energy O.M. No. DAE U.O. No./11/40-A/90-Parl. dated 29 July, 1990]

CHAPTER III

RECOMMENDATIONS AND OBSERVATIONS WHICH THE COMMITTEE DO NOT DESIRE TO PURSUE IN THE LIGHT OF THE REPLIES RECEIVED FROM GOVERNMENT

Recommendation

It is regrettable that the manufacture of heat exchangers for project Dhruva was substantially delayed due to the dislocation of machinery at BHEL—the manufacture and the Department had to pay a compensation of Rs. 14.10 lakhs to the piping contractor for maintaining his work force idle. The Committee are surprised that the Department could not recover this compensation from BHEL since their delay was covered by 'force majeure' clause. The Committee do not find adequate justification in the plea of the Department that the closing of the piping contract before delivery of the heat exchangers would have resulted in greater expenditure and time delay since another contractor had to be employed later to do the erection job. They regret that the Department did not take adequate care to safeguard interests of the Government at the time of entering into contract with the piping contractor.

[S. No. 8 (Para 1.36) of Appendix II to 163rd Report of PAC (8th Lok Sabha)]

Action Taken

The piping contract was for a total sum of Rs. 91.84 lakhs. Time would have been lost if action had been initiated for fixing up the piping contract after the heat exchangers had been delivered by BHEL, there would have been cost escalation also. Hence, it was considered to be in the best interest of the Project not to terminate the piping contract (prematurely). The piping contract was entered into in the year 1978 after following the prescribed procedure. The standard terms and conditions (for safeguarding the interests of the Government) were incorporated in the contract. It could not be foreseen at the time of entering into the contract that the commencement of the work would be delayed because of the delay in the manufacture and delivery of the heat exchangers by BHEL. In the circumstances, the Committee might be inclined to reconsider, and hold that there were no omissions or lapses in exercising adequate care for safeguarding the interest of the Government.

[Department of Atomic Energy D.O. No. PrAO/Control/2/1(23)/PAC/89/Dhruva/146 dated 25 July, 1990]

Recommendation

The Committee note that the cost of the project Dhruva which was estimated as Rs. 49.88 crores in 1974 had to be revised to Rs. 76.30 crores in 1977 and against to Rs. 107.88 crores in May 1988. The Committee are distressed to find that the increase in project cost due to price escalation under the two heads 'Major Works' and 'Machinery & Equipments' alone has accounted for an increase of Rs. 13.84 crores *i.e.* about 23 per cent of the total increase in project cost over that estimated in 1974. Similarly, the cost of heavy water has also gone up from the estimated cost of Rs. 17.00 crores in 1977 to Rs. 44.00 crores in 1984-85 due to price escalations. The Committee cannot but express their unhappiness over the failure of the Department in completing the project Dhruva within the stipulated time frame. Despite the various reasons and explanations offered for the increase in project cost, the Committee consider that much of the escalation was due to project planning being faulty and without perspective.

[S. No. 9 (Para 1.64) of Appendix II to 163rd Report of PAC (8th Lok Sabha)].

Action Taken

The circumstances under which the cost over runs occurred under the various heads including major works and machinery and equipment were explained in detail in the reply to the questionnaire No. 2(iv) forwarded with the Department letter No. PrAO/Control/2/1(23)/PAC-Dhruva/88/600 dated 22.11.88. It has also been explained that the project was the major one (of this type) undertaken by the Department with wholly indigenous efforts, it was a very complicated one, calling for inputs from a large number of specialised fields and disciplines. The Project planning was done by pooling the best resources available with the Department and the progress was also closely monitored. Inspite of all the efforts put in, the time over-runs and cost over-runs became unavoidable because of the various circumstances explained already, and the Committee might be inclined to reconsider their observation that much of the escalation was due to the Project planning being faulty and without perspective.

[Department of Atomic Energy D.O. No. PrAO/Control/2/1(23)/PAC/89/Dhruva/146 dated 25 July, 1990].

Recommendation

The Committee are constrained to observe that an expenditure of Rs. 7.55 crores had to be incurred towards additional new requirements under the heads 'Major Works' and 'Machinery & Equipment'. The Committee

have been informed that the additional new requirements could not be visualised earlier as the detailed design engineering and the construction work for the project were being done in parallel. The Committee feel that the project planning in the case of Dhruva Reactor left much to be desired right from the beginning. It is clear that the additional new requirements reflect nothing but a case of poor planning on the part of the project authorities. In the opinion of the Committee, this resulted in substantial increases in the quantities of work required to be done with consequent increases in cost and delay in execution of the project.

[S.No. 10 (Para 1.65) of Appendix II to 163rd Report of PAC (8th Lok Sabha)]

Action Taken

The expenditure of Rs. 7.55 crores on additional requirements comprises Rs. 4.65 crores on major works and Rs. 2.90 crores on machinery and equipment, and comes to about 7 ½% of the final sanctioned cost of the Project. Of the amount of Rs. 2.90 crores in respect of machinery and equipment, an amount of Rs. 1.90 crores was for meeting the nuclear safety standards in accordance with the evolving International Atomic Energy Agency (IAEA) Nuclear Safety Standard Programmes, Rs. 0.52 crores was for the Electron Beam Welding Machine (as the indigenous equipment did not meet the specifications) and Rs. 0.22 crores was for commissioning equipment, in lieu of the BARC equipment which could not be utilised as had been envisaged earlier.

Of the additional requirement of Rs. 4.65 crores on major works, about Rs. 2.83 crores was necessitated by the nuclear safety standards.

It may thus be seen that the additional/new requirements are not indicative of poor planning on the part of the Project authorities. Inspite of all the care taken at the Project planning and design stage, certain changes in design, and certain additional requirements, became unavoidable in a Project of this nature, which was on the very frontiers of technology, as already explained in the replies to the questionnaire. The Project planning was done and the cost estimates and other inputs were prepared by specialised divisions such as the reactor Engineering Division, Reactor Operations Division, Technical Services Division, Civil Engineering Divisions etc., of BARC all of which consisted of experienced engineers and scientists who had worked on reactors such as Cirus, Tarapur Atomic Power Station and Rajasthan Atomic Power Station which were under construction. The Project design, estimate and planning were all supervised/guided by Project Design and Review Committee, Project Implementation Committee, Directors of Groups and other senior scientists/ engineers of BARC. Many of the technical problems which arose in the course of execution of the project as well as indigenisation, were

successfully solved because of the professional experience brought to bear on them.

[Department of Atomic Energy D.O.No. PrAO/Control/2/1(23)/PAC/89/Dhruva/146 dated 25 July, 1990]

Recommendation

The Committee are surprised to find that the project estimates for 1974 under the head 'Office Expenses' had to be substantially increased in 1977 because the expenses such as telephone, stationery etc., were not provided for in the initial stages as the Department had envisaged that the existing facilities available within BARC could be utilised for the project Dhruva. The Committee consider that the present case is indicative of the casual approach displayed by the Department in preparing the project estimates since utilisation of the facilities at the cost of other Divisions of BARC would not have reflected the true cost of project Dhruva. The Committee expect the Department to be more cautious in preparing and processing the project estimates.

[S.No. 11 (Para 1.66) of Appendix II to 163rd Report of PAC (8th Lok Sabha)]

Action Taken

It was originally envisaged that the existing facilities such as telephone, telex etc., in BARC could be used for the Project also. However, when these were not found to be adequate and the facilities had to be augmented for meeting the requirements of the Project, a provision for these items was included in the estimate prepared in 1977, for reflecting the cost of the Project as correctly as possible, even though the provision (Rs. 0.30 crores) formed only a very small portion of the total cost of the Project. In these circumstances, the non-inclusion of a provision for these items in the original estimate prepared in 1974, may not be taken as any indication of a casual approach in the preparation of the project estimates; the methodology adopted for preparing the project estimates has been explained in the reply to para 1.65 *ante*.

[Department of Atomic Energy D.O. No. PrAO/Control/2/1(23)/PAC/89/Dhruva/146 dated 25 July, 1990]

Recommendation

The Committee observe that as against the sanctioned project cost of Rs. 76.30 crores, the expenditure incurred on the project upto the end of 1983-84 was only Rs. 56.85 crores. The Committee, however, find that the expenditure registered a sudden rise in 1984-85 when it touched the figure of Rs. 104.19 crores *i.e.* Rs. 27.89 crores over and above the sanctioned cost. The rise in expenditure during 1984-85 has been stated to be due to debit for heavy water raised against the project. It has also been stated that the excess expenditure was incurred because of the on-going nature of the project nearing completion. But the fact remains that the Department

had continued to incur expenditure which was not covered by sanction for several years. Since the Department themselves were the suppliers of heavy water, they should have anticipated the expenditure and provided for the same at the appropriate time. Clearly, there was lack of financial discipline and vigilance on the part of the Department. Although the Department is stated to have initiated proposal for revision in the sanctioned cost of the project in 1985, the revised sanction for Rs. 107.88 crores was accorded only in May 1988 *i.e.* after three years of the incurring of excess expenditure, obviously when the audit observations were made known to the Department. The Committee take a serious view of this matter and they desire that responsibilities be fixed for budgetary irregularities committed in this regard.

[S.No. 12 (Para 1.67) of Appendix II to 163rd Report of PAC (8th Lok Sabha)]

Action Taken

The total expenditure on the Project upto the end of 1983-84 was Rs. 56.85 crores, which was within the sanctioned cost of Rs. 76.30 crores. The proposals for revision of the sanctioned costs were made in April 1985, when the debit on account of the heavy water supplied to the Reactor was raised during 1984-85, because of which the total expenditure exceeded the sanctioned cost of Rs. 76.30 crores. The proposals for revision of the sanctioned cost were under scrutiny at various stages, prior to their finalisation, for obtaining the revised financial sanction for the Project, which was issued in the month of June 1988. However, the total expenditure on the Project from year to year had been shown in the Budget proposals as well as in the Performance Budgets of the Department for the years 1984-85, 1985-86 and 1986-87 *vide* Para 1.1.1 of Chapter V of the Performance Budget for the year 1984-85; Para 1.1.1 of Chapter V of the Performance Budget for the year 1985-86; and Para 1.1.1 of Chapter V of the Performance Budget for the year 1986-87.

The Project had almost been completed by 1984-85 (the reactor attained criticality in August 1985). The Budget provision in those years (1984-85 onwards) was for procurement of heavy water for the first charge to the reactor, and for procurement of the balance equipment for the Project and for spill over commitments. The expenditure was incurred on these items after necessary Budget provision had been made for the same (in the respective years).

It may be mentioned once again that the 100 MWe Research Reactor was being designed and built by the Indian scientists and engineers for the first time in India; as such; every item of expenditure could not be anticipated and provided for in the estimates for the Project, as changes in design specifications (based on safety and other technological

developments) had to be incorporated. Considering that the Project as a whole was a venture into an unknown area on the very frontiers of technology, it is submitted that there were no Budgetary irregularities.

[Department of Atomic Energy D.O. No. PrAO/Control/2/1(23)/PAC/89/Dhruva/146 dated 25 July, 1990]

Remarks of Audit

How could a budget provision be made for a project for which there was no revised sanction?

Further Comments of Department

This project of national importance has been expected to contribute enormously to indigenous capabilities. It was therefore, necessary to continue to incur expenditure on essential items since any stoppage at that stage would have further delayed the project and resulted in additional escalation in the project cost. Besides, the need for augmenting our capabilities with respect to production of radioisotopes and special nuclear materials was an important factor. At the same time, the existing CIRUS research reactor was also getting old (commissioned in 1960). Under these circumstances, it was considered prudent to go ahead with the expenditure booking by making adequate budget provision.

[Department of Atomic Energy D.O. No. PrAO/Control/2/1(23)/PAC/89/Dhruva/146 dated 25 July, 1990]

CHAPTER IV

RECOMMENDATIONS AND OBSERVATIONS REPLIES TO WHICH HAVE NOT BEEN ACCEPTED BY THE COMMITTEE AND WHICH REQUIRE REITERATION

Recommendation

The committee note that the Department of Atomic Energy in their note submitted to the Cabinet in 1972 for seeking approval for setting up of a 100 MW Thermal Research Reactor at Trombay, had expected the proposed reactor to be commissioned by the end of 1976 on the premise that the project report would be ready by early 1973. The Committee, however, find that the project report could be completed only in May 1974 with changes stated to have been necessitated by refinements, plant lay-out, etc., on the basis of the feed back obtained from the utilisation experience of CIRUS reactor. Considering the fact that the Department had been operating the CIRUS reactor since 1960 and thus had utilisation experience available instantly, the committee feel convinced that the Department did not make serious and time bound efforts from the initial stages itself in meeting the time schedules envisaged in the original note furnished to the Cabinet. The Committee find no justification for this delay of more than a year in preparing the project report.

[S. No. 1 (Para 1.29) of Appendix II to 163rd Report of PAC (8th Lok Sabha)].

Action Taken

The Conceptual Report on the Project was prepared in July 1972. It was envisaged at that time that the Project would be ready by April 1973.

The Centre (BARC) had been operating the Cirus Reactor since 1960 and had acquired experience in that. Dhruva was the first major Project taken up by the Department indigenously. Inputs were required from a large number of specialists with expertise in various fields such as materials, engineering, fuelling, physics, chemistry, instrumentation, etc. Results of the experience gained with the Cirus experimental facilities had to be pooled for incorporation of the facilities in an improved version, in consultation with the various officers in the field. Because of all these factors the Project Report could not be got ready by April 1973, as had been envisaged. It was completed in May 1974 after incorporation of the changes necessitated in Design, Plant Layout etc.; among these changes, the most important one was the change in the Reactor Building—from the cylindrical structure to the rectangular one (based on the feed back from the Cirus Research Reactor experimental facilities). In view of these

circumstances, the Committee may be inclined to agree that the additional time taken for the preparation of the Project Report was not due to want of serious and time bound efforts in the Department.

[Department of Atomic Energy D.O. No. PrAO/Control/2/1(23)/PAC/89/Dhruva/146 dated 25 July, 1990]

Remarks of Audit

It has been stated that because of various factors mentioned in the "Acton Taken" Note there was delay in preparation of Project Report.

Where these factors not known while submitting a note to the Cabinet in 1972 for seeking approval for setting up of the Reactor?

Further, the delay is attributed to change in the Reactor Building.

What was the reason for the change and whether it was envisaged that the change could be brought out within the sanctioned cost?

Further Comments of Department

No. The factors that contributed to the delay in the preparation of the report were basic changes in the Reactor Design, provision of additional experimental facilities etc. which evolved as a result of detailed discussions with all concerned to freeze various parameters. Besides the preliminary conceptual design report prepared in 1972 was based on an existing design of a Canadian Research Reactor. The design of our reactor got modified when progressive discussions justified incorporating changes to suit our requirements.

Some of these changes were based on researcher's additional requirements which were suggested by them on the basis of advanced features noticed in other high-flux research reactors in the world.

Rectangular design of the reactor building was selected for the following reasons:

(1) Ease of equipment and piping layout.

(2) Need for extra space for incorporating additional experimental facilities.

(3) Ease of installing mechanical handling facilities.

It was not envisaged that this change could be contained within the overall sanctioned cost. In addition certain major changes were necessitated in the design of the reactor which could only be frozen progressively. The cost implications became known only thereafter.

Remarks of Audit

Why was the major change in design which would result in escalation of the cost of Project not brought to notice of Cabinet?

Further Comments of Department

At the time when the Cabinet was approached in September 1972, it was mentioned in the note that "the estimates are based on preliminary design concepts and cost data available from the project presently being built by DAE and may need to be revised when the design parameters are frozen and detailed design work is taken up".

Subsequently, in the note to DAE on 20.3.74 seeking additional expenditure sanction for excavation, it was clearly mentioned that the design of the proposed reactor building had undergone changes and that it had been decided to go in for rectangular building. The second revision in the cost of the project was proposed in April 1975 when the AEC was approached with the proposal increasing the project cost to Rs. 49.87 crores. However, the Cabinet was not approached then as still some parameters required firming up. It was ultimately in August 1977 that AEC was approached again for a revision in the cost to Rs. 76.29 crores and the reasons suggested for increase in the cost were slippage in the project schedule, modification in the design of the reactor building, late receipt of important raw materials and general cost escalations. Cabinet's approval was obtained on 3.4.1978 and the sanction was issued on 10.4.1978.

[Department of Atomic Energy D.O No. PrAO/Control/2/1(23)/PAC/89/Dhruva/146 dated 25 July, 1990]

Recommendation

The Committee further note that while the conceptual design for the new reactor was finalised in 1974, the detailed design parameters were completed only in 1978. The Committee have been informed that the design and development of the sub-systems for the reactor took a longer time as several changes were made in order to provide for facilities under the changed nuclear situation after Pokhran explosion in 1974 when it was realised that the Department would not be able to buy sub-systems and equipments from many of the developed countries. It has also been stated that the Department had a limited scope for an NRU type of reactor when the proposal was submitted to the Cabinet in 1972 but the Department, under the changed nuclear situation, decided to go on their own for builiding a facility incorporating latest research capabilities. The Committee, however, feel that the Department did not bestow proper care and attention on planning the project even in 1977 when the dates of completion of various activities for commissioning the reactor by December 1981 were revised. It is obvious that the Department did not properly analyse the progress of work at the time of revising the date of

commissioning of the reactor in 1977 as is borne out by the fact that there were substantial delays even against the revised target dates in completion of both the civil works and the manufacture of nuclear equipments for the project.

[S.No. 2 (Para 1.30) of Appendix II to 163rd Report of PAC 28th Lok Sabha)]

Action Taken

All the relevant factors had been carefully considered at the time of proposing the revision of the date of commissioning of the Reactor from 1977 to 1981. This covered inter-alia the progress made in the works in major areas, for which Bar Charts were also prepared. These included the progress made in regard to the Reactor Building, Service Building, Calandria, End Shields, Electrical Power Supply, Fuelling Machines, etc. Bar Charts, were revised in respect of 24 items in 1977. However, the revised date of December 1981 could not be adhered to, not due to lack of proper care and attention on planning the Project, but it was due to various factors which could not be visualised or foreseen (in 1977), as indicated below briefly:

(i) Longer time taken (about 12 months) for the finalisation of tender specifications, preparation of tender documents etc. (by Consultants), for the issue of the tender notices and placement of Work Orders.

(ii) The Time lost by the contractor (about 8 months) for starting the work, after mobilising the labour force and putting up the labour camp within the Security Zone, and due to the onset of monsoon.

(iii) Longer time taken for completion of the Service Building (about 12 months) because of the high level of precision involved in the construction and the proximity of the Building to the existing Cirus Reactor.

(iv) Longer time (about 12 months) taken in the fabrication work because of the intricacy of the work and the stringent requirements of quality control and testing, which included 100% radiography testing of all welding jobs, and also partly because of the prolonged labour strike in the Works of the fabricators.

(v) Longer time (of about 20 months) taken for the completion of the Service Building due to the presence of hard rock in the northern section as well as due to the complicated nature of the work involved.

(vi) Longer time (of about 49 months) taken for the Fabrication of Calandria due to:—

(a) Delay in the supply of Stainless Steel Plates by the foreign manufactures.

(b) Longer time taken for the manufacture of the large diameter zircaloy re-entrant cans, which needed extensive R&D efforts.

(c) Slippage in the delivery of various equipments by the vendors.

(d) Longer time taken on the commissioning activities as certain deficiencies were observed (during precommissioning checks), which needed correction.

(e) Prolonged flushing operations for the moderator and the main Coolant System became necessary for removing the large volume of the debris from the fabrication operations.

(f) There was interruption in the light water commissioning checks, due to unforeseen repairs which had to be carried out for the main Coolant Pumps (in consultation with the foreign vendors); some problems were encountered in the light water commissioning tests, which had to be solved, and some of the tests had to be repeated.

Because of the various factors indicated above briefly, the target dates as revised in 1977 could not be kept.

[Department of Atomic Energy D.O. No. PrAO/Control/2/1(23)/PAC/89/Dhruva/146 dated 25 July, 1990]

Remarks of Audit

The Reason for delay such as high level of precision involved in the construction and the proximity of the building to the existing Cirus Reactor are not acceptable as they were known to the Department. It would indicate that the time for completion of work fixed were not realisitic.

Further Comments of Department

In case where consultants, vendors were responsible for delay whether any action was taken against them? If not, what were the reasons for not penalising them?

In Several cases, the delays were due to technical problems encountered during fabrication/erection of equipment. These were primarily due to the entire design being done indigenously as also manufacture of some of the complex components being undertaken for the first time in the country. Though consultants and vendors caused the general delay, it is very difficult to prove beyond all reasonable doubts that the delay was entirely due to them. However, some vendors/contractors were penalised for delays caused by them.

[Department of Atomic Energy D.O. No. PrAO/Control/2/1(23)/PAC/89/Dhruva/146 dated 25 July, 1990]

Recommendations

Among the important reasons which were advanced for the delay in completion of the civil work, are delay in formulation of tender specification and issuing of the same; changes in design and increase in scope of work during construction, inadequate sub-soil investigations and complexity of the nature of the job to be executed. (Para 1.31)

As regards delay in tender formulation etc., the Committee have been informed that the detailed design parameters could not be supplied to the consultants at a time to enable them to formulate tender specification completely as the design parameters had to be finalised by the engineers and scientists of various disciplines and some hold-ups had occured in the course of critical examination of problems which could not be finalised in advance. Yet another reason advanced by the Department for delay on this count is that the tenders were for a large magnitude with many conditions to be stipulated therein and it took time to process the tenders and obtain final approval of the competent authority. The Committee are not convinced by the reasons advanced to explain delay in completing the stage prior to commencing and during execution. On the other hand, the committee feel convinced that the work on this project was undertaken in a casual manner and the project languished for want of coordination among various project authorities involved in its execution. (Para 1.32)

[Sl. Nos. 3 & 4 (Paras 1.31 & 1.32) of Appendix II to 163rd Report of PAC (8th Lok Sabha)]

Action Taken

The work on the Project started soon after the receipt of Government's approval in 1972, and preliminary works such as site preparation, establishment and manning of the Project Office, invitation of tenders for long delivery items etc., were taken up. The excavation for the Reactor Building was commenced in May 1974 (based on an adhoc sanction accorded for the same). Thus, there was no delay between the sanctioning of the Project and the commencement of the construction.

So far as co-ordination among the various Project Authorities involved in the execution of the Project was concerned, the Project was managed by a Project Manager under whom there were various Project Groups responsible for design, construction and commissioning. The project cost estimates and other inputs were prepared by the Civil Engineering Division, Reactor Operations Division, Technical Services Division, etc., of BARC. The Project Manager was guided by a Project Design and Review Committee (later known as Project Implementation Committee), consisting of Directors of Groups and other Officers of BARC. This Committee was responsible for the Project Progress review on a weekly basis and for preparing quarterly physical and financial progress reports. These reports were reviewed by the Department of Atomic Energy as well as the Atomic Energy Commission periodically. It would be relevant to

emphasise in this connection that the Project management was always under the scrutiny of the professionally experienced staff, as a matter of fact, many of the technical problems that were caused by the policy of indigenisation were successfully solved only because of such professional expertise.

These circumstances would show that the work was not undertaken in a casual manner and that the Project did not languish for want of co-ordination among the Project Authorities. The various delays occurred because of the circumstances indicated above. [Para 1.31 & 1.32]

[Department of Atomic Energy D.O. No. Pr. AO/Control/2/1(23)/PAC/89/Dhruva/146 dated 25 July, 1990].

Remarks of Audit

The Reactor is claimed to be indigenous to a large extent.

What was the estimated foreign exchange component for the Dhruva Reactor excluding civil works, heavy water, fuel, envisaged and actual?

Government's approval was given in 1972 but the excavation for reactor building was commenced in May 1974 (delay of about 24 months) were not broad plans of the reactor building ready while obtaining approval for the project?

Why abnormal time was taken for starting of excavation work?

Further Comments of Department

Foreign exchange content excluding civil works, fuel and heavy water.

Anticipated — Rs. 893.74 lakhs
Spent till date (31.3.90) — Rs. 857.46 lakhs

The design indicated in the preliminary conceptual design report submitted in 1972 was totally revised and the finalised design of the Reactor Building became available only in 1974.

In the financial sanction issued in January 1973 for Rs. 86.53 lakhs for undertaking preliminary work urgently, the amount envisaged for excavation was only Rs. 4.00 lakhs. It was in the beginning of 1974 that the new design parameters of the Reactor Building were finalised. Financial sanction was therefore sought for an additional expenditure of Rs. 14.93 lakhs for excavation in March 1974 stating "the quantity of excavation to be done has thus increased mainly because of bigger basement and sub—basement floors and also on account of the basement for a guide tube laboratory building which was not envisaged earlier".

The additional expenditure of Rs. 14.93 lakhs over and above Rs 4.00 lakhs issued in January 1973 was finally sanctioned on April 25, 1974. The excavation work started in May, 1974.

[Department of Atomic Energy D.O. No. PrAO/Control/2/1 (23)/PAC/89/Dhruva/146 dated 25 July, 1990]

CHAPTER V

RECOMMENDATIONS AND OBSERVATIONS IN RESPECT OF WHICH GOVERNMENT HAVE FURNISHED INTERIM REPLIES

NIL

NEW DELHI;
12 February, 1992
23 Magha, 1913 (Saka)

ATAL BIHARI VAJPAYEE
Chairman,
Public Accounts Committee.

APPENDIX I

Observations and Recommendations

Sl. No.	Para No.	Ministry/Deptt. concerned	Observation / Recommendation
1	2	3	4
1	11	Atomic Energy	In the note of the Department of Atomic Energy, submitted to the Cabinet in 1972 seeking approval for setting up of a 100 MW Thermal Research Reactor at Trombay, it was anticipated that the research reactor would be commissioned by December, 1976. In June 1977, the dates of completion of various activities were revised for commissioning the reactor by December, 1981. But the project was eventually commissioned only in August, 1985. In their earlier Report, the Committee had observed that there was avoidable delays in various sectors during execution of the project. The Committee had also expressed the view that the Department did not properly analyse the progress of work at the time of revising the date of commissioning of the Reactor in 1977. From the scrutiny of the action taken notes furnished by the Department of Atomic Energy, the Committee are unable to revise their impressions that the Department did not make serious and time bound efforts from the initial stages itself not only in meeting the time schedules originally envisaged but also those revised in June, 1977. What distresses the Committee more is the fact that the Department did not pay adequate care on planning the project in 1977 when the dates of completion of various activities for commissioning the reactor by December, 1981 were decided. The utter lack of planning is borne out by the fact that there was delay on each and every facet of the project. For instance the project report which was expected to be pre-

1	2	3	4
			pared by early 1973 was completed only in May, 1974. There was a delay of 12 months for the issue of the tender notices and placement of work orders. Longer time of 12 months and 20 months was taken in the fabrication work and completion of the Service Building respectively. Delay of about 49 months had occurred in the fabrication of Calandria. From these delays, the committee gather an irrefutable impression that the design parameters were not adequately taken care of at the pre-construction stage with the result that the project schedule was badly thrown out of gear. Further, the cost of project Dhruva which was estimated at Rs. 49.88 crores in 1974 had to be revised to Rs. 76.30 crores in 1977 and again to Rs. 107.88 crores in May, 1988. Obviously, the long delays in different activities of the project were to a large extent responsible for this huge escalation in costs. The Committee have also no doubt that the subsequent changes in the design as also the increase in scope of work during execution of the project highlight another facet of poor planning on the part of the project authorities. The Committee cannot but express their strong displeasure on the lack of proper care and planning on the part of the concerned authorities in such an important national project. The Committee stress that the Department should take all corrective steps to ensure that the delays/difficulties experienced in this project do not recur in such projects in future. Concrete steps taken in this regard should be intimated to the Committee within six months.

PART II

Minutes of the sitting of PAC held on 24 January, 1992.

The Committee sat from 1030 hrs. to 1230 hrs. on 24 January, 1992.

PRESENT

Shri Nirmal Kanti Chatterjee — *In the Chair*

MEMBERS

2. Shri Girdhari Lal Bhargava
3. Shri Vilas Muttemwar
4. Shrimati Krishna Sahi
5. Shri Pratap Singh
6. Prof. (Dr.) S.P. Yadav
7. Shri R.K. Dhawan
8. Shri Dipen Ghosh
9. Shri Murasoli Maran
10. Shri Vishvjit P. Singh
11. Shri Ish Dutt Yadav

LOK SABHA SECRETARIAT

1. Shri S.C. Gupta —*Joint Secretary*
2. Smt. Ganga Murthy —*Deputy Secretary*
3. Shri K.C. Shekhar —*Under Secretary*

REPRESENTATIVES OF AUDIT

1. Shri N. Sivasubramaniam—ADA (Reports)
2. Shri A.K. Menon —ADA (Army, Navy, Air Force etc.)
3. Shri Dharam Vir —DGA (CR-I)
4. Shri A.K. Banerjee —Pr. DA (Reports Central)
5. Shri Dhivendra Swarup —Pr. DACR (II)
6. Shri T.N. Thakur —Pr. DA Scientific Departments
7. Shri P.K. Lahiri —Pr.. D.A. (Direct Taxes)
8. Shri K. Krishnan —Director (DT)-I
9. Shri Kulvinder Singh —Director (DT)-II

2. In the absence of Chairman, the Committee chose Shri Nirmal Kanti Chatterjee, to act as Chairman for the sitting of the Committee in terms of rule 259(3) of the Rules of Procedure and Conduct of Business of Lok Sabha.

3. The Committee considered and adopted the following Draft Action Taken Reports subject to modifications shown in the Annexure.

(i) ** ** ** **

(ii) On the recommendations contained in 163rd Report of PAC (8th Lok Sabha) relating to Research Reactor Dhruva

(iii) ** ** ** **

4. ** ** ** ** **

5. ** ** ** ** **

6. The Committee authorised the Chairman to present the Reports to the House after incorporating therein modifications/amendments arising out of factual verification by Audit.

7. ** ** ** ** **

The Committee then adjourned.

ANNEXURE

Modifications/Amendments made by the Public Accounts Committee at their sitting held on 24th January, 1992 in the Draft Report on Action Taken on 163rd Report of the Public Accounts Committee (8th LS) relating to research reactor Dhruva.

Page	Para	Line	Modification / Amendments
9	11	6	*Insert* 'were revised' *after* the word 'activities'
-do-	-do-	7	*Delete* the words 'were revised'
-do-	-do-	23	*Delete* the words 'and attention'
-do-	-do-	3 from bottom	*For* 'revised' *substitute* 'decided'